

# Gann Lines and Angles

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*by Robert Pardo*

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***"Integrated use of Gann Lines and Angles. . . appreciably enhances the accuracy of the identification and verification of potential turning points. "***

## **INTRODUCTION**

Gann Lines and Gann Angles are technical charting methods for the projection of Forward Support and Resistance. This article will discuss these techniques, their applications, the concept of Forward Support and Resistance, and the Principle of Coincidence.

The projection of potential future turning points is one of the more interesting and rewarding applications of Forward Support and Resistance. This article will outline an integrated use of Gann Lines and Angles. This integration appreciably enhances the accuracy of the identification and verification of potential turning points. It is a good example of the "sum exceeding the parts." It is also an excellent illustration of the Principle of Coincidence.

## **THE MARGIN OF ERROR**

Experience indicates that many traders are unaware of the LIMITATIONS of technical indicators and their applications. Most traders know the proper application of a particular method. However, most do not know how to determine at what point a method is being used beyond its inherent capabilities. The result of this is inaccurate and misleading trading information. Application of the Principle of Coincidence is one method that helps to reduce this effect.

There is a great deal of interest in precision entry techniques as well as in methods for predicting market turning points. Gann Lines and Angles can both be used individually or jointly towards both of these ends. When techniques are employed for these purposes, it is mandatory to fully appreciate the allowable margin of error inherent in such methods. Since even the most accurate analytic methods possess an error margin, it is worthwhile to work towards minimizing its impact on forecasts and market entry calculations. Employing a well-chosen selection of indicators and methods balanced in an integrated model is one such method. It is also at the heart of the Principle of Coincidence.

## **THE JOINT APPLICATION OF MULTIPLE TECHNIQUES**

Three examples of technical decision models employing multiple techniques will be developed. These models will consider the following techniques:

1. the Isolation of Significant High and Low Pivot Points in an attendant Price Space,
2. the Projection of Forward Support and Resistance (Gann Lines and Angles),
3. a Momentum Indicator (Relative Strength), and

#### 4. Pattern Recognition (Momentum/Price Divergence)

taken together in a complementary synthesis. An integrated use such as this constitutes an application of the Principle of Coincidence.

The use of multiple, integrated techniques can lead to the following trading enhancements:

1. the Improvement of Precision,
2. a Greater Probability of Accuracy, and
3. Independent Cross Verification.

The isolation of future market turning points is the primary purpose of the method presented. A secondary and equally important use of this method is the verification and categorization of established turning points. Additionally, the three example studies will illustrate the concept and power of the Principle of Coincidence.

## **THE PIVOT POINT**

### **The Pivot Point Defined**

A PIVOT POINT is a particular point in time and price at a particular level of price action when the trend of the market has changed direction. There are Pivot Point HIGHS and Pivot Point LOWS. The three Price Space Examples shown each display a Significant High (S2) and Low (S1) Pivot Point.

### **Pivot Point Levels**

Pivot points can and do occur at all levels of significance down from major, medium, intermediate, minor to micro turning points. It is essential to the effective use of Pivot Points that they be categorized by their appropriate level. The Pivot Points identified in the examples cited are of medium-term level. Pivot points can and do occur in tic-by-tic data, hourly bar charts, daily data on the short-term, "micro" level, on the longer-term level where they can coincide with monthly and/or yearly highs and lows, in weekly bar charts, etc. Pivot Points occur in any and all types of charts.

### **The Significance of the Pivot Point Level**

The significance of the concept of the Pivot Point level is a question of both identification and application. If one is trading short-term, an evaluation of short term Pivot Points will prove most useful. If one is trading long term, such an evaluation will have a more limited applicability. These types of examples can be proliferated ad infinitum. Suffice it to say that to achieve maximum performance, one should evaluate Pivot Points on the level appropriate to one's central trading strategy. In other words, long-term traders should focus on higher-level Pivot Points, and short-term traders should focus on lower level Pivot Points. This is not to say that one should ignore all other Pivot Points as irrelevant. When properly understood, the various levels of Pivot Points can and should be used together in a complementary synthesis.

