

Rediscovering W. D. Gann's method of forecasting the financial markets

By James Smithson

1. Introduction

William Delbert Gann (1878 -1955) was a successful stocks and commodities trader. He also wrote seven books and numerous short courses on how to trade successfully. However, Gann's unique skill was the way in which he accurately forecast the financial markets.

This paper examines Gann's method of forecasting the financial markets. More specifically, it examines the genesis of his forecasting method, its early application by him, the potential problems with its practical application and their resolution. It goes on to look at the evolution over time of Gann's methodology in the construction of annual forecasts, the problems arising from the greater complexity of annual forecasts and his solution to this complexity.

2. Gann's discovery of his forecasting method

Gann summarised the way in which he discovered his forecasting method as follows:

"A man may evolve a beautiful theory for making money in the stock market, and he may try it out on paper and find that it works. It is apparently successful, but when he applies it to actual trading and begins to buy and sell, he then finds the weak point and the theory fails in actual practice. I know whereof I speak, for I have tried dozens of different theories, put my money down and lost; exploded the theory, discarded it and started all over again..... The fact that my method of forecasting has stood the test of time is sufficient proof that I have solved the problem" (Gann, 1923, appendix, p. 1).

The Oxford English Dictionary defines scientific method as "A method of procedure that has characterised natural science since the 17th century, consisting in systematic observation,

measurement, and experiment, and the formulation, testing, and modification of hypotheses."

Thus Gann discovered his method of forecasting the financial markets from his research based on the scientific method.

Gann stated that in August 1902 he started researching the financial markets and in August 1908, shortly after he moved to New York City, he "made one of his greatest mathematical discoveries for predicting the trend of stocks and commodities" (Gann, 1954, p. 1).

Gann initially observed that the prices of stocks and commodities appear to move in cycles. Through inductive reasoning, he then hypothesised that there is a set of immutable principles, which he called 'natural law', underlying the complexity of stock and commodity prices. Gann then set out to discover these principles governing market prices:

"I soon began to note the periodical recurrence of the rise and fall in stocks and commodities. This led me to conclude that natural law was the basis of market movements. I then decided to devote ten years of my life to the study of natural law as applicable to the speculative markets and to devote my best energies toward making speculation a profitable profession" (Wyckoff, 1909, p. 52).

In addition to his early research carried out while an employee in a brokerage

business (initially in Texarkana and then in Oklahoma City), Gann spent nine months collecting and analysing stock prices in public libraries both in the US and UK. The resultant data set of stock prices started in 1820 and went through to 1909 (Wyckoff op. cit. p. 52).

Gann eventually discovered the natural law, or the set of immutable principles, governing stock and commodity prices. Gann called this natural law "the Law Of Vibration":

"After exhaustive researches and investigations of the known sciences, I discovered that the Law Of Vibration enabled me to accurately determine the exact points to which stocks or commodities should rise and fall within a given time" (Wyckoff op. cit. p. 52).

The evidence shows that by late 1909 Gann had fully discovered and tested his method of forecasting the financial markets, found it to be sound and was highly proficient in its practical application. For example, in December 1909, an interview with Gann was published (Wyckoff op. cit. pp. 54-55) which showed at that time Gann was skilled in forecasting and trading individual stocks, in forecasting the Dow Jones Industrials Average (which then comprised 12 stocks) and in forecasting and trading the two leading commodities (viz. wheat and cotton).

3. The principles of Gann's forecasting method

Gann's method of forecasting the financial markets consisted of two elements: (1) cycles of time and (2) the rate of vibration.

3.1 Cycles of Time

Cycles, and their possible influence on human activities, have been a source of speculation since time immemorial. However, it appears that it was not until Gann carried out his research between 1902 and 1908 that the cause and effect of cycles on financial markets was fully understood for the first time. Gann subsequently referred to time cycles throughout his writings, including:

"Time is the most important factor in determining market movements because

the future is a repetition of the past and each market movement is working out time in relation to some previous time cycle" (Gann, 1946, p. 4).

