TAG XVIII
New Orleans
1996

Construction & Application of the MACD Indicator

In this workshop, the man who developed the Moving Average Convergence-Divergence (MACD) indicator will teach you the intricacies of this popular and effective indicator.

Tim Slater's Note: The MACD was matched in popularity only by the Stochastic in past CompuTrac surveys of active, computerized traders.

Gerald will begin this session with a description of the basic construction of the MACD indicator and the principles that underlie the patterns it describes. He will show you the basic buy and sell signals generated by the MACD, and then build upon those signals to demonstrate how to use longer and shorter term MACD lines to refine buy and sell signals. He will also show you how to adjust MACD signals for market trend. Gerald will also cover stop-loss techniques and the application of cyclical phases. He will show you how to use MACD to determine when very strong market up moves are in progress. Finally, Gerald will describe some of the other, lesser known techniques associated with MACD.

Gerald Appel is the president of Signalert Corporation, an investment advisory firm that manages approximately $280 million in capital. Signalert also publishes the technical newsletter Systems and Forecasts, *highly rated by* The Hubert Financial Digest *and by* Timer Digest *for its performance in market timing.*

Gerald has written twelve books relating to investment strategies including Winning Market Systems, Double Your Money Every Three Years, Stock Market Trading Systems, The Big Move, New Directions in Technical Analysis *(co-author, Dr. Martin E. Zweig), and* Time-Trend III. *In addition, Gerald has had many articles published in such publications as* Money *magazine,* Barron',s *and* Stocks and Commodities *magazine. He has also produced and appeared in a number of videotapes related to technical investment strategies. Gerald has presented at a number of seminars within the United States and abroad. He has appeared on "*Wall Street Week" *with Louis Rukeyser, and is a frequent guest on other television programs on the financial news networks and elsewhere.* ■

A complete catalogue of all TAG XVIII tapes may be ordered from:

telerate Seminars

701 Poydras, Suite 3900 • New Orleans, LA 70139-3901
(800) 535-7990 or (504) 592-4550
FAX (504) 592-4553

Gerald Appel

Signalert

150 Great Neck Rd.
Suite 204
Great Neck, NY 11021
(516) 829-6444
FAX (516) 829-9366

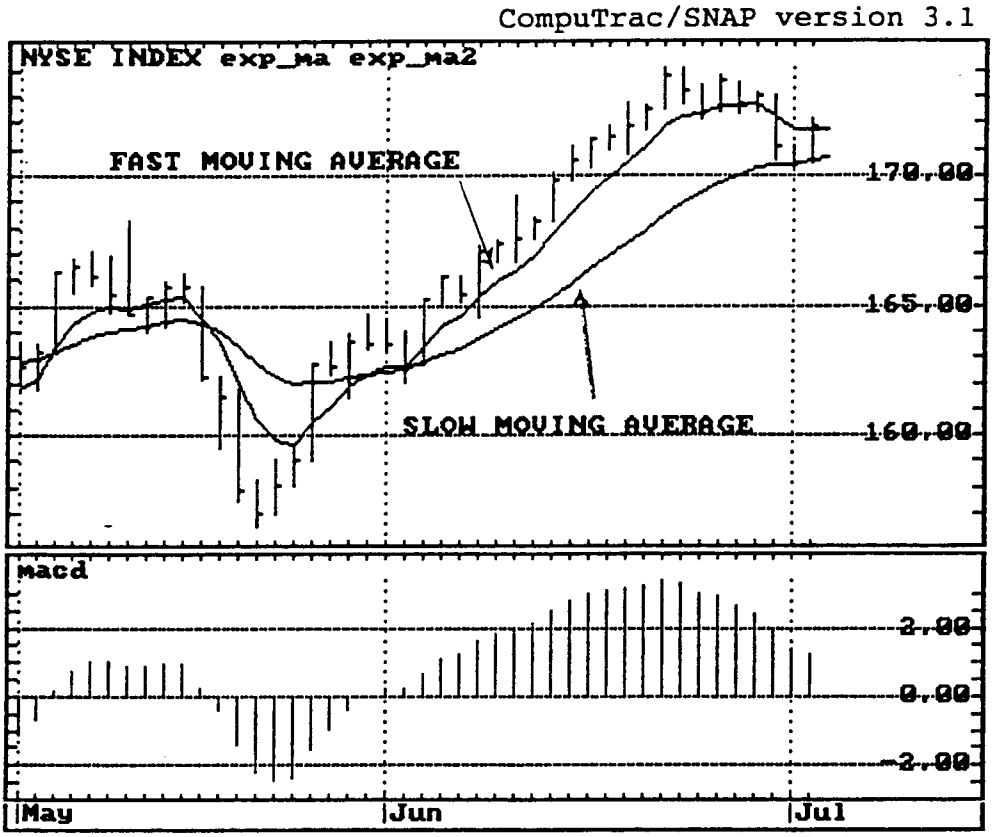


CHART 1
THE BASIC STRUCTURE OF MACD

A shorter term moving average will rise more quickly than a longer term moving average during market uptrends. As the rise comes to an end, the slower moving average will catch up, narrowing the distance between them. This narrowing suggests an end to the advance. The same pattern occurs during market downtrends. The differential between the two moving averages may be plotted as a histogram.

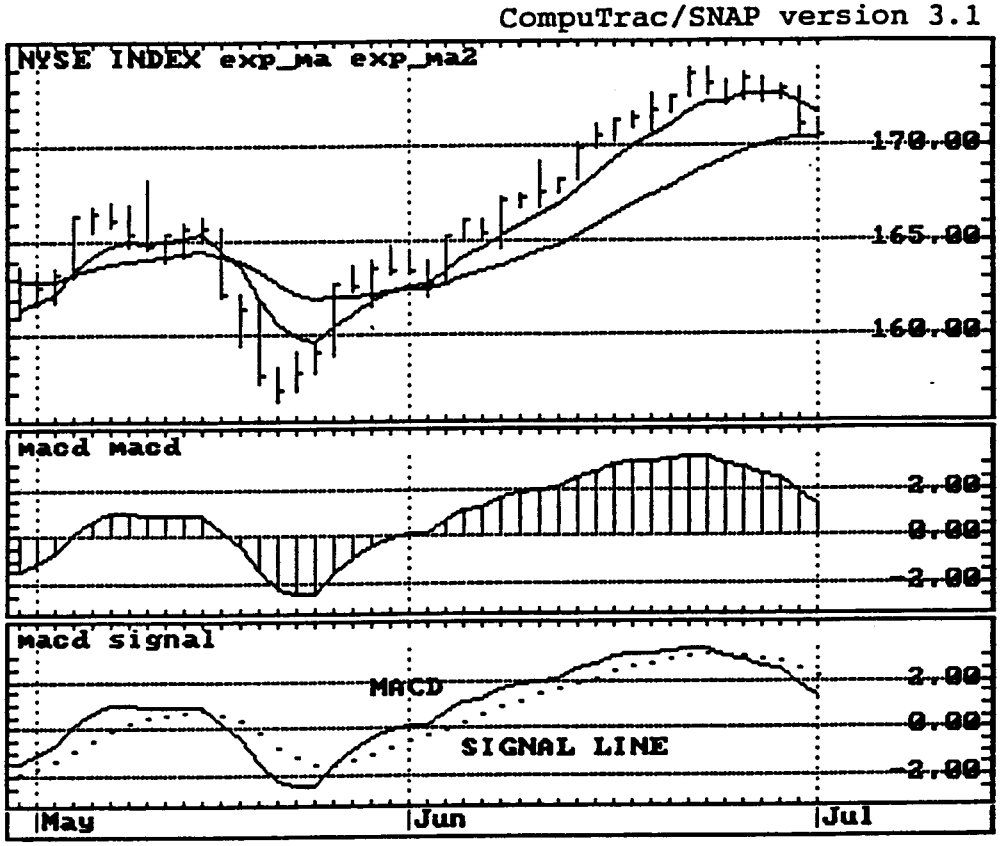


CHART 2
INTRODUCING THE SIGNAL LINE

The differential between the two moving averages may be plotted also as a line, which will correspond to the high and low extremes of the histogram. A moving average is then created of the differential between the two moving averages that comprise MACD. We usually plot this moving average as a dotted line and refer to it as the signal line. The moving average signal line is usually between 5 - 10 days in length and serves to define the trend of of the differential. When the differential lies above its moving average, MACD is in a positive mode. When the differential lies below its moving average, the trend of MACD is considered negative.

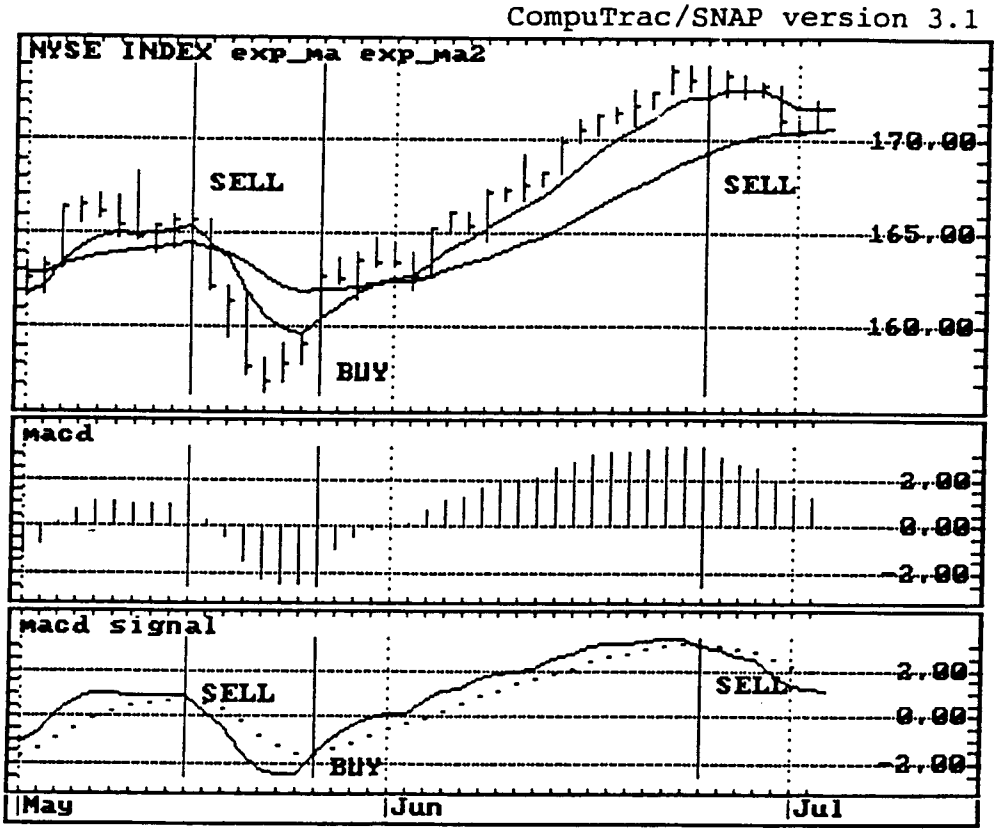


CHART 3
THE BASIC BUY AND SELL SIGNALS

As a basic, buy signals are generated in MACD when the MACD line (the line that measures the differential between two moving averages) crosses from below to above its signal line. Sell signals are generated when the MACD line crosses from above to below its signal line. More advanced buy and sell signals will be illustrated on the following pages.

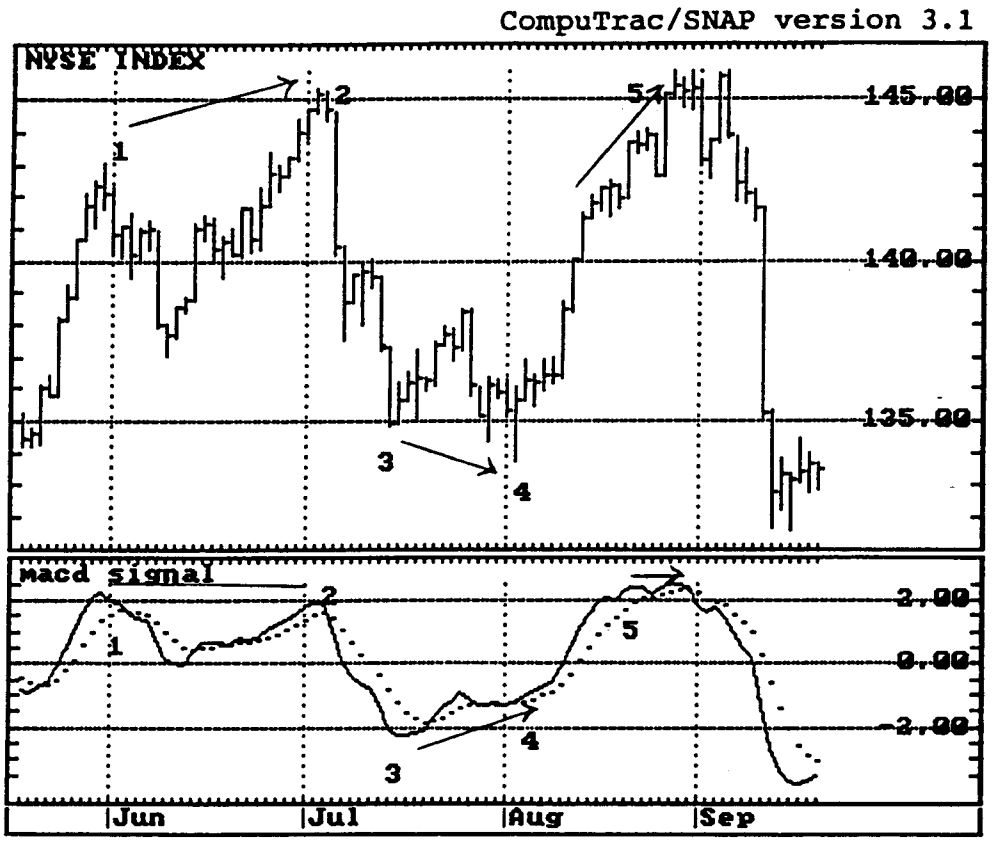


CHART 4
USING DIVERGENCES TO RECOGNIZE THE MOST RELIABLE SIGNALS

Divergences between price patterns and momentum patterns often serve to identify the most profitable buy and sell signals. A positive divergence exists when prices fall to a new low, but MACD fails to make a new low along with declining price movement. This divergence indicates decreasing downside momentum. A fine example is shown on the chart between points 3 - 4. The buy signal that took place at 4 was likely to prove more reliable than the buy at 3 because of the positive divergence that preceded the buy.

Negative divergences exist when prices move to new highs but MACD fails to make a new peak along with price. Such patterns appear on the chart between areas 1 - 2 and at Area 5. The sell signal at Point 2 was more likely to prove significant than the sell at Point 1 because of the negative divergence that preceded the sell in that area.

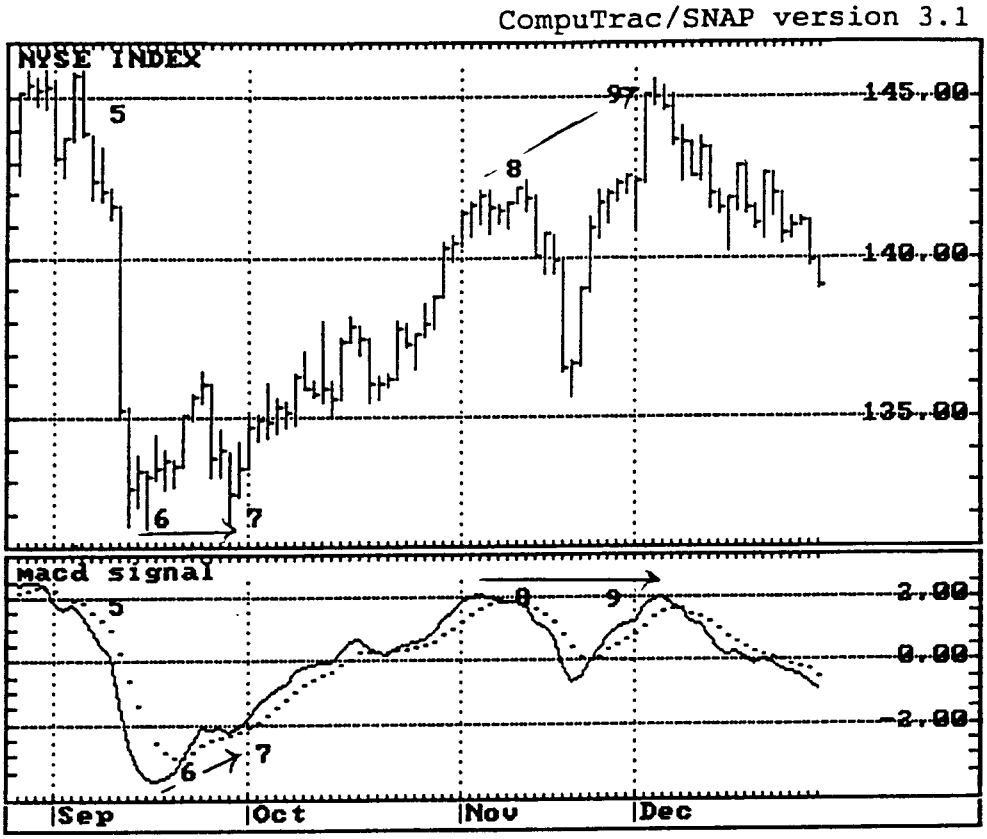


CHART 5
FURTHER EXAMPLES OF DIVERGENCES

A positive divergence developed between Points 6 - 7, price formations showing equal lows while MACD traced out a rising formation. The sell at Point 9 was likely to prove more significant than the sell at Point 8 because of the negative divergence that preceded the sell signal.