## **THE PRICE SPACE**

### **Definition of a Price Space**



MP03

*"Betting on a horse, that's gambling, betting you can make three spades that's entertainment, betting that cotton will go up three points, that's business. See the difference?"*

***"Betting on a horse, that's gambling, betting you can make three spades that's entertainment, betting that cotton will go up three points, that's business. See the difference?"***



Chart 1:

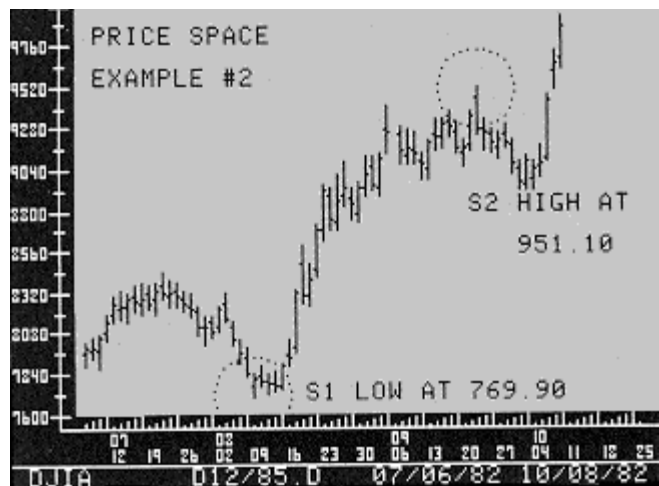


Chart 2:



Chart 3:

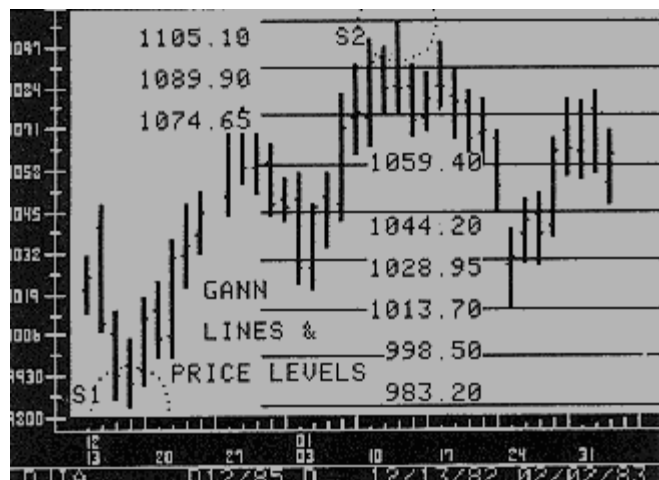


Chart 4:

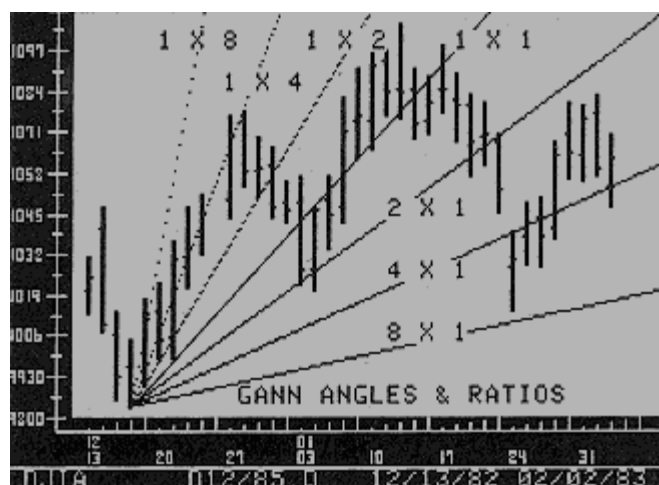


Chart 5:

A PRICE SPACE is a COMPLETED price action bounded by both a Low and a High Pivot Point of equal term level. The Pivot Points that begin and end a Price Space are its boundaries, or Boundary Points. The LEVEL of the Price Space is determined by the level of its Boundary Pivot Points. A Price Space bounded by intermediate-level Pivot Points is an intermediate Price Space.

