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**SPECULATION IN GOLD FUTURES**

**A STUDY OF THE MARKETS INVOLVED , INFLUENCING  
FACTORS , AND FOMULATING A TRADING STRATEGY BY  
FOLLOWING A TECHNICAL ANALYSIS APPROACH .**

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**BY  
RAMZI ABDUL-FATTAH  
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BEIRUT UNIVERSITY COLLEGE  
P.O.BOX 98 13- 5053  
BEIRUT , LEBANON

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CANDIDATE : RAMZI ABDUL- FATTAH  
DEGREE : MASTERS OF SCIENCE IN BUSINESS

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FOLLOWING A TECHNICAL ANALYSIS APPROACH .

THE FOLLOWING PROFESSORS NOMINATED TO SERVE AS  
THE ADVISORS OF THE ABOVE CANDIDATE HAVE  
APPROVED HIS RESEARCH WORK .

NAME : DR. TAREK MIKDASHI

SIGNATURE -----

NAME : DR. ABDEL BAZAK CHORRAGI

SIGNATURE : 

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## **ABSTRACT**

Speculation in gold futures, a paper constructed in a way to give informative facts and findings that are necessary for the professional investor who is willing to take the risk of investing in a highly volatile market. Furthermore, It is my objective to prove that by following a technical analysis approach, applying a computer software program called Metastock Professional, is effective in finding opportunities that give good returns on investment in the gold futures market. The psychological makeup of the individual trader, discipline, patience and a good planning strategy combined are the essentials required to achieve success not only in futures but in any risky market as well.

This project is divided into three parts. Part One, Introduction, contains general information about the Gold market and the futures market. The necessary characteristics are compiled to give a comprehensive overview. In part Two, intensive efforts have been made to gather information about the factors that affected gold prices to change during the period 1974 upto 1993. Articles dated back to 1976 were extracted from periodicals, magazines, and newspapers like Dun's Review, Industry Surveys, Economist, Euromoney, Business Week, Fortune, The Banker and The Wall Street Journal. Analysis of gold price changes and conclusions are structured through this part by specific dates that correspond to major market trends. The most interesting section comes in part Three where a technical approach is conducted to gold futures by applying a vast number of indicators and moving averages that are popular to professionals around the World. In this part the objective is to highlight opportunity Buy/Sell signals after testing the profitability of each trade and finally implementing a trading strategy in the short and intermediate term.

## PART ONE

### I - THE GOLD MARKET

#### A - INTRODUCTION

Man has known and used gold for more than 6000 years because of its beauty. Gold has excellent industrial properties, including malleability, durability, indestructibility and electrical conductivity. Gold is lustrous and does not lose its luster. For this quality, throughout history, gold has been highly valued for jewelery and other ornamental and decorative uses.

Gold has a long monetary history, with coins in wide circulation as early as 500 B.C. Gold was the formal international standard of exchange in varying degrees from 1816 until 1971. In 1944, with the Bretton Woods Agreement, several important international monetary policies were set. Among them was the provision for the conversion of gold in U.S. dollars, by the U.S. government, at \$35.- per ounce. Interestingly, this was done more to stabilize the price of the dollar than to stabilize the price of gold.

Gradually, however, the dollar weakened against gold. Until 15 AUG 1971, the Smithsonian Agreement terminated the \$35.- per ounce of gold and with that the

fixed exchange rate between the dollar and other foreign currencies. Gold prices were allowed to float and be determined by the free international market for gold. Finally, during 1974 the U.S. government announced that U.S. citizens could hold gold legally beginning on December 31, 1974. In response to this change in policy, gold futures contracts began to be traded on several exchanges. This began the period of extreme volatility in gold prices. The highest ever in gold prices was achieved during January 1980, when the price of gold rose to \$850 per ounce. At the beginning of 1985, it was below \$300 per ounce. Investments in gold takes many forms. You can purchase bullion, coins, mine shares, and futures contracts. Hoarding involves the purchase of gold for long-term possession as a protection against inflation and eroding currency values. The term "coin" means coins minted by a government. The term "bullion" refers only to gold and silver. Platinum or any other precious metal, is not considered bullion. Bullion is only limited to gold that has been refined to a high degree of purity - i.e. 0.900 purity or above. In most cases banks handle gold of 0.995 or 0.9995 purity. The key markets for physical gold are London, Zurich, Hong Kong, and New York. The key markets for gold futures are the Commodity Exchange (COMEX) in New York and the International Monetary Market (IMM) in Chicago. Gold futures are also traded in London, Singapore, Hong Kong, Tokyo, Sydney and Winnipeg, Canada.

The major sales by producers of newly mined gold are largely made in the European market through the three gold-pool banks in Zurich and the five bullion banks in London. Customers on the purchase side include major jewelry groups, Middle East hoarders, Central Banks, and small-scale speculators.

The element of delivery is much greater in the Cash markets than in the futures market. Participation in the futures market includes a large portion of Short-term speculators and bullion banks of the cash market are key hedgers and speculators as well.

Commission house business also plays a vital role in creating liquidity in gold futures, supplying business to the floors of exchanges from a variety of clients ranging from very large to extremely small speculators.

## **B - SUPPLY**

The two major producers of gold are South Africa, more than 50% of total world production, and the previously called Soviet Union. A significant amount of South Africa's production is sold as gold coins, namely the Krugerrand, many of which are hoarded by investors. The previously called Soviet Union is the second largest producer of gold. While the exact amount of production is held secret by the Russian authorities, it is estimated to be close to 25% of the world



production. This estimation is made by analysing gold sales made mainly for wheat purchases and other products and for the need of hard currency. Canada and The United States are the third and fourth largest producers respectively. Since gold has been held by private individuals, international agencies (IMF), and national governments, gold supplies come not only from new production but also from dishoarding by these groups.

### **C - DEMAND**

Over 50% of the use of gold is a combination of demand for jewelery and industrial purposes. During the past 30 years, gold has become a highly needed industrial commodity with many electrical and electronical, aerospace and aviation, and medical and dental applications. This important sector is very price sensitive, moving in a close relationship to trends in the gold market. The other key elements of demand for gold are coin and bar hoarding. Gold for hoarding is very sensitive to trends in world economics and politics. Purchases of gold for hoarding vary considerably from wealthy individuals to Central banks.

### **D - PRICE DETERMINANTS**

In gold it is a fact that we always have dramatic falls in price as well as price rises. Gold prices are volatile not only because of its relative scarcity and periodic supply and demand imbalances, but also because gold is a popular store of wealth in periods of political or economical uncertainties.

Prices are not seen as an invitation to buy or a warning to sell, but rather as a fair approximation of the risks involved. Gold prices are a reflection of the trend in the hope, fear, knowledge, optimism, and greed of the investing public. The sum of these emotions is expressed in the price level. Prices never reflect what they are worth but what people think they are worth.

Precious metals tend to perform well in the acceleration phase of the economic cycle, as inflationary pressures mount and many major currencies experience weakness. On the other hand, periods of deflation are likely to have a negative effect on gold prices.

Because the trend in financial markets is determined by the investors' expectations of the future movements in the economy, prices are affected by the changes of these expectations. The psychological attitude of investors to the changing level of the future economic activity and its development is fully

discounted in the market where buying or selling of financial assets is taking place well ahead in advance.

The major movements of bonds (i.e. interest rates), equities, and gold prices are related to movements in the level of business activity. The business cycle usually has a life between 3 - 5 years. The economy is rarely stable but is either expanding or contracting. As a result financial markets are also in a continuing state of changing trends.

An expanding economy is normally favorable for equity prices. A weak economy is bullish for bonds. An inflationary economy is favorable for gold prices.

The bond market is the first financial market to begin a bull phase. This occurs after the growth rate in the economy has peaked then slowed down and is entering into the initial stages of recession. This corresponds to a fall in interest rates. After this point the participants in the equity market are able to see that corporate profits are declining sharply because of recession and begin accumulating stocks which means that the bull market for equities is already under way. After the recovery has been under way for some time, investors feel uncomfortable about the outlook for inflation. They start buying gold and prices are going up. At this point, all three financial markets are in a rising trend.

Gradually the economy absorbs the recession and starts the expansion cycle by putting upward pressure on the price of credit, i.e. interest rates. Since rising interest rates mean falling bond prices, the bond market reaches the peak and begins its bear phase. At this point the economy is still expanding and the rising business activity results in improved productivity.

Thus equity prices keep on rising until investors sense that the economy is about to start expanding at a decreasing rate and that the potential improvement in corporate profits is very little. Then, they start selling equities and a bear phase is started.

Since the highest rate of inflation is reached around the beginning of the recession stage of the business cycle, the peak price of gold should theoretically be achieved several months ahead in advance.

The price of gold is determined basically by two types of market participants. The first group deals in gold as an industrial commodity affected by fundamental demand - supply relationships. The second group invests in gold as a hedge against inflation. The level of business activity has more or less identical effect on both types of gold market participants, since the trend of industrial demand and the rate of inflation are both normally rising during a business cycle expansion and falling during recession.

Other factors that can affect the price of gold are the U.S. balance of payments deficit, oil prices, wars and political unrest in other parts of the world. Changes in the balance between supply and demand due to increased sales by the major producing countries such as South Africa and the Soviet Union or by international agencies or governments, such as the IMF or the United States, tend to decrease the price of gold.

Finally, the price of gold relative to the price of other major precious metal, like Silver and platinum, also tend to be affected by them. Since the price of a futures contract is a price for future delivery, buyers and sellers must take into account the cost of storage, financing costs and insurance. These expenses are usually added together and are called "Carring Charges".

### **E - SPECULATIVE USES OF GOLD FUTURES**

Gold producers, fabricators, traders, and distributors use gold futures contracts to hedge their inventories to assure stability of costs or maintaining a certain level of profits. On the other hand, gold futures contracts have been an important speculative vehicle for both, the individual investor and institutions.

Due to the high leverage, low transaction costs, the good reputation of the markets, and the high level of liquidity, speculative investors are attracted to the futures market seeking profit by accepting the risks that hedgers are avoiding. Both hedgers and speculators are important elements of the futures market, because they add validity and liquidity. In fact, the presence of speculators assures the high level of liquidity provided. Technical and emotional factors in addition to the fundamental factors play an important role in the gold futures market.

## **II - THE FUTURES MARKET**

### **A - INTRODUCTION**

Futures were originally developed for grains as a means to find protection against the risk of price changes. Throughout the years futures have developed for many basic commodities some are agricultural like coffee, corn, sugar, soybeans, wheat and meat and some are non-agricultural like gold, silver, copper, zinc, crude oil and gas.

In 1975, a major development in the future market occurred by introducing financial futures contracts. The financial futures markets has grown remarkably in recent years to include:

- 1 - Short-term interest rates contracts like Treasury Bills, Certificate of Deposit (CDs), and Eurodollar futures.
- 2 - Long-term interest rates contracts like Treasury Notes and Bonds futures. A related interest rate options were introduced in Nov. 1982.
- 3 - A variety of stock indexes and options introduced in Feb. 1982 like S&P 500, FT-SE 100, and N.Y. Stock Exchange Composite Index.
- 4 - Foreign Currency futures and options like British Pound, Deutch Mark, Japanese Yen, Swiss Franc, Canadian Dollar and French Franc.

### **B - FUTURES CONTRACT SPECIAL FEATURES**

A Futures contract is a legally binding commitment to deliver or take delivery of a given quantity and quality of a commodity during a designated month in the future at a price agreed upon in the trading pit or ring of a commodity exchange.

All transactions are executed in the central location of an exchange by an open outcry competitive auction. Every bid by a buyer is known to every seller and every offer by a seller is known to every buyer. Since the market participants are in the same location, this competition should result in a better price.

However, many participants in the futures market have no intention of ever taking or making delivery. They enter into futures investments planning to close out their positions before the delivery date. It is a fact that less than 3% of the total of contracts traded result in actual delivery of commodities.

Futures brokers charge commissions that ranges from \$30 - \$60 - \$100 on each round-turn contract traded. These commissions are collected only when investors close out their positions by a reversing trade.

Futures contracts have fixed delivery months specified by the sponsoring exchanges. The following table lists the special features of a Gold futures contract traded on the N.Y. Commodity Exchange (COMEX):



**COMEX GOLD**

Delivery Months: FEB, APR, JUN, AUG, OCT and DEC plus the  
current month and the next two calendar months

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Trading Unit: 100 troy ounce

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Minimum Fluctuation: \$0.10 per troy ounce, (\$10.- per contract)

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Daily Price \$25 per ounce as compared to the Settle

Movement Limits: price of the previous day. \$2500 per contract.

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Position Limits: Overall net position limit is 6,000 contracts. Spot  
positions limit is 3,000 contracts.

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Grades Deliverable: 100 troy ounces of refined gold assaying not less than  
0.995 fineness.

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Delivery: By negotiable warehouse receipt issued by and signed  
on behalf of a licensed depository, properly endorsed  
and accompanied by a weight certificate.

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Trading Hours: 9:00 A.M. to 2:30 P.M. U.S. Eastern Time.

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## **C - THE CLEARING HOUSE**

Futures contracts are cleared through the clearing house division or a separate clearing corporation of a commodity exchange. The clearing house assumes the responsibility to the buyer and the seller as a third party guarantor of the transaction. As a measure of protection against loss, the clearing house set procedures to be followed by brokers at all times. These procedures are:

- 1 - To impose initial margin requirements known as performance margin on both buyers and sellers. The initial margin deposited could be done by an interest bearing security such as treasury bills. Initial margins range from 5 to 15 percent of the face value of each contract.
- 2 - Marking the contracts to market at the end of every trading day. This process is done by adjusting the equity in an investor's commodity account in order to reflect the change in the settle of the futures contract.
- 3 - To impose daily maintenance margin requirements known as variation margin on both buyers and sellers. The investor must keep in his commodity account an equity equal to or greater

than 75% to 80% of his initial performance margin. If this requirement is not met, the investor will receive a margin call from his broker. This margin call is a request for an additional deposit of cash. If the investor does not or cannot respond then the broker will close out his position by entering a reversing trade in the investor's account.

The number of contracts outstanding on a certain commodity is called Open Interest on the contract. Long and short positions are not counted separately, meaning that open interest can be defined as either the number of long or short contracts outstanding.

#### **D - REGULATIONS**

Futures markets are regulated by the Commodities Futures Trading Commission (CFTC), a federal agency. The CFTC sets capital requirement for member firms of the futures exchanges, authorizes trading in new contracts, and oversees maintenance of daily trading records.

The futures exchange sets limits on the amount by which futures prices may change from one day to the next. Price limits traditionally are viewed as a means

to limit violent price fluctuations. Price limits are often eliminated as contracts approach maturity, usually in the last month of trading.

### **E - TAXATION**

Because of the mark-to-market procedure, investors do not have control over the tax year in which they realized gains or losses. Therefore, taxes are paid at year end on total profits or losses regardless of whether the position has been closed out.

## PART TWO

### PRESS REVIEWS

## THE FACTORS THAT AFFECTED THE PRICE OF GOLD

### A - OVERVIEW

The free gold market has only been in existence since 1968. During the period 1960 - 1968 the price of gold was still being maintained at the official level of US \$35 per ounce by the gold pool which included the Western European Central Banks and the Federal Reserve Bank of New York. Whenever gold threatened to exceed \$35.- the Bank of England, acting for the pool, sold gold into the London fix and when prices weakened, the bank bought gold back. This system was effective up to 1966 when a substantial rise in physical demand began to put considerable pressure on major currencies and many private investors, fearing devaluation, were starting to move into gold. For the first time the gold pool found itself in the position of being the net seller in the gold market.

Despite the constant outflow of gold from the government stocks the pool continued to sell gold to all buyers at \$35.-. At the end of 1967, the British Government was forced to devalue the pound and an increased demand for gold

from private speculators quickly was stimulated. In March 1968 The United States was already suffering from balance of payments difficulties due to its involvement in the Vietnam War, the demand for gold reached a high level that the London Gold market closed for two weeks at the request of the United States. As it was not applicable to maintain the gold price at \$35.-, the gold pool was dissolved. When the market reopened, a two-tier system was established where official dealings between governments remained at \$35.- and a parallel free market was established to operate at prices determined by supply and demand. The two-tier system was formally abandoned in Nov. 1973 and by late Dec. 1974, gold reached a peak of \$197.50.

Speculation in the U.S. futures markets began to influence the movement of the price of gold. Gold contracts had been introduced on U.S. exchanges at the end of 1974. In 1977, the bull market had initially been triggered by the collapse of the dollar, but the subsequent rise was due to a combination of inflationary expectations, speculation and concern over the deterioration of the international political situation.

The following sections discuss the nature and the trends of the gold market as well as the factors that affected the price of gold to change starting from 1976 up to Jan. 1993.

## **B - 1976 REVIEW**

Gold Price Range: Lowest in Aug. \$104. / oz.

Highest in Dec. \$134.50 / oz.

The major influence on the price of gold was the uncertainties in the European Exchange Markets as reflected by the devaluation of the Spanish and Italian currencies. Furthermore, the weakness of French Franc increased the private demand for gold on the Paris Market. As a result, the heavy purchases of gold coins caused a sudden increase in the bullion market prices. West Germany and Italy alone absorbed 50% of the South African output of gold coins.

Another influence was due to increases in the industrial demand and in purchases for the manufacture of jewelry. The policy of South Africa, the world's largest producer, was that the more gold coins can be sold to private investors and individuals, the less gold it must auction in London and Zurich. By lowering the supply on the major gold markets, South Africa can support the price of gold, aid its exports, and strengthen its economy.

Some experts argued that by the abolition of the official gold price, Central banks would be able to buy and sell gold freely at market prices so the monetary role of the metal was strengthened. The gold holdings of central banks

valued at market prices account for half of the world monetary reserves. The function of monetary gold as a reserve has actually gained in importance. It will continue to be an important component of national wealth and, as such, a measure of a country's solvency. It will continue to be as the principle asset of the central banks and a reserve of last resort.

### **C -1977 MARKET FOCUS**

Gold Price Range: Lowest in Jan. \$132.30 / oz

Highest in Dec. \$164.95 / oz

Investors were gradually shifting from more and more of their assets into gold. In a portfolio a proportion between 5% and 20% seemed as reasonable strategy. The view was rising commodity prices in the U.S and political uncertainty around the world which stimulated investors into gold as a hedge and as a store of value. Along with the increased expectation of inflation industrial demand also helped in shifting the price of gold upward. Middle East Jewellery demand was strong as well.



## **D - 1978 THE BULL MARKET CONTINUE**

Gold Price range: Lowest in Apr, \$170.85 / oz

Highest in Oct, \$242.60 / oz

The same factors that affected the gold price rise in 1977 prevailed in 1978 where the main source of buying came from The Middle East , Far East and North America. The U.S. market, however, was the most powerful influence on the gold price through increased speculative investment demand in the futures markets.

When gold prices rise the world's central banks gold reserves value is increased and thus the metal could back enough paper currency to keep the economy going. However this increase in the money supply is usually accompanied with high rates of inflation and thus high interest rates. The stock market will be shaken because investors tend to go for gold as an inflationary hedge by being a store of value. The cost of capital is high and thus capital expansion is limited and production capacity is decreased. Hence, unemployment rate gets higher.

## E - 1979 ECONOMIC DIARY

Gold Price Range: Lowest in Jan, \$233.70 / oz

Highest in Dec, \$524.00 / oz

The prime factor in the sudden rise to an abnormal value in gold was the almost daily boost in oil prices. The rise in oil prices was simultaneously weakening most major currencies like the Dollar, Yen, Swiss Franc, and the Mark. All these industrial countries were experiencing a very high rate of accelerating inflation. Along with rising inflation, a loss of faith in paper currencies was spreading fast. Investors, mainly speculators were simply withdrawing from paper currencies and equities and switching into gold as a hedge against inflation.

Gold was regarded then as the only satisfactory long-term hard currency investment. Gold was seen as a major international monetary instrument and reserve asset. This increased role of gold was evidenced by Central banks steadily revaluing their gold reserves at higher market prices.

Furthermore, demand for gold was getting stronger ever since the U.S. treasury increased its monthly gold sales to 1.5 million ounces. Bids were received for 5.5 million ounces. This oversubscription reflects the underlying strong demand. This effect was also reflected with the IMF's auction sales as well.

The increased demand was evident also by the heavy buying of wealthy individuals in the Middle East mainly from Iraq, Saudi Arabia, Kuwait, U.A.E., and

Iran. After the freeze of the Iranian funds in U.S. banks due to the American Embassy event in Tehran, Arabs began to realize the dangers behind such acts and started to shift away from the dollar into gold.

Another factor underlying the strong demand was the increasing interest by the U.S. investing public where much of the activity that affected the price of gold took place in the highly speculative futures markets in New York and Chicago. All the above factors made gold prices ride on an emotional tide that carried it too far from equilibrium reflecting fear, greed, or panic inspired by real or imagined financial, political, and economical crises.

#### **F - 1980 REACTION FACTORS**

Gold Price Range: Lowest in Mar, \$475.00 / oz

Highest in Jan, \$850.00 / oz

After being sparked by the rise of oil prices and the freezing of Iranian assets in U.S. banks following the seizure of the U.S. embassy in Tehran, the climax came with the Soviet invasion of Afghanistan in Dec 1979. This resulted in an increased buying of gold which carried prices to a historical peak of \$850.00 per ounce in Jan. 1980. The relative increase in the price of gold had increased the global liquidity with a dangerous level of inflationary consequences. Central

banks in Europe were valuing their official gold reserves at higher market levels and thus sharply raising their ability to borrow and spend. High-priced gold reserves allow both developing and industrial nations to use the metal as a collateral for balance of payments loans and to choose higher debt rather than tighter monetary policies as a means of balancing trade deficits and paying high priced oil.

The considerable increase in the gold price was accompanied by high turnover and hedge demand for investment purposes as well as for speculation. The main reasons for this sudden price rise were the political developments in the Middle East and strong support came from the continuous bullish trends in the American futures markets.

This steep rise was followed by a fall in prices just as rapid when gold reached its bottom price of \$475 at the end of March 1980. The major factor that contributed to the decline of gold prices were:

- 1 - The general panic of the silver futures markets, as a result of irresponsible speculation, spilled over into gold futures and then the physical gold market was unable to stand up against the flood of liquidation of futures contracts and came under selling pressure.

- 2 - Interest rates in the U.S. then rose even faster, and the interest rate differential in favour of the dollar induced many investors to switch from the security and commodity markets into high yielding dollar holdings (deposits) at 18.25% for six months in banks. Oil money were flooding into dollar assets while the precious metal deteriorated. Taking note that the big Middle East investors were not actually selling the gold they own. But with a \$120 billion in new money surplus, all it takes a small shift in the flow into gold or dollars to make a huge difference. That what really took place, a shift in investment into dollars earning high rates of interest. At the same time small investors and hoarders of gold in The U.S. and Europe were dumping the metal for quick cash pushing the price down.
- 3 - Soaring credit costs (high interest rates for lending) pushed individuals and banks towards selling gold to increase their liquidity. Also, it was very expensive to maintain gold positions financed with borrowed money and this led to more liquidation.

On the other hand, gold was a significant part of government reserves around the world, and few central banks would like it to collapse. There was an almost universal agreement that the price of gold would not go very low. Central banks

were bound to come in and support it. With current-account deficits growing, governments needed to borrow in the international credit markets, and gold was perceived as solid collateral. A price around \$450.00 an ounce was perceived as reasonable.

In July 1980 another rapid price increase to \$600 an ounce was due to the following factors:

- 1 - Further oil price rises and the existing energy problems.
- 2 - Continuing high rates of inflation.
- 3 - Increased political tension in the Middle East. Rumors of the killing of American hostages in Iran triggered the first wave of gold buying. In addition, Wealthy Arab individuals were turning back to gold after the bombing of several Arab mayors' houses in the West Bank area of Israel and the failure of talks between Egypt and Israel on West Bank autonomy.
- 4 - Reduction in production supply of the world's greatest producer, South Africa, in an attempt to keep the price from falling below \$500 and in anticipation of further price rises.
- 5 - The Soviet union abstained from selling into the market resulted in a scarcity of physical delivery.

6 - The International Monetary Fund (IMF) officially ended its monthly gold sales auction in May 1980. The U.S. Treasury had not sold any gold to support the dollar since Oct. 1979.

A sharp rise in the price of gold to nearly \$700.00 per ounce on Sep. 12, 1980 appeared to be a repeat of a familiar story. A serious new investment trend among wealthy Arabs investors who were stockpiling large amounts of gold as a reserve asset at home. Swiss customs figures show that Iraq, Kuwait, United Arab Emirates, Iran, and Saudi Arabia imported \$3.9 billion in gold from Switzerland in 1980. It was based on Arab distrust of all paper currencies in time of war and gold was seen as the ultimate reserve asset that offered protection.

The boom in the gold futures market was affected by three elements:

1 - The public interest in gold increased because of a growing concern about the value of the dollar and its purchasing power; oil prices increases; international insecurity; inflation; delays in U.S. government action; absence of an energy plan; and balance of payments deficit. The American people got the message that existed in the rest of the world: If you have money, you must find a way to prevent the passage of time from destroying its purchasing power.

- 2 - The leverage that the futures market provided with a margin deposit between \$2000 and \$3000, allowing the investor to afford buying or selling 100 ounce 9.95% fine gold contract, represents a very small Commitment that the public could take part easily.
- 3 - Unique to the futures market was the low carrying charge which gave the investor and portfolio manager the opportunity to buy gold for future delivery at a very low premium to spot prices.

During periods of intense speculation activity, the futures market have great influence on the price because the paper transactions account for a greater volume in money terms than the physical market. The futures markets are the determining factors in the short-term. Long-term situations are predominated by the conditions on the spot market.



## **G - 1981 THE BEAR MARKET STARTED**

Gold Price Range: Lowest in Dec, \$400 / oz

Highest in Mar \$513.75 / oz

A drop in the price of gold to \$400 / oz in Dec 1981, the lowest since Nov. 1979, was for a number of reasons:

- 1 - High interest rates were driving up carrying charges and the cost of financing to an expensive level. Investors were taking the opportunity of any small rally in gold prices to sell their holdings of a non-interest bearing asset that became increasingly expensive to finance.
- 2 - The market's perception of a relaxed international tension where political chocks had not been enough to stimulate buying. The gold market has become more sophisticated about emotional displays of price movements. Afghanistan took place in a bull market while Anwar Sadat's assassination occurred in a bear market and the psychology of the gold market was totally different as compared to 1980. The gold market suffered a loss of public interest during its decline.

3 - Downward price pressure came from the same factors that decreased the price of oil namely recession and oversupply.

World recession plus falling oil prices, resulted in less cash available for jewelery purchases and commodity speculation. There was also an oversupply of gold.

South Africa withheld some 66 metric tons of gold from world markets in 1980. But with the 1981 current account deficit, it was forced to sell all the gold mined into the market. The Soviet Union was pushed into the bullion market because of its need for hard currency to pay for its \$3.3 billion trade deficit with the West and to finance its purchases of grain, sugar, and meat. All this forced Russia to sell more of its gold into the market and thus the oversupply of gold.