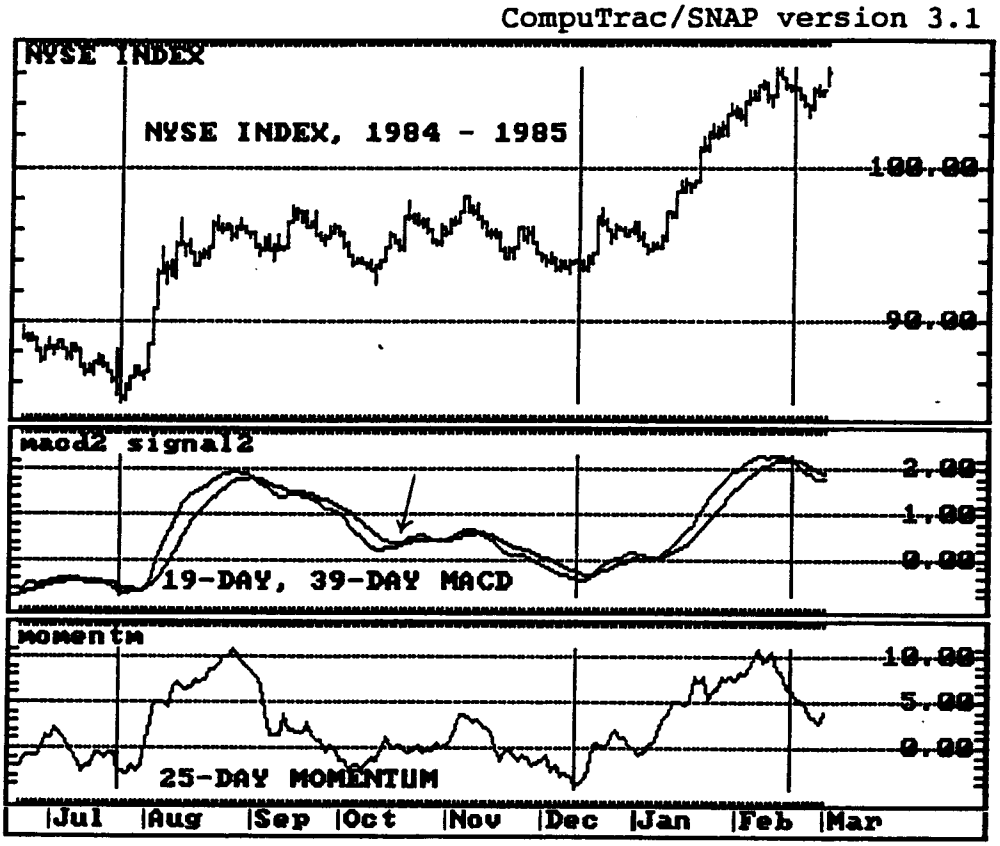


CHART 6
COMPARING MACD TO A PRICE MOMENTUM OSCILLATOR

MACD is a very smooth timing oscillator compared to daily momentum oscillator indicators. Its buy signals (July and December on the chart) are clearer as are its sell signals.

There was, incidentally, no buy signal in October even though MACD crossed from below to above its signal line. As a general rule, MACD must first fall below 0 as a precondition for a buy signal. MACD must rise above 0 once a buy signal is generated before a sell signal can be generated, unless the indicator falls to a new low which then generates a sell below the 0 line.

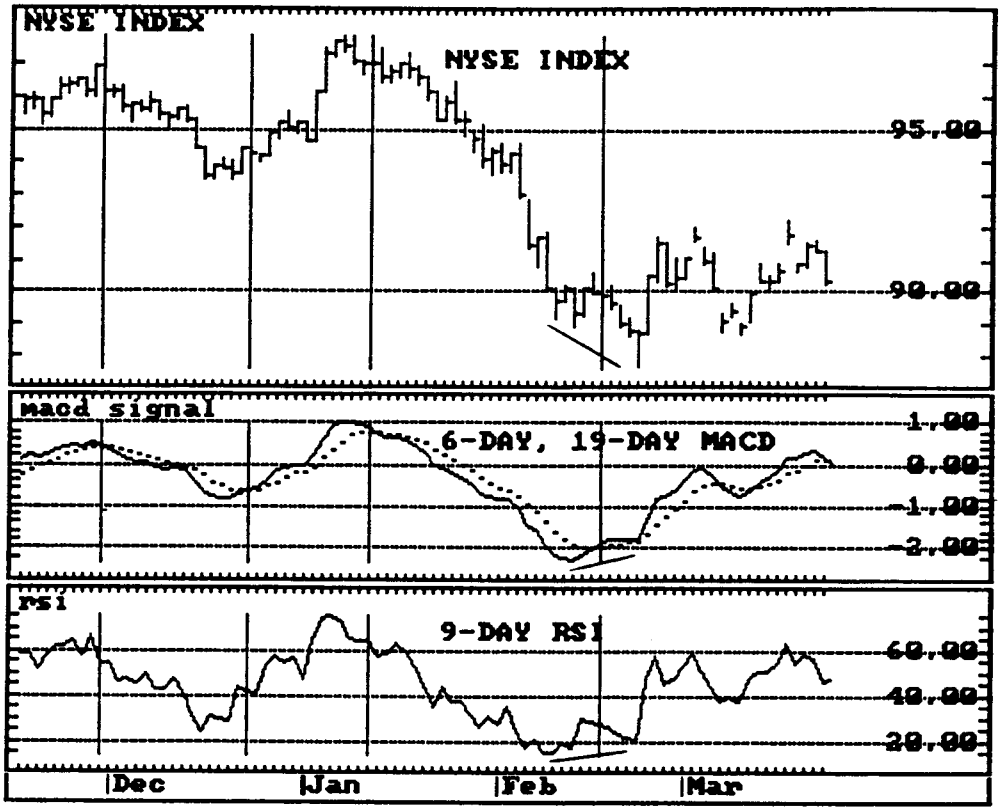


CHART 7
COMPARING MACD TO THE RELATIVE STRENGTH INDEX

RSI is an excellent technical tool with many applications. However, we see on this chart again that MACD provides much smoother lines, leading possibly to easier interpretation.

Both MACD and RSI generated fine positive divergences in February as both tools provided valid buy signals simultaneously.

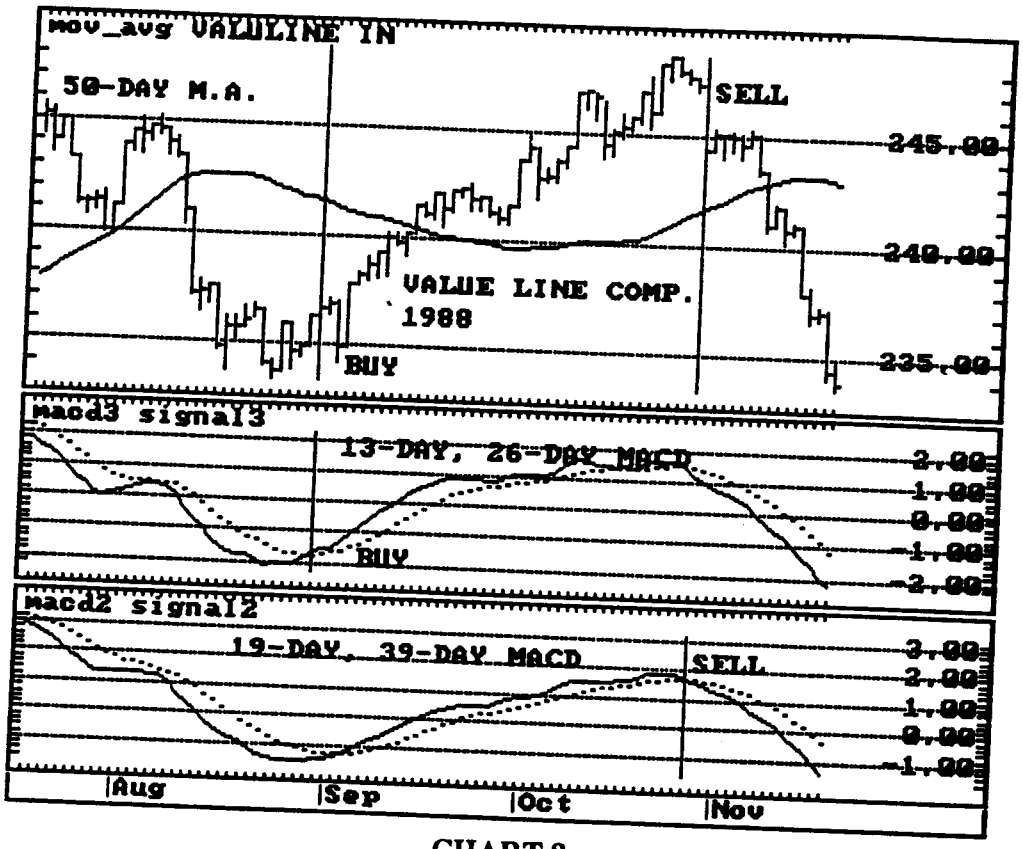


CHART 8
COMBINING TWO MACD COMBINATIONS WITH TREND FOLLOWING TECHNIQUES FOR MORE ACCURATE SIGNALS

Since most markets tend to decline more rapidly than they rise, it is advisable to employ a more rapid MACD combination (shorter term moving average pairings) to track declining markets for buy signals and slower MACD pairings to track rising markets for sell signals. Otherwise, buy signals tend to occur late and sell signals tend to occur prematurely. In the above chart, we employ a 13-day, 26-day exponential average pairing to generate buy signals and a 19-day, 39-day pairing to generate sell signals.

A 50-day moving average is employed to define trend. If the average is rising sharply, indicating a strong uptrend, we would employ an even more rapid MACD pairing (6-day, 19-day) to generate buy signals and we might delay selling until negative divergences appeared, even if the signal line for the sell MACD is violated.

Trends in the above chart are, for the most part, neutral. Therefore, we do not employ a very rapid MACD combination for buying and we sell immediately upon violation of the signal line by the MACD line.

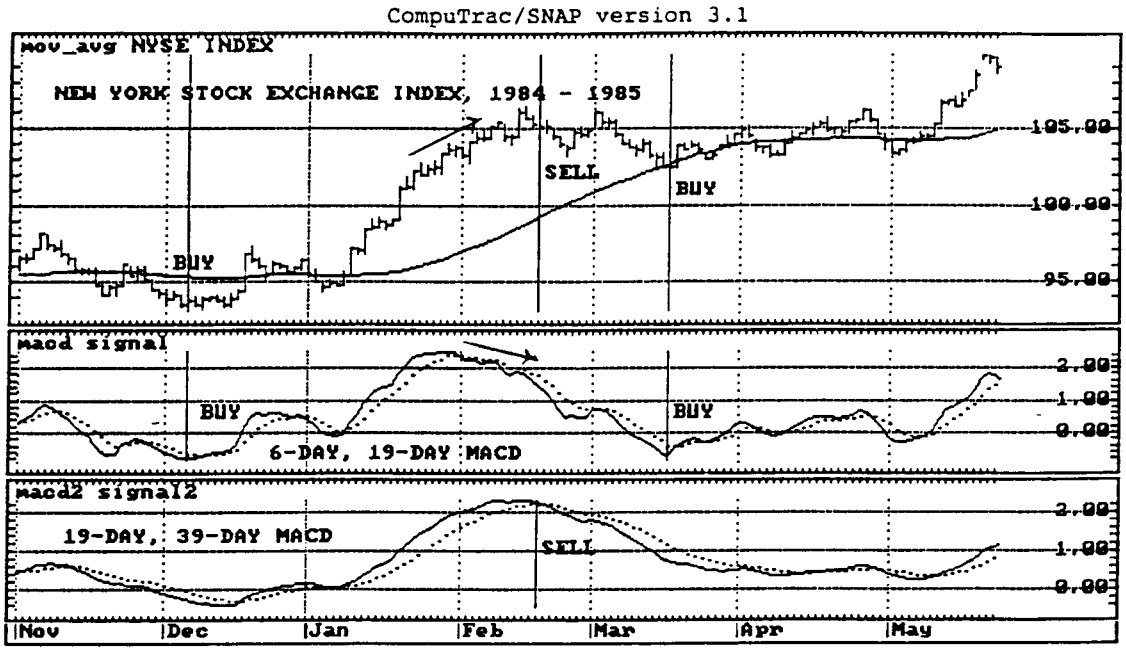


CHART 9
MACD DURING A STRONGLY UPTRENDED MARKET PERIOD

The stock market was in a general uptrend, the 50-day moving average flat to rising for the most part, so we employed a rapid (6-day, 19-day) MACD for buying, keeping the 19-day, 39-day MACD as our sell trigger.

Once you buy on the shorter MACD pairing, you hold until the longer MACD pairing (your sell trigger) rises to above 0, holding until that MACD line falls below its signal line. You are stopped out prior to this only if the short term MACD falls below the lowest level that immediately preceded its buy signal.

Buy conditions on the above chart were met when the 6-day, 19-day MACD line first fell below 0 and then rose through its signal line. Signals took place during December 1984 and March 1985. The sell signal (based upon the 19-day, 39-day MACD lines) in February was well timed.

The moving average was rising sharply at the time of the sell signal. In this case, we might have by-passed the sell if not for the negative divergence traced out by the shorter term MACD during the period preceding the sell.

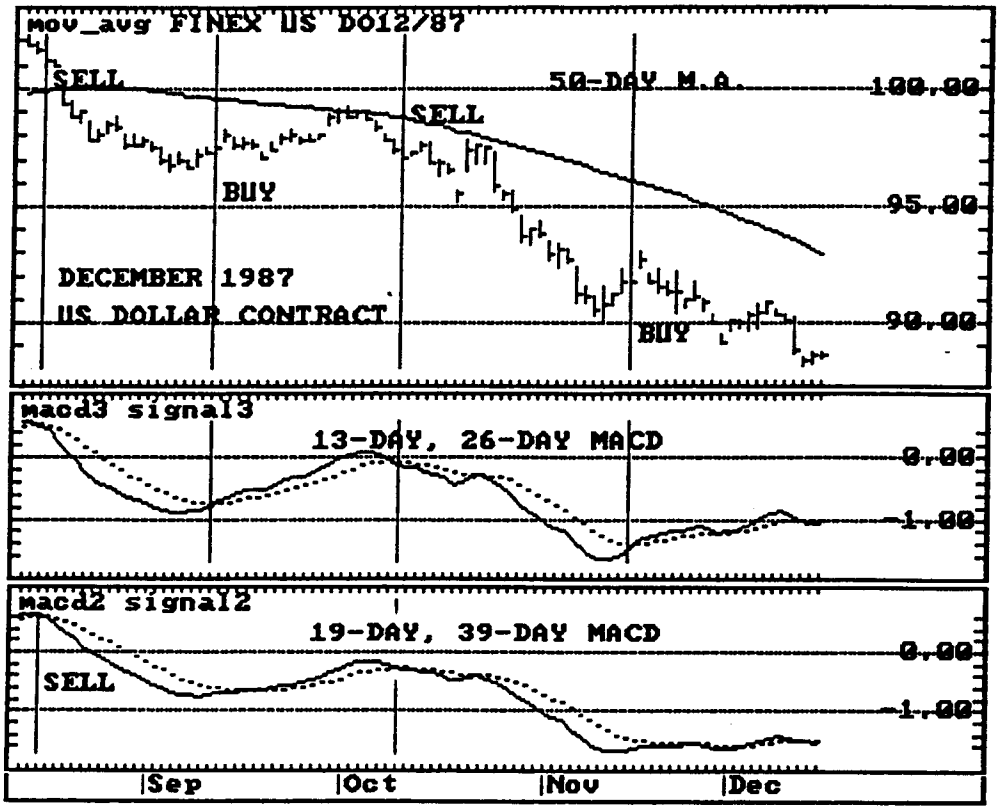


CHART 10
MACD DURING A STRONGLY DOWNTRENDED MARKET PERIOD

The December 1987 US Dollar was in a very strong downtrend during the fourth quarter of 1987. You can see the pattern of lower prices, confirmed by a rapidly declining 50-day moving average.