### **The Price Space, Elliott Wave and Dow Theory**

Those familiar with the Elliott Wave and Dow theories will recognize waves and price swings in the concept of the Price Space. There are similarities. Often, an Elliott wave or a price swing will correspond to a Price Space. However, it is important to note that all Price Spaces do NOT correspond to an Elliott wave or a Dow Theory price swing. Price spaces are more generic. The concept of the Price Space is more all-encompassing. A Price Space is solely determined by its boundaries.

### **The "Dimensions" of a Price Space**

Price Spaces have a price and a time dimension. The price, or "space" dimension, is its price "height," or, the price distance traveled from its beginning boundary to its ending boundary. This discussion is exclusively concerned with the price dimension.

### **Three Examples of Price Spaces**

Price Space example #1 begins at Pivot Point Low S1 on 3/9/82 at a price of 786.10 and ends at Pivot Point High S2 on 5/7/82 at a price of 875.50 for a height of 90.40 ( $875.50 - 786.10 = 90.40$ ) points.

Price Space example #2 begins at Pivot Point Low S1 on 8/9/82 at a price of 769.90 and ends at Pivot Point High S2 on 9/22/82 at a price of 951.10 for a height of 181.20 points. Price Space example #3 begins at Pivot Point Low S1 on 12/16/82 at a price of 983.30 and ends at Pivot Point High S2 on 1/12/83 at a price of 1105.10 for a height of 121.80 points.

### **The Relationship Between Pivot Points and Price Spaces**

In summary, the boundaries of a Price Space are described by a High and a Low Pivot Point. A Price Space is the base "unit" for analyses such as Gann Lines. Pivot Points are the base unit for analyses such as Gann Angles.

An examination of the examples supplied will help "flesh out" a more intuitive notion of the concepts of the Pivot Point and the Price Space.

## **THE CONCEPT OF FORWARD SUPPORT AND RESISTANCE**

### **"Traditional" Support and Resistance**

Traditionally, support and resistance are anticipated at price levels where the market previously exhibited support and/or resistance. According to the old formula, when resistance is "broken" it becomes support for a future decline from higher levels. The inverse is true for support. Additionally, support can be anticipated at price levels reflecting established monthly, yearly, all-time, etc. "significant" lows. The reverse is true for resistance and prior significant highs.

All of these things that hold for traditional support and resistance (TS/R) also hold true for Forward Support and Resistance (FS/R). Also, the existence and use of FS/R is not a replacement for TS/R.

Forward Support and Resistance is a complement and addition to Traditional Support and Resistance.

### **Forward Support and Resistance**

FORWARD SUPPORT AND RESISTANCE price levels are calculated from previous price action. In the case of Gann Angles, FS/R is projected forward from a prior Pivot Point. In the case of Gann Lines, FS/R is projected forward from a prior Price Space. The distinction here is:

- (1) TRADITIONAL Support and Resistance (TS/R) is projected forward from previously established significant price levels, while
- (2) FORWARD Support and Resistance (FS/R) is projected forward from CALCULATED price levels derived from previously established price action.

### **The Advance Projection of Pivot Points**

Before reading any further, review the Dow Jones Industrial Average, pork bellies, British pound and Kansas City Value Line studies (Charts 9, 10, 11, 12) featuring Gann Lines, and Gann Angles projected forward from both the Pivot Point High and Low. In particular, examine the points of Gann Angle intersection. Examine closely those angle intersection points that occur near Gann Lines. A large number of significant market turns are indicated by these intersections. Space does not permit the in-depth discussion of all of these market turns. However, the time you spend examining them will prove interesting and worthwhile.

Even a cursory examination of these examples will supply ample food for thought as to why one of the best and most powerful applications of Gann Lines and Angles is the advance projection of points in price and time where potential trend reversals are likely to occur. There are problems of accuracy when each of these techniques is used alone. However, when used together, there is a noticeable enhancement.

## **GANN LINES**

### **Gann Lines Defined**

GANN LINES are Forward Support and Resistance lines. They are constructed by dividing a Price Space into a selected number of equal divisions. A Gann Line study displays these price levels as horizontal lines drawn at equidistant spaces.