#### **H - 1982 BAD NEWS FOR GOLD**

Gold Price Range: Lowest in Jun, \$317.50 / oz

Highest in Dec, \$456.90 / oz

The main factors behind the decline of the price of gold to below \$320 in June 1982 were:

- 1 - Stocks and bonds were booming.
- 2 - The dollar was strong.
- 3 - Inflation was low and was going lower.
- 4 - Real interest rates were high.
- 5 - Selling by the Soviet Union, together with the unloading of gold from the Middle East. Iraq and Iran sold gold to meet financial difficulties due to the drop in oil prices.
- 6 - In the U.K. the government have taken measures against gold bullions fraud by imposing a Value Added Tax (VAT) of 15% on investors dealing with gold since Apr 1982. This measure was a setback against promoting South African gold coins and bars in Britain.

After reaching a bottom in Jun 1982, gold prices started to climb up again to reach a high of \$456.90 / oz in Dec 1982. The main reason behind the rise was that sentiment began to change as people began to realize that something was wrong in the world of international banking. People with capital in the Third World were the first to show that they preferred to buy gold than deposit money in another country's banking system.

In Aug 1982, Paul Volcker, chairman of the U.S. FED. Reserve, moved rapidly to solve a U.S. banking crisis over the Mexican debt problems. With the banking issue out in the open, gold rose rapidly as a reaction to the lowering of western interest rates.

There were two sources of demand for gold: those who wanted to hold it and those who were forced by the rising price to cover their bear positions.

### **I - 1983 MARKET ANALYSIS**

Gold Price Range: Lowest in Dec, \$381.50 / oz

Highest in Jan, \$499.75 / oz

Gold prices declined rapidly as the U.S. banking crisis was solved by the rescheduling of Mexico's debt. Some of the important factors that enhanced the decrease in gold price were as follows:

- 1 - Gold was in oversupply.
- 2 - South Africa was still selling gold as it was mined.
- 3 - The Soviet Union was continuing to make regular sales.
- 4 - Central banks of some countries in financial trouble were liquidating their gold stocks.

- 5 - Speculators who bought earlier were taking profits by selling to close their positions.
- 6 - Gold buying in the Middle East was drying up as the huge cash surpluses of the oil producing nations were diminishing as the prices of crude oil were dropping. Oil - rich countries started selling their gold which led to a fast selling by speculators and the price of gold went below \$400 an ounce on Dec. 1983.

For gold, both supply and demand can produce big price moves. On the supply side, annual production is accumulated over stocks of gold mined over hundred of years. These stocks can be dumped on the market at any time. But, uptill now this has never happened and the supply of gold is inelastic.

Similarly, a sudden shift in demand can send prices soaring. Indeed, the big price swings during the years, since 1974, reflect shifts in demand. As a result economists were always trying to measure the factors that affect the demand for gold. Gold markets are not mysterious. Demand can be understood by using the basic tools for economic analysis. Economists found that the major force pushing up the demand for gold is not the current rate of inflation but rather the fear of future inflation. They believe that the best way to forecast inflation is to look at the increases in the worldwide money supply relative to the amount needed to sustain economic growth. They found that for every 1% increase in excess

liquidity the price of gold goes up by 2%. Likewise, when world political tension intensify, demand for gold goes up.

Although central banks were trying to keep money growth low, the less developed oil-producing countries like Mexico and Venezuela were in financial difficulties because of weak oil prices and central banks thus will have to expand money supply to provide them with credit.

As the world money supply increases it will give a signal of future inflation and that would push up the price of gold. However, some analysts believe that weak oil prices alone will decrease gold prices since the ability of OPEC members to buy gold would be reduced. It might even encourage them to sell.

#### **J - 1984 PSYCHOLOGICAL POINT**

Gold prices were falling but in a thin market. The price was heading towards the important psychological barrier of \$300.00 per oz. There seemed to be a correlation between volume of contracts traded on the gold futures markets and volatility of the price of gold. The closer the price gets to the cost of production, the less volatile it becomes. Cost of production, at that time, was estimated at \$247.00 per ounce on the average for the non-communist world. As the price of gold gets volatile the greater the volume of contracts traded would be.

Gold's main attraction is its tradeability. It is the most liquid asset of all. Its role as a store of value is reflected by the unwillingness of the big central banks, who hold more than 75% of total production of gold, to reduce their holdings. This tells us something about their need to retain gold as an asset.

The strength and stability of the dollar eliminated another source of gold demand. That situation was reinforced by the continuing slide of the British Pound upto 1.17 against the dollar on Dec. 19, 1984.

The low oil prices decreased oil revenues which resulted in a major source of gold demand reduction.

The first sign that a major selling of gold came from Hong kong on Dec 15, 1984, which quickly spread to London and New York. The recognition for that time was not to hold gold as an inflation hedge nor as a shelter from economical or political uncertainty. A dramatic liquidation of gold was taking place.

#### **K - 1985 UNDER REVIEW**

Gold during the year traded between \$290 and \$330 an ounce. The same reason prevailed for the past three years where disinflation pushed the prices way below its previous levels.

Gold as a metal behaves as it always does like a financial instrument. High real interest rates in America were making the dollar a more attractive investment than gold a non-interest bearing metal. Steadier recovery in the world economy raised hopes of non-inflationary growth and rendered gold, as an old fashioned inflation hedge, in excess - i.e. less investors would be interested in gold as an investment. As speculators search for more excitable things to trade gold becomes more like an ordinary commodity influenced by the balance between supply and demand.

Physical demand for gold for 1985 was strong. This was why the price of gold did not fall below \$300 that much.

Canada is the second biggest gold producer in the non-communist world after South Africa. While South Africa was in battle with labor unrest and increasing production costs, the Canadians were opening new mines, expanding existing ones and selling record numbers of maple leaf gold coins. Investors shifted to buy shares of Canadian gold mines because it had political and economical stability, while South Africa had neither. Costs at most Canadian mines were well below the production costs of South Africa.



### **L - 1986 A ROYAL CELEBRATION**

Gold price range fluctuated between \$345.3 and \$429.80 an ounce. The main reason behind the rise was a sharp increase of demand. Most of this demand came from Japan. To celebrate Emperor Hirohito's 60 years as sovereign with a special set of coins helped with a rising Yen (20%) against the dollar which made gold cheap for the Japanese government and its people, they bought about 40% of all gold supplied to the market in 1986.

A falling dollar helped in the rise of gold of about 15%. The appreciation of major European currencies made gold cheap for investors and industrial users. Because of talks about sanctions against South Africa by the west, fears of disruption of gold and platinum supplies made speculators very active in the futures markets. A rally in platinum was spilling over into gold. Platinum prices were soaring to a five year high of \$560 per oz on Aug. 11, 1986. Gold zoomed up 16% to reach over \$400.

### **M - 1987 STOCK MARKET CRASH**

After a 16% increase in 1986, gold was an additional 25% in 1987 to range from \$422.90 and \$491 an ounce. The reason behind the rise was the deep emotional

fear of a slowdown in world economic growth, rising inflation, and a crash of the dollar and world stock markets on Oct 19, 1987.

Gold remains the most popular of the hedge metals. Silver and Platinum are more volatile than gold, but their usefulness as an inflation hedge is reduced by the big effect of their industrial demand.

#### **N - 1988 COST OF PRODUCTION AFFECT SUPPLY**

Gold price fell from \$478.5 in Jan down to \$399.20 in Sep 1988 was due to the following:

- 1 - Increased gold production affected prices due to increased supply by the continued selling of gold by the Soviet Union and other East Bloc nations in order to purchase grain.
- 2 - Oil prices had fallen to a two-year low.
- 3 - The dollar had strengthened.
- 4 - The Bond Market had rallied.

There is no business like gold. Companies spend fortunes looking for a commodity which has limited practical use. If they are lucky and strike gold,

there is no way they can add value to their product. Instead all gold mines receive the same price. They can compete with each other only by producing it at the lowest cost.

During the period 1980 - 1988, new finds around the world changed the structure of world gold-mining industry. The biggest loser was South Africa. South Africa's share of non-communist world production fell from 70% in 1980 to 44% in 1988. The total world production was rising fast where most of the increase came from America, Canada, and Australia.

Gold was found also in Indonesia, Ireland, the Amazon Jungle, and Papua New Guinea. At these mines, the average cost of producing an ounce of gold was around \$200. Some had costs around \$100 an ounce. In South Africa, however, the average cost was \$305 an ounce. South Africa had moved from being the lowest-cost gold producer to being the highest among big producers. The reason was because of its gold was deep in the ground and the cost of labor needed to get it to the surface was rising rapidly.

Although South Africa was the highest-cost producer, it still sits on the largest and richest known reserves in the world. They have reserves to cover another 45 years of production.

## O - 1989 ACTION & REACTION

In the financial markets, as in physics, for every action there is an equal and opposite reaction. In May 1989, influenced by declining interest rates and low inflation, equities climbed to a 20 month high since Sep. 1977. Utility stocks traditional beneficiaries of low interest rates, soared to their highest levels ever. But there was no good news among investors in gold. Gold declined to its lowest level in three years since Sep. 1986 trading at \$365 an ounce. With interest rates running well above inflation, investors needed something that can offer a return for their money.

Even if there is a rise in inflation and the dollar weakened, it is uncertain whether there would be a gold rush again. Hedgers might instead move into currency and interest rate options and futures as a hedge against inflation.

After a long, slow decline through 1989, gold was steadily climbing up to reach \$400 per ounce in Nov. 1989. Certainly none of the usual reasons were behind the rise:

- 1 - There was not a hint for accelerating inflation.
- 2 - The world's political anxiety level had been fallen as quickly as the Berlin's Wall.
- 3 - The strike threats at the mines in South Africa were non-existent.

However, the gold rally which started in Sep 1989 when the dollar weakened a bit after a long climb, was due to renewed buying coming from Japan, Switzerland, and the Middle East. Gold was benefiting from the 190 point drop in the stock market on Oct 13, 1989. But the major influence was because Japanese property and casualty insurance companies gained permission to invest upto 3% of their assets in gold. Although purchases had been moderate the potential of these insurance companies if they bought up to their limit, could be \$4.2 billion into gold.

In recent years, every time the gold price picked up so did supply. Producers would flood the market with the metal to satisfy demand and drive prices back down. This year, however, foreign and domestic (U.S.) producers were holding back supplies in expectation of higher prices to come.

#### **P 1990 - 1991 - 1992 THREE YEARS OF CONSECUTIVE BEAR MARKET**

For the past three years, with few exceptions, the price of gold ranged in narrow trading that have moved lower every year. After reaching more than \$500 an ounce in 1987 when the stock market crashed gold prices fell down more than 30% to reach \$328 an ounce by the end of Dec. 1992, a seven-year low.

Gold is lacking interest from investors and speculators where a large number of them is needed to provide the liquidity to support a rally. Even the price volatility that once made gold a good speculative investment is at a minimum nowadays. Daily price swings of \$5 an ounce are considered significant, while moves of \$30 a day were common in the early 1980's. Over the past two years, the annual trading range for gold prices was only 9% as compared with swings of 20% to 40% in the first half of the eighties.

World economic growth is slow, inflation rate is low, gold supplies are plentiful and investors are looking to put money into assets that not only gain in price but earn some income as well. Real interest rates are high and the share and bond markets are strong.

Investors today are not driven by an inflationary psychology. Inflation in the U.S. is running at about 3% annually, which is far from the double-digit levels that in the past have driven investors to gold. Some analysts argue that even if inflation becomes a concern in a year from now, new financial instruments like futures, options and other derivatives provide investors with effective alternatives to gold's role as an inflation hedge. These interest rate and currency futures and options can be traded as easily as gold. Furthermore, financial deregulation and new technology provide investors with effective means to relocate their wealth very easily. Speculators mostly left the market because they see little profit to be made in gold.

For the past three years demand from jewelery and other industrial users has exceeded world gold production and it is expected to do so again in 1993. Last year, demand for gold was estimated at 82 million ounces which is well above the 57 million ounces of western mining production.

This demand over supply is offset by more than 17 years of mine production hidden away in central banks vaults. The sales by the central banks of Holland and Belgium in Oct. and Nov. 1992 matched the whole of South Africa's output last year. The Dutch Central bank sold 400 tons of gold which is the largest official sale since the Industrial Monetary Fund auction sales in 1970s.

The Central bank of Japan, Brazil, and Canada have been heavy sellers over the past year and a half. Looking ahead, the market now will be expecting further central bank sales, possibly from Italy, France, or Germany.

Fear of political confusion and global war have died with the Soviet Union. Saddam Hussein's invasion of Kuwait two years ago sent gold price up \$42 an ounce to \$415.-. But the price fell quickly to its previous level. Has gold just become like any other commodity? Will it have enough reasons to reach the \$500 & the \$600 peaks of the eighties? Analysts expect that 1993 will bring some rallies in gold, but the price is not likely to go far beyond \$370 an ounce. Central banks in industrial countries still hold, on average, 40% of their foreign reserves in gold. The main reason foreign reserves are held today is to steady

exchange rates, not to finance balance of payment deficits. Gold is considered less liquid than foreign currency and thus less useful for intervention.

The main buyers of gold in the market now are investors from the Far East: Taiwan, Singapore, and Hong Kong. They still value gold as a long-term investment.

## **PART THREE**

### **TECHNICAL ANALYSIS**

#### **A - INTRODUCTION**

To be successful, technical analysis should be regarded as an art, not a science. The disciplined investor, who has a good knowledge of the principles underlying major movements in the market and a balanced view of its technical position, is offered a much superior framework within which to operate. Independent thought is of great importance where action is upto the analyst to



put the pieces together and come up with a working hypothesis whereby the ultimate test is in a real-life situation.

Technical analysis refers to a study of the market itself rather than of the external factors that affect the supply and demand. Technical analyst utilize the statistics generated by the markets. Those who rely on their judgement to make trading decision may use technical devices to enhance their judgement. Others believe that past actions of the market alone may be utilized to reach meaningful conclusions about futures markets.

There are four areas of technical analysis:

- 1 - Patterns on price charts.
- 2 - Trend-following methods.
- 3 - Character-of-market analysis.
- 4 - Structural theories.

To go into detail on any one method would be beyond the scope of this project since many books on technical analysis are available. Chart patterns are almost completely subjective. Character-of-market analysis like oscillators, on-balance volume, and open interest all work well in trading markets and not in trending markets. Structural theories are based on a seasonal or cyclical price movements. They have the tendency to become well known and it can be totally discounted in the price like any other fundamental or technical inputs.

After studying the gold market, I have been able to determine that it is a trending market and only trend-following techniques can be applied.

The concentration of the work will be on the use of trend-following methods in order to formulate a trading strategy.

A trend following technique is by definition, objective. All the elements must be clearly defined before it can be put into practice. This means that a trader can, if

he has the facilities, determine how well any technique has worked in the past and define its important characteristics. Any number of variations can be checked many times in an attempt to optimize results. This way it is almost impossible for a major trend to occur without being able to participate in it.

Through the use of a software computer program called Metastock Professional, I have been able to work with, analyse, and test more than 40 different indicators of which only 3 trend-following indicators have given positive and favourable results.

The 3 indicators are:

- 1 - The Moving Average Convergence/Divergence indicator (MACD).
- 2 - Parabolic SAR indicator.
- 3 - ZIG ZAG indicator.

The above indicators have been applied on past daily data since Dec 31,1991 on seven gold futures contract months, listed below:

- 1 - GF DEC 92.
- 2 - GF FEB 93.
- 3 - GF APR 93.

4 - GF JUN 93.

5 - GF AUG 93.

6 - GF OCT 93.

7 - GF DEC 93.

Futures contracts are subject to standard size and trading requirements imposed by the exchanges. Each single gold future is 100 troy ounces of gold, priced on a per ounce basis for each delivery month. We can take either long or short positions which means either buying or selling futures contracts. Let us assume that we allocate \$50,000.- as the maximum amount of capital risked for speculation in gold futures.

Initial margin requirement for each contract is \$2,500.-, we will allocate \$25,000.- in initial deposit in order to buy or sell 10 contracts on every trade. The remaining \$25,000.- will be used as a variation margin in case needed for marking to the market. Commission on closed deals amount to \$50.- per contract - i.e. \$500 per 10 contracts. The gold market to follow is traded on the Commodity Exchange Inc., New York (COMEX).

The trading strategy is to take positions on every trading signal given by any of the three indicators. We can take either both long and short positions, short positions, or long positions only. A stop and reverse (SAR) order is to be made on a daily basis through out the whole trading period. This is very important to

the trading strategy in order to cut our losses as early as possible and initiate new trades at the best possible entry.

In the following sections a brief discussion of how each indicator works and the given results will be tabulated. Our objective is to locate profitable trades in the short, and intermediate - trend.

### **B - MOVING AVERAGE CONVERGENCE / DIVERGENCE (MACD)**

The MACD indicator, when displayed by Metastock on the computer screen, is calculated by subtracting the value of 26 - day exponential moving average from a 12 - day exponential moving average. Then a 9 - day dotted moving average (the trigger line) is automatically displayed on top of the MACD indicator line. A variation on the MACD can be created by using different periods of the trigger line.

### **INTERPRETATION**

The basic MACD trading rule is to sell when the MACD falls below its 9 - day trigger line. Similarly, a buy signal occurs when the MACD rises above its trigger

line. The buy / sell arrows are automatically displayed using Metastock's Profitability Tester. In order to optimize outcome by maximizing profits and minimizing losses different variation were tested and the best results are tabulated below:

In table 1, the results were achieved by applying a 9 unit move average of MACD which is recommended by the program. However, in table 2 a blind simulation was conducted to reach better results by applying a variation of moving average units for each contract month.

In table 1, the best trades are reached by following the short positions only in all the contracts except for that of Dec 92, where both short and long positions gave 84.6% return on investment (ROI) as compared to 84.8% ROI in the short of Dec 93.

The reason behind the good result of trading short positions only is that the main trend of the market is bearish. Prices fell down from \$370.- in Jan 92 to \$335 in Nov 92. The highest ROI was 84.8% in GF Dec 93 and the lowest was -35.8% in GF Oct 93.

After applying blind simulation all the results in table 2 were improved to reach the highest ROI in GF Dec 92, 96.4%, and the lowest in GF Oct 93 was -22%. Again, trading short positions yielded a higher ROI except that for GF Dec 92.

PROFITABILITY TEST RESULTS  
MOVING AVERAGE REVERSAL  
MACD INDICAT  
9 UNIT M.A. OF INDICATOR

TABLE 1

CONTRACTS	GF DEC 92			GF FEB 93			GF APR 93			GF JUN 93			GF AUG 93			GF OCT 93			GF DEC 93		
	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L
TOTAL NO. OF TRADES	11	5	6	12	6	6	12	6	6	14	7	7	14	7	7	12	6	6	12	6	6
PROFITABLE TRADES	6	3	3	6	4	2	7	4	3	6	4	2	6	4	2	6	4	2	7	5	2
PROFITABLE %	54	60	50	50	66.7	33.3	58	66.7	50	43	57.1	28.6	43	57.1	28.6	50	66.7	33.3	58.33	83.3	33.3
BIGGEST GAIN	10	19	13.7	18.3	18.3	12.3	19.2	19.2	14.7	16.5	16.5	12	19.6	19.6	13.1	19.9	19.9	10.6	18.5	18.5	8.3
BIGGEST LOSS	-4.4	-3.5	-4.4	-5.8	-3.7	-5.8	-6.8	-3.8	-6.8	-6.1	-5.3	-6.1	-7.4	-7.4	-7.4	-14.5	-7.2	-14.5	-6.9	-0.5	-6.9
TOTAL GAIN/LOSS	47.8	40.2	7.6	37.3	37.6	-0.3	44	42.1	1.9	29.6	35.1	-5.5	31.9	37.8	-5.9	11.6	26.5	-14.9	44.5	45.4	-0.9
POINTS/OUNCE	47800	40200	7600	37300	37600	-300	44000	42100	1900	29600	35100	-5500	31900	37800	-5900	11600	26500	-14900	44500	45400	-900
TOTAL COMMISSION PAID	5500	2500	3000	6000	3000	3000	6000	3000	3000	7000	3500	3500	7000	3500	3500	6000	3000	3000	6000	3000	3000
NET GAIN/LOSS	42300	37700	4600	31300	34600	-3300	38000	39100	-1100	22600	31600	-9000	24900	34300	-9400	5600	23500	-17900	38500	42400	-3900
ROI = NET G.L./\$50,000 = %	84.6	75.4	9.2	62.6	69.2	-6.6	76	78.2	-2.2	45.2	63.2	-18	49.8	68.6	-18.8	11.2	47	-35.8	77	84.8	-7.8

**BLIND SIMULATION  
PROFITABILITY TEST RESULTS  
MOVING AVERAGE REVERSAL  
MACD INDICATOR**

**TABLE 2**

CONTRACTS	GF DEC 92			GF FEB 93			GF APR 93			GF JUN 93			GF AUG 93			GF OCT 93			GF DEC 93		
	15-UNIT M.A.			15-UNIT M.A.			13-UNIT M.A.			14-UNIT M.A.			13-UNIT M.A.			14-UNIT M.A.			12-UNIT M.A.		
	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L
TOTAL NO. OF TRADES	6	3	3	8	4	4	10	5	5	8	4	4	10	5	5	12	6	6	10	5	5
PROFITABLE TRADES	6	3	3	5	3	2	7	4	3	6	4	2	7	5	2	8	6	2	7	5	2
PROFITABLE %	100.00	100.00	100.00	62.50	75.00	50.00	70.00	80.00	60.00	75.00	100.00	50.00	70.00	100.00	40.00	66.67	100.00	33.30	70.00	100.00	40.00
BIGGEST GAIN	20.50	20.50	7.20	18.40	18.40	6.70	19.00	19.00	6.80	18.00	18.00	6.60	15.10	15.10	7.30	12.90	12.90	6.90	18.20	18.20	9.60
BIGGEST LOSS	0.00	0.00	0.00	-6.30	-0.40	-6.30	-6.90	-2.20	-6.90	-6.60	0.00	-6.60	-6.90	-6.90	-6.90	-9.40	0.00	-9.40	-7.60	0.00	-7.60
TOTAL GAIN/LOSS																					
POINTS/OUNCE	51.20	41.40	9.80	38.90	38.90	0.00	37.20	39.40	-2.20	48.80	45.40	3.40	30.80	38.00	-7.20	26.90	34.90	-8.00	46.80	47.30	-0.50
TOTAL GAIN/LOSS																					
\$/10 CONTRACTS	51200	41400	9800	38900	38900	0	37200	39400	-2200	48800	45400	3400	30800	38900	-7200	26900	34900	-8000	46800	47300	-500
TOTAL COMMISSION PAID	3000	1500	1500	4000	2000	2000	5000	2500	2500	4000	2000	2000	5000	2500	2500	6000	3000	3000	5000	2500	2500
NET GAIN/LOSS																					
\$/10 CONTRACTS	48200	39900	8300	34900	36900	-2000	32200	36900	-4700	44800	43400	1400	25800	35500	-9700	20900	31900	-11000	41800	44800	-3000
RETURN ON INVESTMENT																					
ROI = NET G.L./\$50,000=%	96.4	79.8	16.6	69.8	73.8	-4.0	64.4	73.8	-9.4	89.6	86.8	2.8	51.6	71.0	-19.4	41.8	63.8	-22.0	83.6	89.6	-6.0



## **C - PARABOLIC SAR**

The parabolic Time / Price system, developed by J. Welles Wilder, is explained thoroughly in his book, *New Concepts in Technical Trading Systems* (page 9). This indicator is used to set price stops and is often called the Stop-and-Reverse (SAR) indicator. The parabolic indicators is calculated as follows:

$$\text{SAR(Tomorrow)} = \text{SAR(Today)} \pm \text{AF} (\text{EP(Trade)} - \text{SAR(Today)})$$
 where AF, the accelerating factor, begins at 0.02 and is increased by 0.02 until a value of 0.2 is reached. The AF is increased each day a new high or new low is made. EP(Trade) is the extreme price point for the trade made so far. If long, EP is the extreme high price for the trade. If short, EP is the extreme low price for the trade. For the first day of entry the SAR is the previous extreme point (EPTrade). The +/- represents the sign at which we add if we are long and subtract if we are short.

## **INTERPRETATION**

If we are long (i.e the price above SAR), the SAR will move up every day, regardless of the direction the price is moving. The amount the SAR moves up depends on the amount that prices move. The parabolic SAR provides excellent stops. We should close long positions when the price falls below the SAR and close short positions when the price rises above the SAR.

The results that is generated by using the parabolic SAR indicator are listed in table 3. The highest return on investment is reached by trading both long and short positions, 120%, in GF Feb 93. The lowest ROI, -28.6%, is reached in GF OCT 93.

#### **D - ZIG ZAG**

The ZIG ZAG indicator filters out changes in the data item that are less than x percent or points. If a 5% ZIG ZAG was displayed, the indicator does not show changes in the price of the security that are less than 5%.

Trying a blind simulation by applying the moving average indicator penetration, Table 4 summerizes the results generated by applying a variation of moving average units to various percentages of the ZIG ZAG indicator. Contract months GF Dec 92 through GF Aug 93 performed well under a 2% ZIG ZAG indicator.