In this situation, it is advised to sell rapidly when sell signals develop. On the chart above, you may have well taken the sell signal indicated by MACD lines crossing from above to below their signal lines even though the 19-day, 39-day MACD combination did not stand in positive territory, unable to rise above 0 following the buy signal in September.

Long side trades were not particularly profitable during the period shown. Short sales, however, did prove quite profitable because of the market declines that immediately followed sell signals.

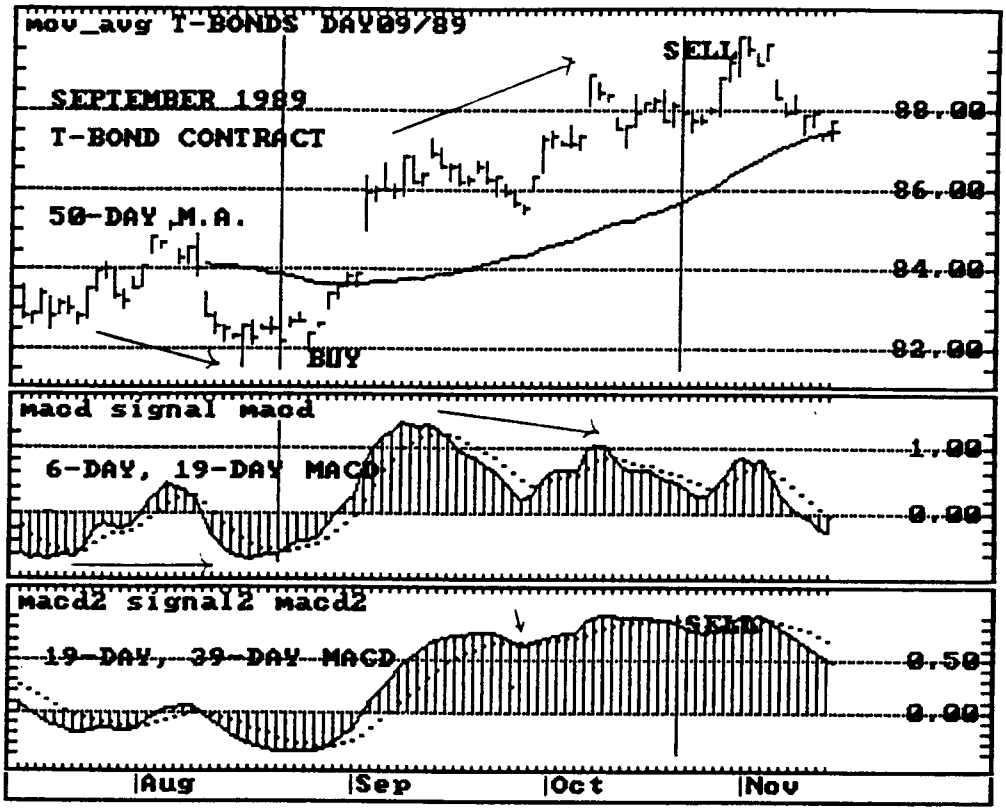


CHART 11
TREASURY BONDS, MACD, AND A STRONG UPTREND

A fine buy signal was generated during August of 1989 by the 6-day, 19-day MACD.

The 19-day, 39-day MACD violated its signal line in September and investors might have taken profits at that time. You would not have sold short, however. The 50-day moving average was rising and even accelerating in its rise. No negative divergences existed.

Given the strength of the advance, intermediate term investors might have given the situation the benefit of the doubt, holding positions until a second sell signal was generated in October. By that time, clear negative divergences were being generated by the 6-day, 19-day MACD. There were, however, no divergences in the 19-day, 39-day MACD and the trend remained strongly up.

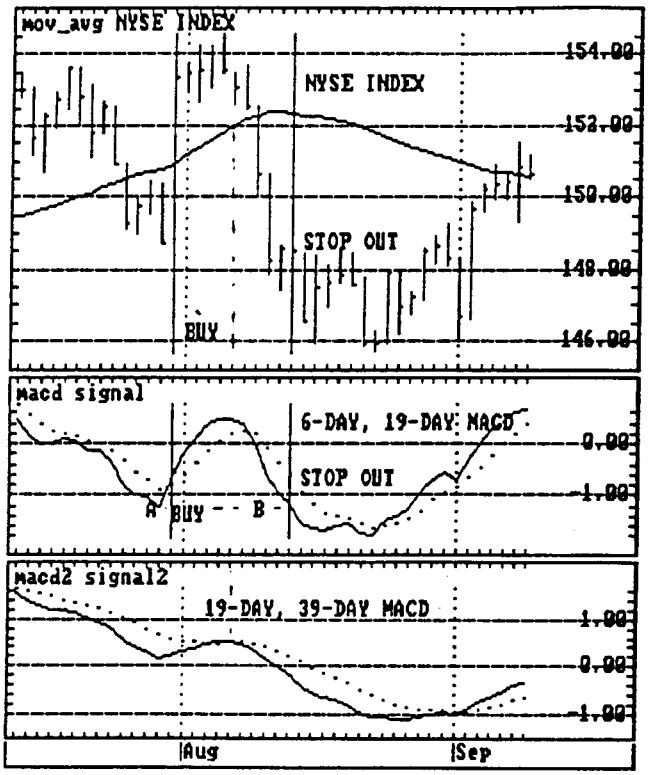


CHART 12
THE STOP LOSS SIGNAL FOR AN UNSUCCESSFUL TRADE

MACD generated a buy signal at A, the 6-day, 19-day MACD crossing its signal line while the 50-day moving average was still rising.

However, the stock market turned down quickly and at Point B, the 6-day, 19-day MACD declined to a low below the low level that preceded the buy signal at A. This generated a stop loss sell signal. A loss on the trade had to be taken.

A new buy signal was generated several days later (not marked on the chart) and that buy signal did turn out to be quite profitable.

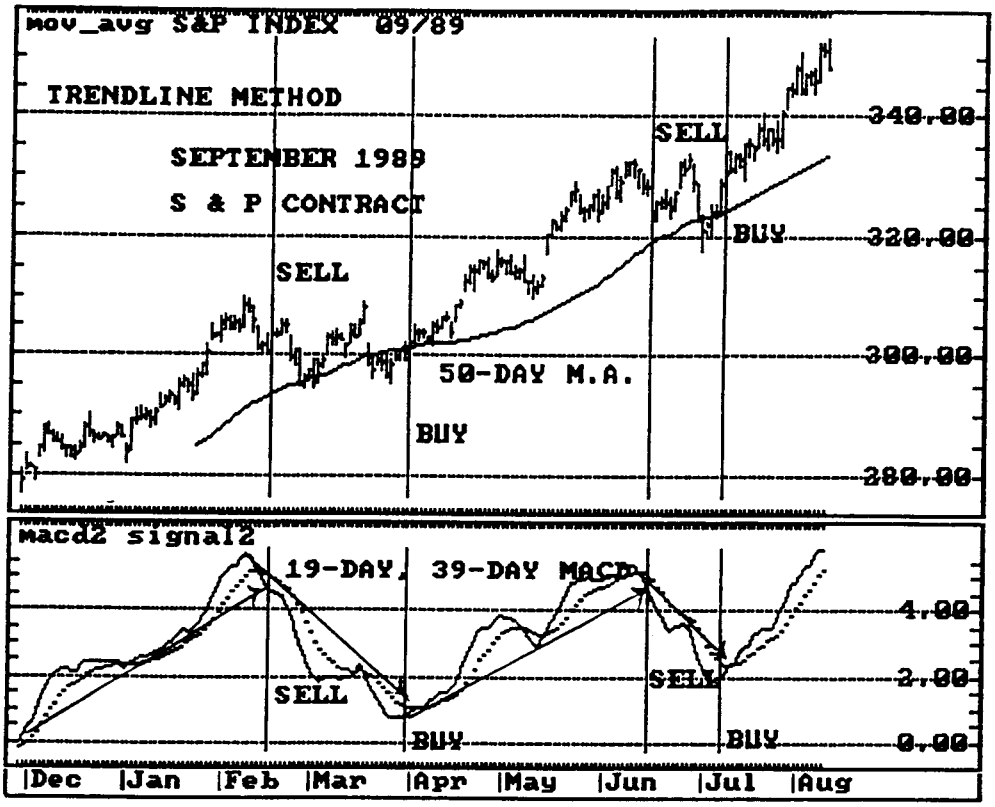


CHART 13
USING TRENDLINES TO CONFIRM BUY AND SELL SIGNALS

The September 1989 Standard & Poor's contract was in a very strong uptrend during the period shown on the chart.

Although we would not normally employ a long term MACD combination (the 19-day, 39-day) as a buying trigger during such a climate, you can see how the use of trendlines provided fine buy-sell confirmations of MACD - signal line crossings during this period.

During strongly uptrended market periods, where no negative divergences exist, you can usually bypass the first sell signals following very successful buy signals. Sometimes, you can even bypass the second sell signal but as a general rule the second of a series of sell signals should be followed.

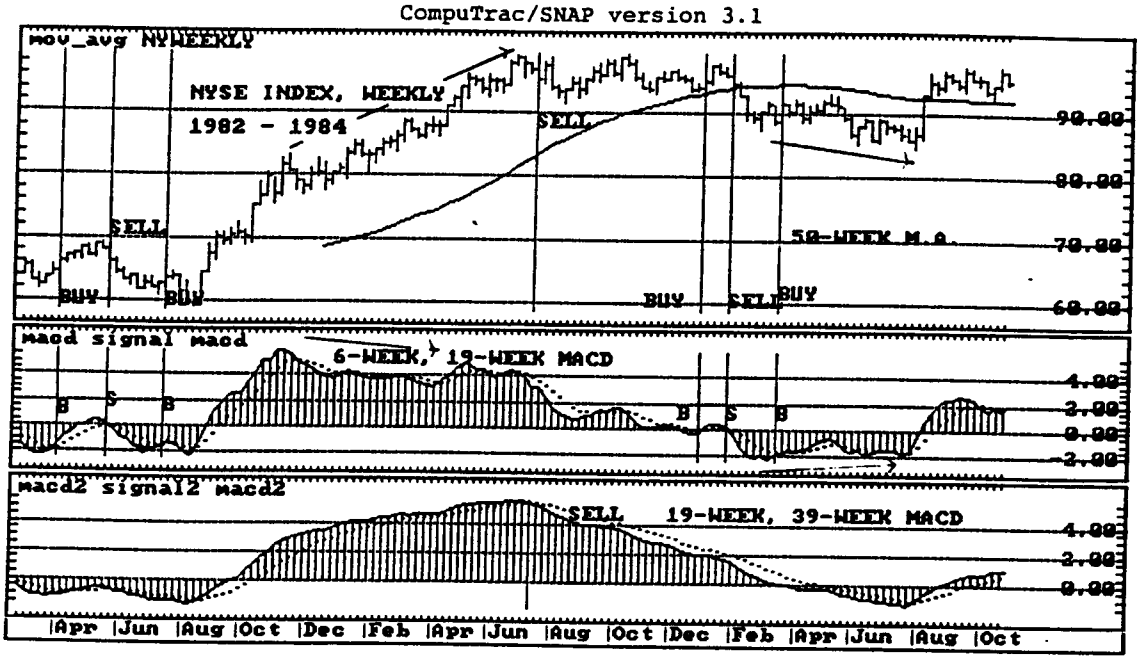


CHART 14
LONG TERM MACD SIGNALS -- THE START OF A BULL MARKET

A major bull market started during the summer of 1982.

Following an aborted buy signal in April, a second buy during June held. The stock market, but not MACD, drifted lower into August, at which time prices started to move rapidly upwards.

With the trend rising -- a 50-week moving average employed to define the weekly trend -- sell signals were delegated to the 19-week, 39-week MACD line which generated a sell signal in June of 1983, fully one year after MACD's most recent buy signal.

It took some time for the buy signal of February 1984 to resolve, but patient holders were ultimately rewarded during August when the stock market finally emerged from its long term base formation.

Notice that we are able to employ the same parameters on a weekly as well as a daily basis. We simply convert daily data to weekly data.

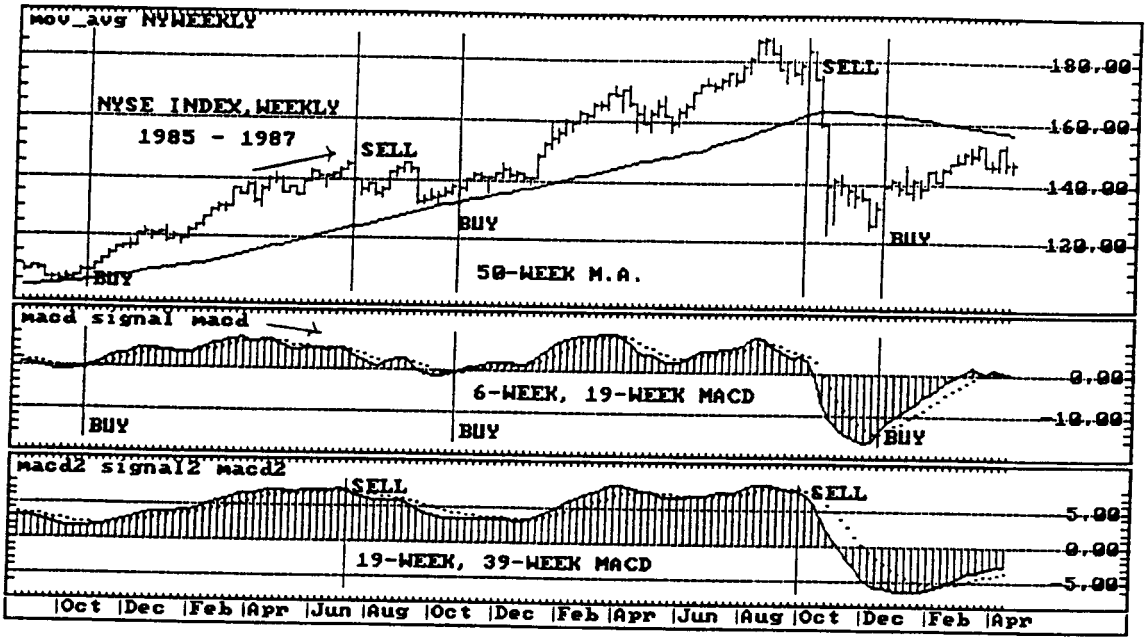


CHART 15
A LONG BULL MARKET -- THEN THE CRASH

With the trend still rising (signified by the rising 50-week moving average), buy signals were taken on the rapid 6-week, 19-week MACD line, sell signals on the slower 19-week, 39-week line.

This combination worked very well between 1985 - 1987, catching all market advances and even producing a timely sell signal just prior to the stock market crash of October 1987.

MACD provided a fine re-entry back into the stock market incidentally, following the crash.

MACD provides very reliable buy signals following severe stock market declines.

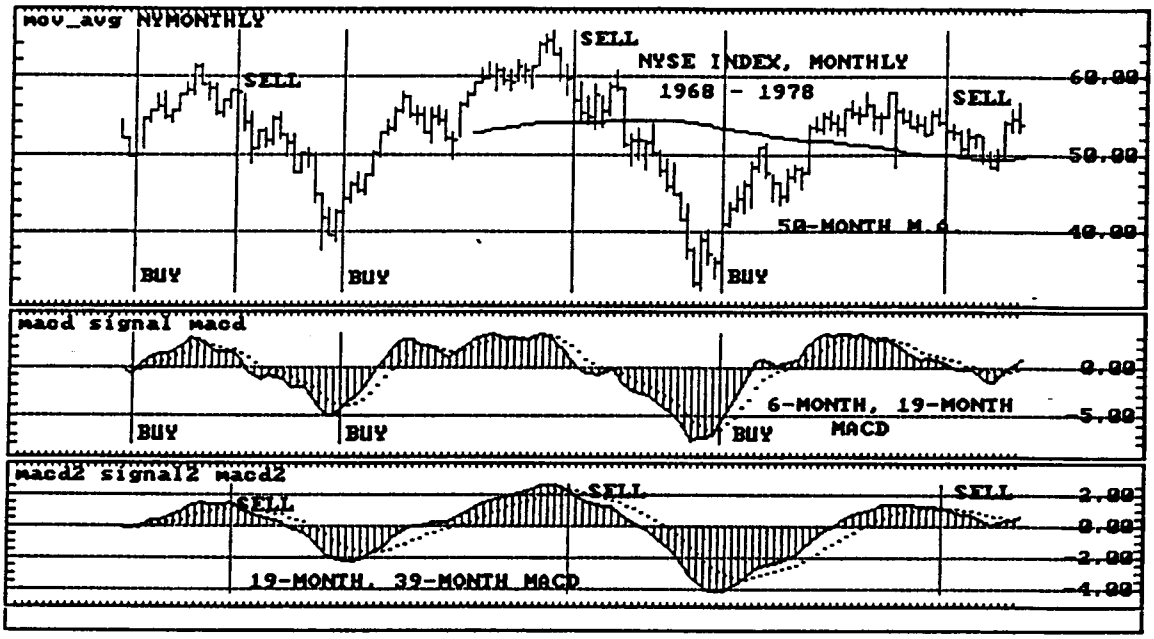


CHART 16
USING MONTHLY MACD TO DEFINE VERY MAJOR TRENDS

MACD may be maintained on a monthly basis to determine the major phases of the stock market cycle.

