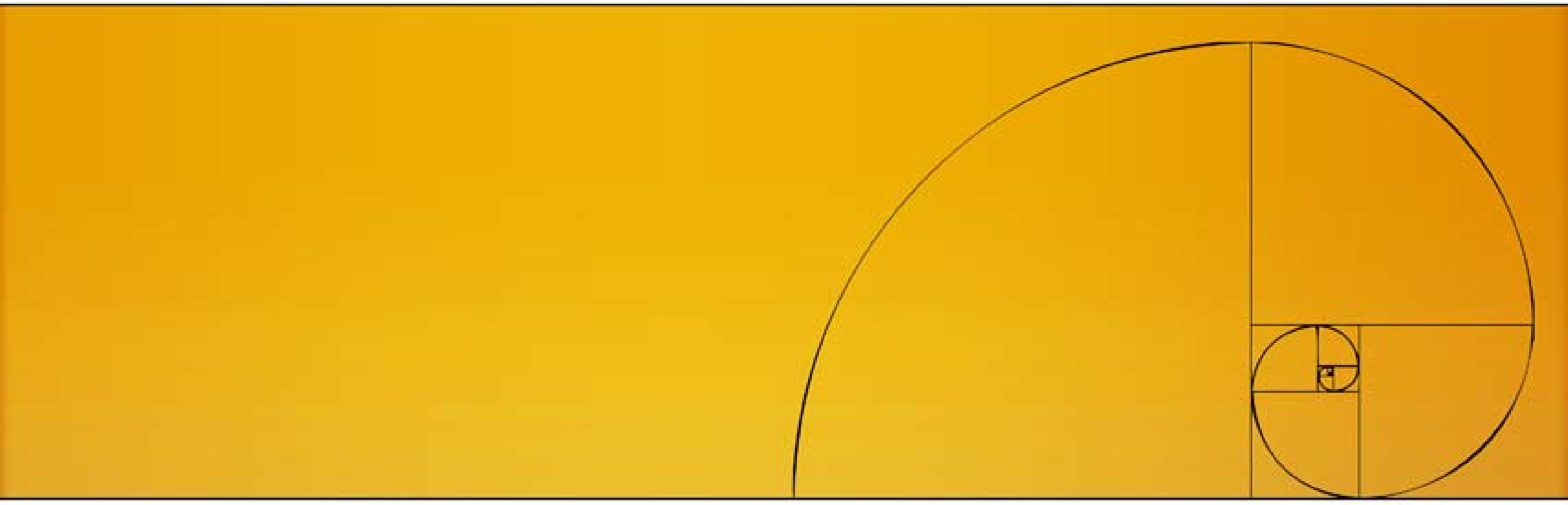
How You Can

Identify Turning Points Using *Fibonacci*

Part 1



By

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elliottwave INTERNATIONAL

EWI eBook

How You Can Identify Turning Points Using Fibonacci

Part 1: Understanding Fibonacci Mathematics and its Connection to the Wave Principle

By Wayne Gorman, Elliott Wave International

Chapter 1 - The Golden Ratio and the Golden Spiral
Examples of the Golden Ratio in nature, human biology and human decision-making

Chapter 2 - Fibonacci Ratios / Multiples and the Golden Section
How the Golden Ratio is connected to the Wave Principle and how it figures in multiples and the Golden Section

Chapter 3 - Amplitude Relationships
Details about how to use Fibonacci ratios and multiples in forecasting and a look at amplitude relationships, or price relationships in terms of retracements made by corrective waves and expansions made by impulse waves

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How time duration of waves seems to reflect certain Fibonacci relationships, whether it is the number of years, days, or months in a wave

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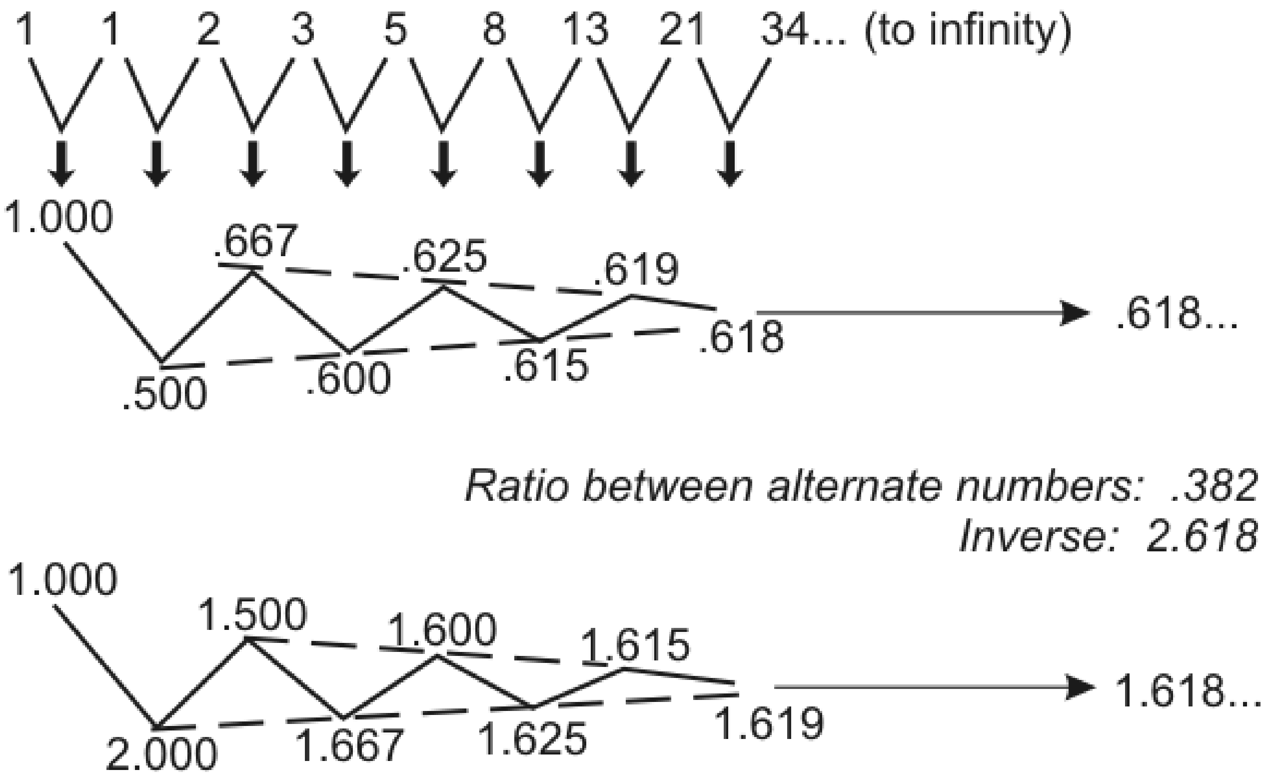
A few questions from the Fibonacci webinar participants

Welcome to Elliott Wave International's "How You Can Identify Turning Points Using Fibonacci." Part 1 of this two-part ebook is called "Understanding Fibonacci Mathematics and its Connection to the Wave Principle." My name is Wayne Gorman, and let me first tell you briefly about my background. I have more than 25 years of experience in trading, forecasting and portfolio management, including work experience at both Citibank in New York and Westpac Banking Corporation in New York. I have been using the Wave Principle since 1986.