PROFITABILITY TEST RESULTS  
PARABOLIC SAR  
(0.02 / 0.20)

TABLE 3

CONTRACTS	GF DEC 92		GF FEB 93		GF APR 93		GF JUN 93		GF AUG 93		GF OCT 93		GF DEC 93				
	S	L	S	L	S	L	S	L	S	L	S	L	S	L			
<b>RESULTS</b>																	
TOTAL NO. OF TRADES	14	7	11	6	15	8	13	7	6	17	9	8	16	8	13	7	6
PROFITABLE TRADES	8	5	7	5	9	6	8	5	3	6	4	2	7	5	7	5	2
PROFITABLE %	57.14	71.43	63.64	83.33	60.00	75.00	61.54	71.43	50.00	35.29	44.44	25.00	43.75	62.50	53.85	71.43	33.33
BIGGEST GAIN	18.90	18.60	17.10	16.20	16.60	16.60	16.00	16.00	10.20	15.40	15.40	8.40	16.60	16.60	16.80	16.80	11.70
BIGGEST LOSS	-4.90	-4.90	-3.60	-3.60	-7.30	-3.50	-5.20	-5.20	-4.30	-6.50	-5.40	-6.50	-10.90	-10.90	-5.80	-4.00	-5.80
TOTAL GAIN/LOSS																	
POINTS/OUNCE	54.40	43.00	65.90	50.40	36.40	36.40	53.80	45.70	8.10	19.10	28.90	-9.80	23.30	33.60	37.50	39.30	-1.80
TOTAL GAIN/LOSS																	
\$/10 CONTRACTS	54400	43000	65900	50400	36400	36400	53800	45700	8160	19100	28900	-9800	23300	33600	37500	39300	-1800
TOTAL COMMISSION PAID	7000	3500	5500	3000	7500	4000	6500	3500	3000	8500	4500	4000	8000	4000	6500	3500	3000
NET GAIN/LOSS																	
\$/10 CONTRACTS	47400	39500	60400	47400	28900	32400	47300	42200	5100	10600	24400	-13800	15300	29600	31000	35800	-4800
RETURN ON INVESTMENT																	
ROI = NET G.L./\$50,000=%	94.8	79.0	120.8	94.8	57.8	64.8	94.6	84.4	10.2	21.2	48.8	-27.6	30.6	59.2	62.0	71.6	-9.6

**BLIND SIMULATION  
PROFITABILITY TEST RESULTS  
MOVING AVERAGE REVERSAL PENETRATION**

**TABLE 4**

RESULTS	2% ZIG ZAG										3% ZIG ZAG									
	GF DEC 92		GF FEB 93		GF APR 93		GF JUN 93		GF AUG 93		GF OCT 93		GF DEC 93		GF OCT 93		GF DEC 93			
	22 UNIT M.A.		21 UNIT M.A.		20 UNIT M.A.		22 UNIT M.A.		23 UNIT M.A.		18 UNIT M.A.		19 UNIT M.A.		18 UNIT M.A.		19 UNIT M.A.			
	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L	S	L	S&L		
TOTAL NO. OF TRADES	6	3	7	4	3	7	4	3	9	5	4	7	4	3	5	3	2	5	3	
PROFITABLE TRADES	5	3	6	4	2	6	4	2	7	4	3	6	4	2	5	3	2	5	3	
PROFITABLE %	83.33	100.00	85.71	100.00	66.67	85.71	100.00	66.67	77.78	80.00	75.00	85.71	100.00	66.67	100.00	100.00	100.00	100.00	100.00	
BIGGEST GAIN	24.20	24.20	23.40	23.40	19.20	22.20	22.20	17.50	24.50	24.50	17.40	24.30	24.30	17.30	23.20	23.20	13.50	23.60	23.60	
BIGGEST LOSS	-1.50	0.00	-2.10	0.00	-2.10	-2.70	0.00	-2.70	-4.00	-4.00	-1.90	-2.00	0.00	-2.00	0.00	0.00	0.00	0.00	0.00	
TOTAL GAIN/LOSS	87.70	61.20	89.20	64.00	25.20	88.10	64.00	24.10	87.60	65.30	22.30	87.00	65.40	21.60	84.00	62.90	21.10	91.00	68.40	
POINTS/OUNCE	87.70	61.20	89.20	64.00	25.20	88.10	64.00	24.10	87.60	65.30	22.30	87.00	65.40	21.60	84.00	62.90	21.10	91.00	68.40	
TOTAL GAIN/LOSS	87.70	61.20	89.20	64.00	25.20	88.10	64.00	24.10	87.60	65.30	22.30	87.00	65.40	21.60	84.00	62.90	21.10	91.00	68.40	
\$/10 CONTRACTS	87700	61200	89200	64000	25200	88100	64000	24100	87600	65300	22300	87000	65400	21600	84000	62900	21100	91000	68400	
TOTAL COMMISSION PAID	3000	1500	3500	2000	1500	3500	2000	1500	4500	2500	2000	3500	2000	1500	2500	1500	1000	2500	1500	
NET GAIN/LOSS	84700	59700	85700	62000	23700	84600	62000	22600	83100	62800	20300	83500	63400	20100	81500	61400	20100	88500	66900	
\$/10 CONTRACTS	84700	59700	85700	62000	23700	84600	62000	22600	83100	62800	20300	83500	63400	20100	81500	61400	20100	88500	66900	
RETURN ON INVESTMENT	169.4	119.4	171.4	124.0	47.4	169.2	124.0	45.2	166.2	125.6	40.6	167.0	126.8	40.2	163.0	122.8	40.2	177.0	133.8	
ROI = NET G.L./\$50,000=%	169.4	119.4	171.4	124.0	47.4	169.2	124.0	45.2	166.2	125.6	40.6	167.0	126.8	40.2	163.0	122.8	40.2	177.0	133.8	

but for GF Oct 93 and GF Dec 93 the best results were achieved under a 3% ZIG ZAG filtering. The highest ROI is reached in GF Dec 92 and GF Apr 93, 169.4% and 169.20% respectively. The lowest ROI is reached in GF Oct 93 equal to 40.2%.

This indicator has limited the number of trades to a minimum while producing the highest ROI as compared to the previous 2 indicators. Also, it generated the highest percentage of profitable trades.

#### **E - CONCLUSION**

The trader must not rely on any one indicator alone. He must endeavor to select a set or group of indicators that would enhance his ability to highlight his entry and exist points. The gold market has been a trending market and the three indicators discussed above performed well since they are a trend following indicators. For a trader to be successful, he should analyse the market on a daily basis to determine any changes in the market and to define his set of indicators to produce buy / sell signals at the best possible point. Furthermore, no one indicator performs well all the time. The situation might change depending on the factors that can affect prices. The aware trader study his move very carefully and does not hesitate to take action when it is needed.

The three indicators if applied together in a trending market might produce positive results as we have seen, but this is only a paper simulation case whereas the ultimate test would be in a real life situation.

The psychological build-up of a trader, his discipline reflected in the ability to follow a trading plan and the tolerance to the amount of risk involved, all play very important part in trading futures.

Listed below are some strategic principles that should be seriously considered in every trading plan:

- 1 - Do not overtrade. Overtrading means that the trader does not know where he is going.
- 2 - Always wait for a near perfect situation. In most markets important long or short trends only come between 2 - 5 times a year.
- 3 - Set your objectives in advance. Do not make a trade unless you know where you are going to get out.
- 4 - Diversification reduces risk. A trader can follow, analyse, and invest in at least 3 different markets.
- 5 - Always try to maintain some cash reserves at all times. Never commit more than you can afford.
- 6 - Avoid trading against the main trend.

7 - Do not let success go to your head. If you find that your positions are continually making profits, it is time to move some of these profits out of the account.

For further details , please refer to the appendix (page 61 ) for the relative charts displayed for some of the contracts together with their relative indicators. Furthermore , a sample of the profitability summaries together with a list of ( high , low , close ) prices plus their relative indicator values and the last moving average values is reported as well .

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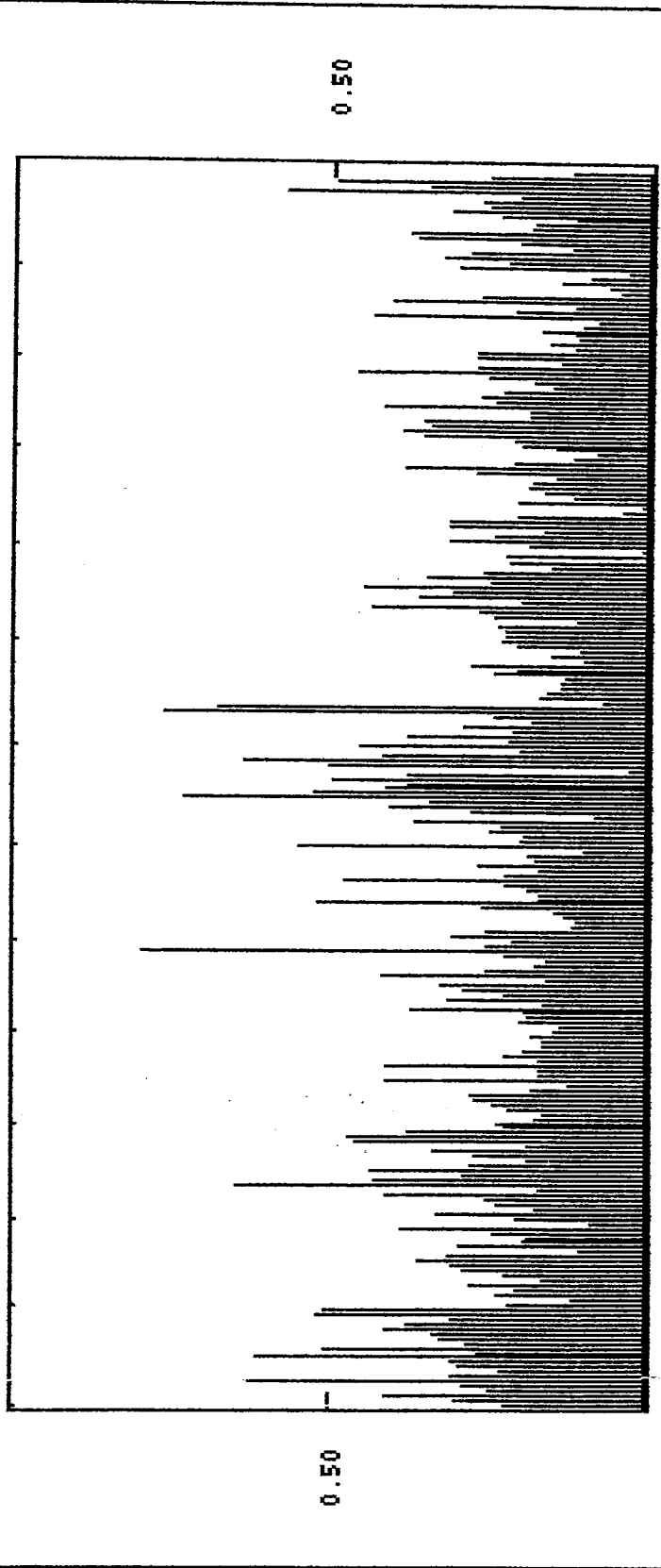
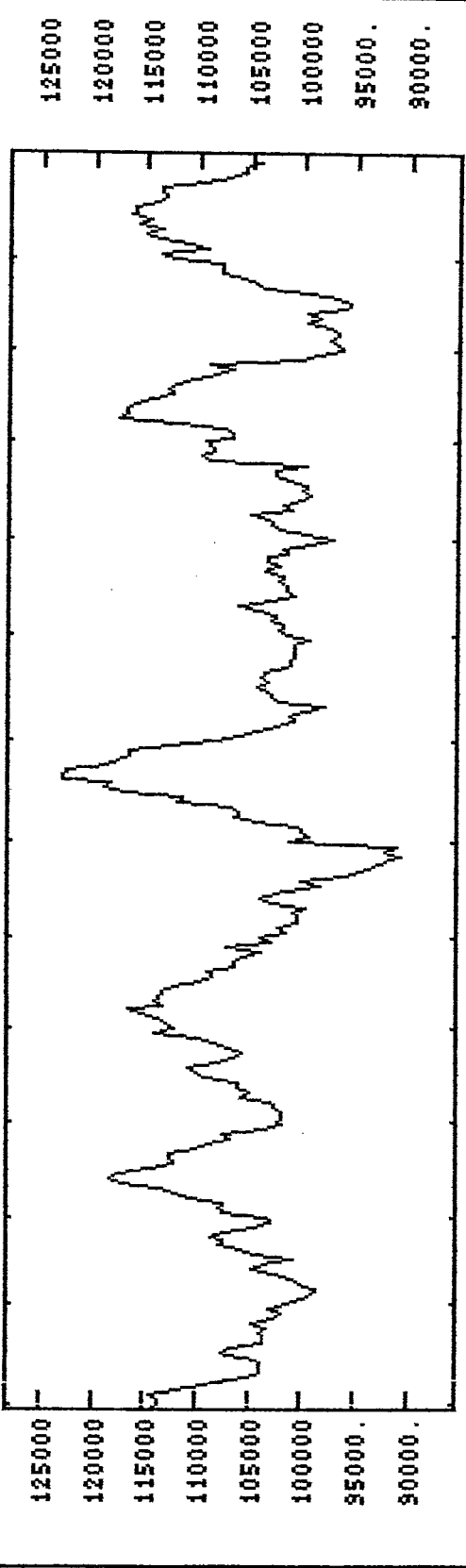
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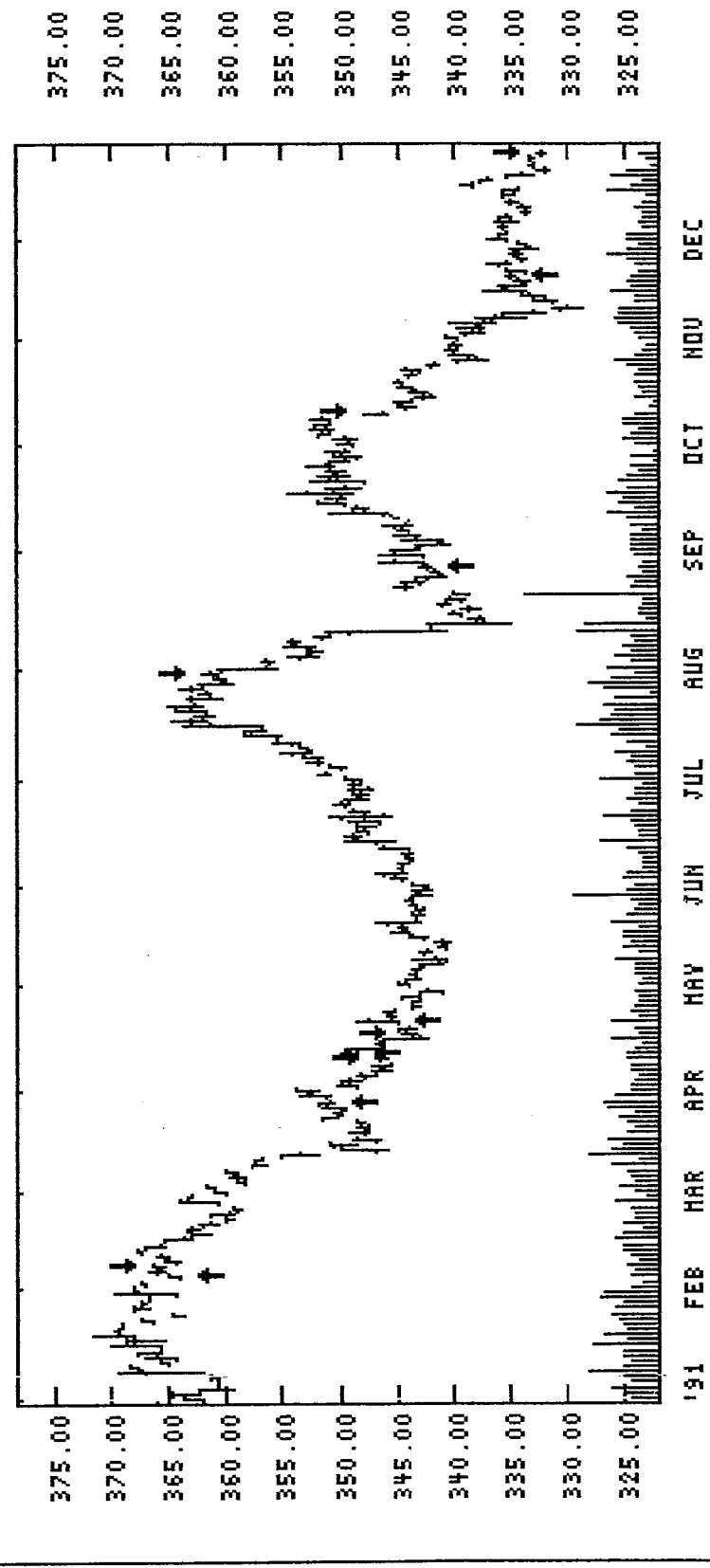
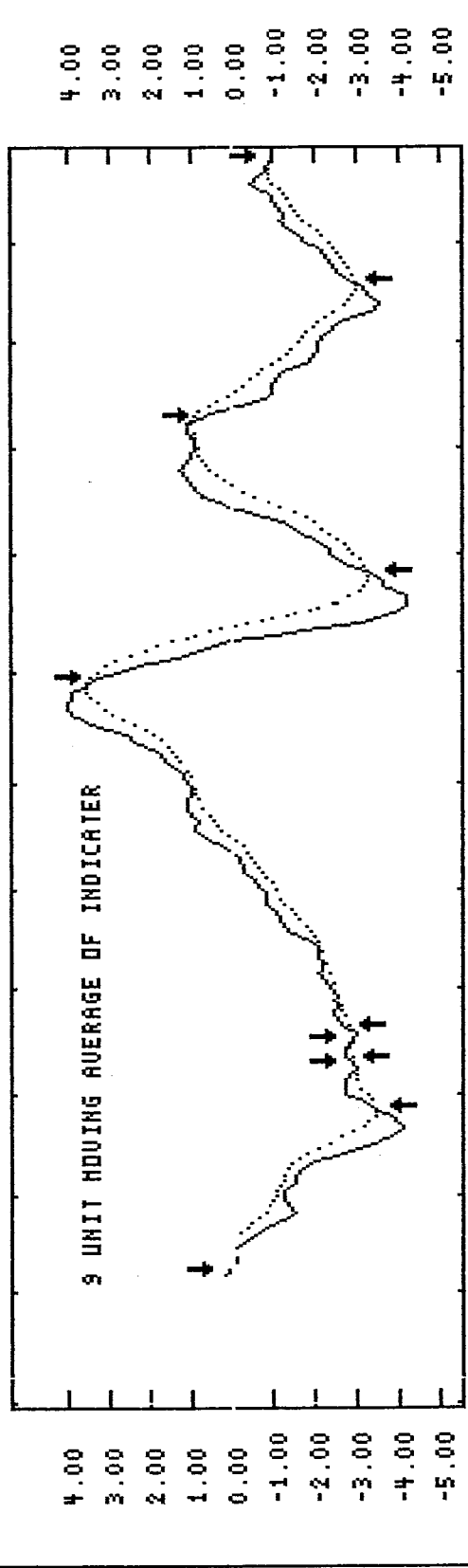
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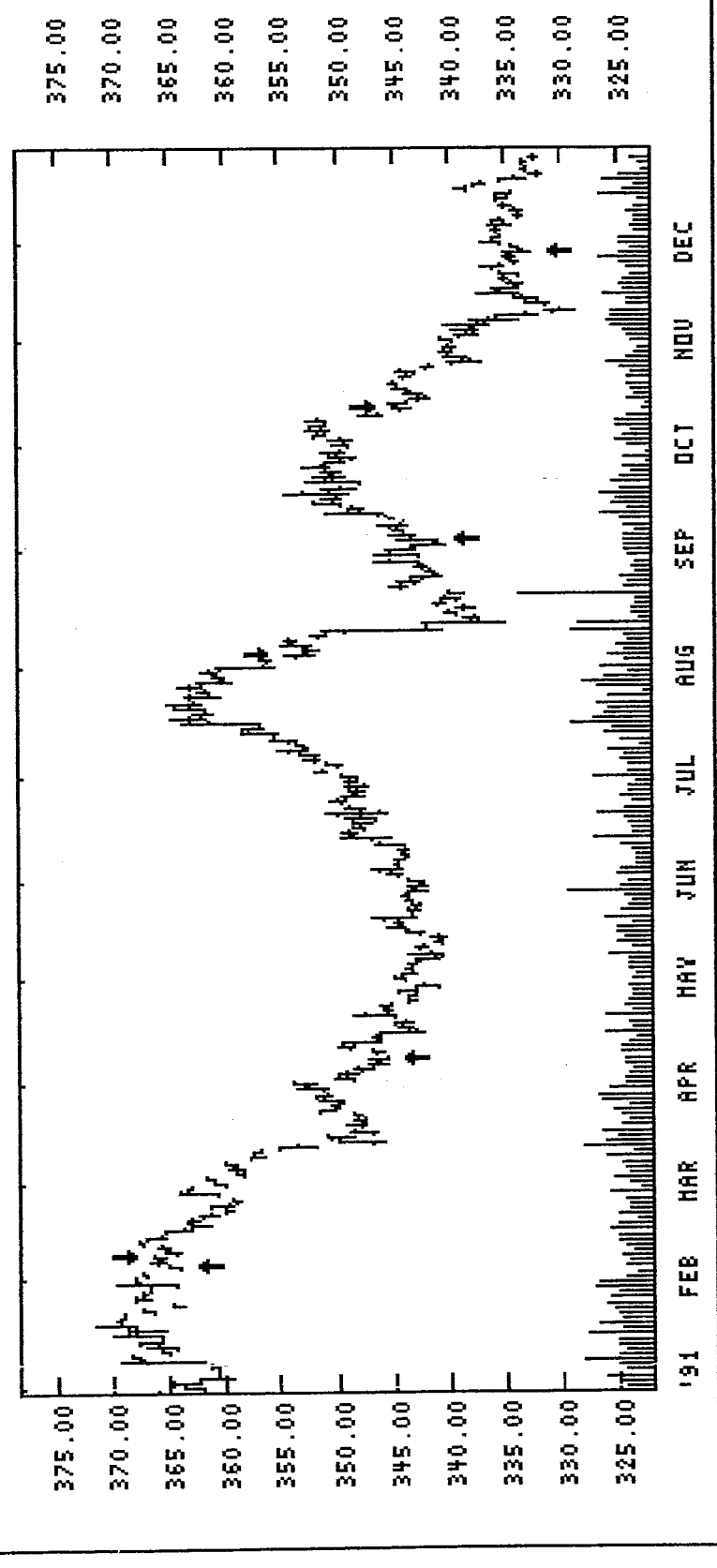
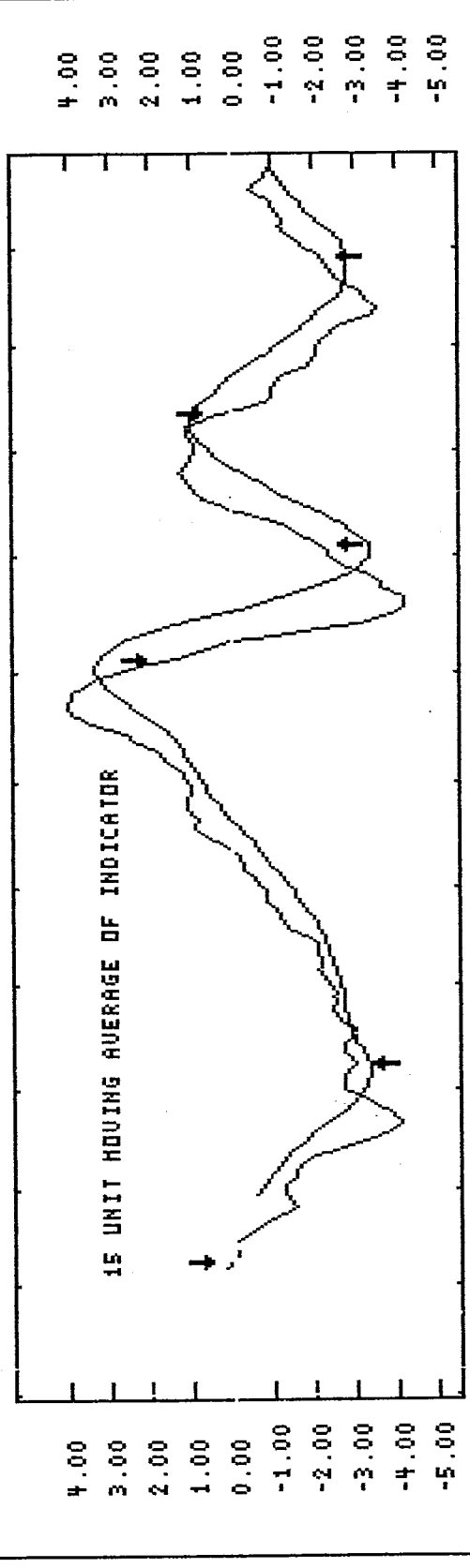
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# APPENDIX









-- MetaStock(tm) Profitability Test --

M.A. Reversal  
(Both Long & Short Positions)

GFDEC92

(9-unit moving average of Indicator)

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
02/05/92	Buy @	365.100	0.000	0.000%	0.000	0.000%	\$ 0.00
02/07/92	Sell @	366.200	1.100	0.301%	1.100	0.301%	\$ 3.01
03/30/92	Buy @	350.700	15.500	4.233%	16.600	4.534%	\$ 45.47
04/09/92	Sell @	346.900	-3.800	-1.084%	12.800	3.450%	\$ 34.14
04/10/92	Buy @	348.600	-1.700	-0.490%	11.100	2.960%	\$ 29.07
04/17/92	Sell @	344.200	-4.400	-1.262%	6.700	1.698%	\$ 16.08
04/21/92	Buy @	347.700	-3.500	-1.017%	3.200	0.681%	\$ 5.75
07/31/92	Sell @	361.400	13.700	3.940%	16.900	4.621%	\$ 45.38
08/28/92	Buy @	342.400	19.000	5.257%	35.900	9.879%	\$ 100.34
10/12/92	Sell @	346.100	3.700	1.081%	39.600	10.959%	\$ 112.23
11/18/92	Buy @	335.200	10.900	3.149%	50.500	14.109%	\$ 147.26
12/29/92	Sell @	332.500	-2.700	-0.805%	47.800	13.303%	\$ 138.01

Total Long Trades :	6	Total Short Trades:	5
Profitable Longs :	3 ( 50.0%)	Profitable Shorts :	3 ( 60.0%)
Total Short Stops :	0	Total Long Stops :	0
Biggest Gain :	19.000	Biggest Loss :	-4.400
Successive Gains :	4	Successive Losses :	4
Total Gain/Loss :	47.800	Average Gain/Loss :	4.345
Total Gain/Loss \$ :	138.01	Total Gain/Loss % :	13.80