In the above chart, we employ the 6-month, 19-month combination for buying and the 19-month, 39-month combination for selling. A 50-month moving average defines trend. The period shown spans nearly 10 years, from the autumn of 1968 into the spring of 1978.

The usual rules were employed. Buy on a crossing of the signal line (6-month, 19-month) and sell on a downside crossing of the signal line (19-month, 39-month). Signals were not as precise during the 1978 - 1990 period, but were still pretty much on target.

Again, you should note that we did not have to change our parameters or the rules of MACD, even for this long term chart. The same principles hold for long term trading as for short term trading.

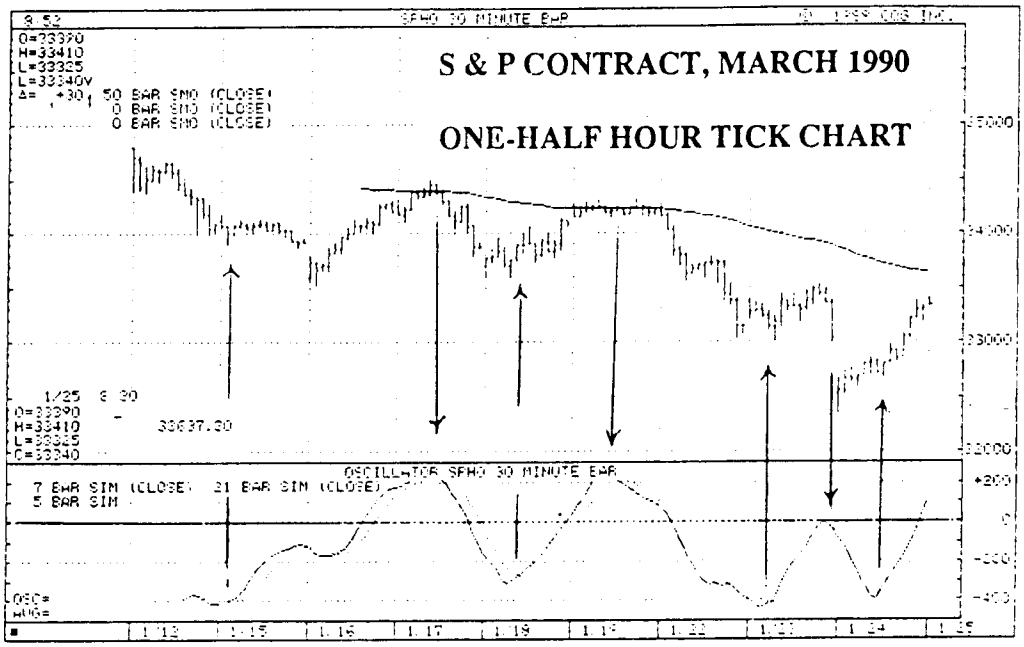


CHART 17
MACD AS A DAY TRADING TOOL

MACD can be a very useful tool for day trading as well as for long term position trading.

The above chart is a 30-minute bar chart of the S & P contract. It employs a 50-unit moving average to define trend. A 7-unit, 21-unit MACD line is employed. Buy and sell signals are shown.

Buy signals were not particularly profitable (nor unprofitable) on balance during this period of declining prices. However, short sales on sell signals during the downtrend would have proven quite profitable.

Daily MACD patterns were clearly on sells during the period of time shown on the chart, January 1990, so intra-day sell signals were confirmed by daily MACD. If possible, you should conduct day trading operations in conformity to daily MACD signals.

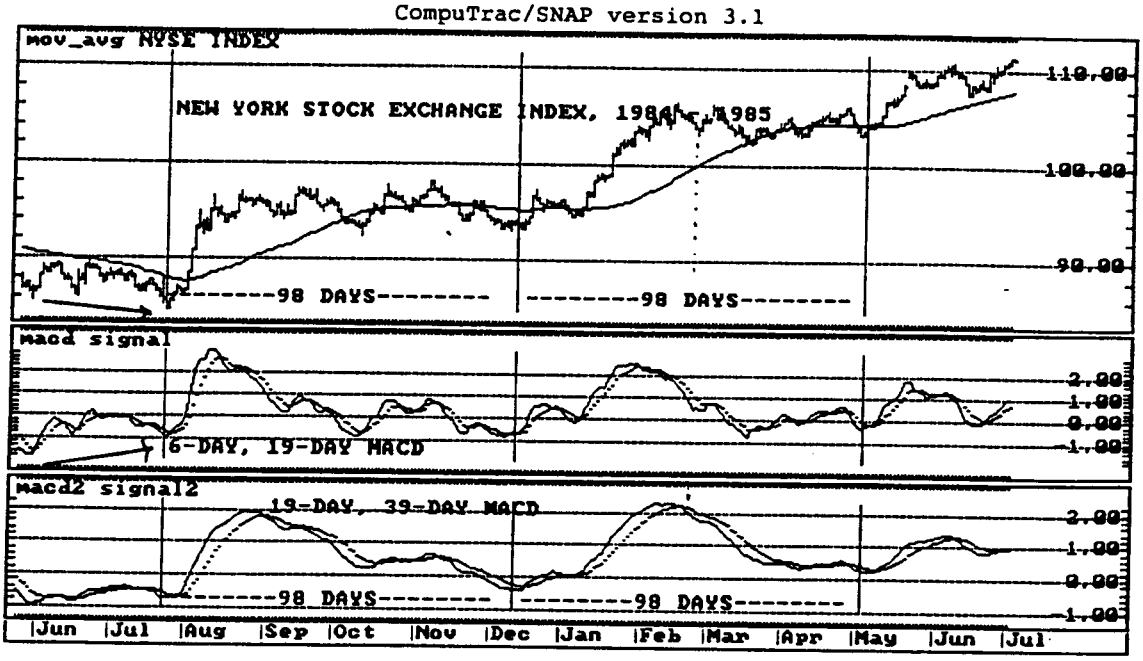


CHART 18
USING TIME CYCLES TO CONFIRM MACD SIGNALS

MACD signals that develop at important scheduled cyclical low points are likely to prove very successful. There was a 98-day period or approximately 20 weeks between the important MACD low in July 1984 and the low in December. We would then pay particular attention to any low and buy signal that developed 98 days from the December low.

Such a low and buy signal did develop in early May, 1985, 98 days from the December bottom. As you can see, a good upmove in the stock market took place right on schedule.

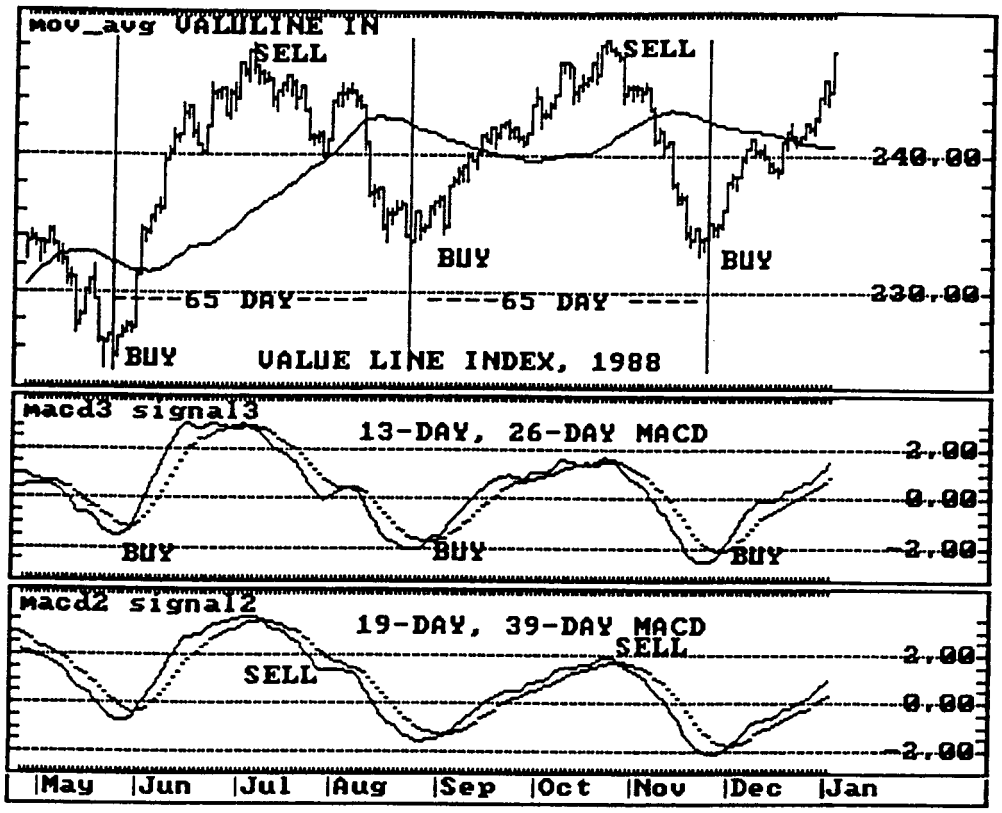


CHART 19
USING TIME CYCLES TO CONFIRM MACD SIGNALS
A SECOND EXAMPLE

The American stock market often rises from low points on a quarterly or 13-week cycle.

The above chart shows this 65-day trading cycle, and MACD buy signals that developed at 65-day intervals during 1988. Notice again -- buy signals are generated by the more rapid MACD combination, sell signals by the slower MACD combination.

We might have also employed a 6-day, 19-day combination for buying but for the most part, trends, as signified by the 50-day moving average, pointed down at the time of buys so we opted to employ the somewhat more stringent 13-day, 26-day combination.

Investors are advised to experiment with different combinations. Markets may not be necessarily similar in the optimum MACD combinations to employ.

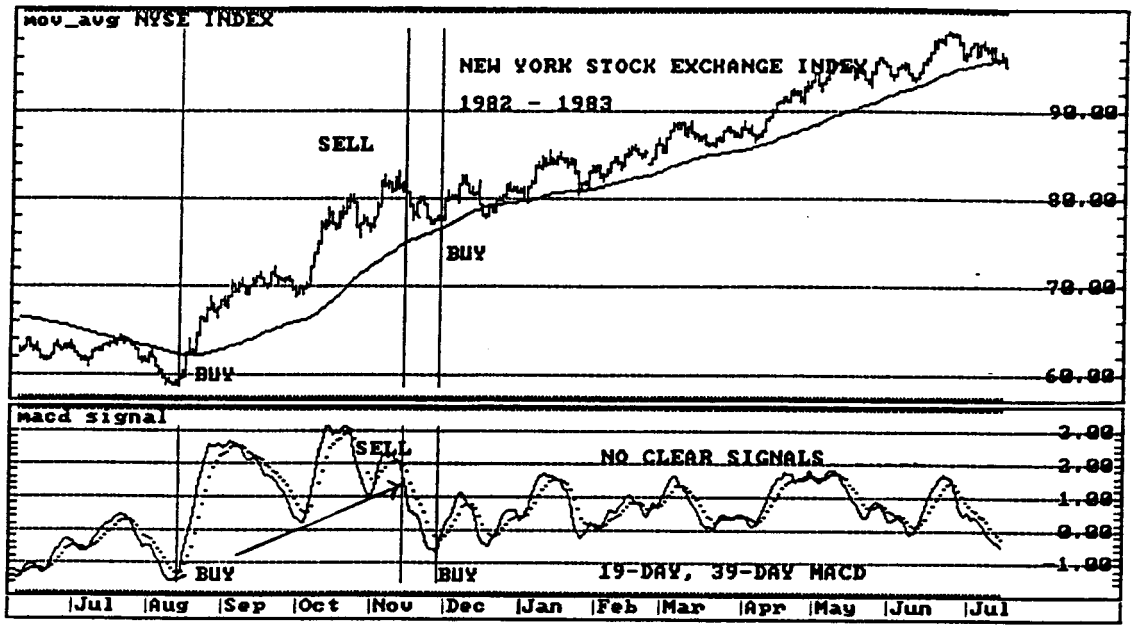


CHART 20
WHEN MACD DOES NOT PROVIDE TIMELY SIGNALS

MACD does not work too well during gradual uptrends or gradual downtrends. It prefers more widely swinging stock market periods.

The 19-day, 39-day MACD provided fine signals during the second half of 1982, but swings into the summer of 1983 were too narrow for adequate signals. (Weekly MACD did very well during this period, however.)

There is not too much to be done once such a period starts except to await the development of more volatile market climates. MACD is an excellent technical tool, but no tool should be employed in isolation.

- The 50-day moving average did rise steadily during the period shown on the chart and, in the absence of clear MACD signals, positions may have been held based upon the 50-day moving average.

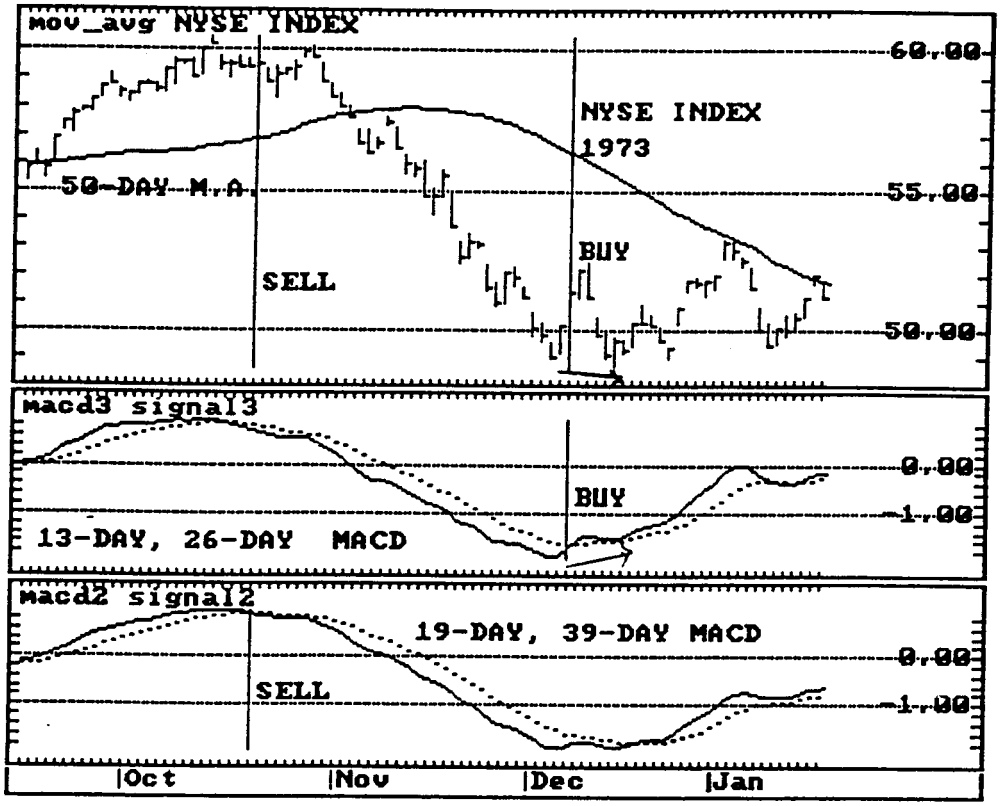


CHART 21
THE AMAZING ABILITY OF MACD TO CATCH THE ENDS OF SIGNIFICANT INTERMEDIATE MARKET DECLINES

MACD is outstanding in its ability to define the conclusion of waterfall declines in various investment markets.

This chart shows the very serious stock market decline that took place between late October and early December during the 1973 bear market.

MACD was not fooled into buying too early but was also not late in its re-entry back into the stock market. A fine sell signal was generated by the 19-day, 39-day MACD and a fine buy signal was generated by the 13-day, 26-day MACD.