Chapter 1: The Golden Ratio and the Golden Spiral

Fibonacci Numbers and the Golden Ratio



Figures 1-3

Let's start with a refresher on Fibonacci numbers. If we start at 0 and then go to the next whole integer number, which is 1, and add 0 to 1, that gives us the second 1. If we then take that number 1 and add it again to the previous number, which is of course 1, we have 1 plus 1 equals 2. If we add 2 to its previous number of 1, then 1 plus 2 gives us 3, and so on. 2 plus 3 gives us 5, and we can do this all the way to infinity. This series of numbers, and the way we arrive at these numbers, is called the Fibonacci sequence. We refer to a series of numbers derived this way as Fibonacci numbers.

We can go back to the beginning and divide one number by its adjacent number – so 1÷1 is 1.0, 1÷2 is .5, 2÷3 is .667, and so on. If we keep doing that all the way to infinity, that ratio approaches the number .618. This is called the Golden Ratio, represented by the Greek letter *phi* (pronounced "fie"). It is an irrational number, which means that it cannot be represented by a fraction of whole integers. The inverse of .618 is 1.618. So, in other words, if we carry the series forward and take the inverse of each of these numbers, that ratio also approaches 1.618. The Golden Ratio, .618, is the only number that will also be equal to its inverse when added to 1. So, in other words, 1 plus .618 is 1.618, and the inverse of .618 is also 1.618.

The Golden Spiral in Nature, Human Biology, and Human Decision-making

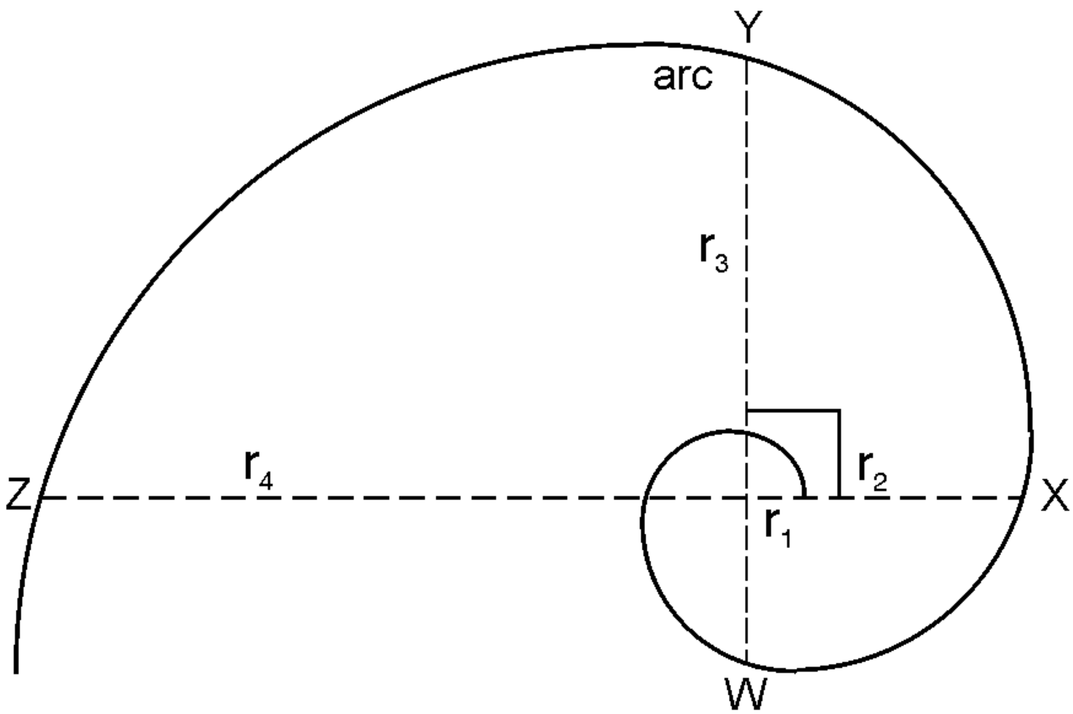
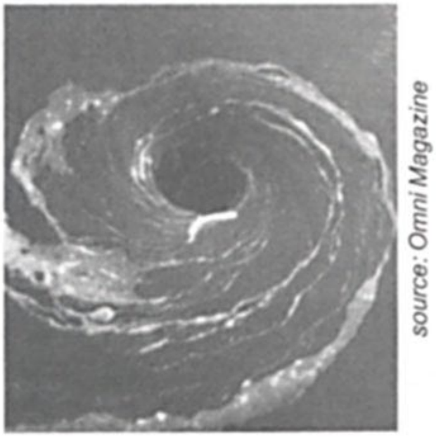
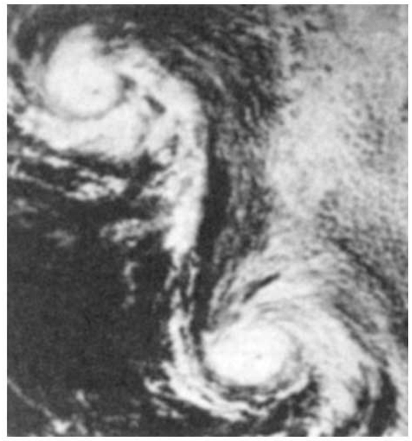
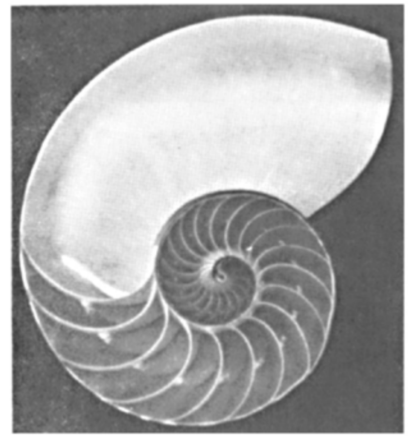


Figure 4
This is a diagram of the Golden Spiral. The Golden Spiral is a type of logarithmic spiral that is made up of a number of Fibonacci relationships, or more specifically, a number of Golden Ratios. For example, if we take a specific arc and divide it by its diameter, that will also give us the Golden Ratio 1.618. We can take, for example, arc WY and divide it by its diameter of WY. That produces the multiple 1.618. Certain arcs are also related by the ratio of 1.618. If we take the arc XY and divide that by arc WX, we get 1.618. If we take radius 1 (r_1), compare it with the next radius of an arc that's at a 90° angle with r_1, which is r_2, and divide r_2 by r_1, we also get 1.618.







Figures 5-7

Now here are some pictures of this Golden Spiral in various aspects of nature. For example, on the left is a whirlpool that displays the Golden Spiral and, therefore, these Fibonacci mathematical properties. We also see the Golden Spiral in the formation of hurricanes (center) and in the chambered nautilus shell (right), which also happens to be a common background that Elliott Wave International uses for a number of its presentations and graphics.