"My experience has taught me that nothing can stop the trend as long as the time cycle shows up-trend. Nothing can stop its decline as long as the time cycle shows down. Stocks can and do go up on bad news and go down on good news" (Gann, 1949, p. 3).

3.2 The Rate of Vibration

In addition to cycles of time, the so-called rate of vibration was a key element in Gann's method of forecasting the financial markets. Gann established the rate of vibration by measuring the slope of the trend line in prices for a particular financial instrument. Importantly, in his research between 1902 and 1908, Gann discovered similar principles operating in the financial markets to those being discovered contemporaneously in quantum physics.

For example, Gann discovered that the rate of vibration (as measured by the slope of the trend line) of stocks and commodities conforms to a series of principal energy levels and subshells. More specifically, the principal energy levels equate to a doubling and halving of the rate of vibration and the subshells equate to a fourfold division of a principal energy level. Moreover, Gann discovered that these principal energy levels and subshells constitute important support and resistance points. Thus in 1909 Gann stated:

"Stocks, like atoms, are really centers of energies, therefore they are controlled mathematically" (Wyckoff op. cit. p. 53) and "By knowing the exact vibration of each individual stock I am able to determine at what point each will receive support and at what point the greatest resistance is to be met" (Wyckoff op. cit. p. 52).

In summary, Gann's method of forecasting the financial markets was based on correctly identifying the underlying cycles that are driving a particular stock or commodity and then analysing the resultant rate of vibration (as measured by the slope of the trend line) to precisely forecast prices at a

Figure 1: Chicago wheat September 1909 futures contract daily price chart



specified time. Importantly, if one has correctly identified the underlying cycles driving a particular stock or commodity, one can precisely forecast when those cycles will come to an end. Consequently, by knowing the date when the underlying cycles will end and by observing the rate of vibration (i.e. the slope of the trend line in prices), one can make a precise forecast as to when and at what price the current uptrend (or downtrend) of the stock or commodity will end.

4. Illustration of Gann's early application of his forecasting method

Here is an example of a forecast that Gann made in 1909:

"One of the most astonishing calculations made by Mr. Gann was during last summer (1909) when he predicted that September wheat would sell at \$1.20. This meant that it must touch that figure before the end of the month of September. At twelve o'clock, Chicago time, on September 30th (the last day) the option was selling below \$1.08, and it looked as though his prediction would not be fulfilled. Mr. Gann said 'If it does not touch \$1.20 by the close of the market it will prove that there is something wrong with my whole method of calculation. I do not care what the price is now, it must go there.' It is common history that September wheat surprised the whole country by selling at \$1.20 and no higher in the very last hour of the trading, closing at that figure" (Wyckoff op. cit. p. 54).

Please refer to Figure 1 as we examine this forecast.

Firstly, Gann identified the start of the uptrend in the September 1909 Chicago wheat futures contract as a price of 94 cents per bushel on January 26th 1909. More specifically, Gann examined the set of positive (or constructive) cycles driving the uptrend in wheat and observed that these cycles started on January 26th 1909.

Gann then calculated the long-term rate of vibration for this uptrend, which is 0.1053 cents per day (or 1 cent per 9.5 days). In completing this task, Gann had to correctly identify the position of the trend line (from the origin of 94 cents on January 26th 1909) and then to measure the slope of the line. Gann would have received corroboration that he had identified the correct position of the trend line from two observations:

1. wheat prices received support on March 22nd 1909, when the rate of vibration had exactly halved, and
2. wheat prices met resistance on April 13th 1909, when the rate of vibration had exactly doubled.

Gann then forecast that the set of positive cycles driving this uptrend would remain in force until at least the end of this futures contract (i.e. until at least September 30th 1909). Consequently, based on the starting point of 94 cents per bushel on January 26th 1909 and a long-term rate of vibration of 0.1053

cents per day, he was able to forecast that on September 30th 1909 the price would be \$1.20.