With trends sharply down -- the 50-day moving average declining rapidly -- we would not employ the very rapid 6-day, 19-day MACD combination. During such times, employ an MACD combination that makes it just a little more difficult to buy.

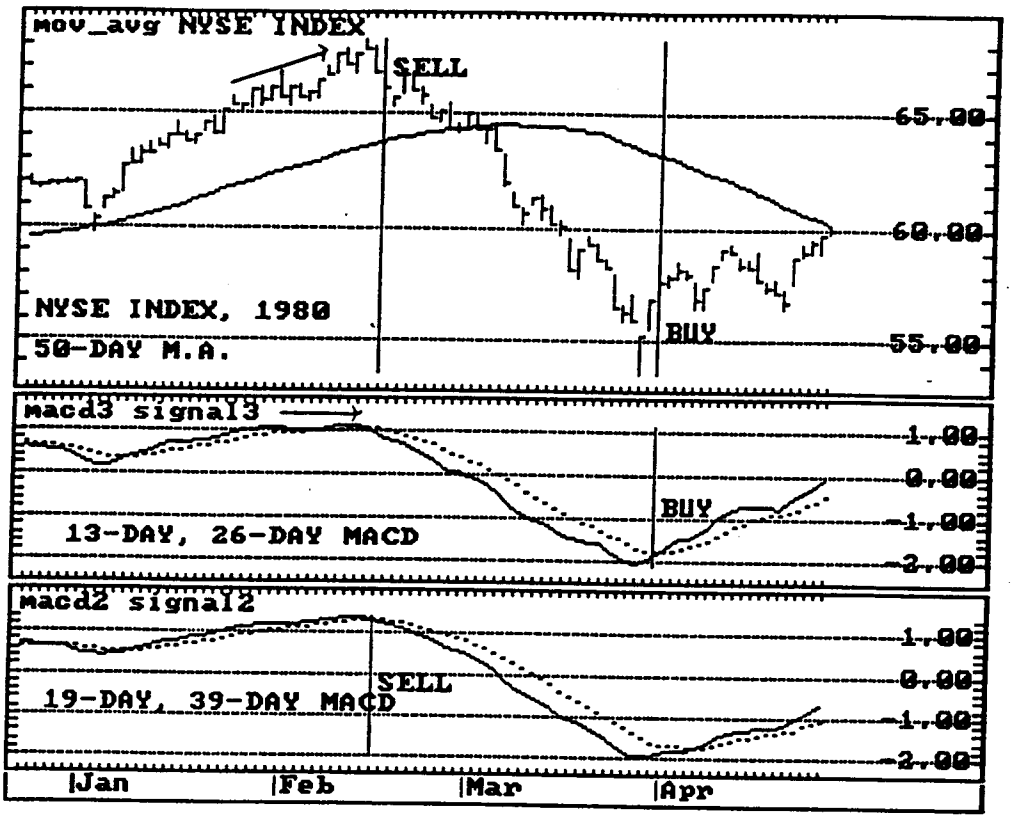


CHART 22
A SECOND EXAMPLE OF BOTTOM FINDING FOLLOWING A DECLINE

The stock market decline of February - March 1980 was also very serious, lasting the usual 5 - 6 weeks.

MACD once again generated timely sell signals (via the 19-day, 39-day MACD) and an excellent re-entry back into the stock market (via the 13-day, 26-day MACD).

Traders should employ at least three MACD combinations -- a very rapid pairing for buying when the trend is strongly up, a medium pairing for buying when the trend is down to neutral, and a longer term pairing for selling.

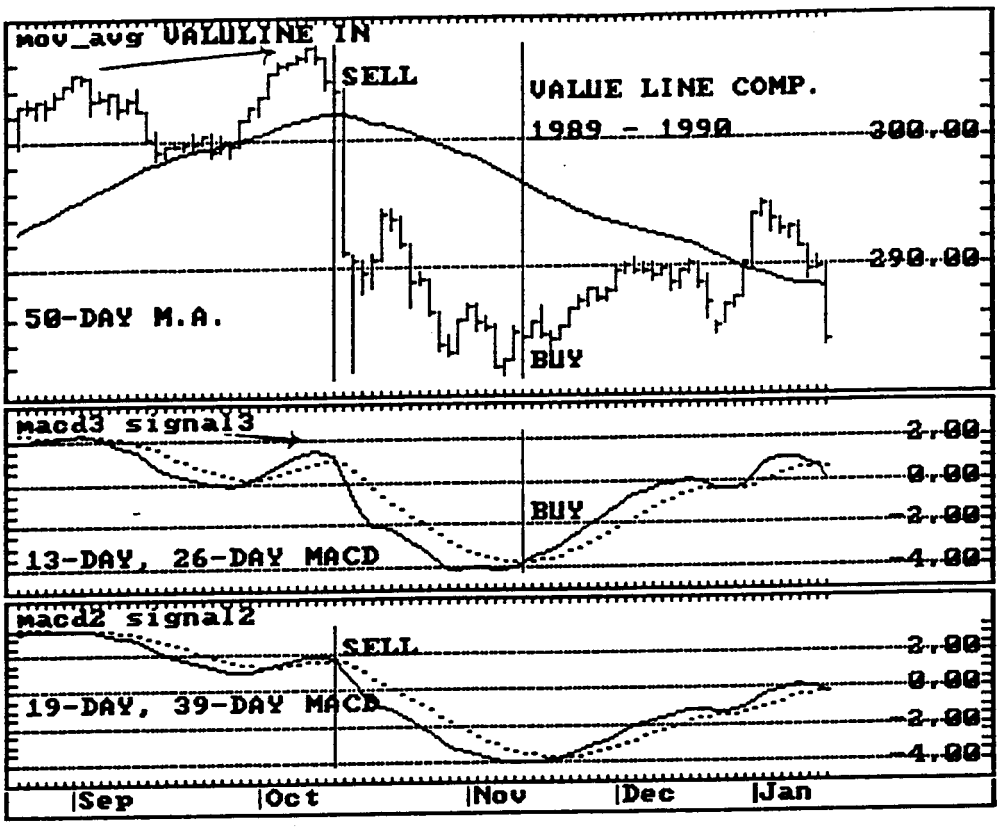


CHART 23
A FINAL EXAMPLE OF BOTTOM SPOTTING

MACD generated a good sell signal just prior to the market hit of October 1989.

Moreover, its re-entry back into the stock market during November could not have been better timed.

Once again, MACD is truly excellent at handling this sort of situation and even if you prefer to employ other indicators most of the time, MACD is worth tracking if only for this sort of occasion alone.

The following charts and information provide further illustrations and instruction regarding the material discussed during the presentation.

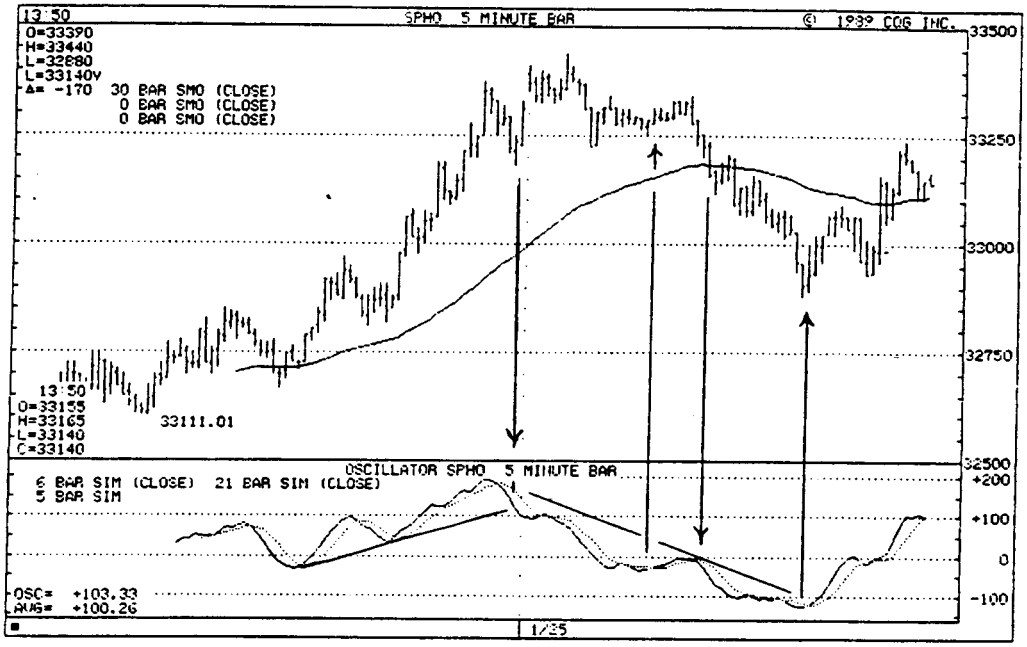


CHART 24
MACD AND THE 5-MINUTE TICK CHART

MACD may be employed for even the shortest time frames:

The above chart shows the March 1990 Standard & Poor's contract, plotted at 5-minute intervals. The entire chart spans less than two trading days.

A 6-unit, 21-unit MACD is employed. Notice the use of trendlines during strongly uptrended periods, as signified, in this case, by a 30-unit moving average. You might also want to observe the use of downtrendlines and the significance of their violation.

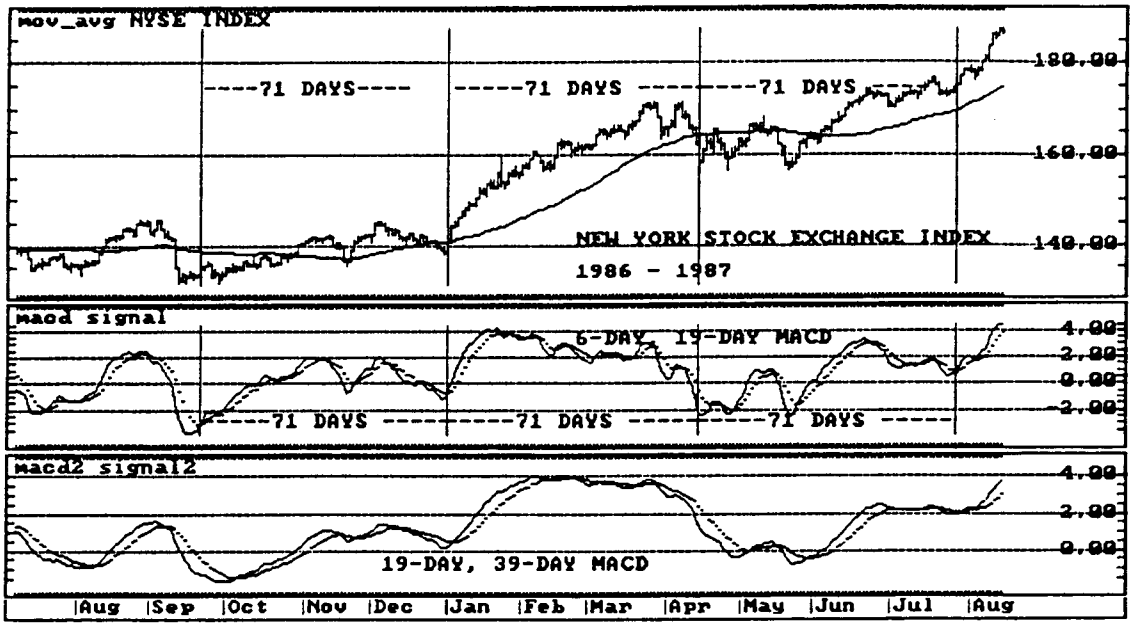


CHART 25
MACD AND THE 71-DAY MARKET CYCLE

MACD provided significant entry junctures on a 71-day market cycle during 1986 - 1987, a cycle very close to the 65-day cycle that we examined previously, in operation during 1988.

The 71-day cycle was very efficient during this time span. Cycles do expand and contract occasionally but I have found over the years that the 8-week cycle, the 16-week cycle and the 24-week cycle all remain consistently significant, at least in terms of the American stock market.

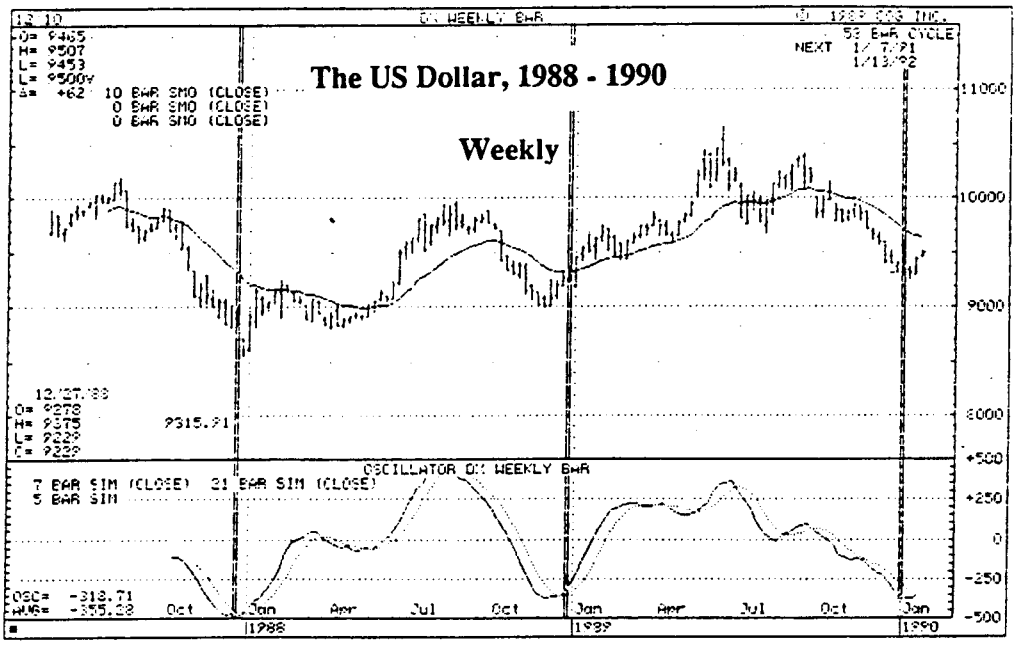


CHART 26
THE 53-WEEK CYCLE OF THE US DOLLAR CONTRACT

The above is a weekly chart of the US dollar futures contract.

A 53-week or approximate one-year market cycle seems to be operative as of January 1990. The very cyclical swings up and down mid-cycle are apparent. The MACD pairing is a 7-week, 21-week combination.

A one-year cycle is operative in the United States stock market as well. Important annual lows tend to develop during the months of October or November, with highs developing on an annual basis, very often within the second quarters of each year.

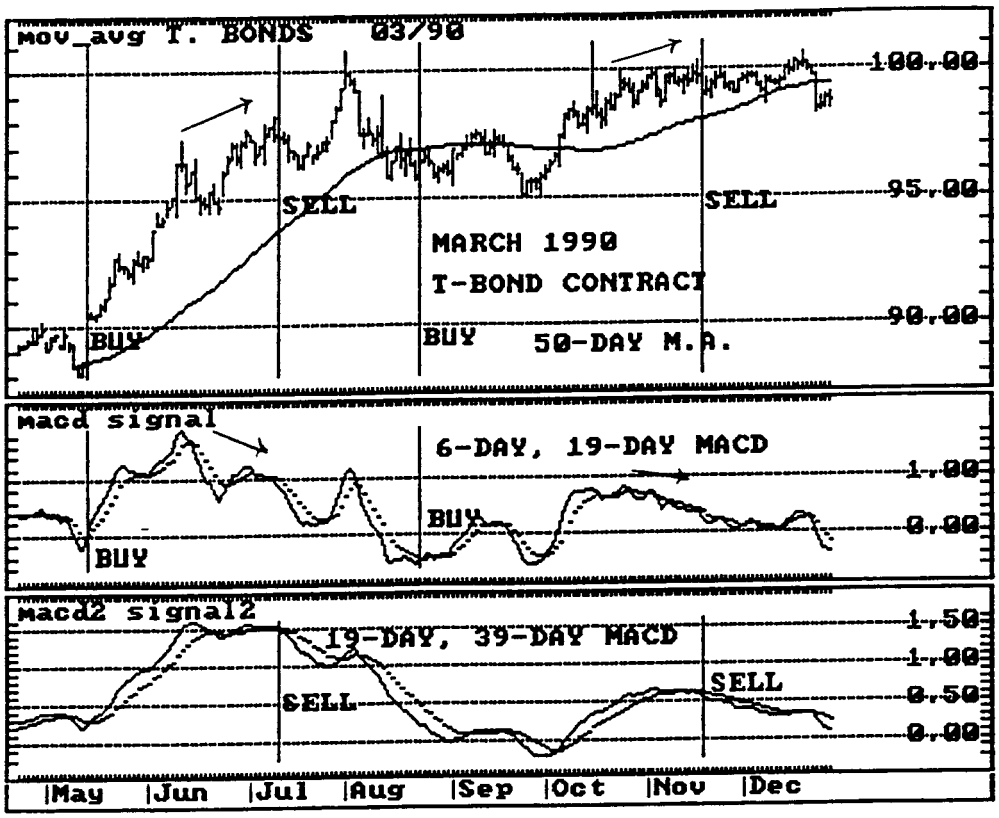


CHART 27
SHIFTING YOUR SELL PARAMETERS BECAUSE OF DIVERGENCE

This is a very instructional chart.