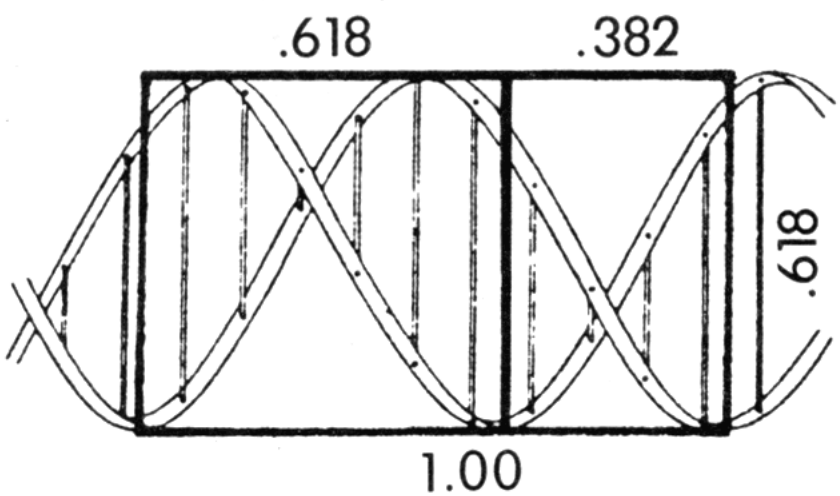


Figure 8

We can also see the Golden Ratio in the DNA molecule. Research has shown that if you look at the height of the DNA molecule relative to its length, it is in the proportion of .618:1. If we look at the components of the DNA molecule, there is a major groove in the left section and a minor groove in the right section. The major groove is equal to .618 of the entire length of the DNA molecule, and the minor groove is equal to .382 of the entire length.

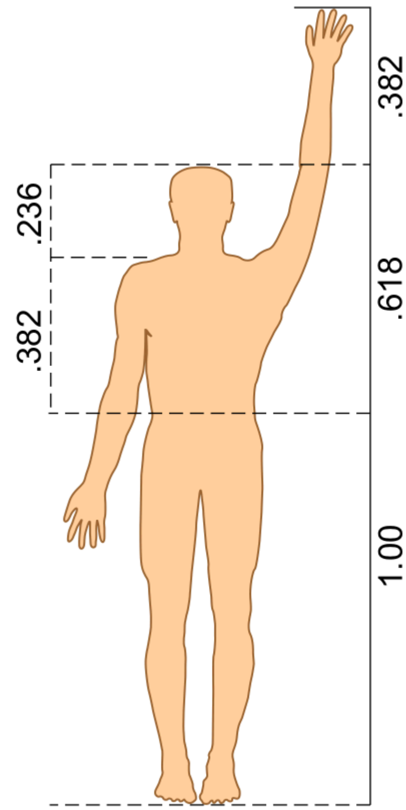


Figure 9
This graphic of the human body also shows how the Golden Ratio exists in certain relationships of the human anatomy.

Binary-Choice Under Conditions of Uncertainty

Opinion is predisposed to 62/38 inclination.

62% is associated with positive responses.

38% is associated with negative responses.

Figure 10
We also see this Golden Ratio in the process of human decision-making. A study was done by Vladimir Lefebvre of University of California at Irvine and Jack Adams-Webber of Brock University that dealt with binary choice under conditions of uncertainty. The study showed that opinion is predisposed to a 62% to 38% inclination. They took a certain sample of people and asked them a question with only two responses to choose from. One was a positive type of response, and the other was negative. The question dealt with a certain subject matter that none of the people were aware of. They had to make a choice under conditions of uncertainty, which parallels what investors do in financial markets. Sixty-two percent of the people made positive responses, and 38% were associated with negative responses. Again, we see how the Golden Ratio is embedded in many aspects of nature, biology, and even our society. Of course, it is also embedded in financial markets.

Fibonacci-Based Behavior in Financial Markets

Figure 11

We can visualize that the stock market or financial markets are actually spiraling outward in a sense. This is a diagram of the stock market whereby the top of each successive wave of higher degree (in terms of the Wave Principle) becomes the touch point of an exponential expansion or logarithmic spiral. We can actually visualize the market in this sense, and we will see later on, in terms of Fibonacci ratios and multiples, how this unfolds.

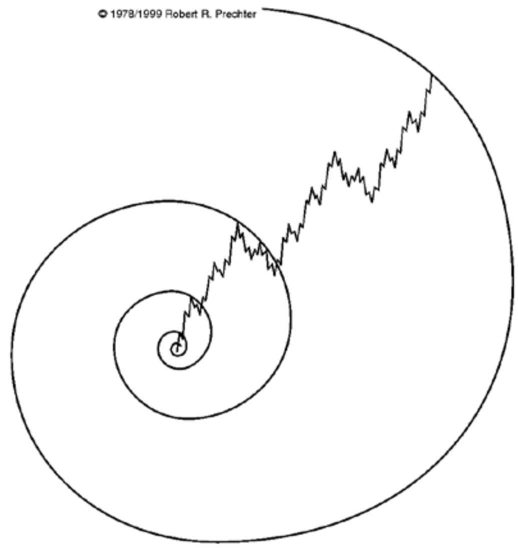
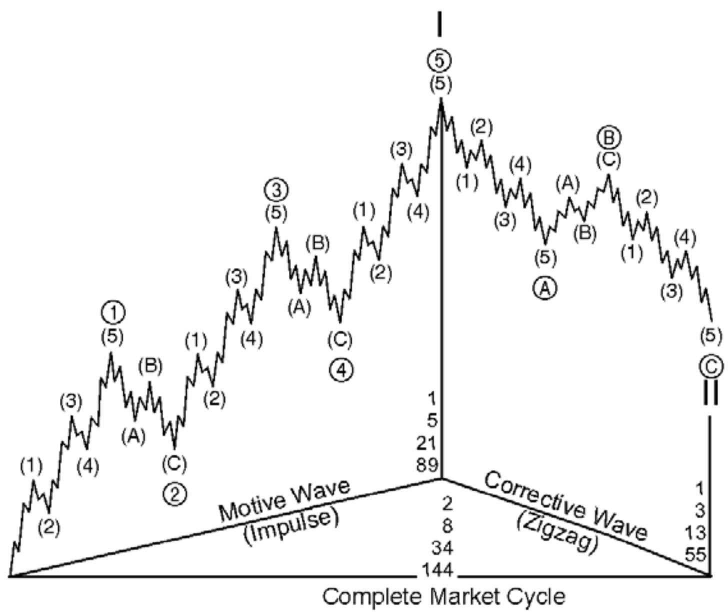


Figure 12

This is a diagram of the Elliott wave pattern. It is a typical diagram showing us the higher degree in Roman numerals with wave I up (motive) and wave II down (corrective). One of the connections to Fibonacci ratios and numbers is that with Elliott wave, if we look at how many waves there are within each wave, we end up with Fibonacci numbers. If we count the motive waves by degree, we get 1, 5, 21 and 89 – 1 wave up overall in wave I; 5 waves for waves ① through ⑤; 21 smaller waves within waves ① through ⑤, labeled as (1), (2), (3), (4), and (5) and (A), (B), (C); and 89 still smaller waves if you count the five waves up and three waves down within wave (1) and (2), etc. If we look at the corrective waves and the waves within those waves, we get 1, 3, 13 and so on – 1 wave down as wave II, 3 waves as Ⓐ, Ⓑ and Ⓒ; 13 waves as waves (1) through wave (5) and (A) through (C) within waves Ⓐ through Ⓒ, and so on.