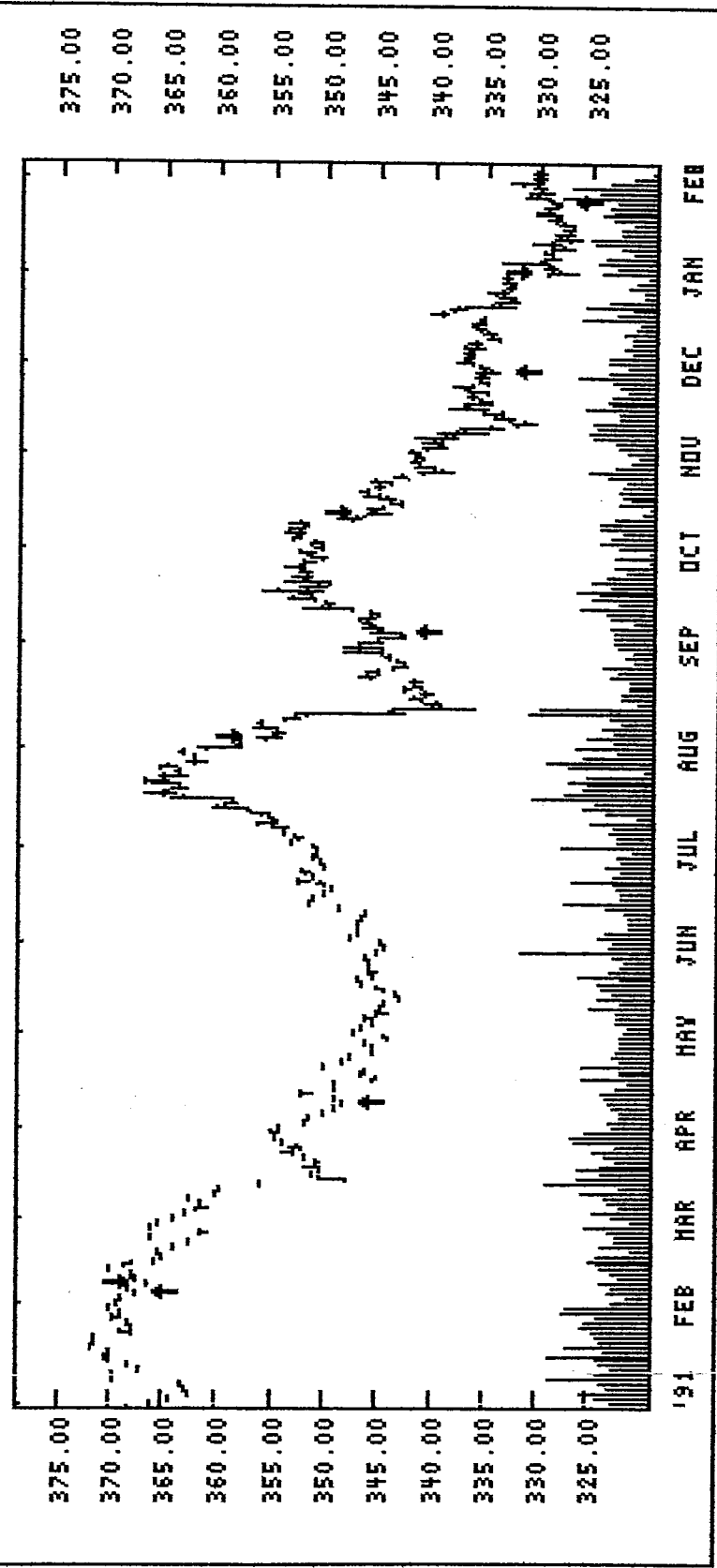
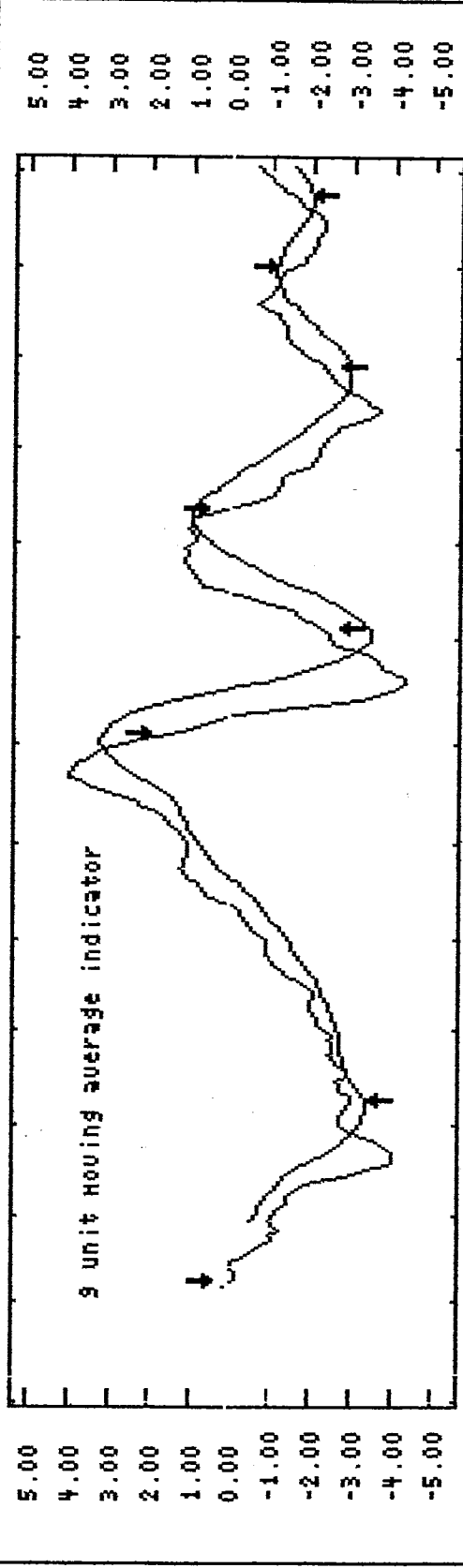
-- MetaStock(tm) Profitability Test --

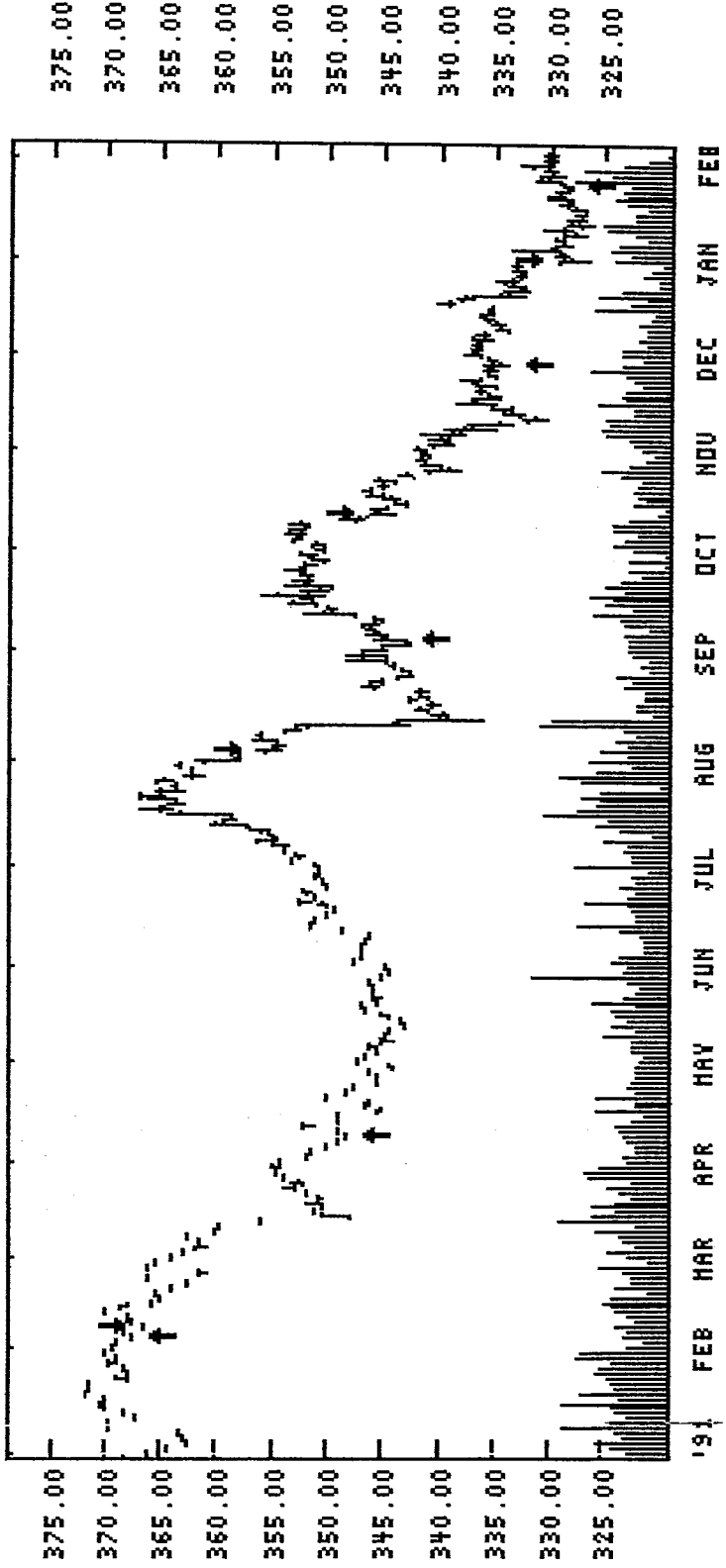
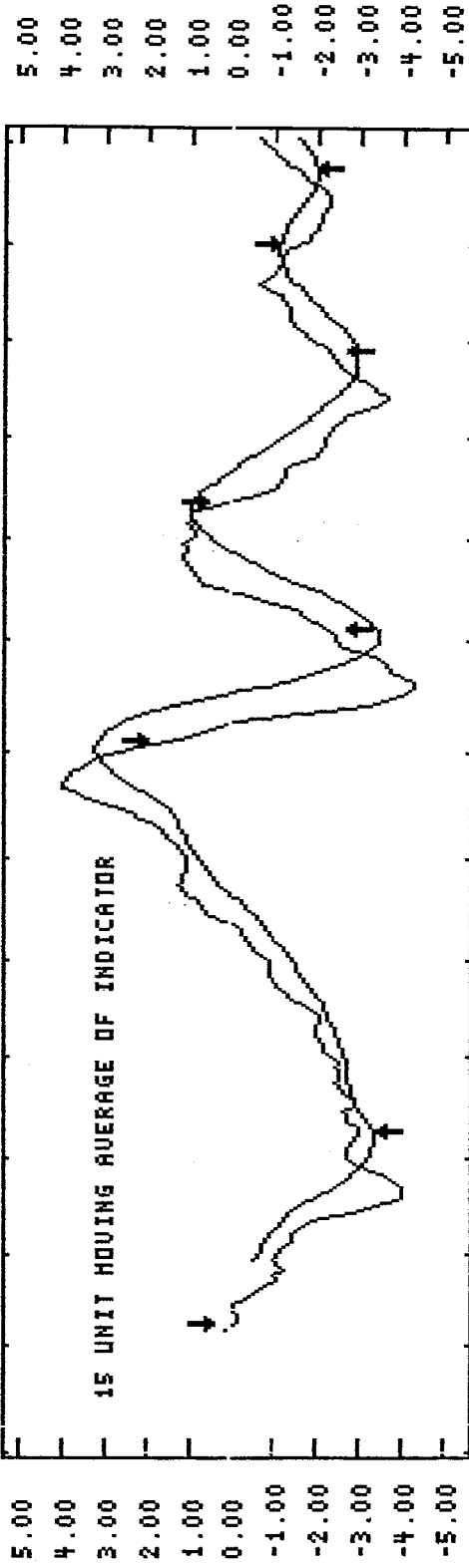
M.A. Reversal  
(Both Long & Short Positions)

GFDEC92

(15-unit moving average of Indicator)

Date	Trade	Price	Profit/Loss				Dollars
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	
02/05/92	Buy @	365.100	0.000	0.000%	0.000	0.000%	\$ 0.00
02/07/92	Sell @	366.200	1.100	0.301%	1.100	0.301%	\$ 3.01
04/08/92	Buy @	345.700	20.500	5.598%	21.600	5.899%	\$ 59.16
08/05/92	Sell @	352.900	7.200	2.083%	28.800	7.982%	\$ 81.22
09/03/92	Buy @	343.400	9.500	2.692%	38.300	10.674%	\$ 110.33
10/13/92	Sell @	344.900	1.500	0.437%	39.800	11.111%	\$ 115.18
11/25/92	Buy @	333.500	11.400	3.305%	51.200	14.416%	\$ 152.04
Total Long Trades :			3		Total Short Trades:	3	
Profitable Longs :			3 ( 100.0%)		Profitable Shorts :	3 ( 100.0%)	
Total Short Stops :			0		Total Long Stops :	0	
Biggest Gain :			20.500		Biggest Loss :	0.000	
Successive Gains :			6		Successive Losses :	0	
Total Gain/Loss :			51.200		Average Gain/Loss :	8.533	
Total Gain/Loss \$ :			152.04		Total Gain/Loss % :	15.20	





-- MetaStock(tm) Profitability Test --

M.A. Reversal  
(Both Long & Short Positions)

GFEB93

(9-unit moving average of Indicator)

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
02/05/92	Buy @	367.700	0.000	0.000%	0.000	0.000%	\$ 0.00
02/07/92	Sell @	366.500	-1.200	-0.326%	-1.200	-0.326%	\$ -3.26
03/30/92	Buy @	354.600	11.900	3.247%	10.700	2.921%	\$ 29.10
04/09/92	Sell @	349.000	-5.600	-1.579%	5.100	1.341%	\$ 12.85
04/10/92	Buy @	352.200	-3.200	-0.917%	1.900	0.424%	\$ 3.56
04/17/92	Sell @	346.400	-5.800	-1.647%	-3.900	-1.222%	\$ -12.97
04/21/92	Buy @	350.100	-3.700	-1.068%	-7.600	-2.291%	\$ -23.51
07/30/92	Sell @	362.400	12.300	3.513%	4.700	1.223%	\$ 10.80
08/28/92	Buy @	344.100	18.300	5.050%	23.000	6.272%	\$ 61.84
10/12/92	Sell @	347.200	3.100	0.901%	26.100	7.173%	\$ 71.41
11/18/92	Buy @	336.500	10.700	3.082%	36.800	10.255%	\$ 104.42
12/28/92	Sell @	333.400	-3.100	-0.921%	33.700	9.334%	\$ 94.25
01/20/93	Buy @	329.800	3.600	1.080%	37.300	10.414%	\$ 106.07

Total Long Trades :	6	Total Short Trades:	6
Profitable Longs :	2 ( 33.3%)	Profitable Shorts :	4 ( 66.7%)
Total Short Stops :	0	Total Long Stops :	0
Biggest Gain :	18.300	Biggest Loss :	-5.800
Successive Gains :	4	Successive Losses :	4
Total Gain/Loss :	37.300	Average Gain/Loss :	3.108
Total Gain/Loss \$ :	106.07	Total Gain/Loss % :	10.61

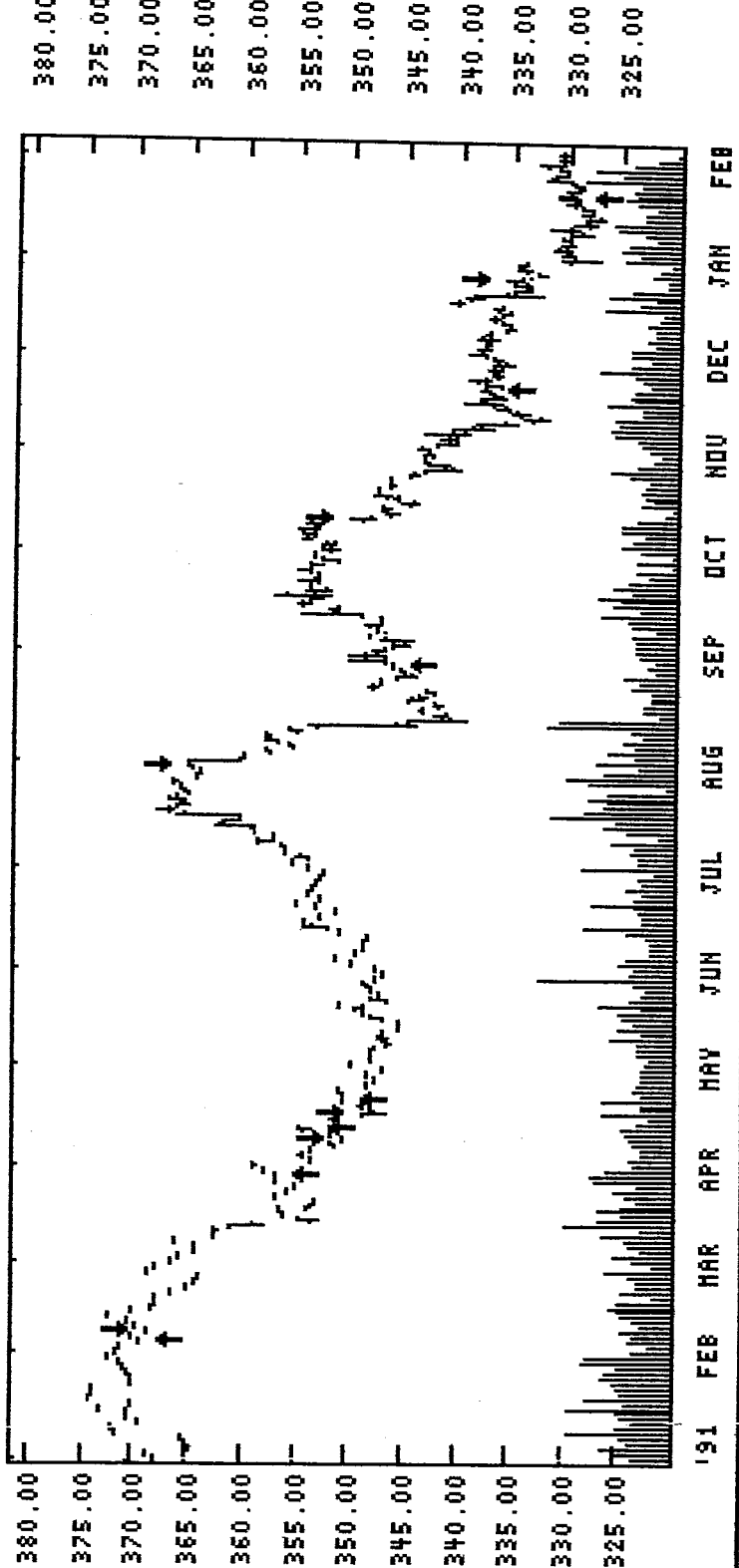
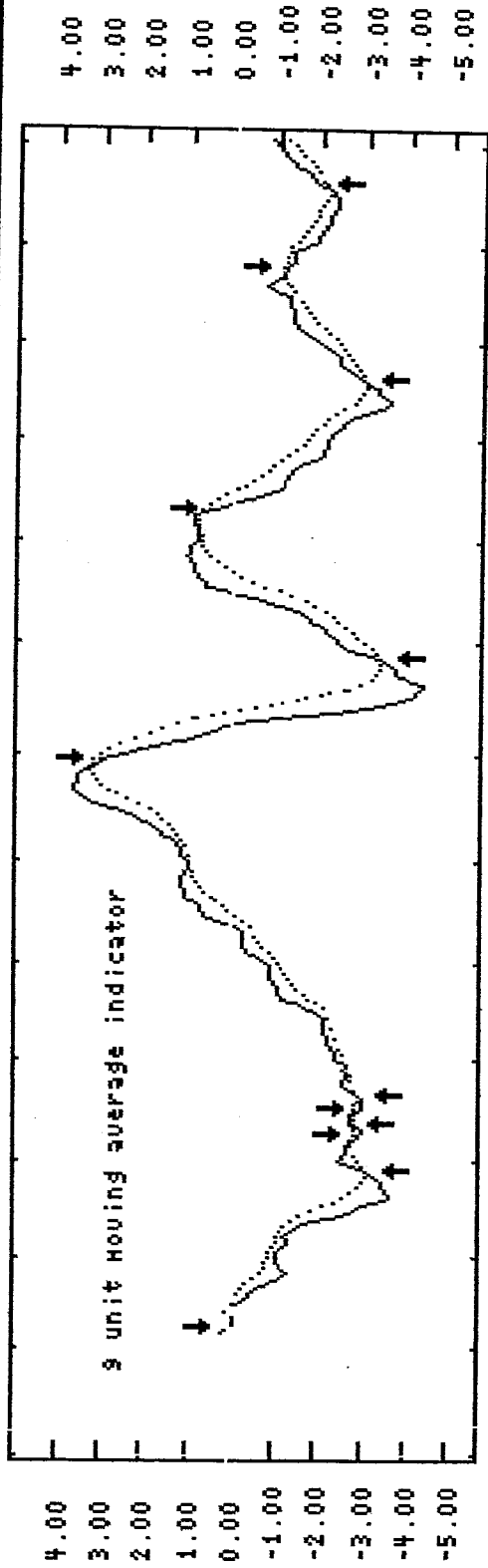
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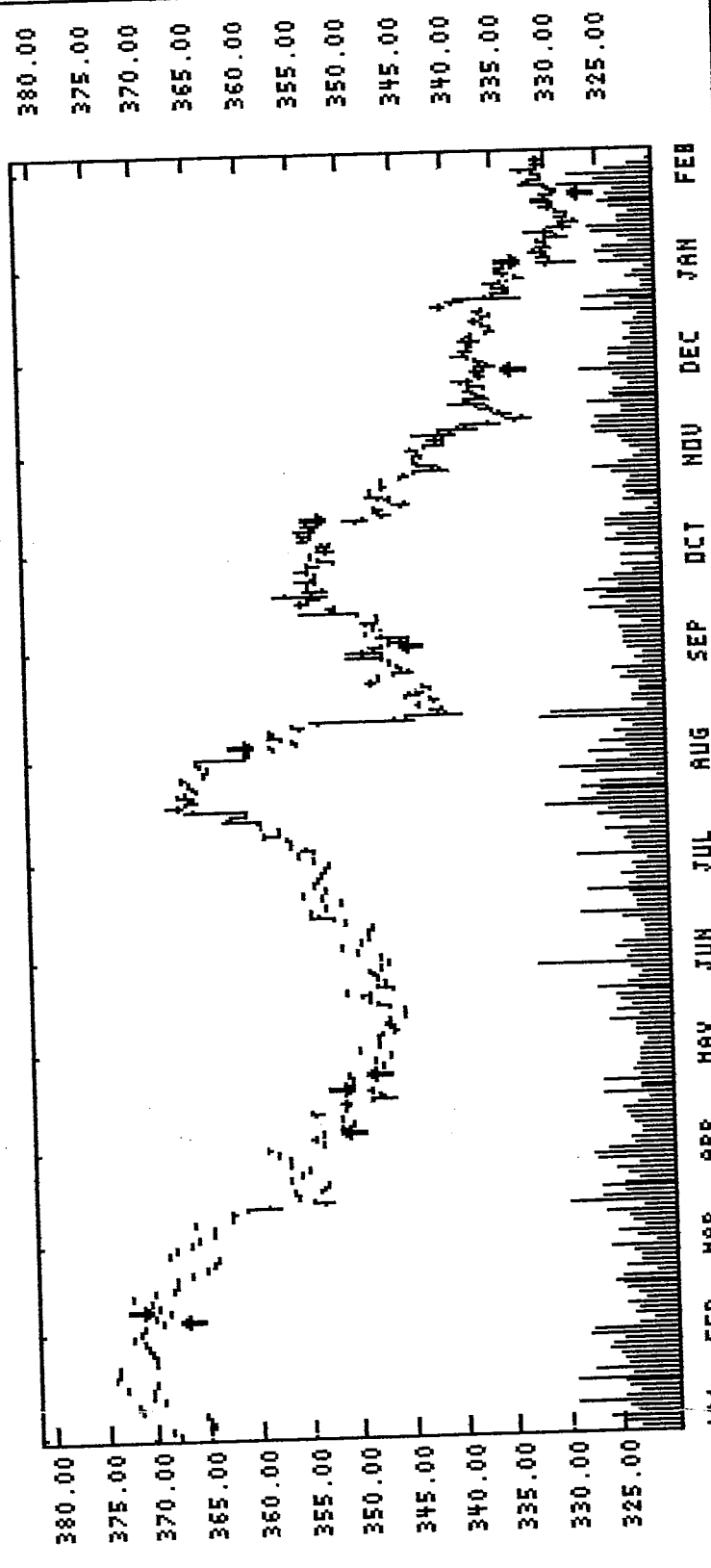
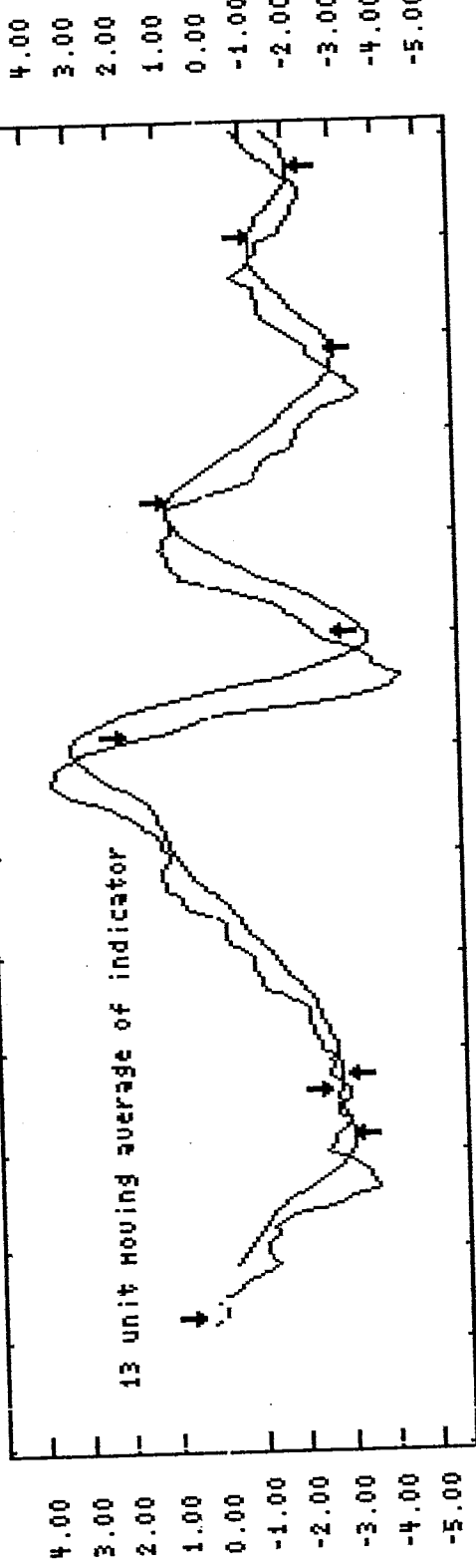
M.A. Reversal  
(Both Long & Short Positions)

GFFEB93

(15-unit moving average of Indicator)

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
01/29/92	Buy	@ 369.000	0.000	0.000%	0.000	0.000%	\$ 0.00
02/03/92	Sell	@ 369.200	0.200	0.054%	0.200	0.054%	\$ 0.54
04/08/92	Buy	@ 348.100	21.100	5.715%	21.300	5.769%	\$ 57.72
08/05/92	Sell	@ 354.800	6.700	1.925%	28.000	7.694%	\$ 78.08
09/03/92	Buy	@ 345.100	9.700	2.734%	37.700	10.428%	\$ 107.56
10/13/92	Sell	@ 345.900	0.800	0.232%	38.500	10.660%	\$ 110.12
11/25/92	Buy	@ 334.700	11.200	3.238%	49.700	13.898%	\$ 146.07
01/04/93	Sell	@ 328.400	-6.300	-1.882%	43.400	12.015%	\$ 124.50
01/25/93	Buy	@ 328.800	-0.400	-0.122%	43.000	11.894%	\$ 123.13
Total Long Trades :			4		Total Short Trades: 4		
Profitable Longs :			3 ( 75.0%)		Profitable Shorts : 3 ( 75.0%)		
Total Short Stops :			0		Total Long Stops : 0		
Biggest Gain :			21.100		Biggest Loss : -6.300		
Successive Gains :			6		Successive Losses : 2		
Total Gain/Loss :			43.000		Average Gain/Loss : 5.375		
Total Gain/Loss \$ :			123.13		Total Gain/Loss % : 12.31		