In monitoring his forecast, Gann would have observed that between July 21st and August 26th 1909 strong short-term negative (or destructive) cycles drove prices well below the long-term trend line (or rate of vibration). Moreover, from examining the underlying positive and negative cycles, he would have established that the short-term negative cycles operated simultaneously with the longer-term (but weaker) positive cycles driving the uptrend; and that the short-term negative cycles would start to expire from August 26th 1909. Gann would have received corroboration that this analysis was correct from observing that on August 26th 1909 the price (96¾) showed that the rate of vibration had fallen to precisely one eighth of its long-term rate (i.e. it had halved precisely three times) and the rate of vibration then started to increase. Thus, from August 26th 1909 Gann forecast and observed the simultaneous expiration of the short-term negative cycles and the doubling three times of the rate of vibration, so that the long-term rate of vibration was regained on September 30th 1909 (at a price of \$1.20).

In summary, this example clearly shows the two elements that constituted Gann's forecasting method: the cycles driving a particular stock or commodity and the resultant rate of vibration, as measured by the slope of the trend line.

5. Potential problems in the practical application of Gann's forecasting method

(i) Obtaining a detailed price history. Gann stated that the only potential problem in the practical application of his forecasting method is obtaining a sufficiently long and detailed price history of a particular financial instrument, in order to identify the underlying cycles:

"In making my calculations on the stock market, or any future event, I get the past history and find out what cycle we are in and then predict the curve for the future, which is a repetition of past market movements..... The limit of

future predictions based on exact mathematical law is only restricted by lack of knowledge of correct data on past history to work from" (Gann, 1927, pp. 76-77).

Clearly, this problem is much less onerous today because of the availability of governmental, commercial and academic databases containing large amounts of electronic price data.

(ii) Complexity of underlying cycles. However, another potential problem in the practical application of Gann's method is the complexity of the underlying cycles. More specifically, from the above examination of Gann's September 1909 wheat forecast, we can conclude that an individual stock or commodity is typically governed by a number of positive (or constructive) cycles and negative (or destructive) cycles; and these multiple cycles act simultaneously and sequentially. Consequently there are likely to be periods of time when it is difficult to identify which particular set of cycles is governing a stock or commodity. The solution to this problem, as Gann recommended, is always to trade in active stocks and commodities:

"Always confine your trading to standard, active stocks listed on the New York Stock Exchange. Outside stocks have spurts, but the active leaders yield more profits in the long run" (Gann, 1923, p. 34).

"You should always trade in stocks that cross former highs and make higher tops and higher bottoms, as they are the best to buy, and leave the dead, inactive ones alone" (Gann, 1936, p. 60).

There are two key advantages to trading in active stocks or commodities. Firstly, if they are active then they are probably being governed by a set of strongly-positive cycles and, therefore, the underlying cycles are likely to be more easily identified. Secondly, these active stocks or commodities are likely to offer significant profit potential. Conversely, the cycles governing inactive stocks or commodities are likely to be in balance and therefore the underlying cycles may well be difficult to identify; anyway there is very limited profit potential during these periods of inactivity.

(iii) Cross-currents. Another potential problem in the practical application of Gann's method is cross-currents, which refers to a stock or commodity ceasing to act in harmony with its underlying cycles. Gann stated that cross-currents are typically more of a problem for stocks than for commodities:

"When you have a forecast made up for cotton or grain, if you are right, you are sure to make money because all options follow the same trend. There are no cross-currents, as in stocks, with some stocks declining to new low levels and others making new highs" (Gann, 1951, foreword).

One cause of cross-currents in stocks, which Gann gives as an example, is dividends. More specifically, dividends can suddenly be declared or cancelled and the resultant stock prices may cease moving in harmony with the underlying cycles. In fact any major and sudden action by a company's management (e.g. a sizeable acquisition or divestment, or the issue of a material amount of new shares) may for a time produce cross-currents in the stock price.