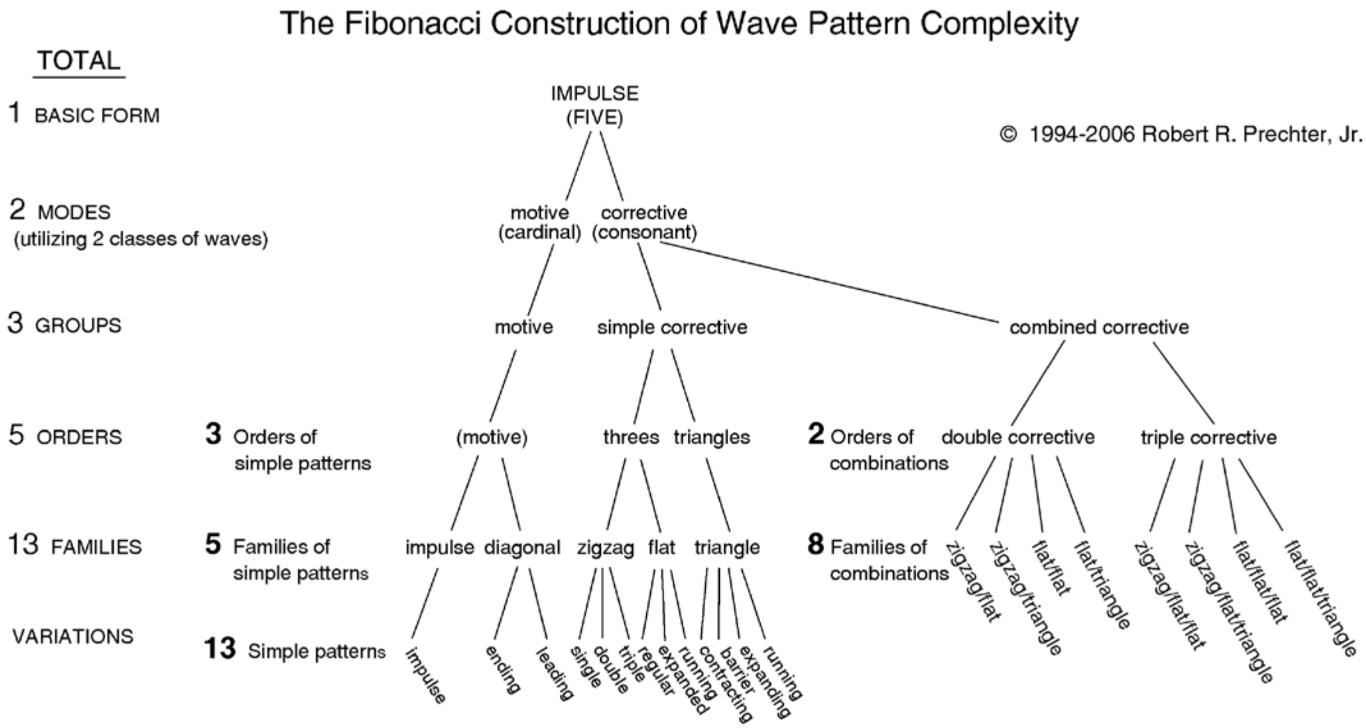


Figure 13

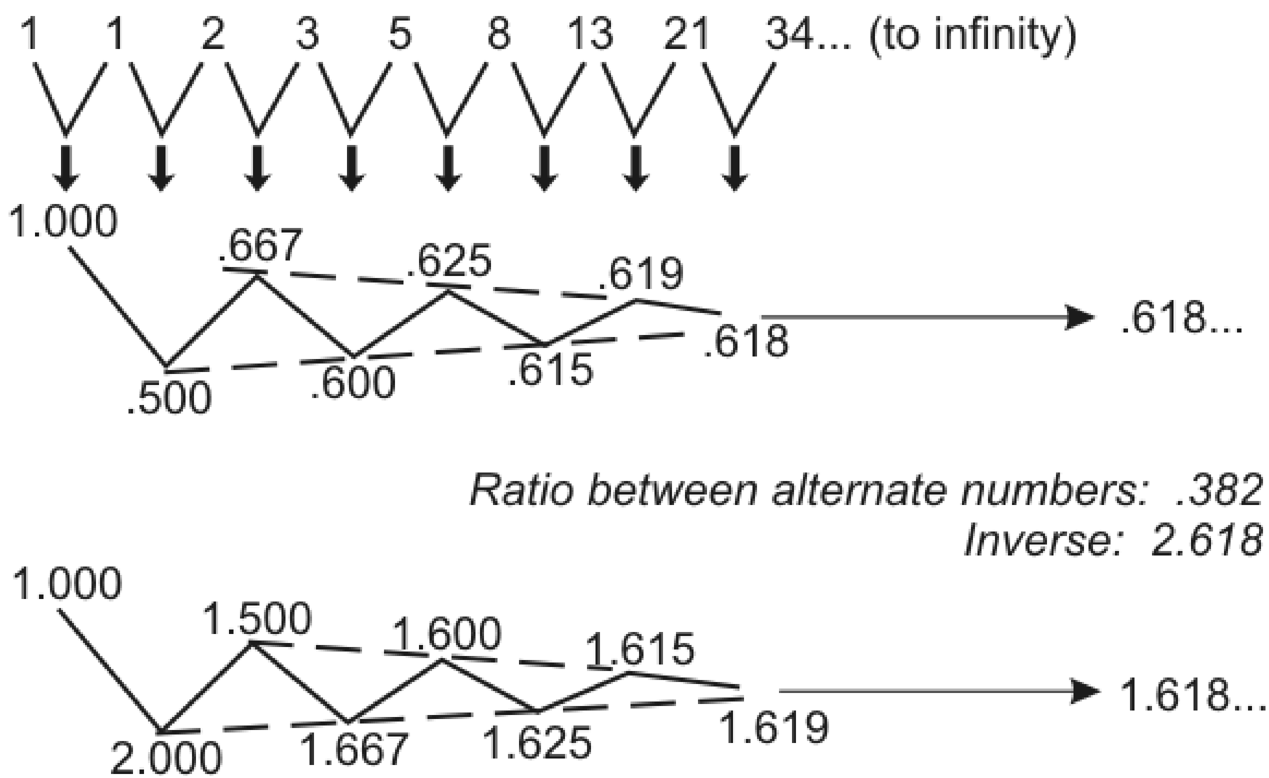
As a matter of fact, if we look at the different types of waves within Elliott wave in this schematic drawing, we again see that they comprise these Fibonacci numbers. We have two modes – motive and corrective. Cardinal means waves that we label with numbers; consonant means waves that we label with letters. There are three groups, five orders, thirteen families, and thirteen simple patterns; these are all Fibonacci numbers.

Chapter One Key Points:

- Fibonacci numbers (1, 2, 3, 5, 8, 13, 21 and so on) are achieved by adding the first two numbers in the series to attain the third.
- The Golden Ratio (0.618 or its inverse 1.618) is achieved by dividing one Fibonacci number by its adjacent number and carrying that to infinity.
- The Golden Spiral is a type of logarithmic spiral made up of a number of Golden Ratios.
- We see the Golden Spiral in nature (hurricanes), human biology (DNA molecule), and human decision-making.
- Connection to the Wave Principle – Financial markets are "spiraling out" in the Elliott wave pattern, and Fibonacci numbers are evident when counting waves as you travel from higher degree to lower degree.