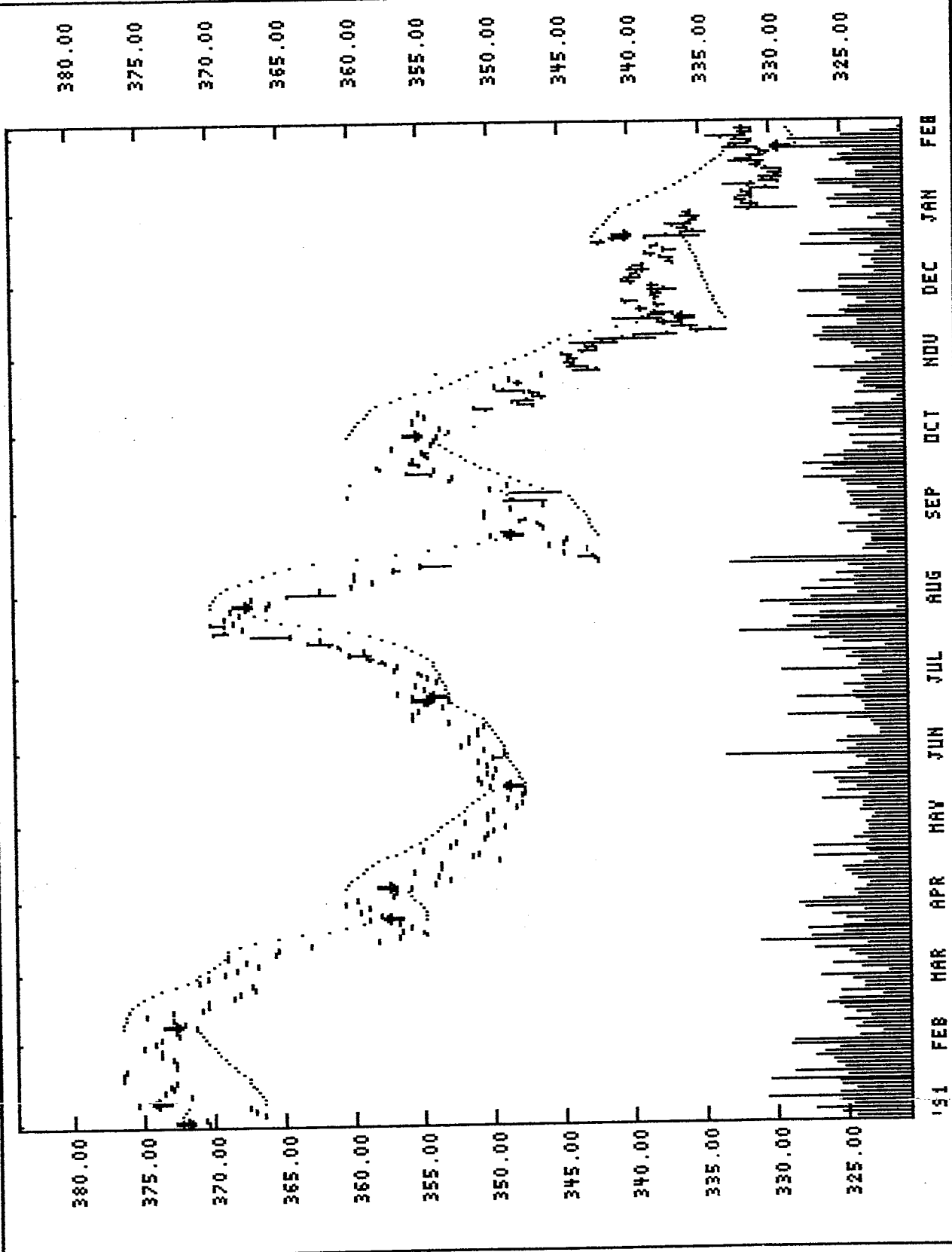




02/02/93

GFJUN93

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-- MetaStock(tm) Profitability Test --

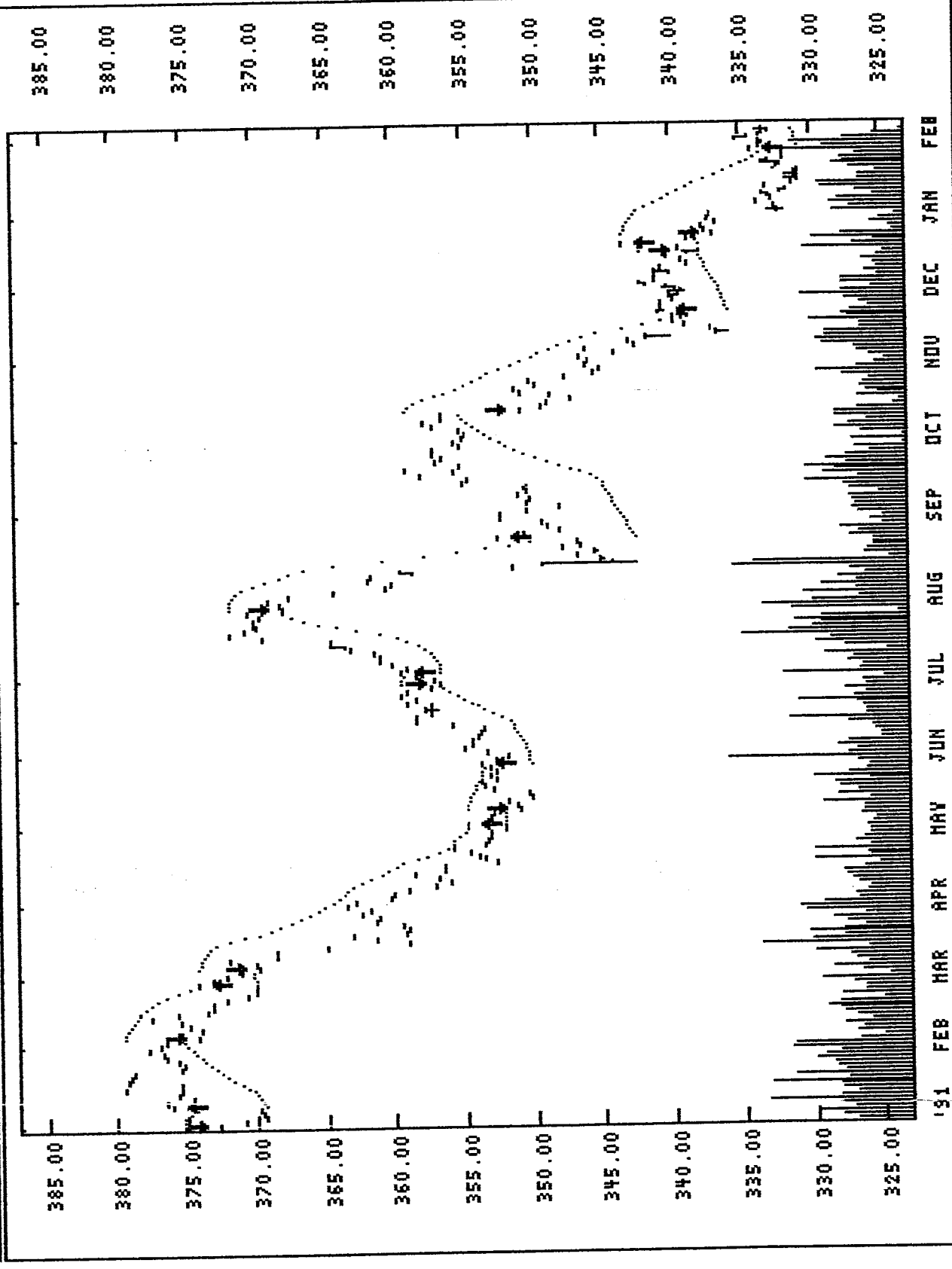
Parabolic SAR  
(Both Long & Short Positions)

GFJUN93  
0.02/0.20 PARABO  
12/31/91 to 02/02/93

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
01/02/92	Sell @	370.300	0.000	0.000%	0.000	0.000%	\$ 0.00
01/09/92	Buy @	375.500	-5.200	-1.404%	-5.200	-1.404%	\$ -14.04
02/07/92	Sell @	371.200	-4.300	-1.145%	-9.500	-2.549%	\$ -25.33
03/25/92	Buy @	358.800	12.400	3.341%	2.900	0.791%	\$ 7.23
04/06/92	Sell @	356.000	-2.800	-0.780%	0.100	0.011%	\$ -0.63
05/14/92	Buy @	350.200	5.800	1.629%	5.900	1.640%	\$ 15.65
06/19/92	Sell @	353.200	3.000	0.857%	8.900	2.497%	\$ 24.35
06/22/92	Buy @	355.800	-2.600	-0.736%	6.300	1.760%	\$ 16.81
07/29/92	Sell @	366.000	10.200	2.867%	16.500	4.627%	\$ 45.96
08/24/92	Buy @	350.000	16.000	4.372%	32.500	8.999%	\$ 91.68
09/30/92	Sell @	353.800	3.800	1.086%	36.300	10.085%	\$ 103.53
11/13/92	Buy @	339.000	14.800	4.183%	51.100	14.268%	\$ 149.70
12/21/92	Sell @	337.200	-1.800	-0.531%	49.300	13.737%	\$ 143.59
01/26/93	Buy @	332.700	4.500	1.335%	53.800	15.071%	\$ 158.85
Total Long Trades :			6		Total Short Trades:		7
Profitable Longs :			3 ( 50.0%)		Profitable Shorts :		5 ( 71.4%)
Total Short Stops :			0		Total Long Stops :		0
Biggest Gain :			16.000		Biggest Loss :		-5.200
Successive Gains :			4		Successive Losses :		2
Total Gain/Loss :			53.800		Average Gain/Loss :		4.138
Total Gain/Loss \$ :			158.85		Total Gain/Loss % :		15.89

02/02/93

GEAUG93



-- MetaStock(tm) Profitability Test --

Parabolic SAR  
(Both Long & Short Positions)

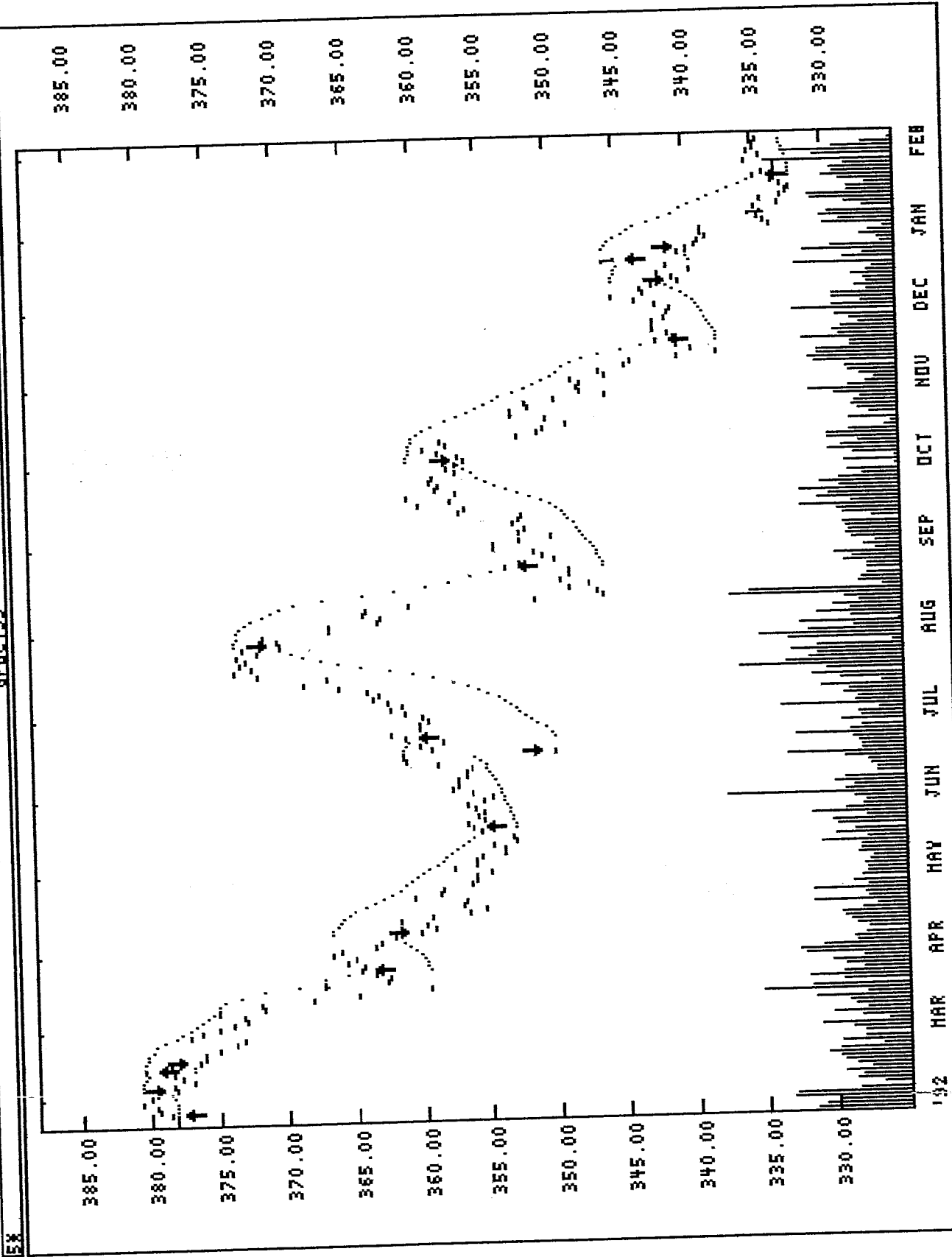
GFAUG93  
0.02/0.20 PARABO  
12/31/91 to 02/02/93

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
01/02/92	Sell @	372.800	0.000	0.000%	0.000	0.000%	\$ 0.00
01/09/92	Buy @	376.100	-3.300	-0.885%	-3.300	-0.885%	\$ -8.85
02/05/92	Sell @	374.100	-2.000	-0.532%	-5.300	-1.417%	\$ -14.12
02/27/92	Buy @	374.100	0.000	0.000%	-5.300	-1.417%	\$ -14.12
03/09/92	Sell @	369.800	-4.300	-1.149%	-9.600	-2.566%	\$ -25.45
05/01/92	Buy @	354.800	15.000	4.056%	5.400	1.490%	\$ 14.08
05/07/92	Sell @	351.000	-3.800	-1.071%	1.600	0.419%	\$ 3.21
05/26/92	Buy @	353.800	-2.800	-0.798%	-1.200	-0.379%	\$ -4.79
06/26/92	Sell @	356.600	2.800	0.791%	1.600	0.413%	\$ 3.09
07/06/92	Buy @	359.500	-2.900	-0.813%	-1.300	-0.401%	\$ -5.07
07/29/92	Sell @	367.900	8.400	2.337%	7.100	1.936%	\$ 18.18
08/24/92	Buy @	352.500	15.400	4.186%	22.500	6.122%	\$ 60.80
10/12/92	Sell @	350.700	-1.800	-0.511%	20.700	5.611%	\$ 55.38
11/18/92	Buy @	340.600	10.100	2.880%	30.800	8.491%	\$ 85.78
12/14/92	Sell @	338.000	-2.600	-0.763%	28.200	7.728%	\$ 77.49
12/17/92	Buy @	343.400	-5.400	-1.598%	22.800	6.130%	\$ 60.27
12/22/92	Sell @	336.900	-6.500	-1.893%	16.300	4.237%	\$ 40.20
01/26/93	Buy @	334.100	2.800	0.831%	19.100	5.068%	\$ 48.85

Total Long Trades :	8	Total Short Trades:	9
Profitable Longs :	2 ( 25.0%)	Profitable Shorts :	4 ( 44.4%)
Total Short Stops :	0	Total Long Stops :	0
Biggest Gain :	15.400	Biggest Loss :	-6.500
Successive Gains :	2	Successive Losses :	3
Total Gain/Loss :	19.100	Average Gain/Loss :	1.124
Total Gain/Loss \$ :	48.85	Total Gain/Loss % :	4.88

02/02/93

GFDC192



EX

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-- MetaStock(tm) Profitability Test --

Parabolic SAR  
(Both Long & Short Positions)

GFOCT93  
0.02/0.20 PARABO  
01/23/92 to 02/02/93

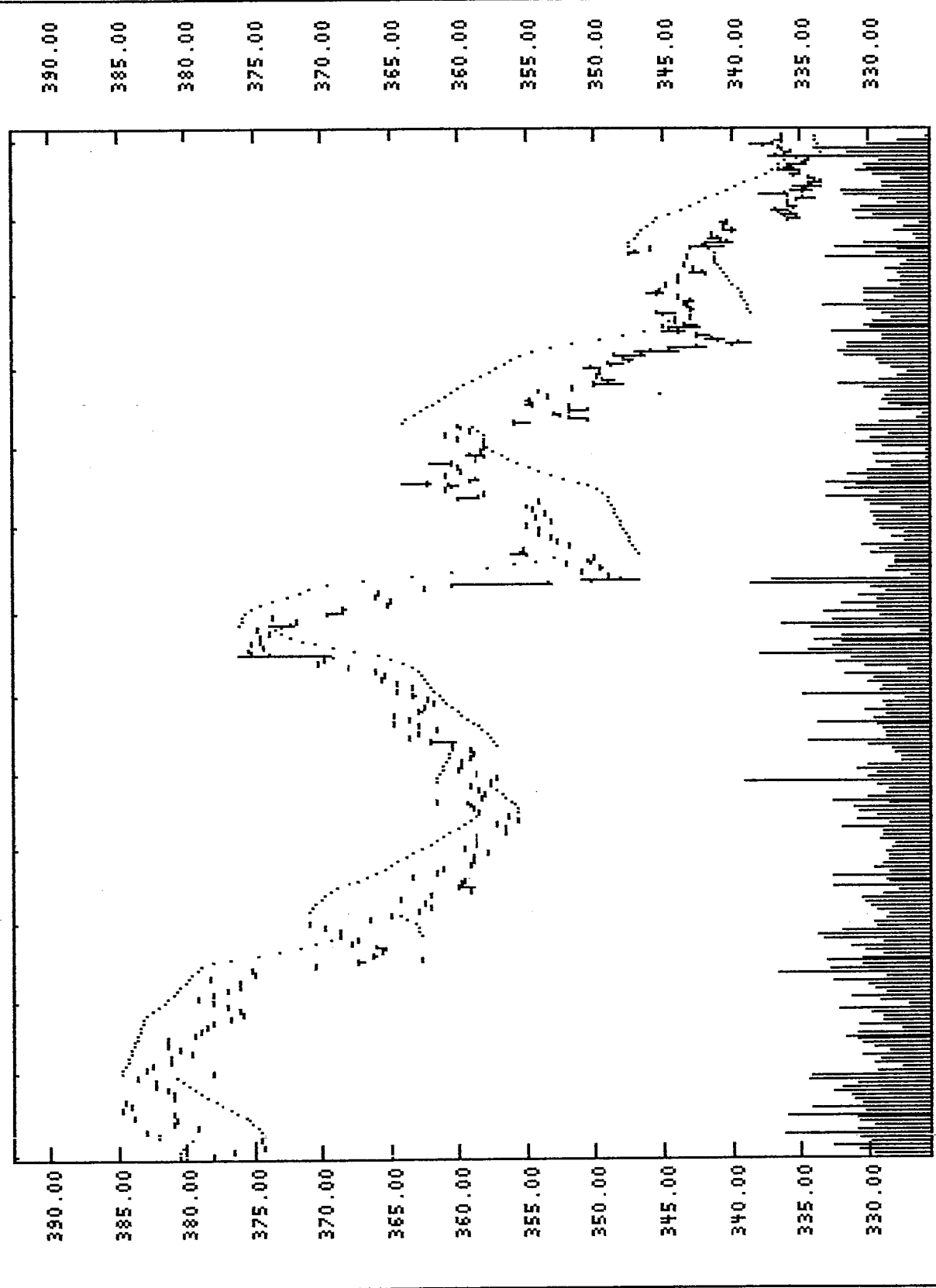
Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
01/27/92	Buy @	378.600	0.000	0.000%	0.000	0.000%	\$ 0.00
02/05/92	Sell @	378.100	-0.500	-0.132%	-0.500	-0.132%	\$ -1.32
02/12/92	Buy @	380.400	-2.300	-0.608%	-2.800	-0.740%	\$ -7.40
02/14/92	Sell @	376.500	-3.900	-1.025%	-6.700	-1.766%	\$ -17.57
03/25/92	Buy @	364.600	11.900	3.161%	5.200	1.395%	\$ 13.48
04/07/92	Sell @	360.100	-4.500	-1.234%	0.700	0.161%	\$ 0.97
05/15/92	Buy @	356.200	3.900	1.083%	4.600	1.244%	\$ 11.81
06/16/92	Sell @	350.100	-6.100	-1.713%	-1.500	-0.469%	\$ -5.52
06/22/92	Buy @	361.000	-10.900	-3.113%	-12.400	-3.582%	\$ -36.48
07/29/92	Sell @	370.000	9.000	2.493%	-3.400	-1.089%	\$ -12.46
08/24/92	Buy @	353.400	16.600	4.486%	13.200	3.398%	\$ 31.85
10/01/92	Sell @	356.300	2.900	0.821%	16.100	4.218%	\$ 40.32
11/13/92	Buy @	342.200	14.100	3.957%	30.200	8.175%	\$ 81.49
12/09/92	Sell @	340.400	-1.800	-0.526%	28.400	7.649%	\$ 75.80
12/17/92	Buy @	345.100	-4.700	-1.381%	23.700	6.269%	\$ 60.94
12/22/92	Sell @	339.700	-5.400	-1.565%	18.300	4.704%	\$ 44.34
01/20/93	Buy @	334.700	5.000	1.472%	23.300	6.176%	\$ 59.71

Total Long Trades :	8	Total Short Trades:	8
Profitable Longs :	2 ( 25.0%)	Profitable Shorts :	5 ( 62.5%)
Total Short Stops :	0	Total Long Stops :	0
Biggest Gain :	16.600	Biggest Loss :	-10.900
Successive Gains :	4	Successive Losses :	3
Total Gain/Loss :	23.300	Average Gain/Loss :	1.456
Total Gain/Loss \$ :	59.71	Total Gain/Loss % :	5.97

02/02/93

GEDEC93

EX



191 FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB

-- MetaStock(tm) Profitability Test --

Parabolic SAR  
(Both Long & Short Positions)

GFDEC93  
0.02/0.20 PARABO  
12/31/91 to 02/02/93

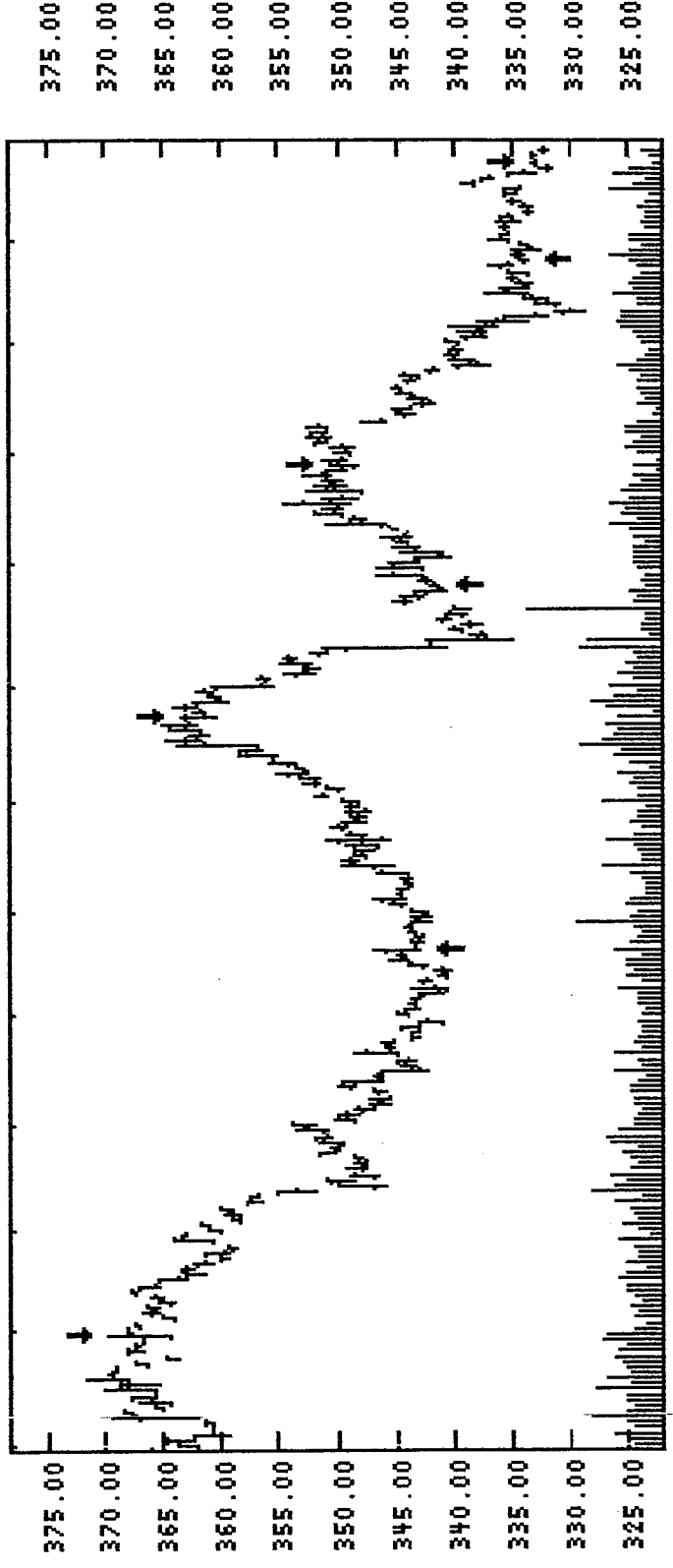
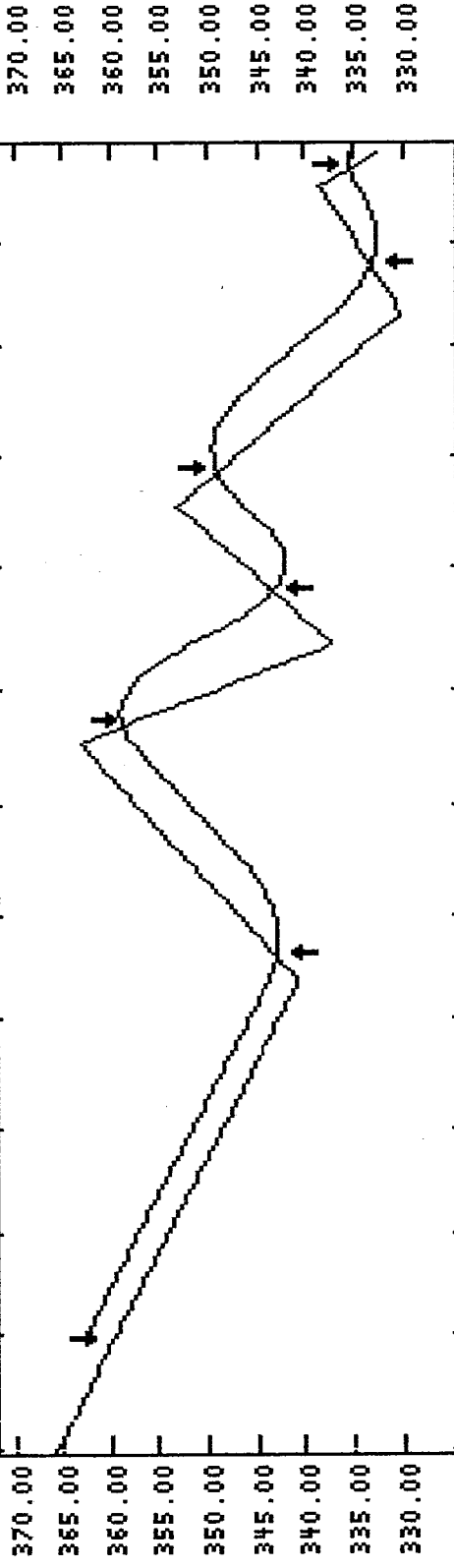
Date	Trade	Price	Profit/Loss					
			Current Trade		Cumulative			
			Points	Percent	Points	Percent	Dollars	
01/02/92	Sell @	378.000	0.000	0.000%	0.000	0.000%	\$ 0.00	
01/09/92	Buy @	382.000	-4.000	-1.058%	-4.000	-1.058%	\$ -10.58	
02/03/92	Sell @	378.000	-4.000	-1.047%	-8.000	-2.105%	\$ -20.94	
03/30/92	Buy @	368.800	9.200	2.434%	1.200	0.329%	\$ 2.89	
04/07/92	Sell @	363.000	-5.800	-1.573%	-4.600	-1.244%	\$ -12.89	
05/14/92	Buy @	358.500	4.500	1.240%	-0.10	-0.004%	\$ -0.65	
05/28/92	Sell @	357.700	-0.800	-0.223%	-0.900	-0.228%	\$ -2.88	
06/11/92	Buy @	360.500	-2.800	-0.783%	-3.700	-1.010%	\$ -10.68	
07/29/92	Sell @	372.200	11.700	3.245%	8.000	2.235%	\$ 21.42	
08/24/92	Buy @	355.400	16.800	4.514%	24.800	6.749%	\$ 67.53	
10/12/92	Sell @	355.800	0.400	0.113%	25.200	6.861%	\$ 68.73	
11/20/92	Buy @	345.500	10.300	2.895%	35.500	9.756%	\$ 99.67	
12/21/92	Sell @	342.200	-3.300	-0.955%	32.200	8.801%	\$ 89.17	
01/26/93	Buy @	336.900	5.300	1.549%	37.500	10.350%	\$ 106.03	
Total Long Trades :			6		Total Short Trades :			7
Profitable Longs :			2 ( 33.3%)		Profitable Shorts :			5 ( 71.4%)
Total Short Stops :			0		Total Long Stops :			0
Biggest Gain :			16.800		Biggest Loss :			-5.800
Successive Gains :			4		Successive Losses :			2
Total Gain/Loss :			37.500		Average Gain/Loss :			2.885
Total Gain/Loss \$ :			106.03		Total Gain/Loss % :			10.60