With price trends favorable, we employ the rapid 6-day, 19-day MACD for entry into the treasury bond market, May 1989. In June, the 19-day, 39-day MACD line crosses from above to below its signal line. However, the sell need not be taken because the trend (50-day moving average) is rising rapidly and because there have been no negative divergences, both the short term and longer term MACD lines achieving new highs with the price of treasury bonds.

The sell signal in July is taken because it is preceded by negative divergences in both the short term and the long term MACD lines.

The sell signal in November is taken because that too is preceded by divergences in both the short term and longer term MACD lines.

Results of trading via MACD can be considerably improved if you employ this indicator in conjunction with other tools and concepts in this manner.

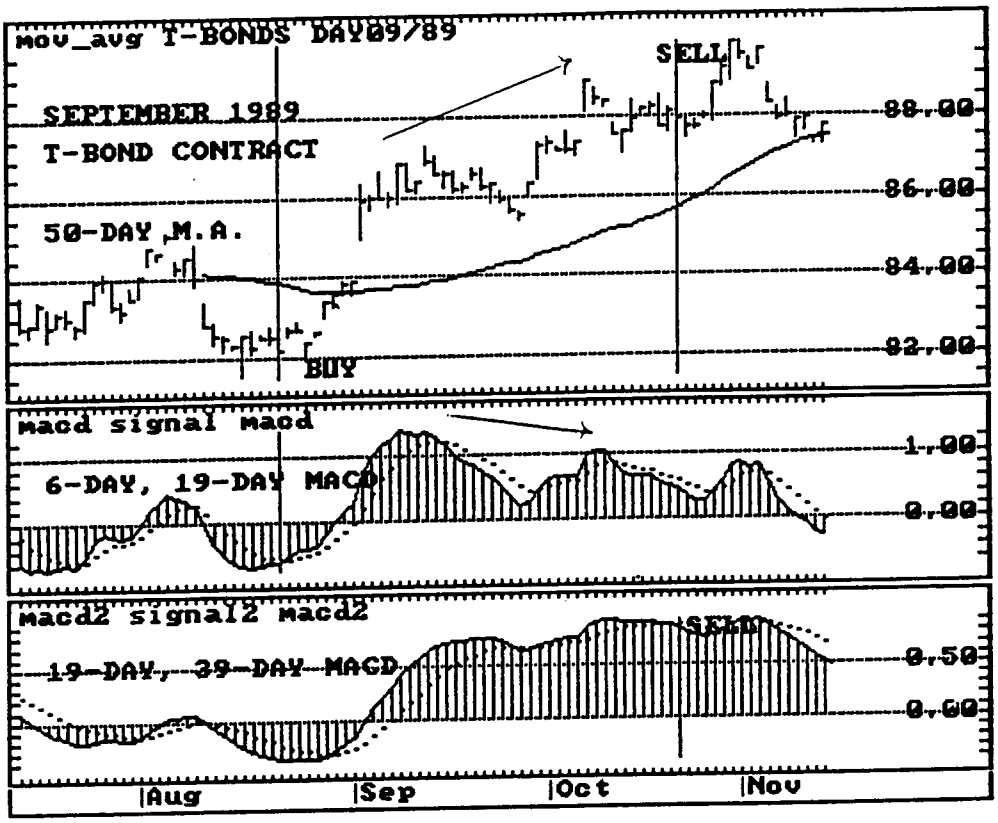


CHART 28
ANOTHER EXAMPLE OF THE DELAYED SELL

A fine buy signal was generated in August of 1988.

The 19-day, 39-day MACD crossed from above to below its signal line in late September but with the uptrend accelerating and with no negative divergences developing, the sell could have been bypassed.

By October, however, negative divergences had begun to appear and so we take the second sell signal that developed at the time.

As matters worked out, the market did rise to one final peak before declining. You would not sell short on the sell because price trends were still sharply rising.

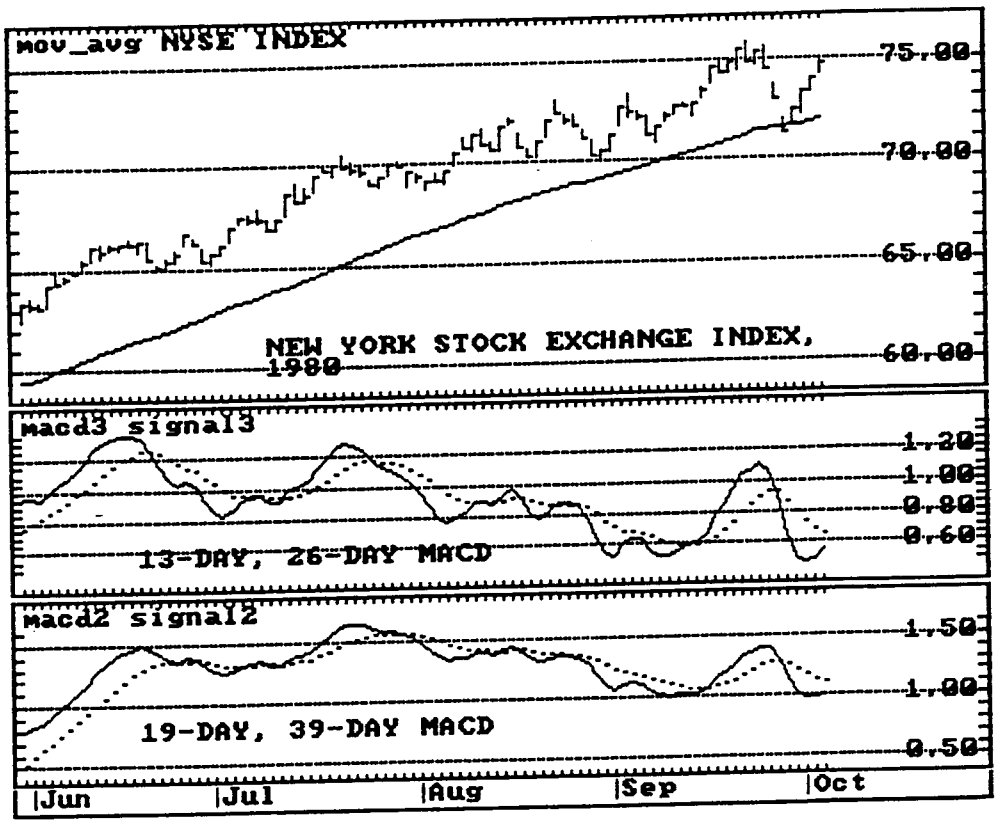


CHART 29
A DIFFICULT CLIMATE FOR MACD

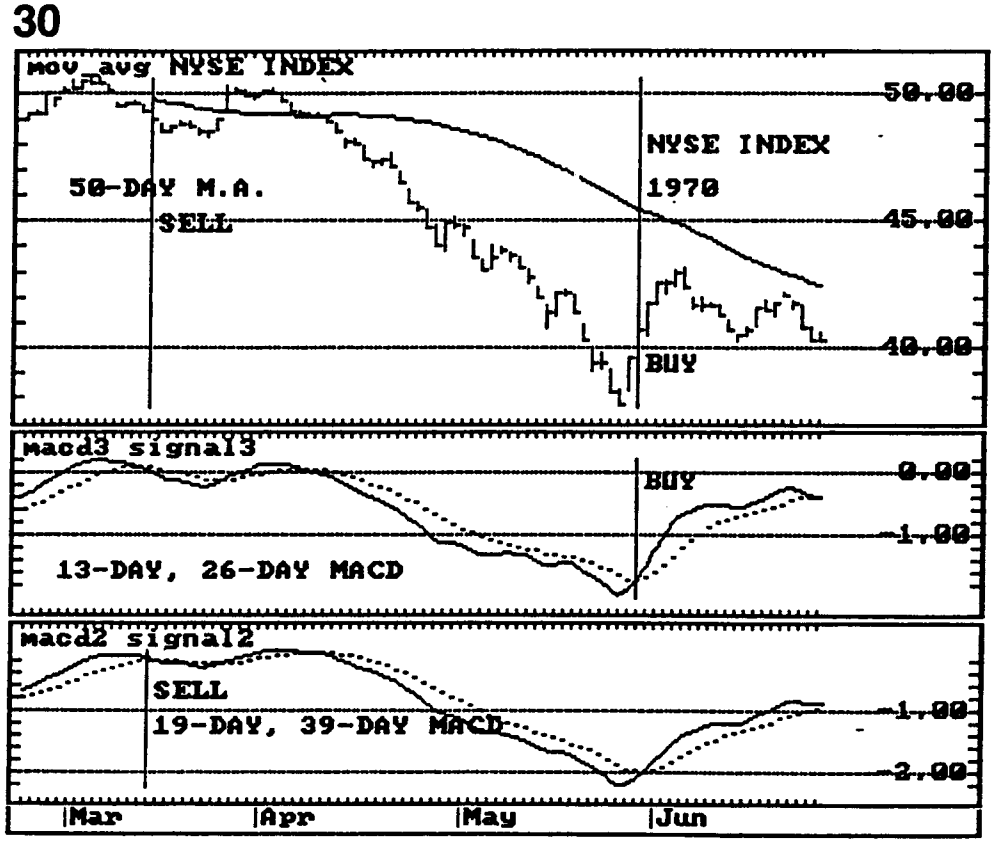
This is a period similar to the period shown during the presentation. Stock prices rose steadily between June and October 1980, but with narrow swings that are not tracked well by MACD.

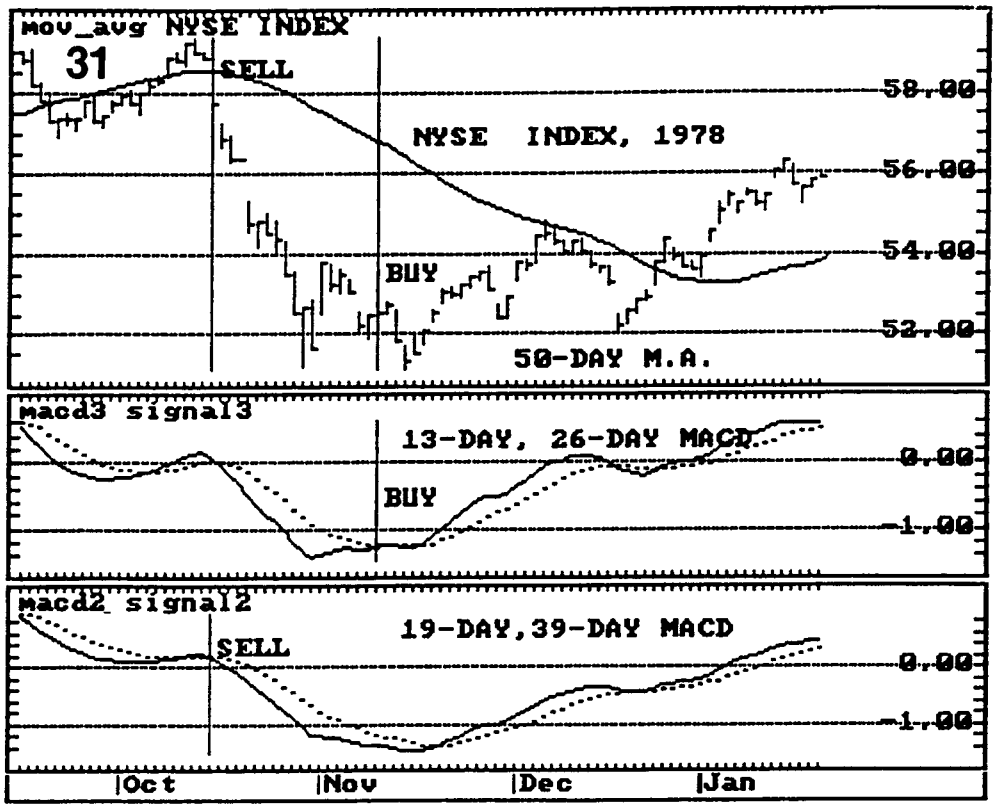
The longer term MACD produced sell signals during June and July but MACD lines did not fall below 0 thereafter, thereby providing no re-entries back into the rising market.

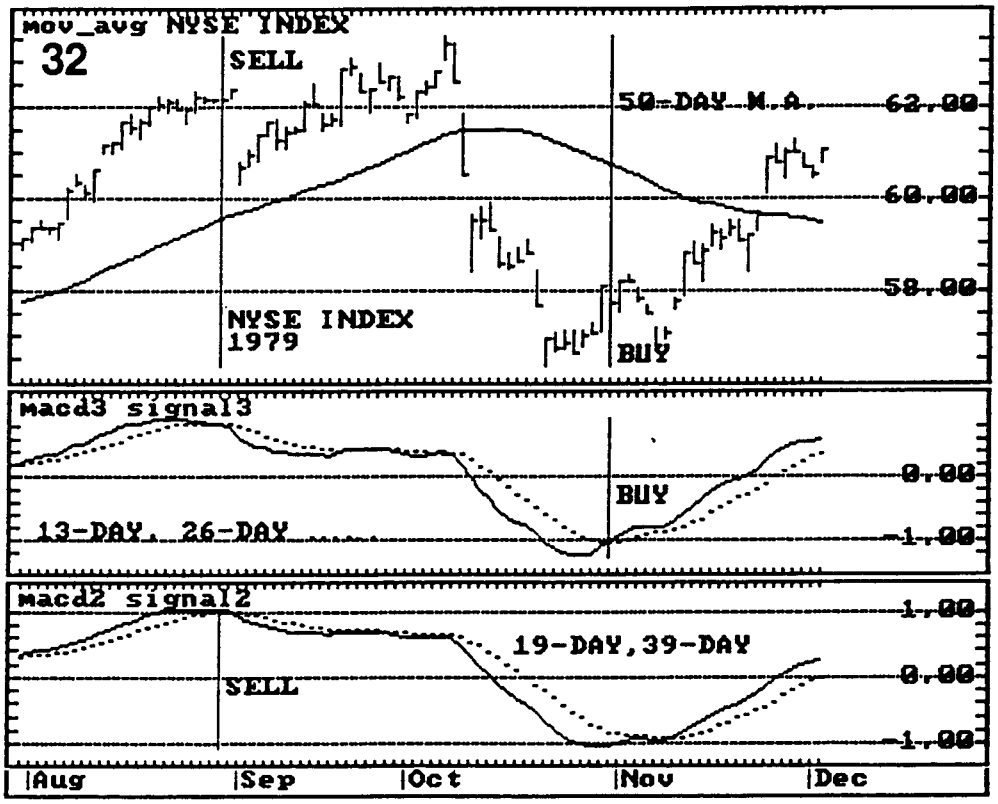
Notice the similarities between this period and the period shown in Chart 20.

The following three charts all provide further illustration of MACD's ability to keep investors out of the stock market during serious market declines while, at the same time, providing excellent re-entry signals as declines come to conclusion.

The periods shown are the winter and spring of 1970 and the Octobers of 1978 and 1979. The charts, by this time, should be self-explanatory.




mov_avg NYSE INDEX
31
SELL
58.00
NYSE INDEX, 1978
56.00
54.00
BUY
52.00
50-DAY M.A.
macd3 signal3
13-DAY, 26-DAY MACD
0.00
BUY
-1.00
macd2 signal2
19-DAY,39-DAY MACD
SELL
0.00
-1.00
|Oct
|Nov
|Dec
|Jan


mov_avg NYSE INDEX
32
SELL
50-DAY M.A.
62.00
60.00
58.00
NYSE INDEX
1979
BUY
macd3 signal3
BUY
0.00
13-DAY, 26-DAY
-1.00
macd2 signal2
1.00
19-DAY,39-DAY
0.00
SELL
-1.00
|Aug
|Sep
|Oct
|Nov
|Dec

HOW TO COMPUTE AND MAINTAIN EXPONENTIAL MOVING AVERAGES:

MACD lines may be created with simple moving averages but my research into the use of MACD has involved exponential moving averages which track trends more closely. Differentials in performance between simple moving averages and exponential moving averages are not great, but once the method is known, exponential averages are simpler to maintain as well as possibly more efficient in their use.

Here is how to calculate exponential moving averages.