Chapter 2: Fibonacci Ratios / Multiples and the Golden Section

Fibonacci Ratios



Figures 14-16 (Figures 1-3 repeated)

Now, bear with me as I lay down some more necessary groundwork before we start looking at price charts in Chapter 3. I want to come back to this diagram of Fibonacci ratios again to point out another interesting Fibonacci relationship. Look at the series at the top. Instead of dividing adjacent numbers (1 by 2, 2 by 3, and 3 by 5 to infinity), if we divide alternate numbers (1÷3, 2÷5, and 5÷13 to infinity), we will get the ratio of .382. 1 minus .618 is also .382. The inverse of .382 is 2.618. If we look at the second alternate – meaning, if we divide 1 by 5 and 2 by 8, etc. – we will get .236 if we carry that to infinity. The inverse of .236 is 4.236. These are all different Fibonacci ratios. I also want to point out two important numbers. We are going to use the number .5 – or 50% — a lot, since we will see it demonstrated in patterns in financial markets. Remember .5. It is not the Golden Ratio, but it is related to Fibonacci numbers. Another number we want to keep in mind is .786, which represents the square root of .618. These are all numbers that we will use to analyze wave patterns in various markets.

Fibonacci Multiples

Fibonacci Ratio Table

NUMERATOR (across) / DENOMINATOR (down)

	1	2	3	5	8	13	21	34	55	89	144
1	1.00	2.00	3.00	5.00	8.00	13.00	21.00	34.00	55.00	89.00	144.00
2	.50	1.00	1.50	2.50	4.00	6.50	10.50	17.00	27.50	44.50	72.00
3	.333	.667	1.00	1.667	2.667	4.33	7.00	11.33	18.33	29.67	48.00
5	.20	.40	.60	1.00	1.60	2.60	4.20	6.80	11.00	17.80	28.80
8	.125	.25	.375	.625	1.00	1.625	2.625	4.25	6.875	11.125	18.00
13	.077	.154	.231	.385	.615	1.00	1.615	2.615	4.23	6.846	11.077
21	.0476	.0952	.1429	.238	.381	.619	1.00	1.619	2.619	4.238	6.857
34	.0294	.0588	0882	.147	.235	.3824	.6176	1.00	1.618	2.618	4.235
55	.01818	.03636	.0545	.0909	.1455	.236	.3818	.618	1.00	1.618	2.618
89	.011236	.02247	.0337	.05618	.08989	.146	.236	.382	.618	1.00	1.618
144	.006944	.013889	.0208	.0347	.05556	.0903	.1458	.236	.382	.618	1.00

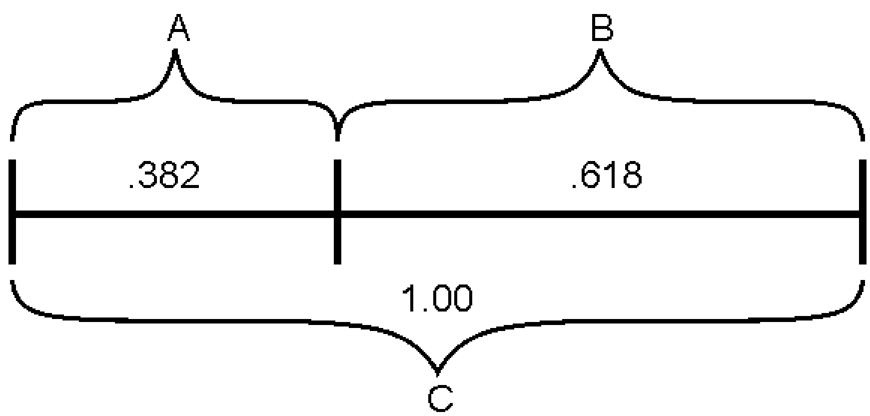
Towards perfect ratios

Figure 17
This table shows the ratios using alternate numbers, second alternate, third alternate and so on. These are all summarized in the table with the ratios and their inverses as they approach perfect Fibonacci ratios. In the row on the bottom, we see .618, .382 and .236. Along the column all the way to the right, we see the inverses of these ratios: 1.618, 2.618 and so on.

Fibonacci Sequence	Ratio	Inverse	Φ^N
Adjacent	.618	1.618	$(1.618)^1$
Alternate	.382	2.618	$(1.618)^2$
2nd Alternate	.236	4.236	$(1.618)^3$
3rd Alternate	.146	6.854	$(1.618)^4$
4th Alternate	.090	11.089	$(1.618)^5$

Figure 18
To make it a little easier for you to keep in mind some of the important ratios, I put together this table. Again, looking at the Fibonacci sequence here, if we divide adjacent numbers by one another and carry that to infinity, that gives us .618. The inverse is 1.618, and that can be expressed as *phi* raised to the power of 1. The next alternate's ratio is .382. Its inverse is 2.618, which is the same as 1.618 squared. You will see in certain charts, especially if you take a look at the book *Beautiful Pictures* by Bob Prechter, examples of some of these higher multiples — *phi* or the inverse of *phi*, 1.618 raised to a power. Of course, we will be dealing a lot with some of these numbers, such as .618, .382, 1.618 and 2.618.

The Golden Section



$$\frac{A}{B} = \frac{B}{C} = .618$$

Figure 19

Before we actually start looking at some markets, I want to show you a diagram of the Golden Section and explain how it shows up in the pattern behavior of price movements. The way to think of the Golden Section is that if we take any length and divide it in such a way that the smaller portion is equal to .382 of the whole and the larger portion is equal to .618 of the whole, that results in the Golden Section. So, in other words, A over B is .618 and B over the entire length of C is also .618. Or, put another way, if the ratio of the smaller length to the larger length is equal to the ratio of the larger length to the whole length, that ratio will always be .618.

Chapter 2 Key Points:

- Fibonacci ratios are achieved by dividing alternate numbers/second alternate numbers, etc., carried to infinity.
- Fibonacci multiples are 1.618 raised to a power.
- The Golden Section: A over B equals .618, and B over the entire length of C equals .618.

Chapter 3: Amplitude Relationships

Now, let's look at how to use Fibonacci ratios and multiples in forecasting, We see Fibonacci relationships both in time and amplitude. First, we are going to discuss amplitude relationships, or price relationships in terms of retracements made by corrective waves and expansions made by impulse waves. There are retracements and multiples.