Gann's solution, once more, is to avoid such problematical stocks and to restrict one's trading to active stocks:

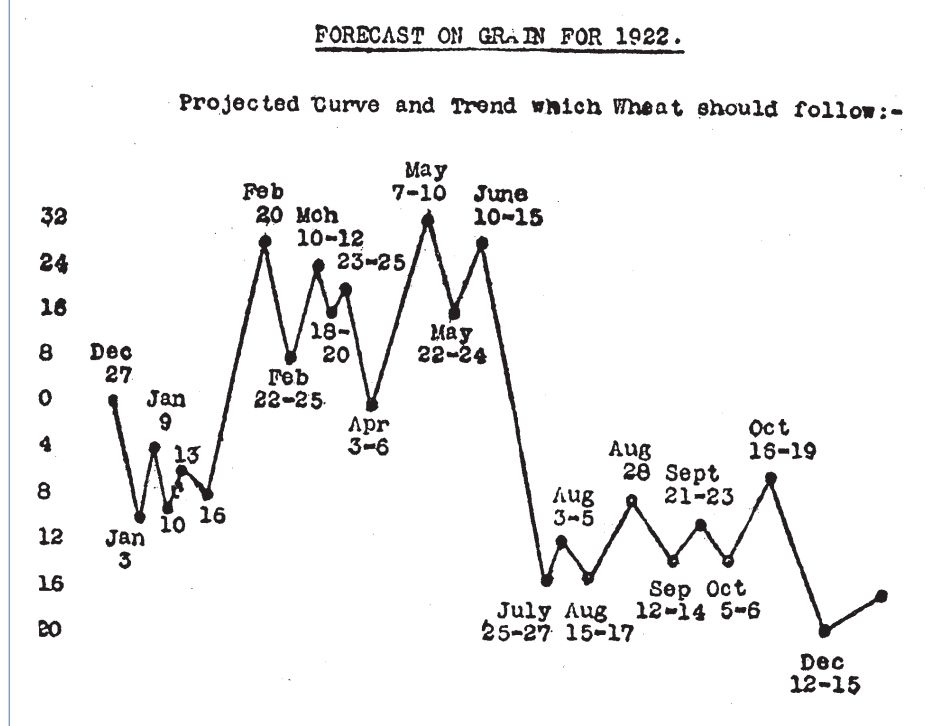
"The kind of stocks to trade in are those that are active and those that follow the rules and a definite trend. There are always queer-acting stocks and some stocks that don't follow the rules. These stocks should be left alone" (Gann, 1936, p. 34).

6. The evolution of Gann's forecasting method into the construction of annual forecasts

In 1909 Gann clearly stated that he would not disclose his actual forecasting method: *"Mr. Gann has refused to disclose his method at any price"* (Wyckoff op. cit. p. 55). Nevertheless the evidence suggests Gann also had a strong desire to help others in their trading activities.

Gann's early attempts to reconcile these two conflicting goals included

Figure 2: The chart that Gann included in his annual forecast for grain for 1922



the publication of a daily letter which advised on when to buy and sell stocks, cotton and wheat (advertised in The New York Herald between April and November 1909). In 1910 he published a booklet entitled "Speculation - A Profitable Profession" and in 1911 Gann sold a mechanical method, based on fixed rules, for trading in stocks and commodities (see The (New York) Sun, 1911, December 19, p.10).

In 1918 Gann published his first annual forecast, which was his latest means of helping his clients in their trading activities, but without disclosing his actual forecasting method. He published a forecast of the stock market's performance in 1919, on December 16th 1918. It comprised a short textual commentary. However Gann's annual stock market forecast for 1922 included for the first time a chart which forecast the trend of industrial stocks and a separate chart which forecast the trend of railroad stocks. Also for 1922, he produced (apparently again for the first time) an annual forecast for cotton and also for grain; both of which comprised a commentary and a chart. Gann stated that his grain forecast was "Made up principally for wheat, although corn

should follow it very closely." This chart is reproduced in Figure 2.

Gann subsequently added further commodities to his service and he continued producing annual forecasts for the rest of his life. In 1923 Gann wrote the first of seven books, entitled "Truth of the Stock Tape" and he continued producing courses on trading the stock and commodity markets. Overall, the evidence suggests that from 1909 until his death in 1955 Gann pursued in his professional activities two conflicting goals; which were to seek to help others in their trading activities, but without disclosing his actual forecasting method.