THE SMOOTHING CONSTANT:

Before you can compute an exponential average, you must derive a smoothing constant which is based upon the number of trading units you wish represented in your average.

To derive your smoothing constant, you apply the following formula.

Smoothing Constant = 2/(Number of Units you wish smoothed + 1)

Examples:

You wish to derive a smoothing constant that is equivalent to a front weighted 10-day moving average.

(Exponential average provide more weight to recent than to past data.)

Smoothing Constant = 2/(10 + 1) = 2/11 =.18.

You wish to derive a smoothing constant for a 39-day exponential average.

Smoothing constant = 2/(39 +1) = 2/40 = .05.

APPLYING THE SMOOTHING CONSTANT:

Once you have secured your smoothing constant, you apply it in the following manner.

New Exponential Average = Smoothing Constant (Today's close - yesterday's exponential average)

+ yesterday's exponential average.

EXAMPLES:

Let's suppose that you are employing a .10 smoothing constant, representative of a 19-day exponential average. Yesterday's exponential average of the NYSE Index stood at 190.00. Today's close of the NYSE Index came to 191.00.

What would today's 19-day exponential average of the NYSE Index come to?

CALCULATIONS:

The new exponential average would be calculated as follows:

New average = .10(191.00 - 190.00) + 190.00 (yesterday's exponential average)

= .10(1.00) + 190.00 = .10 +190.00 = 190.10 (new exponential average).

For another example, let's suppose that yesterday's exponential average stood at 191.00, that, today, the NYSE Index closed at 190.00, and that you desired a 39-day exponential average reading. The smoothing constant for a 39-day exponential average is .05.

New average = .05(190.00 - 191.00) + 191.00

= .05(-1.00) + 191.00 = -0.05 + 191.00 =190.95.

You will have to achieve familiarity with the use of negative numbers to perform these calculations.

STARTING AND STABILIZING YOUR EXPONENTIAL AVERAGE:

Exponential averages require a period of time for stabilization before they become accurate.

For practical purposes, you can establish initial exponential averages in the following ways.

1) Start with a straight average as your first assumed exponential average. In other words, if you want to secure a 19-day exponential average, take a simple average of the most recent 19 days and assume the result to be equivalent to your starting 19-day exponential average. This method is not precise, mathematically, but is close enough for all practical purposes.

2) As an alternative, you can simply assume that yesterday's price is equivalent to yesterday's exponential average and proceed from that point on. Your results will not be immediately accurate but after a period roughly double the period covered by the exponential, they will become accurate enough for practical purposes. If you are working on a .10 or 19-day exponential average, your results should be come sufficiently stable after approximately 38 days (2*19) to be useful.

Once your exponential averages are under way, you will find them simpler to maintain than simple moving averages.

Table 1– Summary of MACD Procedures

FOR YOUR MACD INDICATOR:

Calculate and construct a very fast 6-unit, 19-unit MACD with a 6-day signal line for buy entries.

Calculate and construct a medium speed 13-unit, 26-unit MACD with a 9-day signal line for buy entries.

Calculate and construct a slow speed 19-unit, 39-unit MACD with a 9-day signal line for sell entries.

Exponential averages are employed in all cases. Take these as starting combinations only. Test for the best combinations to use in your own markets. Position traders should calculate MACD on at least daily and weekly bases, monthly possibly as well. Day traders should calculate at least the daily MACD in addition to the intra-day time frame in which you trade.

Calculate and construct a trend following moving average. I suggest a 50-unit simple moving average for starters, but you may want to experiment and optimize for your own markets.

BUY SIGNALS:

First test for trend with the 50-unit moving average.

Second, test for positive divergences in your buy MACD indicators.

Third, test for the presence of an important market low to low time cycle. We are looking for cycles of at least 6-weeks in length for daily trading, for at least 4 - 5 days in length for day trading.

If two of the above three ingredients are in place, then use your most rapid buy MACD for long side entry. You may still employ the most rapid entry if one of the above is in place but risk will be somewhat higher.

If longer term trends are down, then you will generally want to employ the medium speed MACD as your entry. This will provide the markets a little more time to base following market declines during pronounced downtrends.

NOTES:

Unless the trend is extremely favorable, or a clear positive divergence is in place or a significant downtrendline is being violated, no buy signal can occur until the MACD that is being used for buying has first fallen to below 0.

Table 1 -- Sell Procedures

SELL SIGNALS:

When Long Term Trends are Rising and When There are No Negative Divergences in EITHER the Buy or the Sell MACD Combinations:

Sell on sell signals generated by the 19-unit, 39-unit MACD.

At your option, you may bypass the first sell signal that takes place, allowing the market time for one more swing upwards. If you do bypass, then use your 50-day moving average as your stop, selling if the average is penetrated to the downside.

Always take the second of two sell signals generated by the 19-unit, 39-unit MACD.

When Long Term Trends are Rising or Neutral and When There Have Been Negative Divergences in EITHER the Buy or the Sell MACD Combinations:

Sell on Sell Signals generated by the 19-unit, 39-unit MACD.

When Long Term Trends are Clearly Declining:

Sell on Sell signals generated by the buy MACD, probably in this case the 13-day, 26-day MACD.

NOTES:

During positively trended or neutral market periods, no sell is possible until BOTH the buy and sell MACD lines have crossed from below to above 0 unless the buy signal MACD falls to a level lower than the lowest level that immediately preceded the buy signal.

During negatively trended market periods, no sell is possible until at least the buy MACD has crossed from below to above 0 unless this MACD falls to a level lower than the lowest level that immediately preceded the buy signal.

The table below shows the layout of your daily posting of the data required for MACD. "EMA:12" is the column for the 12-day exponential average. "EMA:26" is the column for the 26-day exponential average. The column next to the last column on the right,"EMA:12 - EMA:2", is the differential between the 12-day exponential average and the 26-day exponential average, the MACD line. The column, "EMA:9", is the 9-day exponential average of the MACD line, the signal line.

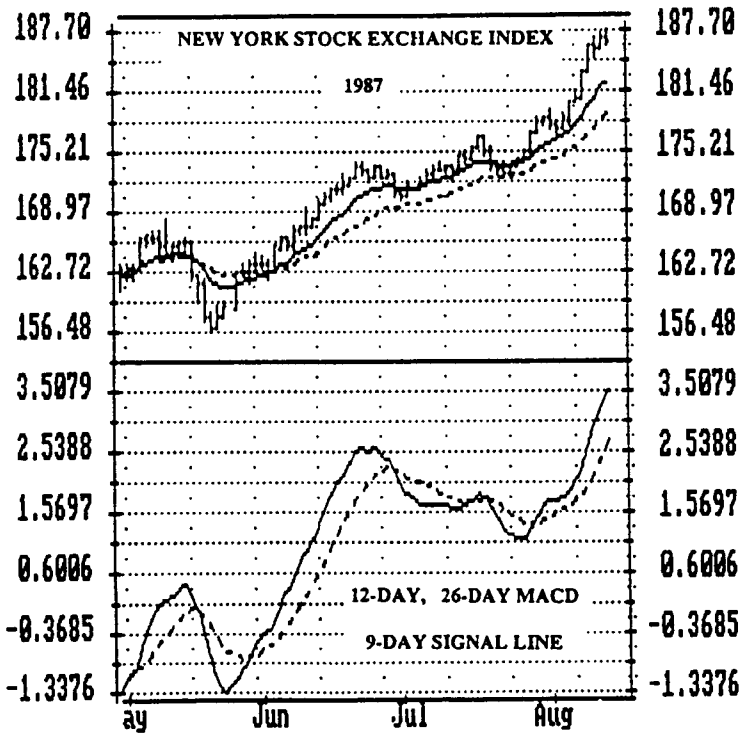
The chart relates to the period partially covered by the data, which relates to the final month shown on the chart.

33

NYSE INDEX

DATE	OPEN	HIGH	LOW	CLOSE	EMA:12	EMA:26	EMA:12-EMA:2	EMA:9
870715	174.67	175.40	173.90	174.58	173.10	171.42	1.6755	1.7436
870716	174.56	175.74	174.56	175.70	173.50	171.74	1.7588	1.7466
870717	175.70	176.67	175.66	176.67	173.99	172.11	1.8813	1.7736
870720	176.65	176.65	175.01	175.08	174.16	172.33	1.8291	1.7847
870721	175.08	175.49	173.10	173.59	174.07	172.42	1.6484	1.7574
870722	173.59	173.83	172.88	173.45	173.97	172.50	1.4769	1.7013
870723	173.45	174.03	172.32	173.03	173.83	172.54	1.2923	1.6195
870724	173.03	173.70	173.03	173.70	173.81	172.62	1.1863	1.5329
870727	173.66	174.50	173.46	174.47	173.91	172.76	1.1512	1.4565
870728	174.32	175.24	174.23	175.24	174.12	172.94	1.1720	1.3996
870729	175.23	177.02	175.01	177.00	174.56	173.24	1.3153	1.3827
870730	177.00	178.55	177.00	178.32	175.14	173.62	1.5179	1.4098
870731	178.31	178.69	178.03	178.64	175.68	173.99	1.6849	1.4648
870803	178.58	179.34	177.63	178.07	176.04	174.29	1.7510	1.5220
870804	177.98	178.38	176.52	177.39	176.25	174.52	1.7286	1.5634
870805	177.38	179.13	177.38	178.54	176.60	174.82	1.7831	1.6073
870806	178.47	180.37	178.11	180.37	177.18	175.23	1.9515	1.6762
870807	180.27	181.45	180.23	180.87	177.75	175.65	2.1011	1.7611
870810	180.79	183.45	180.79	183.45	178.63	176.23	2.4001	1.8889
870811	183.43	186.15	183.43	186.13	179.78	176.96	2.8208	2.0753
870812	186.12	186.73	185.05	185.70	180.69	177.61	3.0840	2.2770
870813	185.69	187.33	185.68	186.95	181.65	178.30	3.3548	2.4926
870814	186.93	187.70	185.99	186.69	182.43	178.92	3.5079	2.6957

34



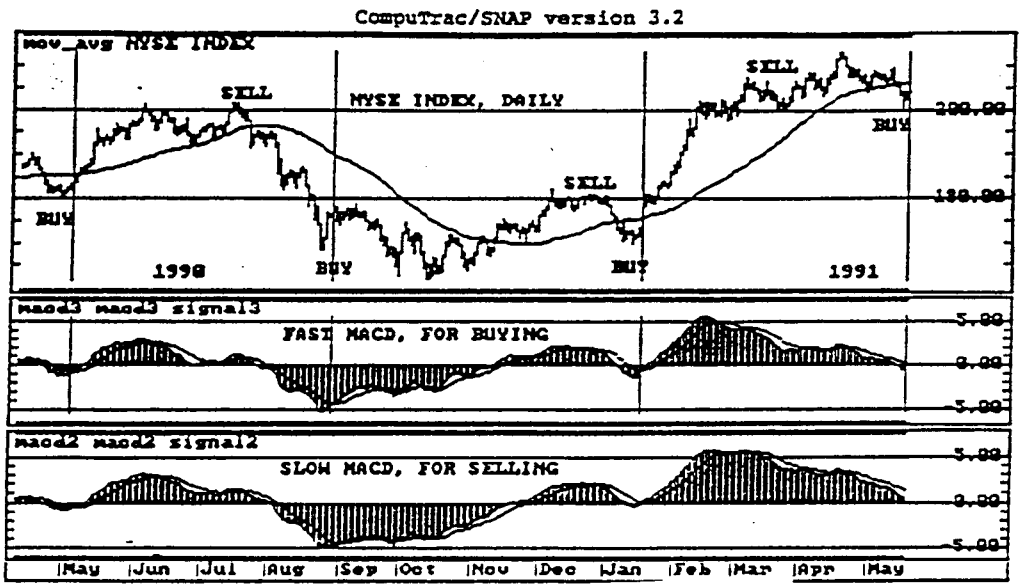


CHART 35
A LOOK AT RECENT HISTORY
THE 1990 STOCK MARKET DECLINE -- THE 1991 RECOVERY

This chart shows the fine series of action signals generated by MACD as one bull market came to an end and another began.

The New York Stock Exchange Index reached an all time high during July of 1990 before plummeting during August of that year. The decline was precipitated by the crisis in the Middle East and sharply rising oil prices which resulted.

However, the decline had been well indicated in advance by negative divergences in MACD at the July peak, the sell signal preceding the actual onset of the crisis.

MACD patterns did a fine job of defining the bottom formation that developed during the final months of 1990, the sell signal in December reversing in ample time for traders to profit from the sharp advance that started in January.

The sell signal in March was a bit premature, although gains in the market following the signal were limited. The buy signal in May did develop below the price levels of the March sell, however.

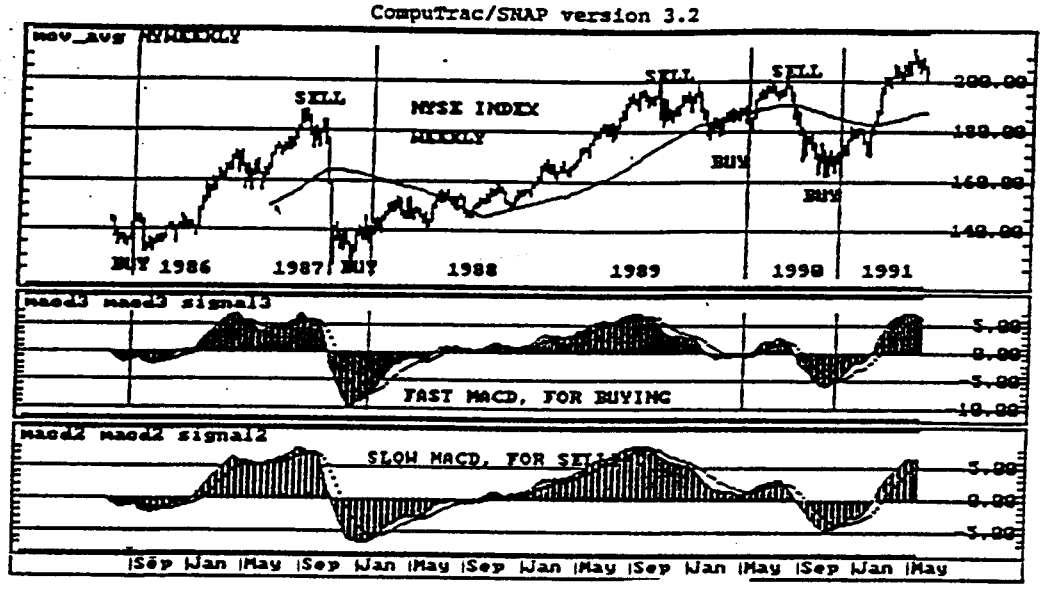
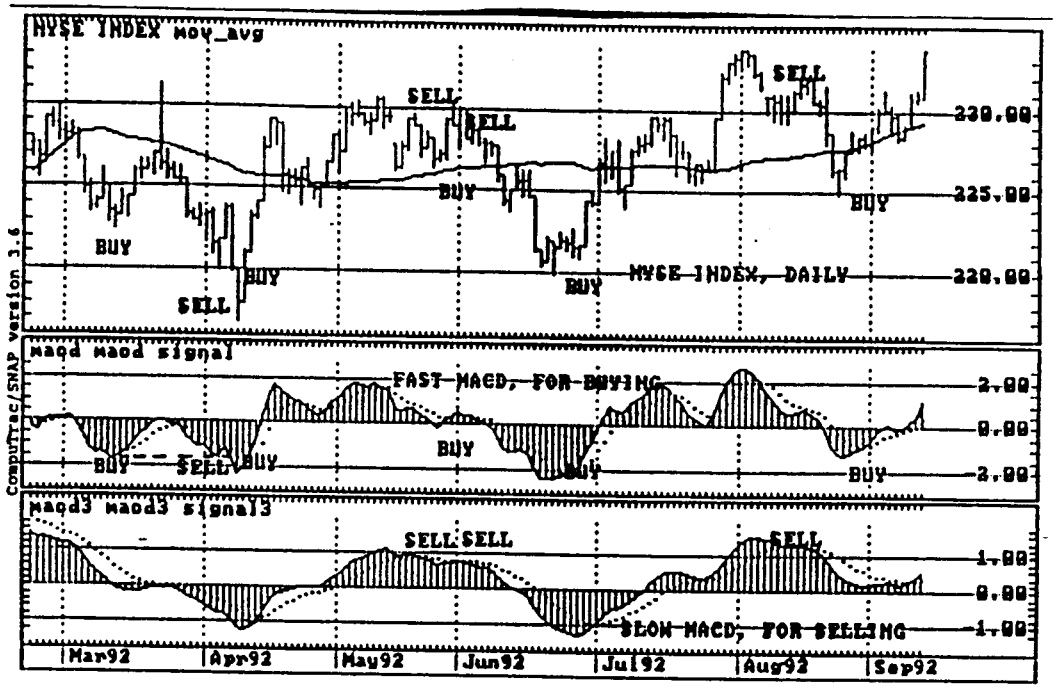


CHART **36**
RECENT LONG TERM BUY AND SELL SIGNALS, 1986 - 1991

We see here the series of major term buy and sell signals produced by MACD patterns based upon weekly postings of the New York Stock Exchange Index.