Retracements – Corrective Waves

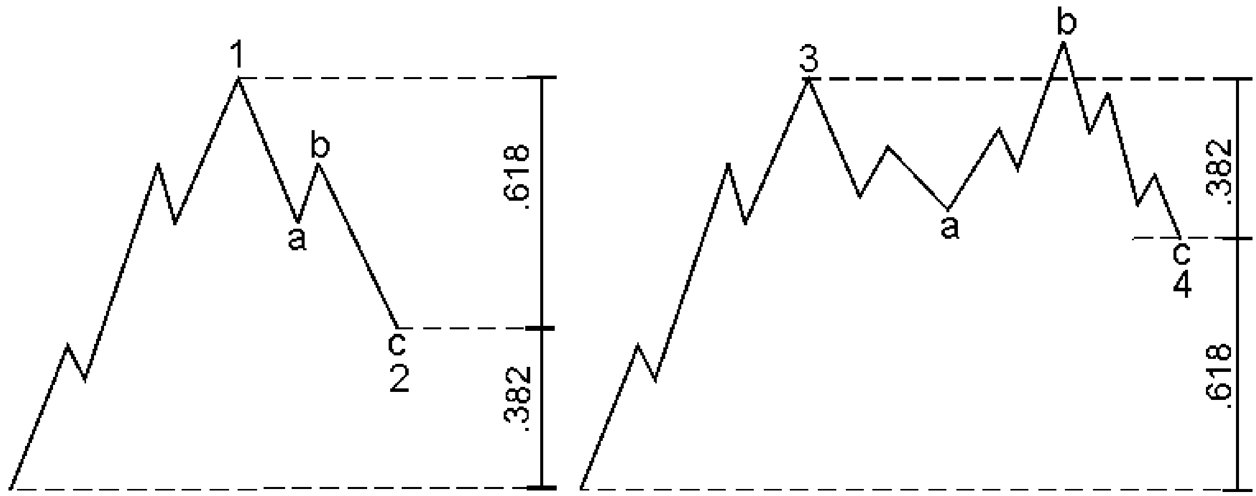


Figure 20 and 21

If we look on the left side of this chart, we see a diagram of wave 1 followed by wave 2. It is common for second waves to retrace .618 of wave 1 – thereby making a deep retracement. We will also be looking for .786. We might often see .5, 50%, but .618 is common. On the right side, fourth waves will commonly retrace a smaller percentage or .382 of wave 3. We might also see something like .236.

Figure 22
Now, finally, we can turn to a price chart, in this case a chart of the S&P 500 Stock Index from August 2004 to April 2005. I have put the wave count on the chart. We have waves 1, 2, 3, 4 and 5. Wave 2 is an expanded flat. Wave 4 is a zigzag. (I'm assuming you have done enough Elliott wave analysis to know what those phrases mean.) Let's look at the retracements that waves 2 and 4 make.

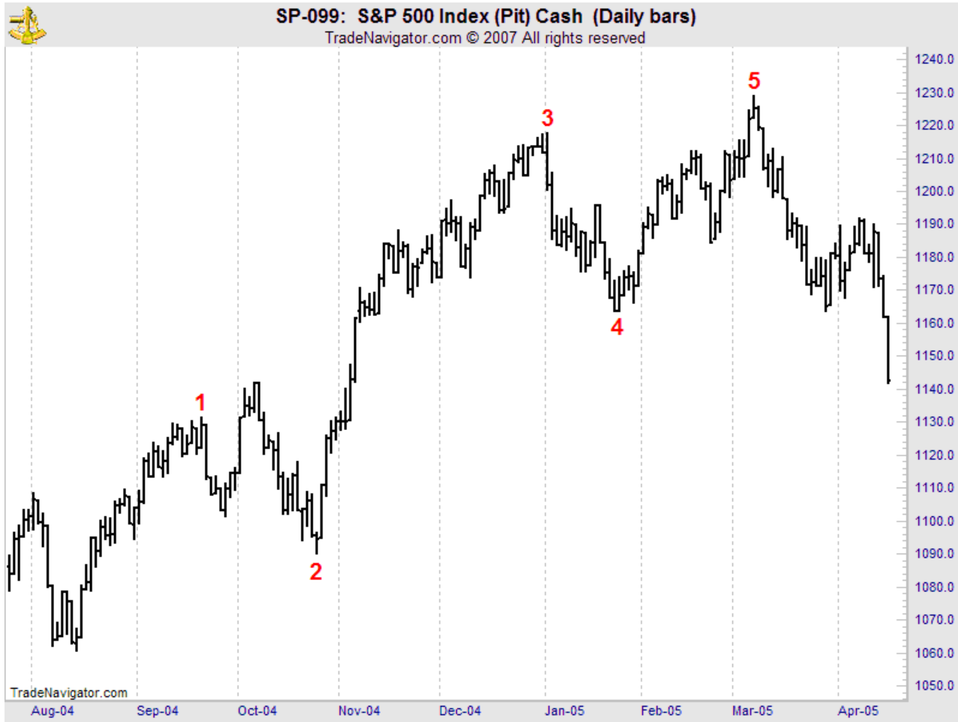


Figure 23
We see that wave 2 makes a deep retracement. It comes close to .618. Look at this Fibonacci table that I put up; notice that I put .382, .5, .618, and .786. .618 is 1087.75, and the S&P low is 1090.19.

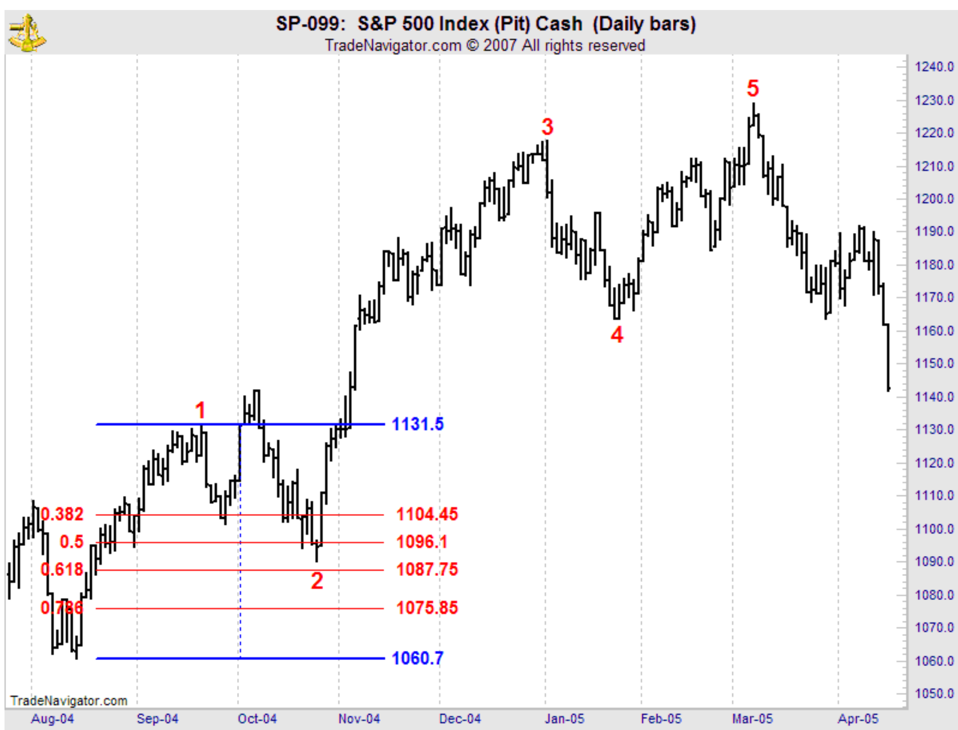


Figure 24
We see that wave 4 makes a shallow retracement of wave 3. It goes just beyond the .382 retracement. .382 is 1169.1, and wave 4 actually bottoms at 1163.75. In a nutshell, this is what we mean when we say that Elliott waves often correct in terms of Fibonacci ratios.