7. Potential problems in constructing an annual forecast and Gann's solutions

As examined above, Gann's method of forecasting the financial markets was based on correctly identifying the underlying cycles that are driving a particular stock or commodity and then analysing the resultant rate of vibration (as measured by the slope of the trend line) to precisely forecast prices at a future point in time.

Gann's practical application of his forecasting method shortly after he completed its discovery (in 1908) was

examined above with reference to his forecast of the September 1909 Chicago wheat futures contract (see Figure 1). Gann's forecasting and trading in stocks in 1908 and 1909 followed a similar structure (see Wyckoff op. cit. p. 54).

Thus Gann's initial application of his forecasting method was to forecast when and at what price an existing and established trend in a particular stock or commodity would end. However, the key problem that Gann encountered some ten years later when he started producing annual forecasts was that they were significantly more complex than his initial application of his forecasting method.

Annual forecasts are more complex because one is not only required to forecast when (and at what price) the current trend will end, but when (and at what price) all subsequent trends over the next calendar year will end. Thus the construction of an annual forecast requires one to make a series of forecasts for a particular period of time and, for each of these periods, to accurately identify the cycles that will drive a particular stock or commodity as well as make a forecast for the resultant rate of vibration (i.e. the slope of the trend line). I will now examine how Gann sought to resolve these problems in constructing his annual forecasts.

7.1 Gann's solutions to the problem of accurately forecasting cycles.

(i) *Delay publication of the annual forecast.* Figure 2 reproduces Gann's annual forecast for 1922 for grain. Although this forecast starts on December 27th 1921, Gann did not publish it until January 31st 1922. It appears that the reason for this delay was because he was unsure whether in January 1922 strongly-positive cycles would start a strong uptrend or whether strongly-negative cycles would start a strong downtrend. Therefore, Gann delayed publication until January 31st, at which time he observed that wheat had made a significant low on January 16th and then established a stable uptrend. Similarly, Gann delayed until April 25th 1922 the publication of his annual forecast for 1922 for cotton; which was thereby reduced to an eight-month forecast.

(ii) *Make a contingent forecast.* In Gann's commentary included in his annual forecast for grain for 1922 he stated, "Remember This Point: If May wheat sells at 1.08 after January 25th it will indicate much lower prices and probably a decline to around 95 to 92 cents per bushel" (Forecast On Grains For 1922, reproduced in the appendix to Gann 1923). In this statement Gann was warning that, if the price of the May 1922 Chicago wheat futures contract fell back to its January 1922 low point (of \$1.08 per bushel), strongly-negative cycles would be in force and consequently the strong downtrend would continue.

(iii) *Forecast a change in trend over several days.* From Figure 2 it can be seen that Gann typically forecast that a change in trend would occur over several days. For example, he forecast that between May 7th - 10th 1922 wheat would make its high prices for the year and then start a downtrend. This technique that Gann employed reflects the multiple nature of the underlying cycles. More specifically, in this instance Gann was forecasting that on May 7th negative cycles would start to exert an influence but they might be insufficiently strong to overpower the previous positive cycles until May 10th 1922; by which date - at the latest - the downtrend would begin.

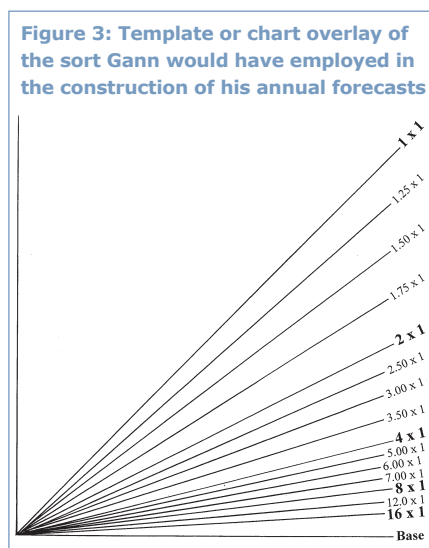
(iv) *Publish regular updates to the annual forecast.* At the end of his annual forecast for grain for 1922 Gann stated "A supplement will be mailed you each month, giving any changes that are indicated, if the market is not following closely the trend as outlined" (Forecast On Grains For 1922, op. cit.). Gann in fact published regular updates to all of his annual forecasts. This technique is highly significant because although he marketed, produced and sold annual forecasts (which are inherently complex), by producing regular updates Gann was converting his annual forecasts into the more simple, accurate and reliable type of forecasts that he had previously produced between 1908

and 1918; which focused on when (and at what price) an existing and established trend in a particular stock or commodity will end.