The buy signal that developed during mid-1986 held until just prior to the market crash of 1987, a very well timed sell signal. The market re-entry that was generated as the year came to a close carried for nearly two years, into 1989.

MACD caught the advance that took place during the first half of 1990, was a little late on the sell in July, but then produced a very fine market re-entry signal during October of 1990. The buy signal was still in effect as of the start of July, 1991.



SUPPLEMENTARY CHART B

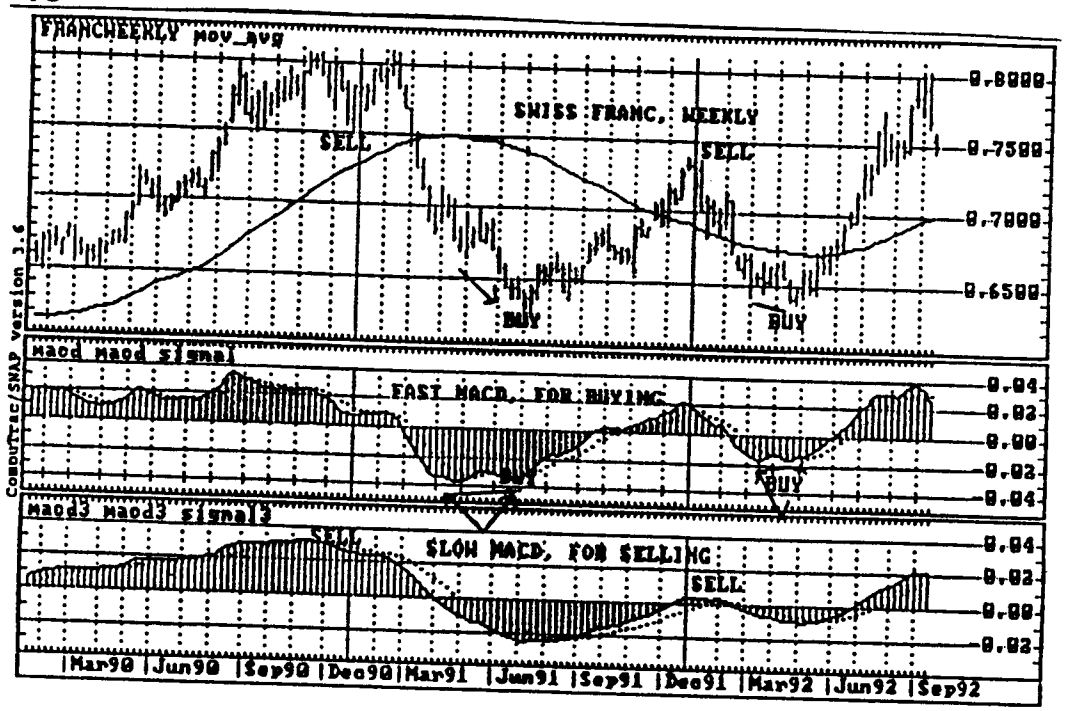
THE DAILY BASED CHART OF THE NEW YORK STOCK EXCHANGE INDEX MARCH - SEPTEMBER 1992

This chart shows the recent status of the daily based MACD for the NYSE Index.

The MACD trend at this time wasy up.

The sell signal that took place during April resulted from the sell stop procedure -- the fast MACD line making a lower low than the previous low level. As often happens, the sell stop was quickly reversed.

The re-entry turned out to be very well timed, along with the initial sell signal in mid-May. A very fine buy and sell sequence developed between June and August as well.



SUPPLEMENTARY CHART C

THE WEEKLY BASED CHART OF THE SWISS FRANC
MARCH 1990 - SEPTEMBER 1992

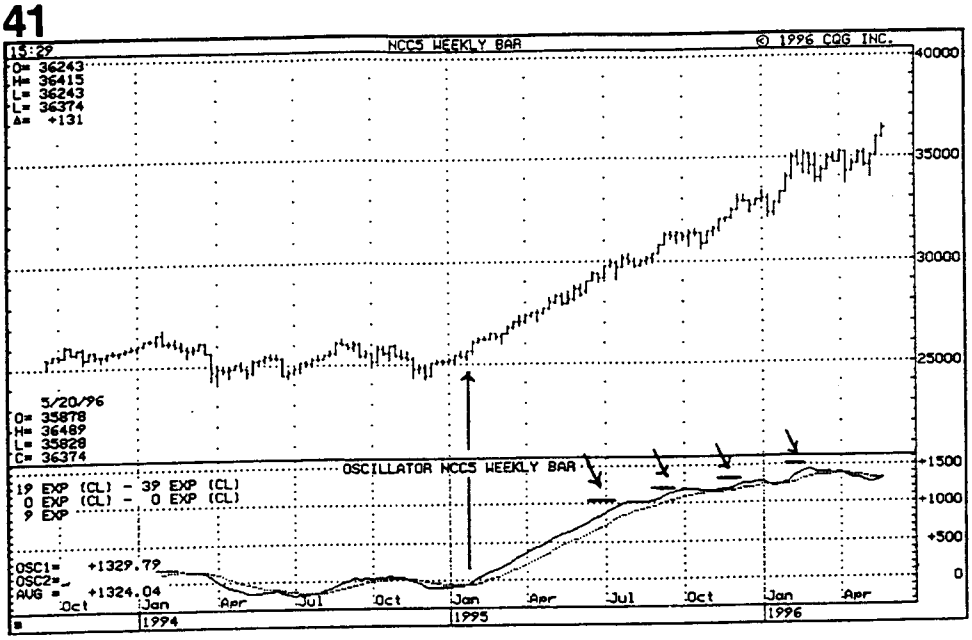
Currencies generally move in more well defined and lasting trends than the stock market. Daily fluctuations can be fairly sharp, so many traders employ longer term data for timing purposes.

MACD lines for the Swiss Franc provided an excellent series of buy and sell signals between 1990 - 1992.

Notice the double bottom formations and the positive divergences that took place at the lows of 1991 and 1992.

A clear negative divergence developed at the market peak during the second half of 1990, but MACD did not produce this sort of warning as we moved into 1992.

There are a number of mutual funds that invest in overseas debt instruments that are denominated n foreign currencies. Such funds tend to rise in price when foreign currencies are stronger than the dollar and to decline when currencies are weaker than the dollar. MACD can be used for the timing of such funds.



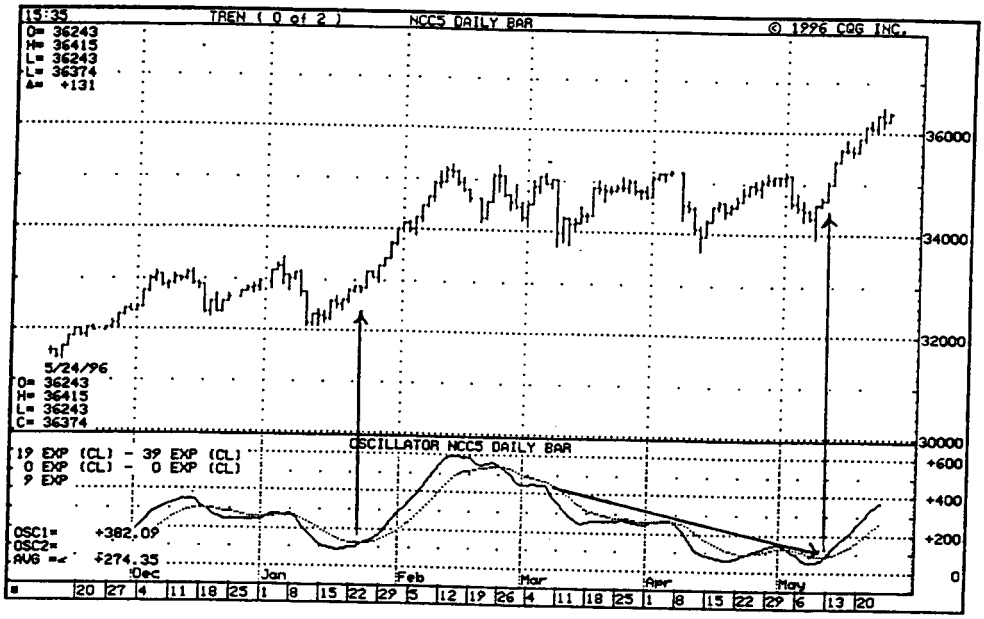
SUPPLEMENTARY CHART D

THE 1994 - 1996 PERIOD FOR THE US STOCK MARKET

The chart above shows the NYSE Index, weekly, along with its 19 - day, 39 - day MACD lines.

A buy signal was generated by these lines during mid-January 1995. From then on, MACD lines traced out a succession of rising peaks and rising lows, confirming the strong uptrend that was in effect. Weekly MACD lines would have kept investors in the stock market for more than a year of steadily rising prices.

Compare this chart to the 1982 - 1983 period reviewed earlier. Weekly MACD lines often perform better than daily during strong major bull trends.



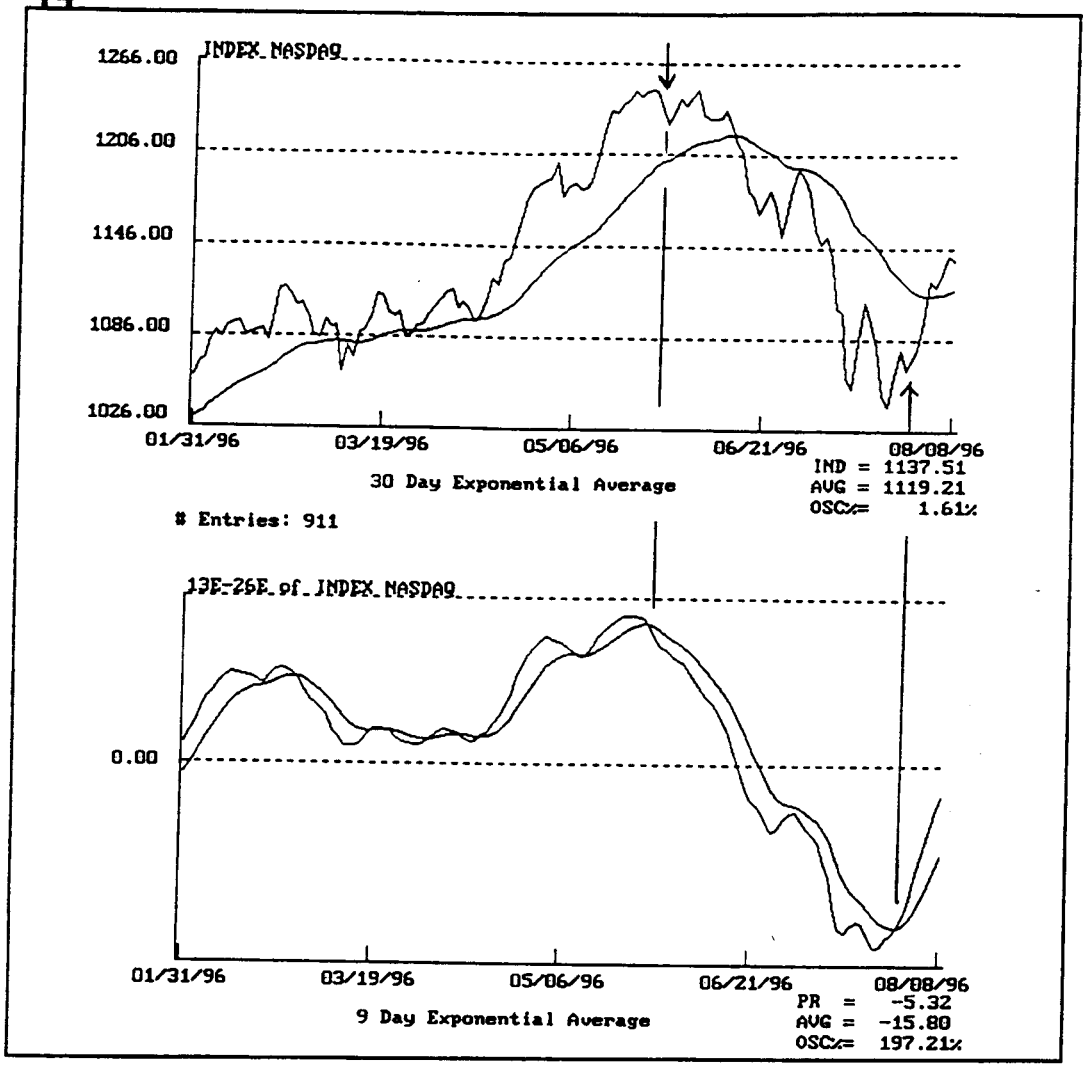
SUPPLEMENTARY CHART E

THE 1996 PERIOD FOR THE US STOCK MARKET, DAILY

The chart above shows the NYSE Index, daily, along with its 19 - day, 39 - day MACD lines.

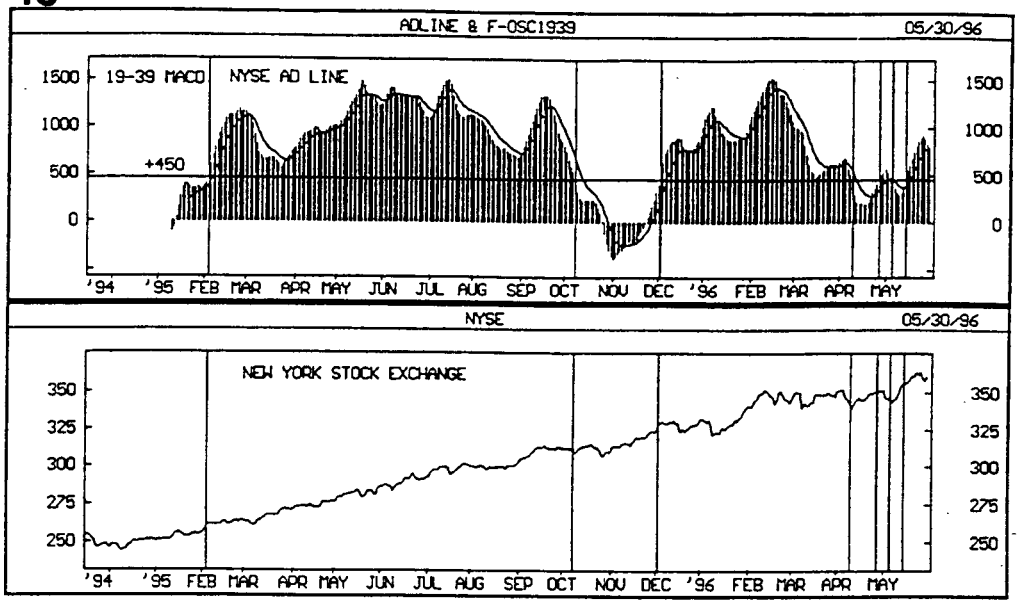
As a general rule, daily based entry signals are derived from somewhat faster MACD patterns. However, less active traders may want to employ somewhat less sensitive MACD lines.

Buy signals during January and May were well timed. Notice the trendline break in MACD that confirmed the rise through the May signal line, a fine confluence of events.



SUPPLEMENTARY CHART G

This chart shows NASDAQ and the medium term MACD, January - August 1996. You can see the excellent sell signal that was generated in early June as well as the very well timed buy signal that occurred at the turn in late July. This was yet another occasion when MACD produced a very well timed buy signal following a sharp and extended intermediate decline.



SUPPLEMENTARY CHART F

A SUPER STAY IN THE STOCK MARKET INDICATOR

The chart above shows the NYSE Index along with a 19 - 39 MACD of the levels of the NYSE advance-decline line, a cumulative total of daily advances minus declines on the New York Stock Exchange.

Research has indicated that it generally pays to remain in the stock market for as long as the 19 - 39 day MACD of the advance-decline line remains above +450.

For example, a HOLD signal was generated on February 3, 1995 at NYSE Index 260.44. The signal remained in effect until October 9, 1995, when the NYSE Index stood at 310.35, the hold good for a gain of +19.2%.

The next HOLD signal was generated on December 21, 1995, NYSE Index 327.60. That signal was cancelled on April 10, 1996, NYSE Index at 340.93. This signal produced a gain of +4.1%.

Timing is not always perfect but the "Stay In Signal" does eliminate many market whipsaws for intermediate term traders.