### **Data Required to Construct a Gann Line Study**

To construct a Gann Line study, four separate pieces of information are required:

1. a HIGH Pivot Point,
2. a LOW Pivot Point,
3. the HEIGHT of the Price Space defined by these two Pivot Points, and
4. the appropriate NUMBER OF DIVISIONS by which the Price Space is to be divided.

Points One and Two are arrived at by inspection. Point Three is arrived at by calculation. Point Four is achieved through experience. Usually, divisions of eight or ten are a good starting point.



Chart 6:

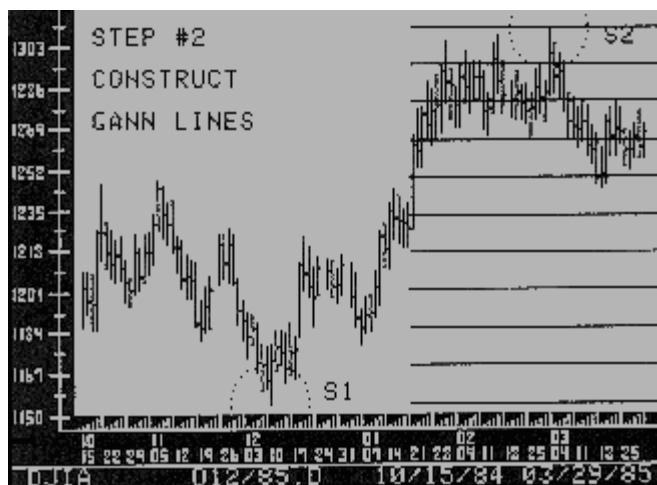


Chart 7:



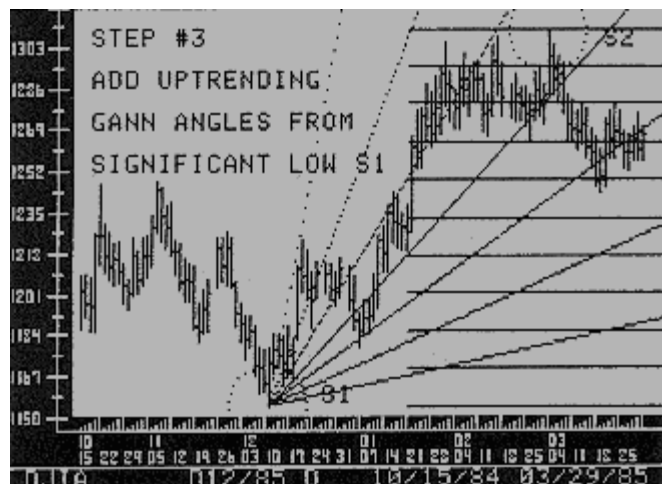


Chart 8:

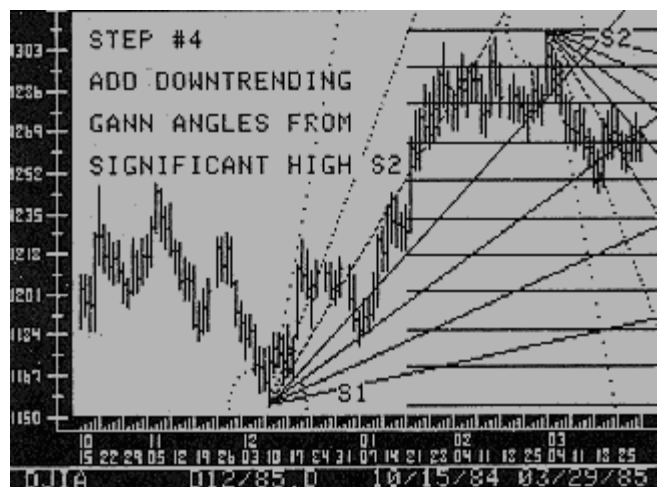


Chart 9:

### **How to Construct a Gann Line Study**

Once these four points are known, the rest is easy. The height of the Price Space is divided into the number of desired segments. Examine the "GANN LINES & PRICE LEVELS" example (Chart 4). The Low Pivot Point, S1, formed on 12/16/82 at a price of 983.20. The High Pivot Point, S2, formed on 1/12/83 at a price of 1105.10. These two Pivot Points define a Price Space equal to 121.90 points ( $1105.10 - 983.20 = 121.90$ ). This Price Space was divided into eighths. Nine horizontal Gann Lines were drawn dividing the Price Space into eight equal price divisions or zones. These price levels can be calculated by either successively adding the "eighth" factor (i.e.,  $121.90 / 8 = 15.238$ ) starting from the low, or inversely, subtracting this factor beginning from the high. In other words:  $983.20 + 15.238 = 998.44 + 15.238 = 1013.68 + 15.238 = 1028.92, \dots$  eight times.