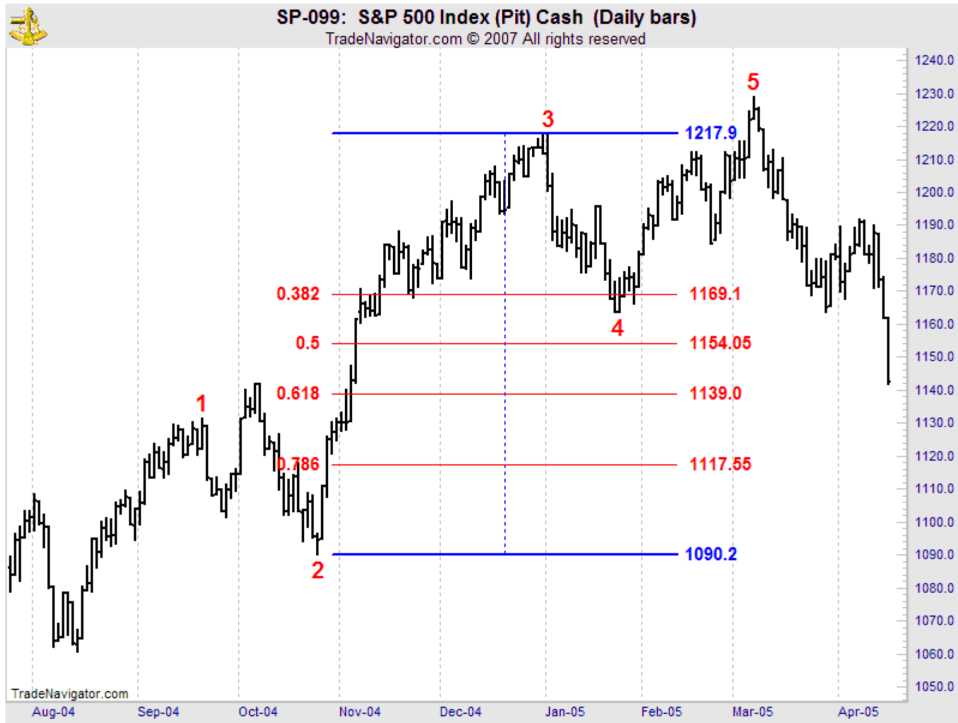
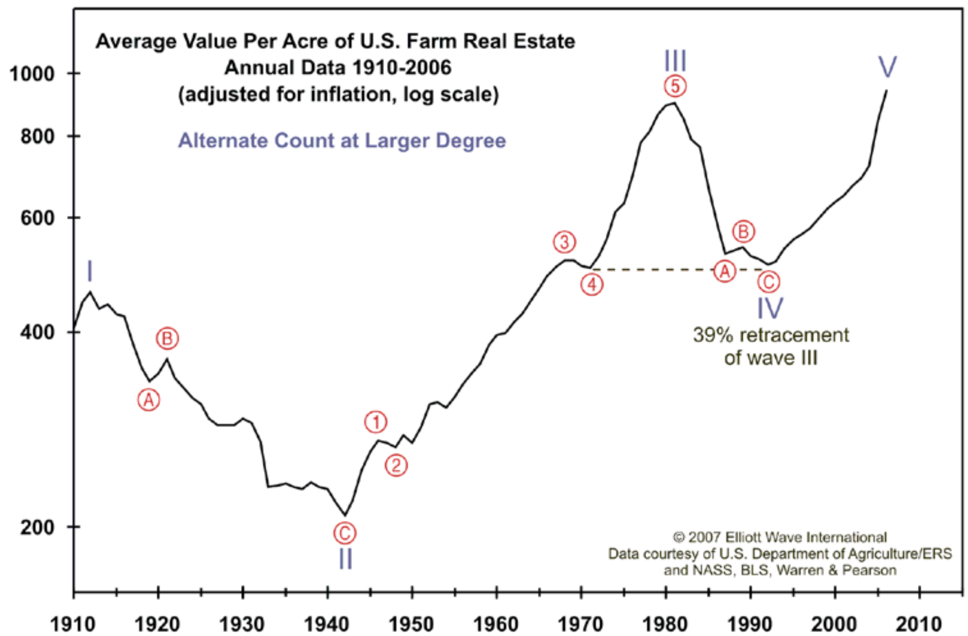


Figure 25
In this chart of cocoa futures, you can see that, from the bottom in 2001, it goes up into the end of 2002.We see a Primary wave ① in red followed by wave ② in red. Wave ②, in this case, is a combination. It's a 3-3-3, W-X-Y: a zigzag for wave (W), a flat for wave (X), and a triangle in wave (Y). For the wave ② combination, we see that the first wave of the combination, wave (W), goes past the 50% retracement and comes close to a .618. The wave (W) low is at 1420. The .618 is 1341. I mention because it is common for the first structure of a combination to achieve most, if not all, of the price retracement.

Notice that after wave (W), the A wave of the triangle in wave (Y) does go a little bit past the .618. It goes to 1299, slightly past the 1341, and finally achieves a .618 retracement. However, most of the price retracement is achieved by the first structure. Although some retracements are much deeper, commonly they do not proceed beyond the .618 Fibonacci ratio.

Note: For an additional example, see **Figure 26** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

Figure 27



Now, here's a chart I developed for one of my other courses on how to anticipate real estate trends. It shows the average value per acre of U.S. farm real estate. It is annual data from 1910 to 2006 and on log scale. In this case, we also see a shallow retracement for wave IV in blue. Wave IV retraces 39% of wave III. Now at this stage, I want to point out a couple of things about log scale. Of course, if you have a wide range of values when you are charting, you want to use log scale as opposed to arithmetic scale. You use arithmetic scale if the range of values is not that wide. It is better to use log scale to identify the wave structure for long-term charts because, ultimately, investors are concerned with percent change. Using log scale portrays your charts as percent change, and that is what you really want to compare. Or, put another way, a 100-point move in the Dow back in the 1930s is not the same as a 100-point move today. You want your chart to reflect that.

Fibonacci relationships may be displayed on arithmetic scale, on log scale, or even as multiples. If the price goes from 10 to 20, that is a multiple of 2. It is a 100% increase but a multiple of 2. So, even if you are charting on log scale because of the wide range of values that you have, that does not mean that the Fibonacci relationships will be reflected in the log values. You have to check all of them. If I am on log scale, I will normally look for Fibonacci relationships by using the log values. However, that does not mean they may not exist in terms of arithmetic values or in terms of multiples.

Figure 28
This is a daily bar chart of the Shanghai Composite Stock Index. This chart to displays a number of Fibonacci relationships, and in some cases, exact Fibonacci relationships. I have already put the wave count on. The high was on October 16, 2007, and this chart goes up to February 28, 2008. We have wave 1 in red and then an expanded flat for 2, followed by 3, 4 and 5. There is an A-B-C flat correction for wave (2) in blue. Then we go another five waves down for wave 1 in red at lower degree.