7.2 Gann's solution to the problem of accurately forecasting the rate of vibration.

In summary, the construction of an annual forecast requires one to make a series of forecasts for a particular period of time and for each of these periods to accurately identify the cycles that will drive a particular stock or commodity and also to forecast the resultant rate of vibration (i.e. the slope of the trend line).

In order to solve the problem of forecasting the rate of vibration when constructing his annual forecasts, Gann produced a template or chart overlay similar to that illustrated in Figure 3. It is likely that this was originally drawn up on tracing paper and later on transparent plastic.



I will now examine how Gann solved the problem of forecasting the rate of vibration when constructing his annual forecasts:

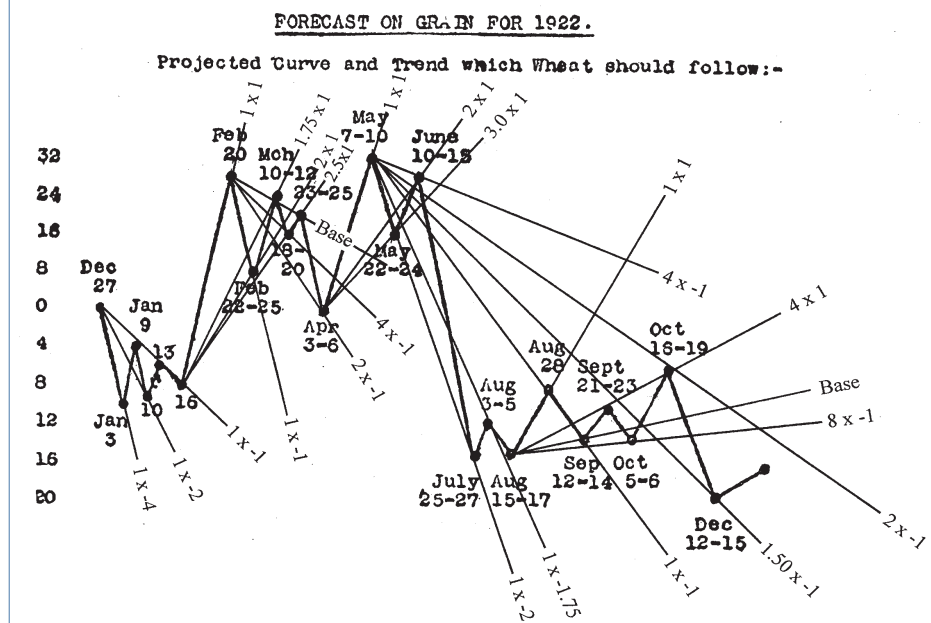
i) Firstly and most importantly, when constructing an annual forecast Gann would have had to identify the cycles that would drive the stock or commodity for a particular period of time in the next calendar year. Thus, the necessary analysis is to forecast for that particular period of time whether the stock or commodity will be governed by positive cycles or by negative cycles. Moreover, it is also necessary to forecast the likely strength of those cycles.

ii) For that period of time (i.e. for that section of his annual forecast), Gann then drew a trend line which best represented the underlying cycles driving the particular stock or commodity. Clearly, if Gann forecast that positive cycles would be in force, then the trend line would slope upwards. Importantly, the greater the strength of the underlying cycles that Gann forecast, the steeper the slope of the resultant trend line that he drew in his annual forecast. The slope of this initial trend line was the initial rate of vibration that Gann forecast for that particular period of time.