### **Selecting an Appropriate Price Space**

To construct a Gann Line study applicable to long-term trading, it would be most appropriate to select a Price Space defined by high-level Pivot Point boundaries. For example, the selection of the highest high and the lowest low in a five-year period would define a Price Space appropriate for long-term considerations. The selection of the level of the Price Space bears a definite relation to the type of intended trading application. Skill must be employed in the accurate identification of a Price Space to enhance the performance of the resulting Gann Line study.

Always bear in mind the fact that a Price Space represents a completed price action or movement, no matter the level of price action. For example, the first thrust swing of a five count Elliott wave would certainly qualify as an appropriate Price Space. The same considerations that apply to the selection and definition of a Price Space are also effective guidelines for the selection of Pivot Points for the projection of Gann Angles.

### **A Discussion of Gann Lines**

Gann Lines have practical value because markets have a distinct tendency to retrace previous price action in relation to certain proportions. For example, note the widespread use of the 50% and 61.8% price retracements. Gann Lines take the retracement concept one step further. They divide an entire Price Space into equal price divisions to reveal Forward Support and Resistance levels. Gann emphasized the importance of the 50% retracement level. This price level is important. Frequently market corrections will end right at or very near this 50% retracement level. Empirical observation, however, has shown that too great a reliance on the 50% or 61.8% retracement levels can be dangerous. Both the British pound and the pork belly studies present retracements that traveled well beyond these levels to 80% (the pound) and 87.5% (the bellies). Overreliance on one retracement level for verification and action can blind a trader to the true nature of the market action unfolding. This can in turn lead to inaccurate and ill-timed market action.

A Gann Line study, which partitions an entire Price Space into equal price zones and Forward Support and Resistance levels, provides a broad and detailed decision framework for analysis and market action. This complete and comprehensive perspective helps to offset "tunnel-vision."

As market price action approaches these various levels of projected Forward Support and Resistance, the prudent trader will be on the alert for a possible change in price trend.

### **GANN ANGLES**

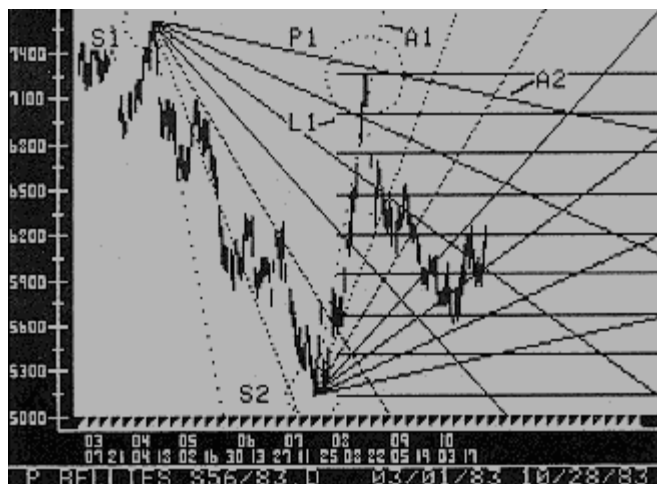


Chart 10:

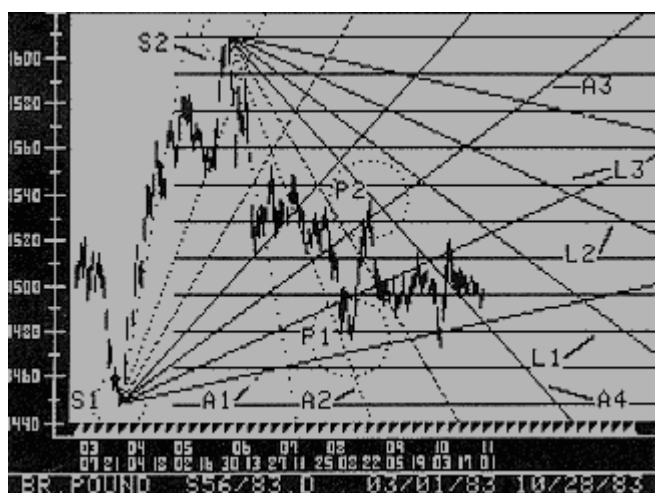


Chart 11:

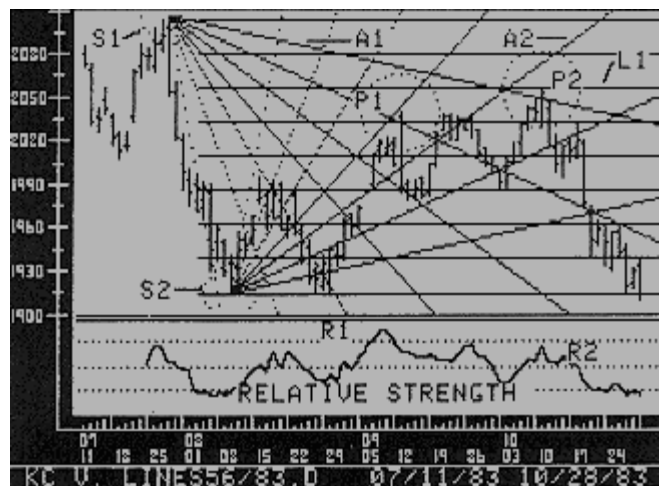


Chart 12:

## **Gann Angles Defined**

GANN ANGLES (Chart 5) are descending and/or ascending lines drawn forward in time from key High and/or Low Pivot Points at specific angles. Gann Angles were viewed by their author as an "unusual" version of moving averages. Gann also viewed them as rates of projected price change. Electing a more pragmatic approach, Gann Angles are descending or ascending Forward Support and Resistance levels.

## **Why Do Gann Angles Work?**

Why Gann Angles can be effectively applied to the market is a bit of a mystery. It appears to have something to do with the tendency of markets to maintain a certain price/time equilibrium. This was Gann's cherished belief. This theory also has been born out to a certain extent by empirical evidence. You will have to satisfy yourself in this regard as you experiment with these methods.

## **How Are Gann Angles Constructed**

Like Gann Lines, Gann Angles are also relatively simple to construct. If one is using the Advanced Chartist, it is only necessary to call the Gann Angle function and use the Live Cursor to specify the selected Pivot Point. The computer does the rest.

For those of you doing manual charting, it is a bit more complicated. Gann Angles are "projected forward," or started from, a key High and/or Low Pivot Point. Gann Angles are different rates of change. In other words, they represent faster and slower rates of price change over a constant time period. A rate of  $1 \times 1$  stands for a change of one unit of price for one unit of time. The unit of measure for price and time is the actual size of one "box" on the charting paper in use. In other words, a Gann Angle advancing at a rate of  $1 \times 1$  advances one square of price for each square of time. The rates of change favored by Gann for review are the following:  $1 \times 8$ ,  $1 \times 4$ ,  $1 \times 2$ ,  $1 \times 1$  (Gann's famous 45 degree angle),  $2 \times 1$ ,  $4 \times 1$ , and  $8 \times 1$ . Examine the "GANN ANGLES & RATIOS" example (Chart 5). These seven Gann Angles are projected forward and upward from a Low Pivot Point that formed on 12/16/83 at a price of 983.30.

## **A Discussion of Gann Angles**

The use of Gann Angles in its simplest form is very similar to that of Gann Lines: namely, as Forward Support and Resistance. As price action approaches the level of the nearest Gann Angle, some type of support and/or resistance can be anticipated. The possibility of a trend change is considered. If none is encountered, then the strength and health of the current price trend is considered to be intact and reconfirmed. But as useful as these angle lines can prove to be in this capacity, they have yet an even more interesting and useful application. And this application highlights the power of the Principle of Coincidence.