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GEDEC92 & 2.00 ZIG ZAG

12/29/92



-- MetaStock(tm) Profitability Test --

M.A. Indicator Penetration  
(Both Long & Short Positions)

GFDEC92

2.00 ZIG ZAG

(22-unit moving average of Indicator)

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
01/31/92	Sell @	367.600	0.000	0.000%	0.000	0.000%	\$ 0.00
05/19/92	Buy @	343.400	24.200	6.583%	24.200	6.583%	\$ 65.83
07/25/92	Sell @	363.200	19.800	5.766%	44.000	12.349%	\$ 127.29
08/27/92	Buy @	341.700	21.500	5.920%	65.500	18.269%	\$ 194.02
09/29/92	Sell @	349.900	8.200	2.400%	73.700	20.668%	\$ 222.67
11/23/92	Buy @	334.400	15.500	4.430%	89.200	25.098%	\$ 276.83
12/23/92	Sell @	332.900	-1.500	-0.449%	87.700	24.650%	\$ 271.11

Total Long Trades :	3	Total Short Trades:	3
Profitable Longs :	2 ( 66.7%)	Profitable Shorts :	3 ( 100.0%)
Total Short Stops :	0	Total Long Stops :	0

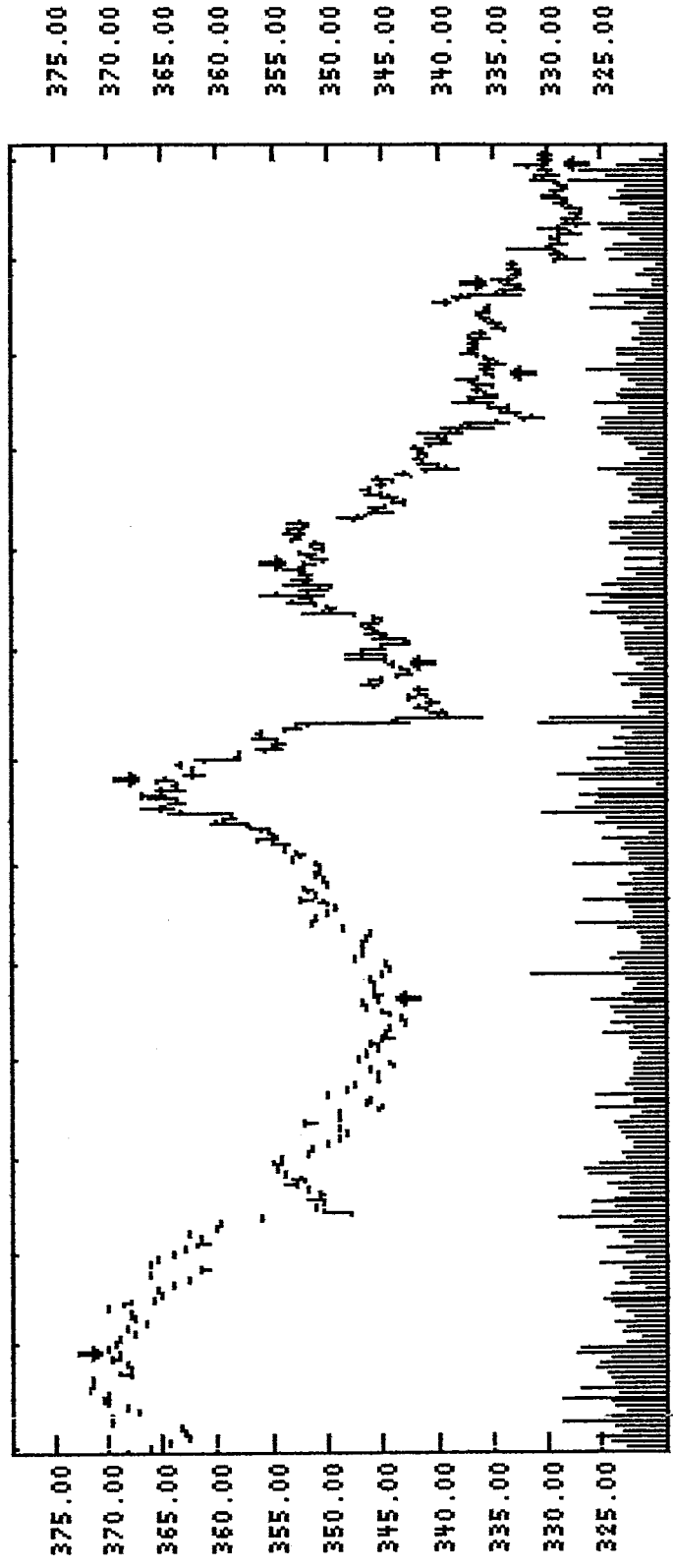
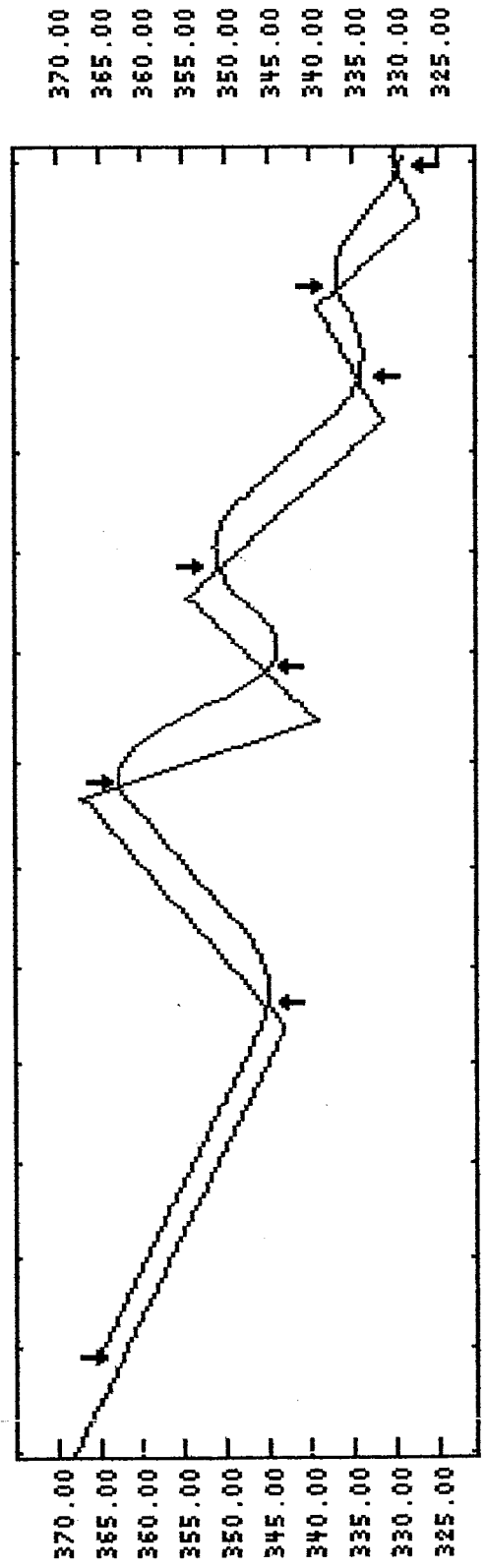
Biggest Gain :	24.200	Biggest Loss :	-1.500
Successive Gains :	5	Successive Losses :	1

Total Gain/Loss :	87.700	Average Gain/Loss :	14.617
Total Gain/Loss \$ :	271.11	Total Gain/Loss % :	27.11

02/02/93

GFFEB93 & 2.00 ZIG ZAG

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1993 FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB

-- MetaStock(tm) Profitability Test --

M.A. Indicator Penetration  
(Both Long & Short Positions)

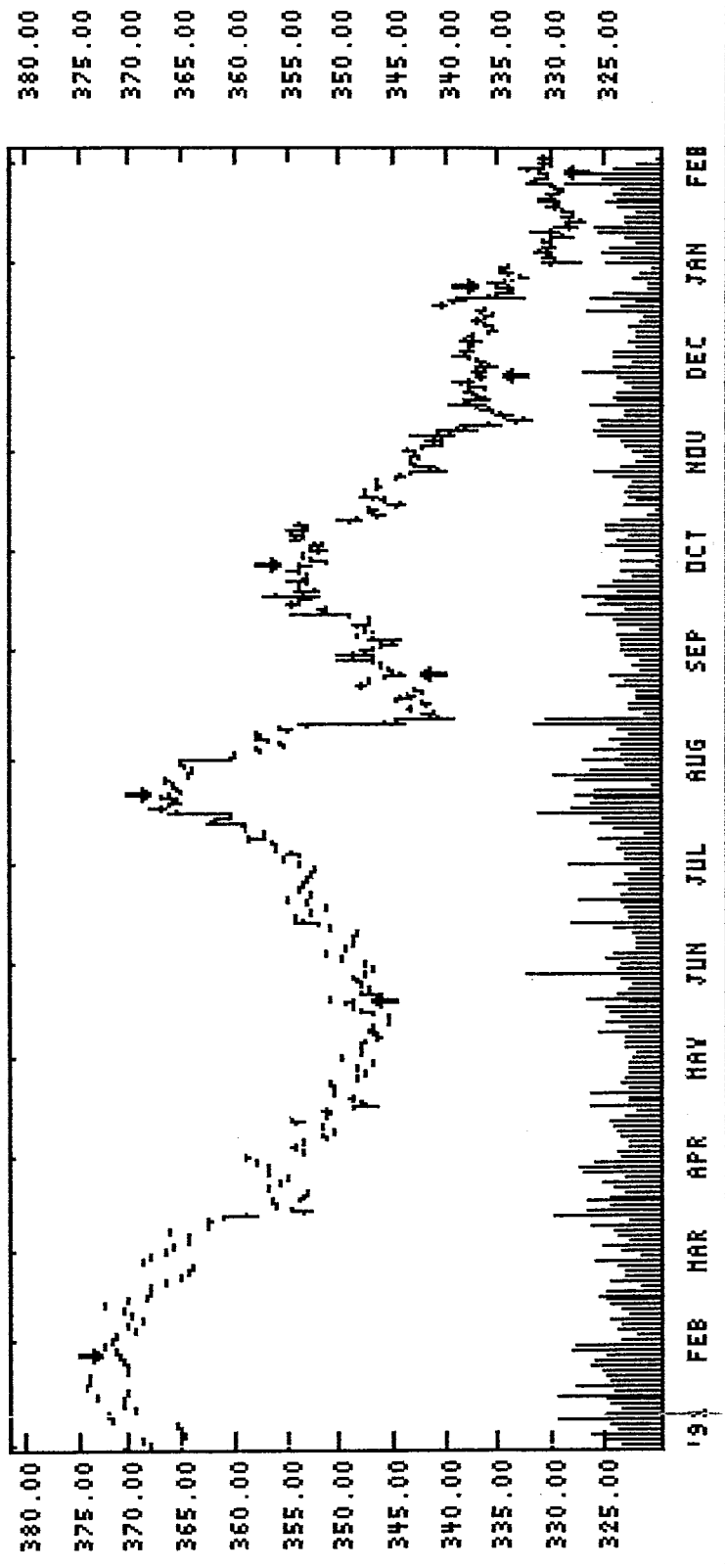
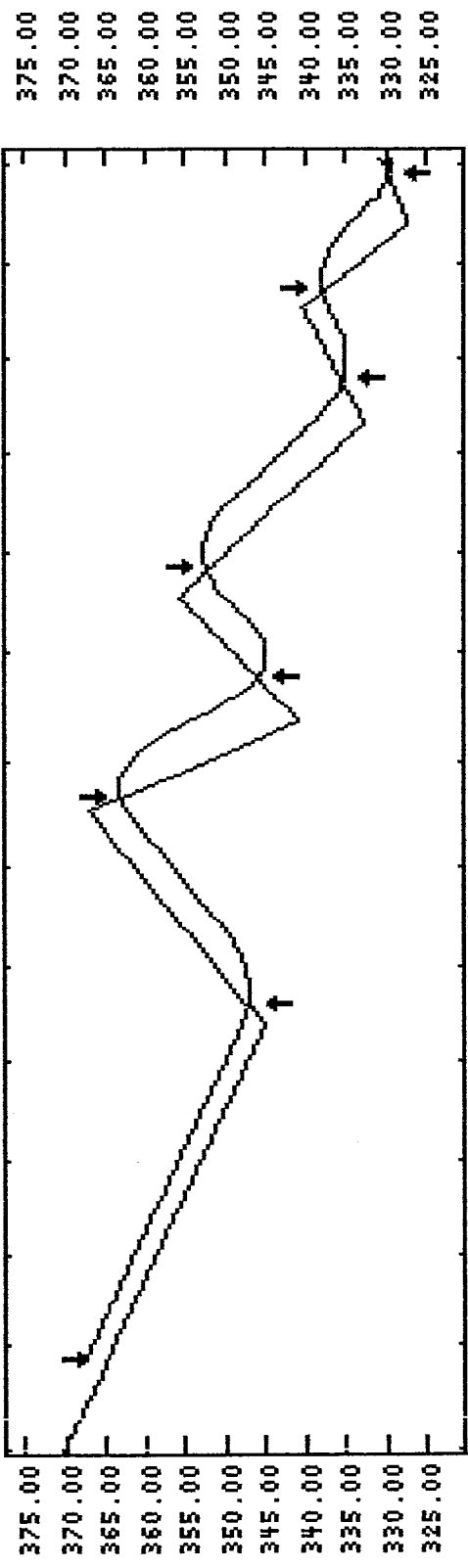
GFFEB93  
2.00 ZIG ZAG  
(21-unit moving average of Indicator)

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
01/29/92	Sell @	369.000	0.000	0.000%	0.000	0.000%	\$ 0.00
05/19/92	Buy @	345.600	23.400	6.341%	23.400	6.341%	\$ 63.41
07/28/92	Sell @	364.800	19.200	5.556%	42.600	11.897%	\$ 122.49
08/28/92	Buy @	344.100	20.700	5.674%	63.300	17.571%	\$ 186.19
09/28/92	Sell @	352.200	8.100	2.354%	71.400	19.925%	\$ 214.11
11/23/92	Buy @	335.500	16.700	4.742%	88.100	24.667%	\$ 271.68
12/23/92	Sell @	333.400	-2.100	-0.626%	86.000	24.041%	\$ 263.72
01/29/93	Buy @	330.200	3.200	0.960%	89.200	25.001%	\$ 275.85
Total Long Trades :			3		Total Short Trades: 4		
Profitable Longs :			2 ( 66.7%)		Profitable Shorts : 4 ( 100.0%)		
Total Short Stops :			0		Total Long Stops : 0		
Biggest Gain :			23.400		Biggest Loss : -2.100		
Successive Gains :			5		Successive Losses : 1		
Total Gain/Loss :			89.200		Average Gain/Loss : 12.743		
Total Gain/Loss \$ :			275.85		Total Gain/Loss % : 27.58		

02/02/93

GFAPR93 & 2.00 ZIG ZAG

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-- MetaStock(tm) Profitability Test --

M.A. Indicator Penetration  
(Both Long & Short Positions)

GFAPR93

2.00 ZIG ZAG

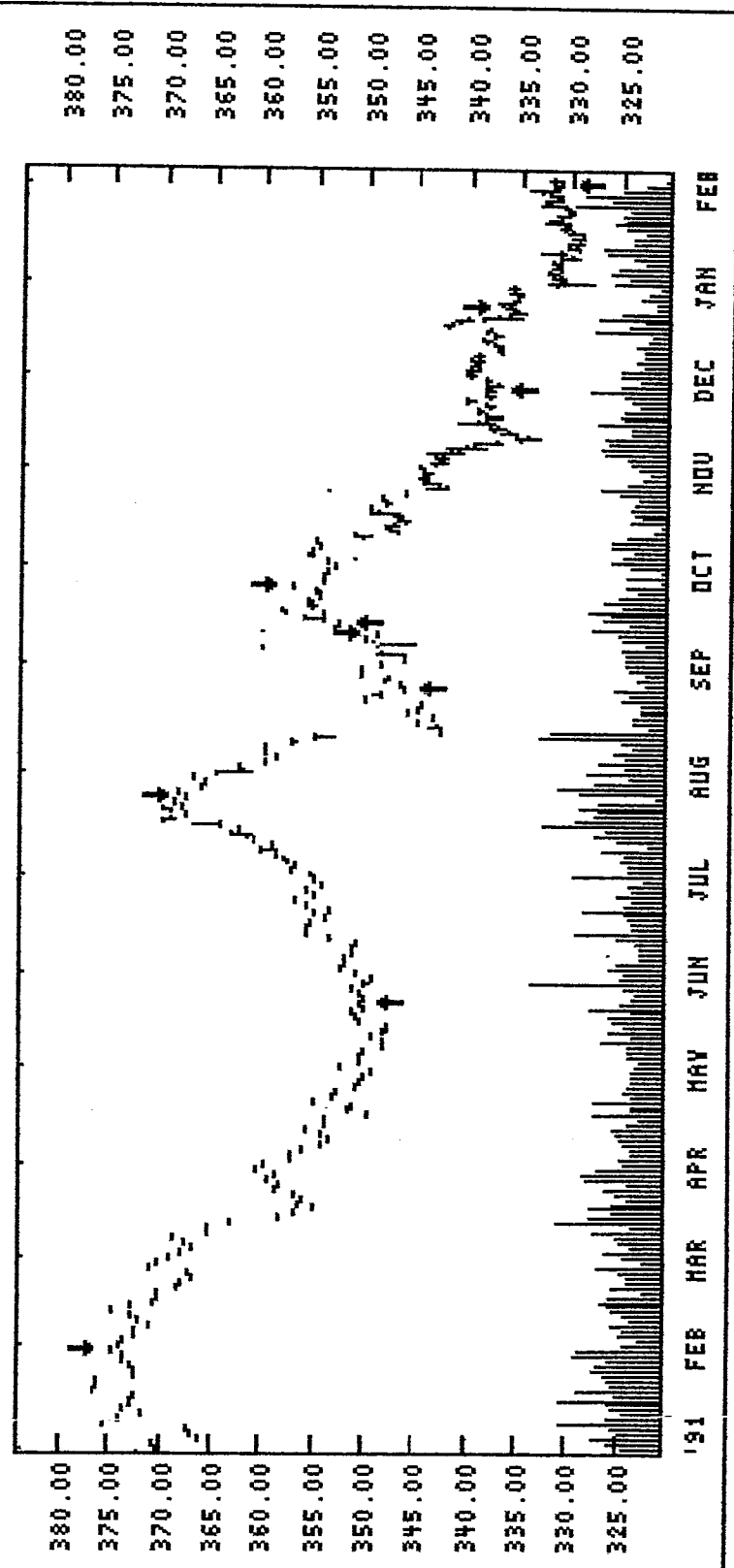
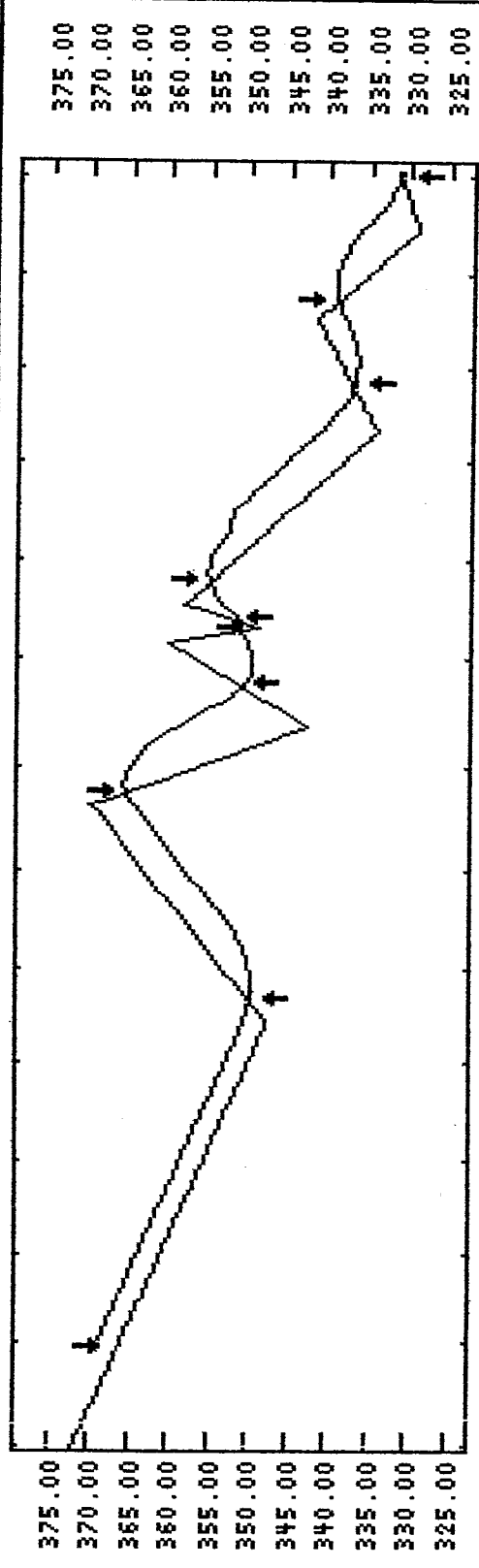
(20-unit moving average of Indicator)

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
01/28/92	Sell @	371.000	0.000	0.000%	0.000	0.000%	\$ 0.00
05/18/92	Buy @	348.800	22.200	5.984%	22.200	5.984%	\$ 59.84
07/23/92	Sell @	366.300	17.500	5.017%	39.700	11.001%	\$ 113.01
08/26/92	Buy @	344.400	21.900	5.979%	61.600	16.980%	\$ 179.56
09/28/92	Sell @	353.700	9.300	2.700%	70.900	19.680%	\$ 211.41
11/23/92	Buy @	336.700	17.000	4.806%	87.900	24.486%	\$ 269.63
12/23/92	Sell @	334.000	-2.700	-0.802%	85.200	23.685%	\$ 259.45
01/28/93	Buy @	331.100	2.900	0.868%	88.100	24.553%	\$ 270.39
Total Long Trades :			3		Total Short Trades :		4
Profitable Longs :			2 ( 66.7%)		Profitable Shorts :		4 ( 100.0%)
Total Short Stops :			0		Total Long Stops :		0
Biggest Gain :			22.200		Biggest Loss :		-2.700
Successive Gains :			5		Successive Losses :		1
Total Gain/Loss :			88.100		Average Gain/Loss :		12.586
Total Gain/Loss \$ :			270.39		Total Gain/Loss % :		27.04

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GFJUN92 & 2.00 ZIG ZAG

02/02/93



-- MetaStock(tm) Profitability Test --

M.A. Indicator Penetration  
(Both Long & Short Positions)

GFJUN93

2.00 ZIG ZAG

(22-unit moving average of Indicator)