iii) Gann then made use of the template depicted in Figure 3, if and when he needed to forecast changes in the initial rate of vibration. More specifically, Gann placed the origin of the template over the start of the initial trend line and rotated it until the 1 x 1 line was over the initial trend line. From the 2 x 1 line on the template, Gann could then see when the rate of vibration of the initial trend line had halved (or from the 1 x 2 line when the rate of vibration had doubled). As discussed above (and as illustrated in Figure 1), Gann had discovered that when the rate of vibration halves it constitutes significant price support and, conversely, when the rate of vibration doubles it constitutes significant price resistance. Thus, by means of his template, in the construction of an annual forecast Gann was able to integrate his forecast on the underlying cycles (particularly their quality and strength) with his forecast on the resultant rate of vibration (or slope of the trend line) and changes in that rate of vibration.

Figure 4 (on the next page) illustrates this process. This is Gann's annual forecast for 1922 for grain (which was reproduced in Figure 2), but with the addition of the trend lines that he would have drawn in its construction with the aid of his template. For example, Gann forecast strongly-positive underlying cycles and therefore a strong upward trend (i.e. a steep initial trend line) between January 16th and February 20th 1922. However, he then forecast negative cycles between February 20th and February 22nd - 25th,

Figure 4: Gann's annual forecast for grain for 1922 with the addition of the trend lines Gann would have used in its construction



the effect of which would be to precisely halve the previous rate of vibration. Gann forecast that this halving in the rate of vibration would provide strong support and prices would then rally until March 10th - 12th. At this point, negative cycles would again come into force which, he forecast, would cause prices to fall until April 3rd - 6th; when positive cycles would once more come into force.

Thus, from Figure 4, we can see that in constructing his annual forecast for grain for 1922, Gann in fact made a series of forecasts. More specifically, he forecast positive cycles (producing an up-trend) from January 16th, negative cycles (producing a down-trend) from February 20th, positive cycles from April 3rd-6th, negative cycles from May 7th-10th, positive cycles from August 15th-17th and finally negative cycles from October 16th-19th to December 31st 1922. Therefore this annual forecast comprised three periods of positive cycles (or up-trends) and three periods of negative cycles (or down-trends). This annual forecast was therefore significantly more complex and prone to error than Gann's initial application of his forecasting method (which was illustrated in Figure 1).

In summary, Gann used a number of techniques to solve the inherent complexity of constructing annual forecasts. This complexity arises because

annual forecasts require one to make a series of forecasts for a particular period of time, and for each of these periods to accurately identify the cycles that will drive a particular stock or commodity and also to forecast the resultant rate of vibration (i.e. the slope of the trend line). However, by publishing regular updates to his annual forecasts, Gann was able to substantially revert to the earlier and simpler application of his forecasting method, which focused on when (and at what price) an existing and established trend in a particular stock or commodity would end.

8. Conclusion

This paper has examined Gann's method of forecasting the financial markets, including its scientific discovery in the early twentieth century, its initial application to the financial markets and its evolution into the construction of annual forecasts.

Now that Gann's forecasting method has been rediscovered, the next goal is its effective and efficient application to the financial markets of the twenty-first century. Consequently the author is currently involved in a project to determine how best to apply Gann's forecasting method to all the major financial markets (for example, paradoxically, the construction of annual forecasts may in fact be a highly inefficient application of Gann's forecasting method).

With regard to its effectiveness, Gann (1923, appendix p.1) suggested that his forecasting method had performed well over the 15 years since its discovery: "The fact that my method of forecasting has stood the test of time is sufficient proof that I have solved the problem". An initial assessment by the author suggests that Gann's forecasting method performs well when applied to a number of current markets (especially if they are very active; in that they are exhibiting large price changes and hence are probably governed by strong underlying cycles)". Therefore the *prima facie* evidence suggests that Gann's forecasting method is still effective.

Overall, Gann's forecasting method is likely to be of considerable interest to investment practitioners; particularly those looking for a scientifically-based forecasting system applicable to the most active markets and financial instruments.

Gann's forecasting method is also likely to be of interest to academics; for example those seeking a scientific paradigm to succeed the Efficient Markets Hypothesis, which according to the analytical framework of Kuhn (1962) would appear to be in a crisis state.

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