## **Isolating Angle Intersections**

Gann was very fond of the 90-degree angle and its broad range of applications to market action. Gann Angles drawn from opposite and equal Pivot Points intersecting at a 90-degree angle often signal key market trend changes. Examine Point P1 on the pork belly chart (Chart 10). The market topped out at a price of 7250 on 8/18/83. The Gann Line L1 was at 7260. The 90-degree intersection of Angles A1 and A2 occurred at 7280 on 8/23/83. Rather impressive. This implies a method of examining all angle intersections; highlighting all 90-degree angle intersections; focusing on those 90-degree Gann Angle

intersections that occur on or near a Gann Line.

Intersections that satisfy these criteria are prime candidates for trend change points. Non-90-degree angle intersections are also significant. However, as a general method it is good to start by sorting by "degree." Skillful use of these techniques requires practice. At minimum, as market action approaches these COINCIDENCES of support and resistance, be mindful of a strong possibility of trend change.

## **THE PRINCIPLE OF COINCIDENCE**

The Principle of Coincidence employs a selection of distinct technical indicators to analyze market action and to make trading decisions. The Principle of Coincidence stipulates that:

1. Any technical indicator(s), pattern recognition signals, trading systems and Forward Support and Resistance, among other things, can be used;
2. That these methods be employed in an internally consistent manner;
3. That each of the methods employed be optimized and tested; and
4. That all of the methods employed will be used in the context of a tested and weighted decision model.

Chances are that anyone who has ever been involved in market action has employed the Principle of Coincidence in a casual manner. However, the concept applied rigorously becomes increasingly powerful.

Consider the following fact: If one proven indicator or technique has a reliability of, for example, 60%, then a selection of three equivalent and statistically independent indicators taken together in an integrated model will yield a significantly greater reliability, possibly well over 80%. This arcane fact of probability is the basis of the Principle of Coincidence.

The particular indicators, signals and methods to be chosen are a function of personal choice, taste, equity, trade, model design features, and market factors. It is essential however, that the selected indicators and methods are:

1. mutually independent,
2. optimized individually,
3. optimized collectively, and
4. integrated and weighted in an effective decision model.

The first two examples discussed illustrated the enhanced performance that results from the integrated use of Gann Lines and two sets of Gann Angles. The third example adds relative strength and divergence.

As an overall and general technique, the Principle of Coincidence is essentially multiple, cross-verification. In other words, if one support line is good, two are better and three are better yet.

A high degree of discretion must be employed in the selection of the technical indicators to be utilized if the Principle of Coincidence is to be fruitfully employed. To effectively derive the synergy that can result from the integration of a selection of technical indicators, one needs to choose indicators that are as

different from one another as possible. The need for this results from the need for statistical independence. For example, a selection of stochastics, relative strength and a moving average crossover would be much better than the use of two different moving average crossovers and an oscillator. The first selection will most likely exhibit greater statistical independence than the second.

When selecting techniques for the forward analysis of support and resistance, employ methods that are as different as possible.

#### **FOUR STEPS TO A GANN LINE AND ANGLE STUDY**

##### **Step #1 - Isolate a Price Space (Chart 6)**

This, of course, is a two-step process. First, Significant High and Low Pivot Points of equal level must be isolated. These Pivot Points determine the boundary of the Price Space. In STEP #1, a Low Pivot Point, S1, was isolated on 12/10/84 at 1154.70, and a High Pivot Point was found on 3/1/85 at 1282.60 defining a Price Space equal to 127.90 points.

##### **Step #2 - Construct Gann Lines (Chart 7)**

In STEP #2, eight Gann Line divisions were constructed based on the 127.90 point price space isolated in STEP #1.

##### **Step #3 - Add Uptrending Gann Angles From Significant Low (Chart 8)**

Seven Gann Angles were projected upward and forward from the Low Pivot Point, S1, on 12/10/84 at 1154.70.

##### **Step #4 - Add Downtrending Gann Angles From Significant High (Chart 9)**

Seven Gann Angles were projected downward and forward from the High Pivot Point, S2, on 3/1/85 from 1282.60.