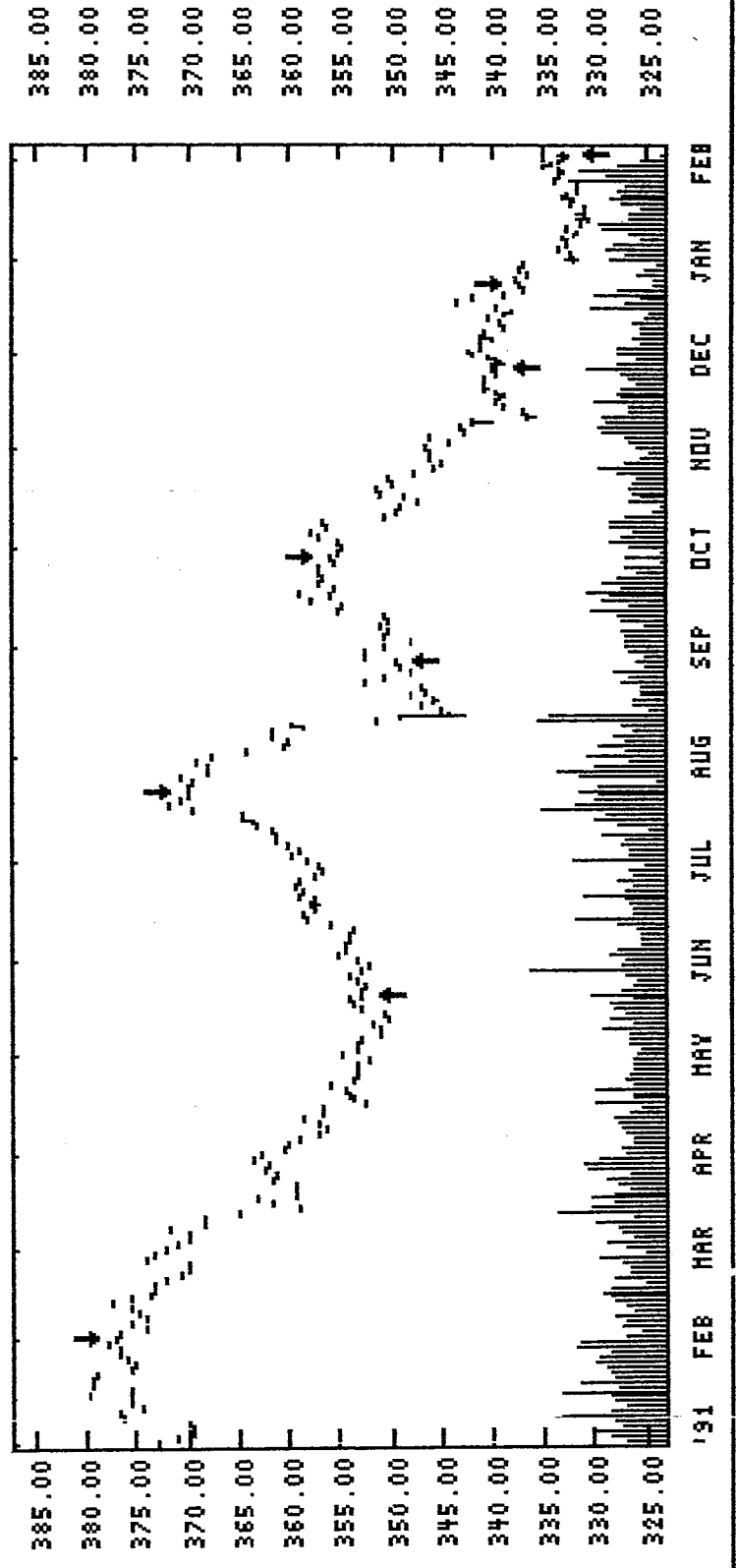
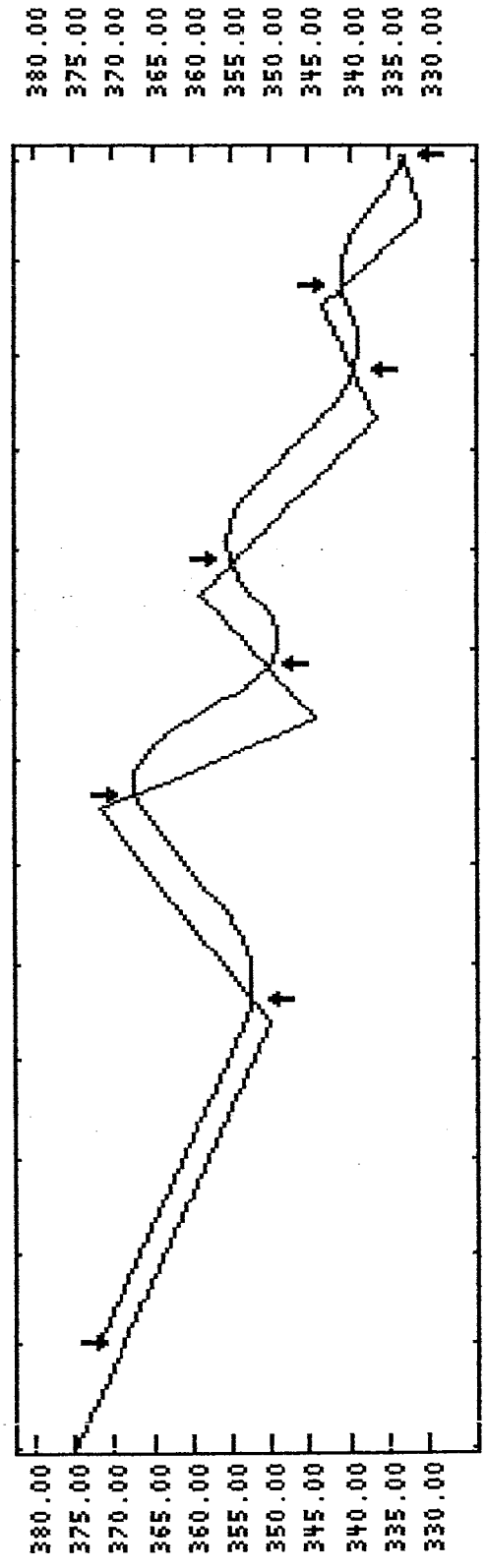
Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
01/31/92	Sell @	374.900	0.000	0.000%	0.000	0.000%	\$ 0.00
05/20/92	Buy @	350.400	24.500	6.535%	24.500	6.535%	\$ 65.35
07/27/92	Sell @	367.800	17.400	4.966%	41.900	11.501%	\$ 118.25
08/26/92	Buy @	346.200	21.600	5.873%	63.500	17.374%	\$ 183.93
09/11/92	Sell @	348.700	2.500	0.722%	66.000	18.096%	\$ 192.47
09/15/92	Buy @	352.700	-4.000	-1.147%	62.000	16.949%	\$ 178.80
09/25/92	Sell @	357.000	4.300	1.219%	66.300	18.168%	\$ 193.17
11/24/92	Buy @	337.900	19.100	5.350%	85.400	23.518%	\$ 257.00
12/23/92	Sell @	336.000	-1.900	-0.562%	83.500	22.956%	\$ 249.94
02/01/93	Buy @	331.900	4.100	1.220%	87.600	24.176%	\$ 265.19
Total Long Trades :			4		Total Short Trades:		5
Profitable Longs :			3 ( 75.0%)		Profitable Shorts :		4 ( 80.0%)
Total Short Stops :			0		Total Long Stops :		0
Biggest Gain :			24.500		Biggest Loss :		-4.000
Successive Gains :			4		Successive Losses :		1
Total Gain/Loss :			87.600		Average Gain/Loss :		9.733
Total Gain/Loss \$ :			265.19		Total Gain/Loss % :		26.52



02/02/93

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-- MetaStock(tm) Profitability Test --

M.A. Indicator Penetration  
(Both Long & Short Positions)

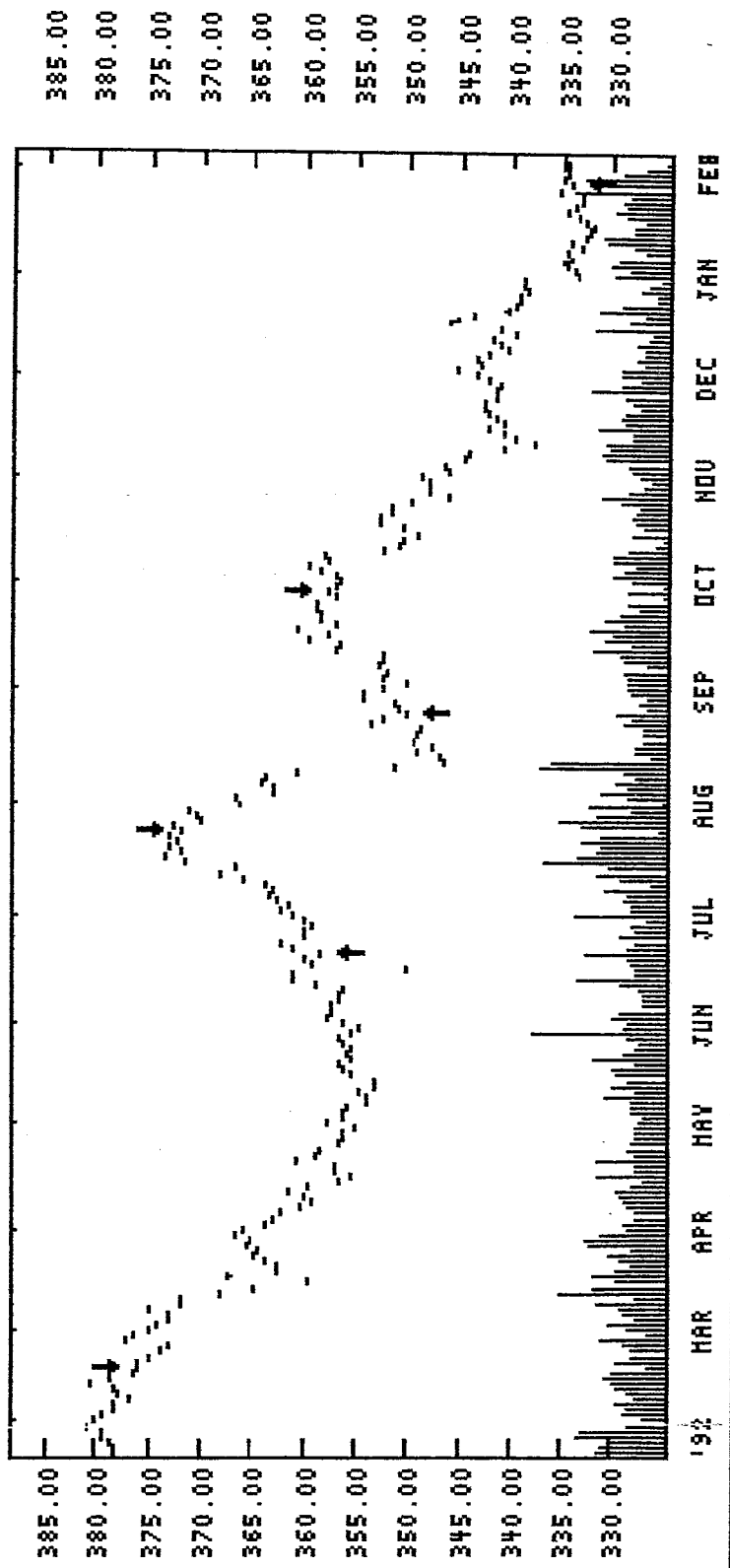
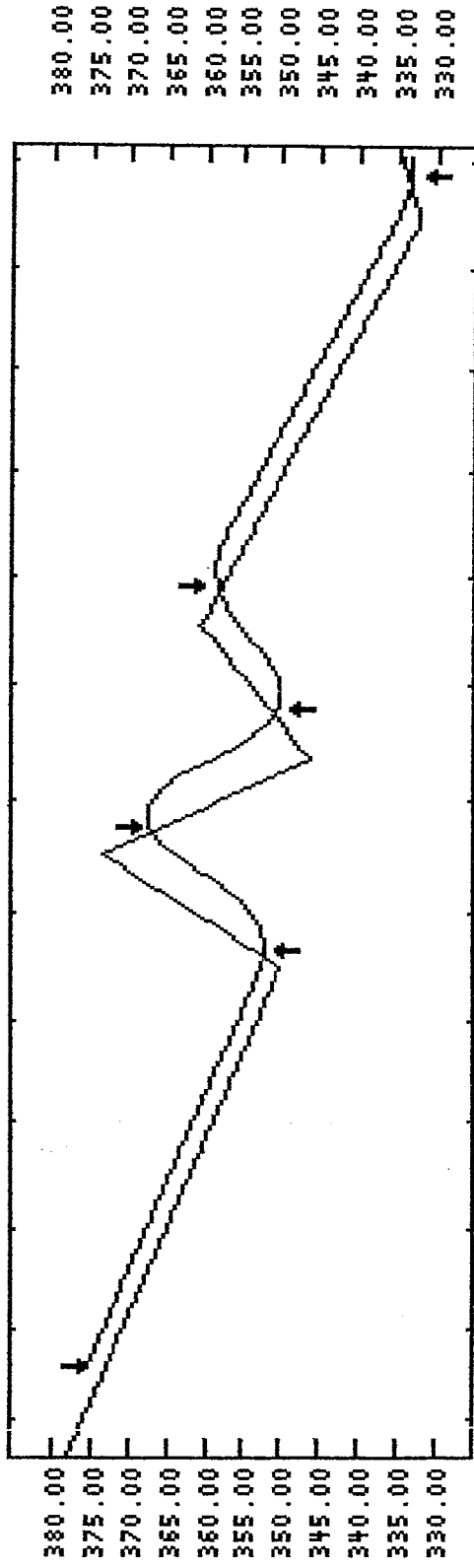
GFAUG93  
2.00 ZIG ZAG  
(23-unit moving average of Indicator)

Date	Trade	Price	Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
02/03/92	Sell @	377.000	0.000	0.000%	0.000	0.000%	\$ 0.00
05/19/92	Buy @	352.700	24.300	6.446%	24.300	6.446%	\$ 64.46
07/23/92	Sell @	370.000	17.300	4.905%	41.600	11.351%	\$ 116.67
08/28/92	Buy @	349.400	20.600	5.568%	62.200	16.918%	\$ 178.84
09/29/92	Sell @	355.700	6.300	1.803%	68.500	18.721%	\$ 200.09
11/24/92	Buy @	339.500	16.200	4.554%	84.700	23.276%	\$ 254.75
12/23/92	Sell @	337.500	-2.000	-0.589%	82.700	22.687%	\$ 247.36
02/02/93	Buy @	333.200	4.300	1.274%	87.000	23.961%	\$ 263.25
Total Long Trades :			3		Total Short Trades:		4
Profitable Longs :			2 ( 66.7%)		Profitable Shorts :		4 ( 100.0%)
Total Short Stops :			0		Total Long Stops :		0
Biggest Gain :			24.300		Biggest Loss :		-2.000
Successive Gains :			5		Successive Losses :		1
Total Gain/Loss :			87.000		Average Gain/Loss :		12.429
Total Gain/Loss \$ :			263.25		Total Gain/Loss % :		26.33

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GFDC192 & 3.00 ZIG ZAG

02/02/93



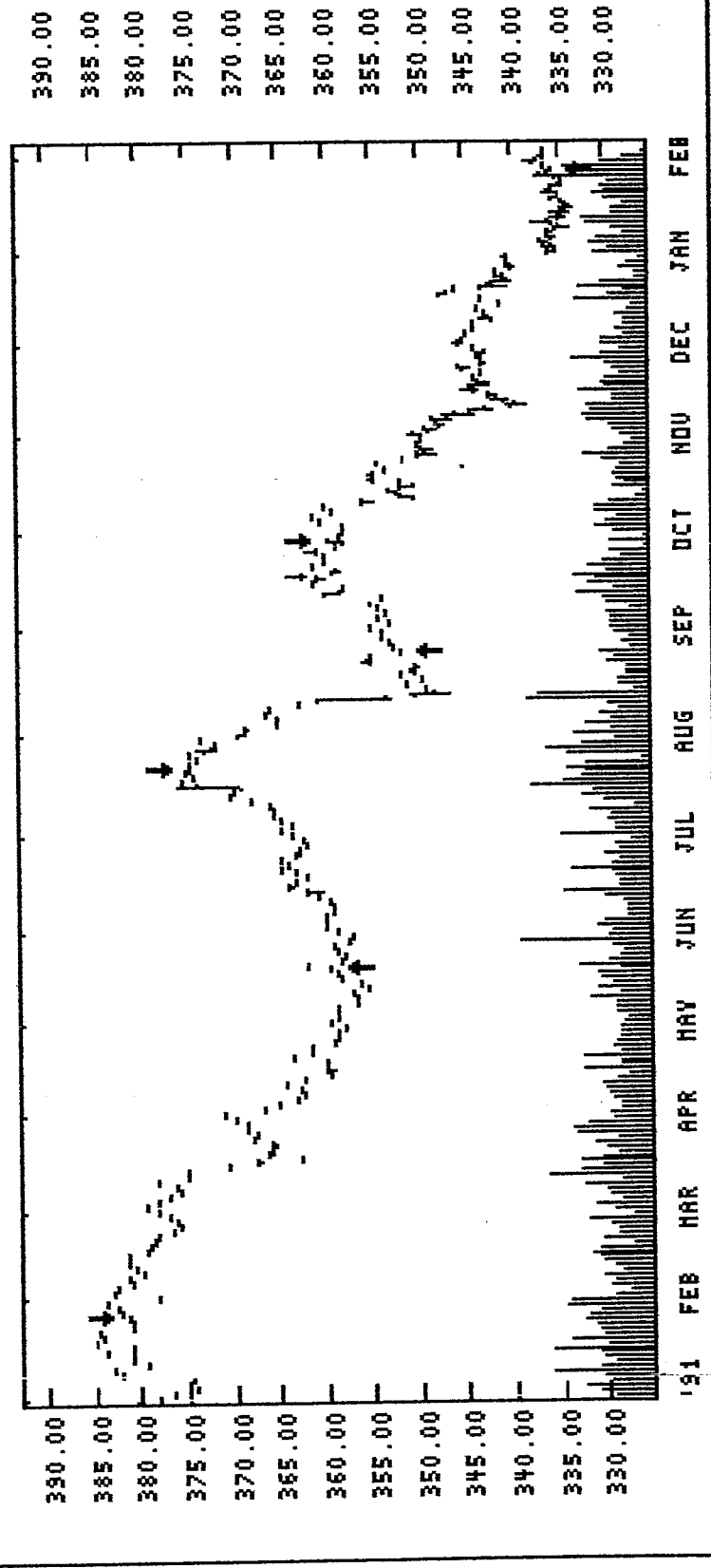
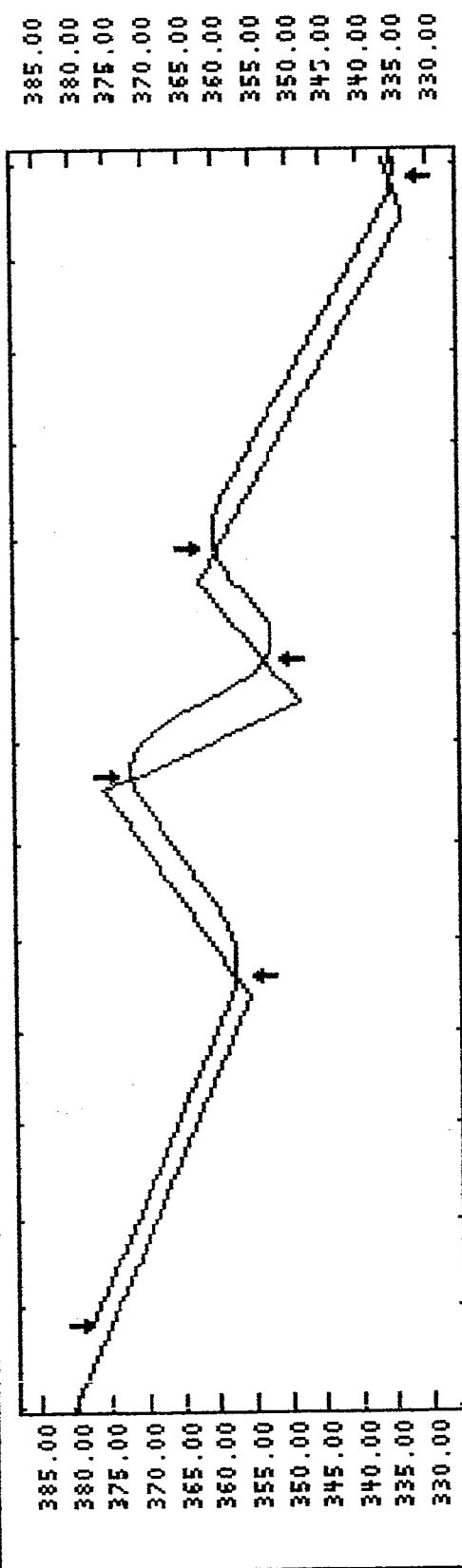
-- MetaStock(tm) Profitability Test --

M.A. Indicator Penetration  
(Both Long & Short Positions)

GFOCT93  
3.00 ZIG ZAG  
(18-unit moving average of Indicator)

Date	Trade	Price	Profit/Loss				
			Current Trade		Cumulative		
			Points	Percent	Points	Percent	Dollars
02/18/92	Sell @	376.100	0.000	0.000%	0.000	0.000%	\$ 0.00
06/19/92	Buy @	358.200	17.900	4.759%	17.900	4.759%	\$ 47.59
07/27/92	Sell @	371.700	13.500	3.769%	31.400	8.528%	\$ 87.08
08/26/92	Buy @	349.900	21.800	5.865%	53.200	14.393%	\$ 150.83
09/29/92	Sell @	357.500	7.600	2.172%	60.800	16.565%	\$ 175.83
01/27/93	Buy @	334.300	23.200	6.490%	84.000	23.055%	\$ 252.13
Total Long Trades :			2		Total Short Trades:		3
Profitable Longs :			2 ( 100.0%)		Profitable Shorts :		3 ( 100.0%)
Total Short Stops :			0		Total Long Stops :		0
Biggest Gain :			23.200		Biggest Loss :		0.000
Successive Gains :			5		Successive Losses :		0
Total Gain/Loss :			84.000		Average Gain/Loss :		16.800
Total Gain/Loss \$ :			252.13		Total Gain/Loss % :		25.21

GFDEC93 & 3.00 216 289



-- MetaStock(tm) Profitability Test --

M.A. Indicator Penetration  
(Both Long & Short Positions)

GFDEC93  
3.00 ZIG ZAG  
(19-unit moving average of Indicator)

Date	Trade	Price	Current Trade		Profit/Loss		
			Points	Percent	Points	Percent	Dollars
01/27/92	Sell @	381.500	0.000	0.000%	0.000	0.000%	\$ 0.00
05/18/92	Buy @	359.400	22.100	5.793%	22.100	5.793%	\$ 57.93
07/23/92	Sell @	374.600	15.200	4.229%	37.300	10.022%	\$ 102.67
08/26/92	Buy @	351.900	22.700	6.060%	60.000	16.082%	\$ 169.49
09/29/92	Sell @	359.300	7.400	2.103%	67.400	18.185%	\$ 194.08
01/27/93	Buy @	335.700	23.600	6.568%	91.000	24.753%	\$ 272.52
Total Long Trades :			2		Total Short Trades: 3		
Profitable Longs :			2 ( 100.0%)		Profitable Shorts : 3 ( 100.0%)		
Total Short Stops :			0		Total Long Stops : 0		
Biggest Gain :			23.600		Biggest Loss : 0.000		
Successive Gains :			5		Successive Losses : 0		
Total Gain/Loss :			91.000		Average Gain/Loss : 18.200		
Total Gain/Loss \$ :			272.52		Total Gain/Loss % : 27.25		

Security: GFDEC92

Indicator: MACD

Date	High	Low	Close	Volume	Indicator	Last M.A.
12/31/91	366.000	366.000	366.000	9513		
01/02/92	363.800	362.000	363.700	20014		
01/03/92	364.600	362.300	364.600	27032		
01/06/92	362.500	359.400	360.600	37355		
01/07/92	360.800	360.800	360.800	21933		
01/08/92	361.500	360.700	361.400	26194		
01/09/92	369.300	362.000	367.500	56998		
01/10/92	368.400	367.700	368.400	27339		
01/13/92	365.800	365.100	365.800	20393		
01/14/92	367.000	364.500	366.000	26549		
01/15/92	367.700	365.700	365.600	27464		
01/16/92	370.000	365.600	368.000	55468		
01/17/92	368.500	365.500	368.500	24028		
01/20/92	371.500	368.000	369.200	46042		
01/21/92	369.700	369.200	369.200	25619		
01/22/92	369.100	369.100	369.100	28914		
01/23/92	367.500	366.200	367.500	30353		
01/24/92	364.600	363.800	364.600	37040		
01/27/92	368.000	366.600	368.000	33816		
01/28/92	367.400	367.000	367.400	27567		
01/29/92	366.700	366.700	366.700	47034		
01/31/92	369.800	364.400	367.600	45728		
02/03/92	368.000	368.000	368.000	19263		
02/04/92	367.300	367.100	367.300	10088		
02/05/92	365.100	364.200	365.100	20856		
02/06/92	366.800	365.500	365.600	18384	0.147	
02/07/92	366.200	365.500	366.200	25037	0.095	
02/10/92	365.500	364.000	365.200	14748	-0.022	
02/11/92	366.000	364.900	365.800	20163	-0.069	
02/12/92	367.700	367.200	367.700	25714	0.038	
02/13/92	367.100	365.200	365.700	27577	-0.028	
02/14/92	365.500	363.000	363.600	32652	-0.238	
02/18/92	363.000	361.500	363.000	28285	-0.445	
02/19/92	363.500	362.500	363.100	9258	-0.595	-0.198
02/21/92	362.500	360.700	361.500	26510	-0.827	-0.323
02/25/92	360.100	359.500	360.100	17366	-1.105	-0.480
02/25/92	361.500	359.400	359.600	16513	-1.348	-0.653
02/26/92	359.400	358.800	359.400	21659	-1.539	-0.830
02/27/92	364.200	360.800	363.900	35020	-1.335	-0.931
02/28/92	363.300	363.000	363.000	7686	-1.226	-0.990
03/02/92	361.000	360.000	361.000	18623	-1.277	-1.048
03/03/92	361.900	361.000	361.900	29794	-1.236	-1.085
03/09/92	359.000	358.500	359.000	15686	-1.407	-1.150
03/10/92	359.600	358.500	359.100	20933	-1.518	-1.223
03/11/92	360.000	359.200	360.000	22893	-1.520	-1.283
03/12/92	357.800	356.500	357.400	37031	-1.700	-1.366
03/13/92	357.500	356.800	356.800	15322	-1.868	-1.466
03/16/92	355.000	351.900	353.500	58723	-2.226	-1.618
03/17/92	350.000	346.000	350.000	38883	-2.745	-1.844
03/18/92	351.000	348.500	351.000	25727	-3.047	-2.084
03/19/92	349.000	346.500	348.500	39674	-3.438	-2.355
03/20/92	349.200	347.700	347.900	25097	-3.751	-2.634
03/23/92	348.600	347.600	347.700	16630	-3.971	-2.902
03/24/92	348.600	347.800	348.600	24525	-4.031	-3.127
03/25/92	351.500	350.200	350.300	30439	-3.906	-3.283
03/26/92	350.400	349.800	350.000	16658	-3.786	-3.384

03/27/92	351.500	349.500	351.300	41603	-3.551	-3.417
03/30/92	352.000	350.500	350.700	42852	-3.372	-3.408
03/31/92	353.500	350.800	352.400	33972	-3.065	-3.339
04/01/92	353.700	351.800	353.700	19802	-2.692	-3.210
04/02/92	350.100	348.500	349.100	20925	-2.714	-3.111
04/03/92	349.900	348.300	349.200	15764	-2.693	-3.027
04/06/92	348.400	347.000	348.300	14839	-2.713	-2.965
04/07/92	347.100	345.600	346.600	19655	-2.827	-2.937
04/08/92	347.200	345.700	345.700	21477	-2.951	-2.940
04/09/92	346.900	346.000	346.900	24558	-2.926	-2.937
04/10/92	350.000	348.600	348.600	24958	-2.746	-2.899
04/13/92	349.400	346.400	346.600	16473	-2.723	-2.864
04/14/92	346.800	346.200	346.700	10974	-2.667	-2.824
04/15/92	346.200	342.200	342.900	37098	-2.879	-2.835
04/17/92	344.500	343.400	344.200	14897	-2.915	-2.851
04/20/92	345.000	343.400	343.800	15392	-2.940	-2.869
04/21/92	348.500	344.800	347.700	37406	-2.635	-2.822
04/22/92	345.800	345.100	345.800	14878	-2.507	-2.759
04/23/92	346.400	345.100	345.300	20226	-2.416	-2.691
04/24/92	343.700	342.800	343.500	17208	-2.453	-2.643
04/27/92	343.500	342.900	343.100	14642	-2.484	-2.611
04/28/92	344.500	343.000	343.100	14573	-2.480	-2.585
04/29/92	343.100	341.100	342.200	16024	-2.517	-2.571
05/01/92	345.000	343.800	345.000	12920	-2.308	-2.519
05/04/92	344.300	343.000	343.300	11813	-2.245	-2.464
05/05/92	343.900	343.200	343.400	17991	-2.162	-2.404
05/06/92	343.600	343.000	343.100	16712	-2.096	-2.342
05/07/92	342.800	341.100	341.300	17201	-2.155	-2.305
05/08/92	343.600	340.500	341.600	33381	-2.155	-2.275
05/11/92	343.000	342.000	342.300	14765	-2.078	-2.235
05/12/92	341.200	340.500	340.800	28225	-2.106	-2.209
05/13/92	341.500	340.400	341.100	19806	-2.083	-2.184
05/14/92	344.000	342.400	343.500	26010	-1.860	-2.119
05/15/92	345.600	343.900	344.200	28948	-1.612	-2.018
05/18/92	345.000	344.400	344.500	14084	-1.377	-1.890
05/19/92	347.000	343.000	343.400	37924	-1.259	-1.763
05/20/92	343.600	342.600	343.600	22692	-1.136	-1.638
05/21/92	343.400	342.500	342.600	15883	-1.103	-1.531
05/22/92	343.900	343.200	343.600	13927	-0.989	-1.422
05/26/92	344.200	343.500	344.000	19760	-0.858	-1.310
05/28/92	343.500	342.000	342.900	72627	-0.828	-1.213
05/29/92	343.700	342.000	342.300	22626	-0.840	-1.139
06/01/92	343.500	342.200	343.500	18762	-0.750	-1.061
06/02/92	345.600	344.300	345.200	27713	-0.543	-0.957
06/03/92	346.900	344.400	344.600	22912	-0.420	-0.850
06/04/92	345.000	344.500	344.600	9998	-0.318	-0.743
06/08/92	344.900	344.000	344.100	9944	-0.272	-0.649
06/09/92	344.200	343.600	344.200	11600	-0.225	-0.564
06/10/92	344.700	343.600	343.800	12990	-0.216	-0.495
06/11/92	346.500	343.800	346.200	23077	-0.026	-0.401
06/12/92	349.700	345.400	348.600	46754	0.304	-0.260
06/15/92	349.500	348.100	348.800	15319	0.574	-0.093
06/16/92	348.400	347.600	347.900	15131	0.713	0.068
06/17/92	348.600	347.000	348.600	16890	0.867	0.228
06/18/92	349.200	346.500	348.000	19816	0.933	0.369
06/19/92	350.900	345.600	346.200	43327	0.839	0.463
06/22/92	349.200	347.500	349.000	19940	0.966	0.564
06/23/92	350.500	349.100	349.800	15293	1.115	0.674
06/24/92	349.400	347.600	348.100	24040	1.092	0.758
06/25/92	348.900	347.700	348.300	15500	1.077	0.822