The execution of these four steps completes the process of constructing a Gann Line and Gann Angle study. This process was performed for each of three example studies: bellies, pound, and Value Line.

#### **STUDY #1: PORK BELLIES 3/1/83-10/28/83 (CHART 10)**

The SIGNIFICANT HIGH, S1, was made on 4/13/83 at a price of 7590. The SIGNIFICANT LOW, S2, was established on 7/19/83 at a price of 5125. These points defined a PRICE SPACE equal to 2465 points and lasting 69 trading days. This PRICE SPACE was divided into eight equal price zones. Gann Lines were drawn and Gann Angles were projected forward from these defining points. This example illustrates an important point in the use of retracement techniques. Although it is somewhat uncommon, price action can retrace much more than 50% of prior price action and still BE a retracement. This market retraced to Point P1, a price of 7250 on 8/18/83. Our 87.5% Gann Line was at 7260. The 90-degree intersection of Gann Angles A1 and A2 occurred on 8/23/83 at a price of 7280. Averaging these two prices  $7260 + 7280 \times .5 = 7270$  we see a an extremely accurate market call. This is definitely usable.

#### **STUDY #2: BRITISH POUNDS 3/1/83-10/28/83 (CHART 11)**

The SIGNIFICANT LOW, S1, was made on 3/28/83 at a price of 14480. The SIGNIFICANT HIGH was established on 5/31/83 at a price of 16090. These two points established a PRICE SPACE of 1610 points

lasting 46 trading days. This PRICE SPACE was divided into ten price zones, Gann Lines were drawn, and Gann Angles were projected forward. The retracement of the PRICE SPACE ended at approximately the 80% level at point P1 on 8/11/83 at a price of 14770. The Gann Line at L1 was equal to 14805. The intersection of Gann Angles A1 and A2 occurred on 8/9/83 at a price of 14705. Averaging these two prices, we arrive at a price of 14755. The actual low was made at a price of 14770 on 8/11/83.

The price swing between points P1 (8/11/83, 14770) and P2 (8/23/83, 15380) defined a minor PRICE SPACE of 610 points lasting eight trading days. The intersection of Gann Angles A3 and A4 occurred on 9/1/83 at a price of 15335. The price of Gann Line L2 is 15290 and L3 is 15445. The average of these two lines is 15365. The actual price high was made at 15380 on 8/23/83. Also we can see from the chart that the market rose to strong overhead resistance at the descending Gann Angle A4. This example further highlights the utility of multiple support and resistance methods.

### **STUDY #3: KC VALUE LINE 7/11/83-10/28/83 (CHART 12)**

This example will integrate relative strength together with Gann Lines and Angles. The SIGNIFICANT HIGH, S1, was made on 7/27/83 at a price of 21050 and our SIGNIFICANT LOW was established on 8/9/83 at a price of 19140, defining a PRICE SPACE of 1910 points, occurring in nine trading days. Gann Lines and Gann Angles were constructed and relative strength with a period of nine days was plotted. A 75% retracement ended at point P2. Gann Line L1 was at price 20340. Gann Angles A1 and A2 intersected at a price of 20550 on 10/3/83. The actual high terminating this retracement occurred on 10/10/83 at a price of 20560. As if this weren't impressive and strong enough in its own right, a strong bearish signal was generated by a relative strength/price divergence. RS entered the sell zone (R1) two days prior to the high at P1 (9/13/83, 20370). However, RS failed to make a higher high (R2) as price made a new and final high at point P2 (10/10/83, 20560). This is the classic pattern of divergence or, as some call it, non-confirmation.

### **CONCLUSION**

It is this type of coordinated and integrated use of different support and resistance methods together with technical indicators that is known as the Principle of Coincidence.

*Robert Pardo is President of the Pardo Corporation, an Evanston, Ill. firm responsible for the Swing Trader and Advanced Chartist software packages. All of this charts reproduced in this article were created by the Advanced Chartist on an Apple IIe, courtesy of the Pardo Corporation.*

This article was also published in the May/June 1985 issue of Wall Street Micro Investor, Suite 302, 11 Hanover Square, New York, N.Y., 10005.