06/26/92	349.200	347.300	347.700	16698	1.008	0.859
06/30/92	349.100	348.100	348.200	8685	0.980	0.883
07/01/92	349.600	348.300	349.400	49575	1.037	0.914
07/06/92	352.000	350.800	351.200	17913	1.205	0.972
07/07/92	350.900	349.500	350.800	17275	1.293	1.036
07/08/92	352.800	351.500	352.000	22356	1.438	1.117
07/09/92	353.200	351.400	353.200	20273	1.626	1.218
07/10/92	355.000	352.400	352.600	33013	1.710	1.317
07/13/92	353.500	352.700	353.400	7011	1.818	1.417
07/14/92	355.700	353.600	355.400	24595	2.031	1.540
07/15/92	358.500	355.000	358.300	36770	2.394	1.711
07/16/92	358.300	356.500	356.700	30721	2.532	1.875
07/17/92	363.800	356.700	361.500	66722	2.973	2.095
07/20/92	364.700	361.800	363.200	47545	3.413	2.358
07/21/92	362.800	361.100	361.900	37210	3.623	2.611
07/22/92	364.500	361.600	363.000	34154	3.830	2.855
07/23/92	365.000	362.200	362.600	44660	3.920	3.068
07/25/92	363.500	360.400	363.200	34120	3.991	3.253
07/27/92	362.500	361.500	361.900	2341	3.905	3.383
07/28/92	363.900	362.000	362.900	45444	3.868	3.480
07/29/92	362.500	359.500	360.400	58057	3.608	3.506
07/30/92	361.000	360.100	360.600	37661	3.378	3.480
07/31/92	362.000	360.900	361.400	17869	3.219	3.428
08/03/92	360.600	355.600	356.500	40813	2.691	3.281
08/04/92	356.900	355.700	356.500	19561	2.245	3.073
08/05/92	354.400	351.900	352.900	34114	1.599	2.779
08/06/92	353.000	351.400	352.700	19038	1.058	2.435
08/07/92	354.800	352.300	353.900	26016	0.711	2.090
08/10/92	354.400	353.400	354.000	16012	0.438	1.760
08/11/92	352.300	350.800	350.900	21487	-0.014	1.405
08/12/92	351.300	340.500	342.000	69391	-1.037	0.916
08/13/92	342.200	335.000	337.200	61829	-2.190	0.295
08/14/92	338.800	337.400	337.800	6146	-3.027	-0.369
08/17/92	340.400	339.200	339.900	15352	-3.493	-0.994
08/18/92	339.300	337.600	338.700	14224	-3.910	-1.577
08/19/92	341.300	340.300	340.800	11694	-4.037	-2.069
08/20/92	340.600	339.000	340.200	11626	-4.136	-2.483
08/21/92	340.100	338.700	340.000	114881	-4.183	-2.823
08/24/92	345.300	343.600	344.300	21349	-3.849	-3.028
08/25/92	344.500	342.700	343.300	18173	-3.619	-3.146
08/26/92	343.400	340.500	340.900	25024	-3.578	-3.233
08/27/92	342.000	341.200	341.700	8722	-3.445	-3.275
08/28/92	343.000	341.900	342.400	13667	-3.249	-3.270
08/29/92	346.700	342.600	345.300	9022	-2.841	-3.184
08/31/92	346.700	342.600	345.300	18343	-2.488	-3.045
09/01/92	345.700	342.800	343.400	20434	-2.325	-2.901
09/02/92	343.400	340.300	341.100	19795	-2.343	-2.789
09/03/92	344.600	340.900	343.400	19970	-2.159	-2.663
09/08/92	345.300	343.000	343.800	21240	-1.960	-2.522
09/09/92	344.800	344.000	344.600	9473	-1.721	-2.362
09/10/92	346.100	343.500	344.200	21451	-1.544	-2.198
09/11/92	344.900	345.200	345.700	23628	-1.275	-2.014
09/14/92	351.000	345.900	348.800	39605	-0.816	-1.774
09/15/92	348.900	347.500	348.400	18064	-0.477	-1.515
09/16/92	352.000	349.700	351.700	32232	0.043	-1.203
09/17/92	351.100	349.600	349.800	27581	0.309	-0.901
09/18/92	354.500	348.900	353.000	40388	0.755	-0.570
09/21/92	351.300	348.300	349.400	22335	0.826	-0.290
09/22/92	352.600	348.000	350.700	31545	0.971	-0.038
09/23/92	351.900	349.300	350.400	23275	1.051	0.180

09/24/92	351.100	349.400	351.000	13590	1.148	0.373
09/25/92	352.900	350.400	351.100	19562	1.218	0.542
09/28/92	351.000	349.200	349.400	0	1.132	0.660
09/29/92	350.600	348.300	349.900	20024	1.089	0.746
09/30/92	351.300	349.300	349.500	340	1.013	0.799
10/01/92	350.100	348.800	349.100	16857	0.912	0.822
10/02/92	350.500	348.600	349.600	27839	0.860	0.830
10/06/92	351.800	350.900	351.400	21575	0.944	0.853
10/07/92	352.400	350.500	352.200	14487	1.060	0.894
10/08/92	352.200	350.700	351.000	27841	1.049	0.925
10/09/92	352.500	350.700	351.400	28314	1.058	0.952
10/12/92	347.800	345.800	346.100	18634	0.657	0.893
10/13/92	345.000	343.300	344.900	3502	0.243	0.763
10/14/92	345.100	343.500	343.700	697	-0.175	0.575
10/15/92	343.400	341.600	341.900	18205	-0.636	0.333
10/16/92	343.800	342.400	343.200	10199	-0.894	0.088
10/20/92	345.000	343.500	344.600	14790	-0.982	-0.126
10/21/92	345.400	344.500	344.800	16925	-1.025	-0.306
10/22/92	344.200	343.200	343.700	16014	-1.130	-0.471
10/23/92	344.600	342.800	344.200	13056	-1.162	-0.609
10/26/92	342.400	341.200	341.700	24383	-1.362	-0.760
10/27/92	340.000	336.900	338.000	34803	-1.781	-0.964
10/28/92	340.300	338.400	340.100	18658	-1.934	-1.158
10/29/92	340.500	339.700	340.200	10355	-2.024	-1.331
10/30/92	340.400	339.400	340.100	7169	-2.080	-1.481
11/02/92	340.800	339.700	340.600	12919	-2.063	-1.597
11/03/92	339.400	337.400	338.200	18043	-2.206	-1.719
11/04/92	339.800	337.400	337.700	18975	-2.331	-1.841
11/05/92	340.200	336.500	336.800	32142	-2.471	-1.967
11/06/92	338.000	333.700	336.200	35179	-2.598	-2.094
11/09/92	335.800	332.200	333.100	31000	-2.902	-2.255
11/10/92	331.500	328.900	330.100	31708	-3.332	-2.471
11/11/92	333.000	331.100	332.100	16825	-3.484	-2.673
11/12/92	334.100	332.200	333.500	16963	-3.458	-2.830
11/13/92	337.500	333.800	335.400	37584	-3.257	-2.916
11/16/92	336.000	333.700	334.000	21405	-3.167	-2.966
11/17/92	334.600	333.500	334.400	23703	-3.031	-2.979
11/18/92	335.500	334.600	335.200	20697	-2.830	-2.949
11/19/92	335.500	333.700	335.400	13634	-2.624	-2.884
11/20/92	337.000	335.000	335.300	16291	-2.441	-2.796
11/23/92	334.400	333.800	334.400	22663	-2.337	-2.704
11/24/92	334.900	334.100	334.300	41442	-2.237	-2.610
11/25/92	335.000	332.800	333.500	24461	-2.192	-2.527
11/30/92	334.500	333.600	334.300	12522	-2.073	-2.436
12/02/92	336.900	335.500	335.900	24461	-1.836	-2.316
12/03/92	335.900	335.400	335.500	24195	-1.658	-2.184
12/04/92	336.000	335.300	335.700	10105	-1.485	-2.045
12/07/92	336.200	334.500	336.100	14073	-1.303	-1.896
12/08/92	336.000	335.000	335.400	9894	-1.197	-1.756
12/09/92	334.000	333.400	333.600	10520	-1.235	-1.652
12/10/92	334.300	333.500	334.100	15388	-1.214	-1.564
12/11/92	335.500	334.500	335.200	9368	-1.101	-1.472
12/14/92	335.800	334.700	335.800	7120	-0.955	-1.368
12/15/92	335.600	334.400	334.500	39509	-0.927	-1.280
12/17/92	339.200	338.300	338.400	19101	-0.602	-1.144
12/18/92	337.600	336.600	336.900	10485	-0.452	-1.006
12/21/92	335.500	333.000	334.000	36755	-0.547	-0.914
12/22/92	332.600	331.800	332.200	23874	-0.750	-0.881
12/23/92	333.300	332.900	332.900	3683	-0.849	-0.875
12/28/92	333.500	333.000	333.500	5245	-0.872	-0.874

12/29/92 332.700 332.100 332.500 12391 -0.955 -0.890

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MA: 9-unit Exponential of Indicator (0.00% V-shift, 0-unit H-shift)

Security: GFDEC92

Indicator: MACD

Date	High	Low	Close	Volume	Indicator	Last M.A.
12/31/91	366.000	366.000	366.000	9513		
01/02/92	363.800	362.000	363.700	20014		
01/03/92	364.600	362.300	364.600	27032		
01/06/92	362.500	359.400	360.600	37355		
01/07/92	360.800	360.800	360.800	21933		
01/08/92	361.500	360.700	361.400	26194		
01/09/92	369.300	362.000	367.500	56998		
01/10/92	368.400	367.700	368.400	27339		
01/13/92	365.800	365.100	365.800	20393		
01/14/92	367.000	364.500	366.000	26549		
01/15/92	367.700	365.700	365.600	27464		
01/16/92	370.000	365.600	368.000	55468		
01/17/92	368.500	365.500	368.500	24028		
01/20/92	371.500	368.000	369.200	46042		
01/21/92	369.700	369.200	369.200	25619		
01/22/92	369.100	369.100	369.100	28914		
01/23/92	367.500	366.200	367.500	30353		
01/24/92	364.600	363.800	364.600	37040		
01/27/92	368.000	366.600	368.000	33816		
01/28/92	367.400	367.000	367.400	27567		
01/29/92	366.700	366.700	366.700	47034		
01/31/92	369.800	364.400	367.600	45728		
02/03/92	368.000	368.000	368.000	19263		
02/04/92	367.300	367.100	367.300	10088		
02/05/92	365.100	364.200	365.100	20856		
02/06/92	366.800	365.500	365.600	18384	0.147	
02/07/92	366.200	365.500	366.200	25037	0.095	
02/10/92	365.500	364.000	365.200	14748	-0.022	
02/11/92	366.000	364.900	365.800	20163	-0.069	
02/12/92	367.700	367.200	367.700	25714	0.038	
02/13/92	367.100	365.200	365.700	27577	-0.028	
02/14/92	365.500	363.000	363.600	32652	-0.238	
02/18/92	363.000	361.500	363.000	28285	-0.445	
02/19/92	363.500	362.500	363.100	9258	-0.595	
02/21/92	362.500	360.700	361.500	26510	-0.827	
02/25/92	360.100	359.500	360.100	17366	-1.105	
02/25/92	361.500	359.400	359.600	16513	-1.348	
02/26/92	359.400	358.800	359.400	21659	-1.539	
02/27/92	364.200	360.800	363.900	35020	-1.335	
02/28/92	363.300	363.000	363.000	7686	-1.226	-0.566
03/02/92	361.000	360.000	361.000	18623	-1.277	-0.661
03/03/92	361.900	361.000	361.900	29794	-1.236	-0.750
03/09/92	359.000	358.500	359.000	15686	-1.407	-0.842
03/10/92	359.600	358.500	359.100	20933	-1.518	-0.939
03/11/92	360.000	359.200	360.000	22893	-1.520	-1.043
03/12/92	357.800	356.500	357.400	37031	-1.700	-1.154
03/13/92	357.500	356.800	356.800	15322	-1.868	-1.263
03/16/92	355.000	351.900	353.500	58723	-2.226	-1.382
03/17/92	350.000	346.000	350.000	38883	-2.745	-1.525
03/18/92	351.000	348.500	351.000	25727	-3.047	-1.673
03/19/92	349.000	346.500	348.500	39674	-3.438	-1.829
03/20/92	349.200	347.700	347.900	25097	-3.751	-1.989
03/23/92	348.600	347.600	347.700	16630	-3.971	-2.151
03/24/92	348.600	347.800	348.600	24525	-4.031	-2.331
03/25/92	351.500	350.200	350.300	30439	-3.906	-2.509
03/26/92	350.400	349.800	350.000	16658	-3.786	-2.676

03/27/92	351.500	349.500	351.300	41603	-3.551	-2.831
03/30/92	352.000	350.500	350.700	42852	-3.372	-2.962
03/31/92	353.500	350.800	352.400	33972	-3.065	-3.065
04/01/92	353.700	351.800	353.700	19802	-2.692	-3.143
04/02/92	350.100	348.500	349.100	20925	-2.714	-3.211
04/03/92	349.900	348.300	349.200	15764	-2.693	-3.266
04/06/92	348.400	347.000	348.300	14839	-2.713	-3.298
04/07/92	347.100	345.600	346.600	19655	-2.827	-3.304
04/08/92	347.200	345.700	345.700	21477	-2.951	-3.297
04/09/92	346.900	346.000	346.900	24558	-2.926	-3.263
04/10/92	350.000	348.600	348.600	24958	-2.746	-3.196
04/13/92	349.400	346.400	346.600	16473	-2.723	-3.113
04/14/92	346.800	346.200	346.700	10974	-2.667	-3.022
04/15/92	346.200	342.200	342.900	37098	-2.879	-2.954
04/17/92	344.500	343.400	344.200	14897	-2.915	-2.896
04/20/92	345.000	343.400	343.800	15392	-2.940	-2.855
04/21/92	348.500	344.800	347.700	37406	-2.635	-2.806
04/22/92	345.800	345.100	345.800	14878	-2.507	-2.769
04/23/92	346.400	345.100	345.300	20226	-2.416	-2.750
04/24/92	343.700	342.800	343.500	17208	-2.453	-2.733
04/27/92	343.500	342.900	343.100	14642	-2.484	-2.719
04/28/92	344.500	343.000	343.100	14573	-2.480	-2.703
04/29/92	343.100	341.100	342.200	16024	-2.517	-2.683
05/01/92	345.000	343.800	345.000	12920	-2.308	-2.640
05/04/92	344.300	343.000	343.300	11813	-2.245	-2.594
05/05/92	343.900	343.200	343.400	17991	-2.162	-2.555
05/06/92	343.600	343.000	343.100	16712	-2.096	-2.514
05/07/92	342.800	341.100	341.300	17201	-2.155	-2.479
05/08/92	343.600	340.500	341.600	33381	-2.155	-2.431
05/11/92	343.000	342.000	342.300	14765	-2.078	-2.375
05/12/92	341.200	340.500	340.800	28225	-2.106	-2.320
05/13/92	341.500	340.400	341.100	19806	-2.083	-2.283
05/14/92	344.000	342.400	343.500	26010	-1.860	-2.240
05/15/92	345.600	343.900	344.200	28948	-1.612	-2.186
05/18/92	345.000	344.400	344.500	14084	-1.377	-2.115
05/19/92	347.000	343.000	343.400	37924	-1.259	-2.033
05/20/92	343.600	342.600	343.600	22692	-1.136	-1.943
05/21/92	343.400	342.500	342.600	15883	-1.103	-1.849
05/22/92	343.900	343.200	343.600	13927	-0.989	-1.761
05/26/92	344.200	343.500	344.000	19760	-0.858	-1.668
05/28/92	343.500	342.000	342.900	72627	-0.828	-1.580
05/29/92	343.700	342.000	342.300	22626	-0.840	-1.496
06/01/92	343.500	342.200	343.500	18762	-0.750	-1.402
06/02/92	345.600	344.300	345.200	27713	-0.543	-1.295
06/03/92	346.900	344.400	344.600	22912	-0.420	-1.184
06/04/92	345.000	344.500	344.600	9998	-0.318	-1.065
06/08/92	344.900	344.000	344.100	9944	-0.272	-0.944
06/09/92	344.200	343.600	344.200	11600	-0.225	-0.835
06/10/92	344.700	343.600	343.800	12990	-0.216	-0.742
06/11/92	346.500	343.800	346.200	23077	-0.026	-0.652
06/12/92	349.700	345.400	348.600	46754	0.304	-0.548
06/15/92	349.500	348.100	348.800	15319	0.574	-0.434
06/16/92	348.400	347.600	347.900	15131	0.713	-0.313
06/17/92	348.600	347.000	348.600	16890	0.867	-0.189
06/18/92	349.200	346.500	348.000	19816	0.933	-0.070
06/19/92	350.900	345.600	346.200	43327	0.839	0.041
06/22/92	349.200	347.500	349.000	19940	0.966	0.162
06/23/92	350.500	349.100	349.800	15293	1.115	0.286
06/24/92	349.400	347.600	348.100	24040	1.092	0.395
06/25/92	348.900	347.700	348.300	15500	1.077	0.495

06/26/92	349.200	347.300	347.700	16698	1.008	0.583
06/30/92	349.100	348.100	348.200	8685	0.980	0.667
07/01/92	349.600	348.300	349.400	49575	1.037	0.751
07/06/92	352.000	350.800	351.200	17913	1.205	0.846
07/07/92	350.900	349.500	350.800	17275	1.293	0.934
07/08/92	352.800	351.500	352.000	22356	1.438	1.009
07/09/92	353.200	351.400	353.200	20273	1.626	1.079
07/10/92	355.000	352.400	352.600	33013	1.710	1.146
07/13/92	353.500	352.700	353.400	7011	1.818	1.209
07/14/92	355.700	353.600	355.400	24595	2.031	1.282
07/15/92	358.500	355.000	358.300	36770	2.394	1.386
07/16/92	358.300	356.500	356.700	30721	2.532	1.491
07/17/92	363.800	356.700	361.500	66722	2.973	1.614
07/20/92	364.700	361.800	363.200	47545	3.413	1.769
07/21/92	362.800	361.100	361.900	37210	3.623	1.939
07/22/92	364.500	361.600	363.000	34154	3.830	2.127
07/23/92	365.000	362.200	362.600	44660	3.920	2.323
07/25/92	363.500	360.400	363.200	34120	3.991	2.520
07/27/92	362.500	361.500	361.900	2341	3.905	2.700
07/28/92	363.900	362.000	362.900	45444	3.868	2.872
07/29/92	362.500	359.500	360.400	58057	3.608	3.016
07/30/92	361.000	360.100	360.600	37661	3.378	3.133
07/31/92	362.000	360.900	361.400	17869	3.219	3.234
08/03/92	360.600	355.600	356.500	40813	2.691	3.292
08/04/92	356.900	355.700	356.500	19561	2.245	3.306
08/05/92	354.400	351.900	352.900	34114	1.599	3.253
08/06/92	353.000	351.400	352.700	19038	1.058	3.155
08/07/92	354.800	352.300	353.900	26016	0.711	3.004
08/10/92	354.400	353.400	354.000	16012	0.438	2.806
08/11/92	352.300	350.800	350.900	21487	-0.014	2.563
08/12/92	351.300	340.500	342.000	69391	-1.037	2.239
08/13/92	342.200	335.000	337.200	61829	-2.190	1.831
08/14/92	338.800	337.400	337.800	6146	-3.027	1.364
08/17/92	340.400	339.200	339.900	15352	-3.493	0.870
08/18/92	339.300	337.600	338.700	14224	-3.910	0.352
08/19/92	341.300	340.300	340.800	11694	-4.037	-0.158
08/20/92	340.600	339.000	340.200	11626	-4.136	-0.659
08/21/92	340.100	338.700	340.000	114881	-4.183	-1.152
08/24/92	345.300	343.600	344.300	21349	-3.849	-1.588
08/25/92	344.500	342.700	343.300	18173	-3.619	-1.979
08/26/92	343.400	340.500	340.900	25024	-3.578	-2.324
08/27/92	342.000	341.200	341.700	8722	-3.445	-2.625
08/28/92	343.000	341.900	342.400	13667	-3.249	-2.889
08/29/92	346.700	342.600	345.300	9022	-2.841	-3.107
08/31/92	346.700	342.600	345.300	18343	-2.488	-3.272
09/01/92	345.700	342.800	343.400	20434	-2.325	-3.358
09/02/92	343.400	340.300	341.100	19795	-2.343	-3.368
09/03/92	344.600	340.900	343.400	19970	-2.159	-3.310
09/08/92	345.300	343.000	343.800	21240	-1.960	-3.208
09/09/92	344.800	344.000	344.600	9473	-1.721	-3.062
09/10/92	346.100	343.500	344.200	21451	-1.544	-2.896
09/11/92	344.900	345.200	345.700	23628	-1.275	-2.705
09/14/92	351.000	345.900	348.800	39605	-0.816	-2.481
09/15/92	348.900	347.500	348.400	18064	-0.477	-2.256
09/16/92	352.000	349.700	351.700	32232	0.043	-2.012
09/17/92	351.100	349.600	349.800	27581	0.309	-1.753
09/18/92	354.500	348.900	353.000	40388	0.755	-1.473
09/21/92	351.300	348.300	349.400	22335	0.826	-1.201
09/22/92	352.600	348.000	350.700	31545	0.971	-0.947
09/23/92	351.900	349.300	350.400	23275	1.051	-0.711

09/24/92	351.100	349.400	351.000	13590	1.148	-0.479
09/25/92	352.900	350.400	351.100	19562	1.218	-0.242
09/28/92	351.000	349.200	349.400	0	1.132	-0.023
09/29/92	350.600	348.300	349.900	20024	1.089	0.181
09/30/92	351.300	349.300	349.500	340	1.013	0.363
10/01/92	350.100	348.800	349.100	16857	0.912	0.527
10/02/92	350.500	348.600	349.600	27839	0.860	0.669
10/06/92	351.800	350.900	351.400	21575	0.944	0.786
10/07/92	352.400	350.500	352.200	14487	1.060	0.889
10/08/92	352.200	350.700	351.000	27841	1.049	0.956
10/09/92	352.500	350.700	351.400	28314	1.058	1.006
10/12/92	347.800	345.800	346.100	18634	0.657	0.999
10/13/92	345.000	343.300	344.900	3502	0.243	0.960
10/14/92	345.100	343.500	343.700	697	-0.175	0.884
10/15/92	343.400	341.600	341.900	18205	-0.636	0.772
10/16/92	343.800	342.400	343.200	10199	-0.894	0.635
10/20/92	345.000	343.500	344.600	14790	-0.982	0.489
10/21/92	345.400	344.500	344.800	16925	-1.025	0.345
10/22/92	344.200	343.200	343.700	16014	-1.130	0.197
10/23/92	344.600	342.800	344.200	13056	-1.162	0.052
10/26/92	342.400	341.200	341.700	24383	-1.362	-0.10
10/27/92	340.000	336.900	338.000	34803	-1.781	-0.276
10/28/92	340.300	338.400	340.100	18658	-1.934	-0.468
10/29/92	340.500	339.700	340.200	10355	-2.024	-0.673
10/30/92	340.400	339.400	340.100	7169	-2.080	-0.882
11/02/92	340.800	339.700	340.600	12919	-2.063	-1.090
11/03/92	339.400	337.400	338.200	18043	-2.206	-1.281
11/04/92	339.800	337.400	337.700	18975	-2.331	-1.452
11/05/92	340.200	336.500	336.800	32142	-2.471	-1.605
11/06/92	338.000	333.700	336.200	35179	-2.598	-1.736
11/09/92	335.800	332.200	333.100	31000	-2.902	-1.870
11/10/92	331.500	328.900	330.100	31708	-3.332	-2.027
11/11/92	333.000	331.100	332.100	16825	-3.484	-2.191
11/12/92	334.100	332.200	333.500	16963	-3.458	-2.346
11/13/92	337.500	333.800	335.400	37584	-3.257	-2.486
11/16/92	336.000	333.700	334.000	21405	-3.167	-2.606
11/17/92	334.600	333.500	334.400	23703	-3.031	-2.689
11/18/92	335.500	334.600	335.200	20697	-2.830	-2.749
11/19/92	335.500	333.700	335.400	13634	-2.624	-2.789
11/20/92	337.000	335.000	335.300	16291	-2.441	-2.813
11/23/92	334.400	333.800	334.400	22663	-2.337	-2.831
11/24/92	334.900	334.100	334.300	41442	-2.237	-2.833
11/25/92	335.000	332.800	333.500	24461	-2.192	-2.824
11/30/92	334.500	333.600	334.300	12522	-2.073	-2.798
12/02/92	336.900	335.500	335.900	24461	-1.836	-2.747
12/03/92	335.900	335.400	335.500	24195	-1.658	-2.664
12/04/92	336.000	335.300	335.700	10105	-1.485	-2.541
12/07/92	336.200	334.500	336.100	14073	-1.303	-2.395
12/08/92	336.000	335.000	335.400	9894	-1.197	-2.245
12/09/92	334.000	333.400	333.600	10520	-1.235	-2.110
12/10/92	334.300	333.500	334.100	15388	-1.214	-1.980
12/11/92	335.500	334.500	335.200	9368	-1.101	-1.851
12/14/92	335.800	334.700	335.800	7120	-0.955	-1.726
12/15/92	335.600	334.400	334.500	39509	-0.927	-1.613
12/17/92	339.200	338.300	338.400	19101	-0.602	-1.490
12/18/92	337.600	336.600	336.900	10485	-0.452	-1.364
12/21/92	335.500	333.000	334.000	36755	-0.547	-1.252
12/22/92	332.600	331.800	332.200	23874	-0.750	-1.156
12/23/92	333.300	332.900	332.900	3683	-0.849	-1.074
12/28/92	333.500	333.000	333.500	5245	-0.872	-1.010

12/29/92 332.700 332.100 332.500 12391 -0.955 -0.963

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MA: 15-unit Simple of Indicator (0.00% V-shift, 0-unit H-shift)