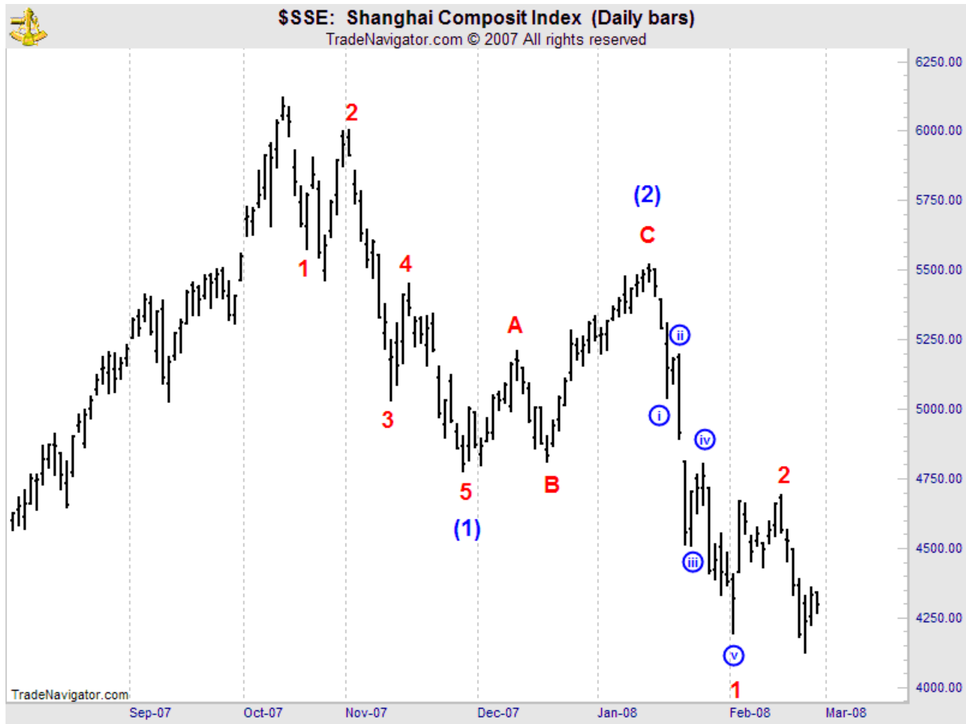


Figure 29
In terms of retracements, we see in the Shanghai Composite Index that wave 2, an expanded flat, retraces .786 of wave 1 in red. The .786 retracement comes in at 6006.3. The actual end of wave 2 is 6005, so it is about one point shy of a .786 retracement.

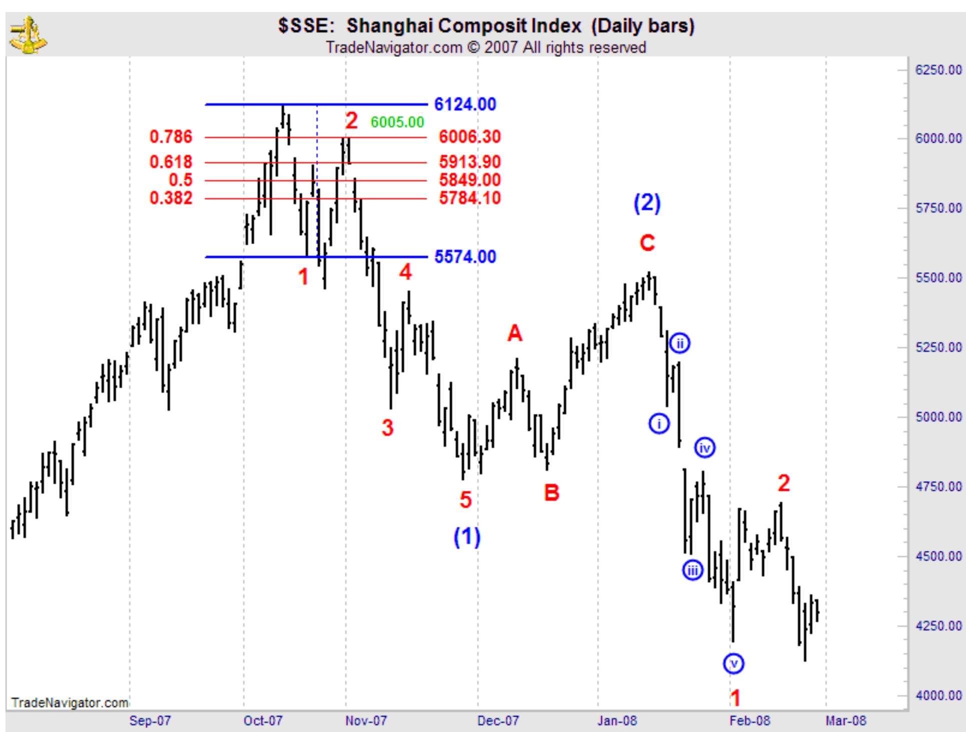
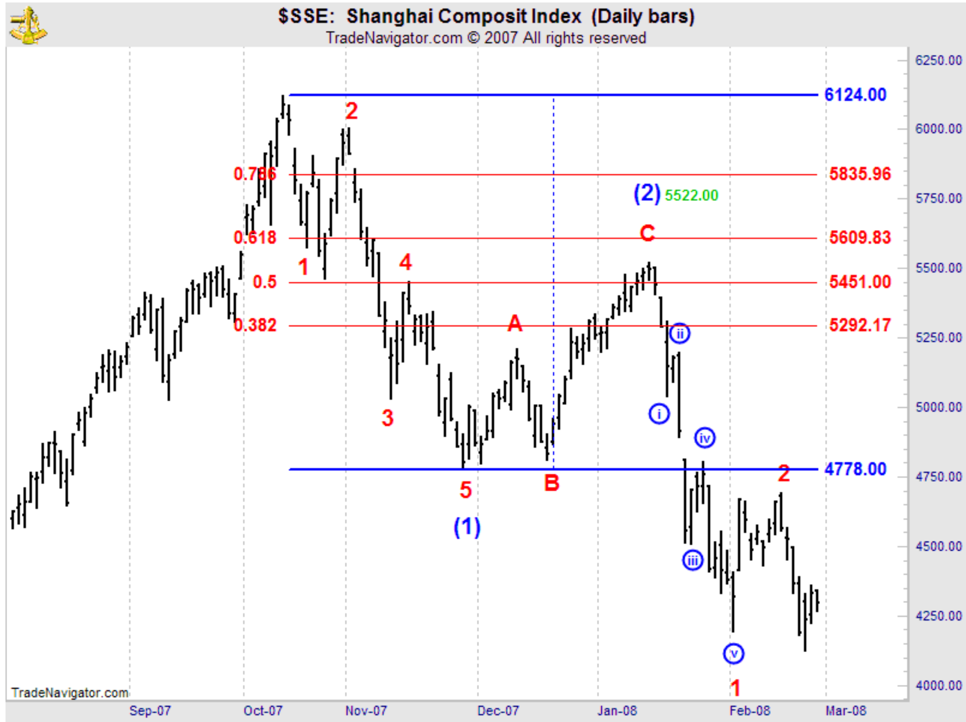


Figure 30

Now, just for your information, the Intermediate wave (2) in blue goes slightly past the 50% retracement; it does not give us quite an exact Fibonacci retracement. We are not always going to have exact numbers. It actually comes in between the 50% and the .618.



Multiples in Impulse Waves

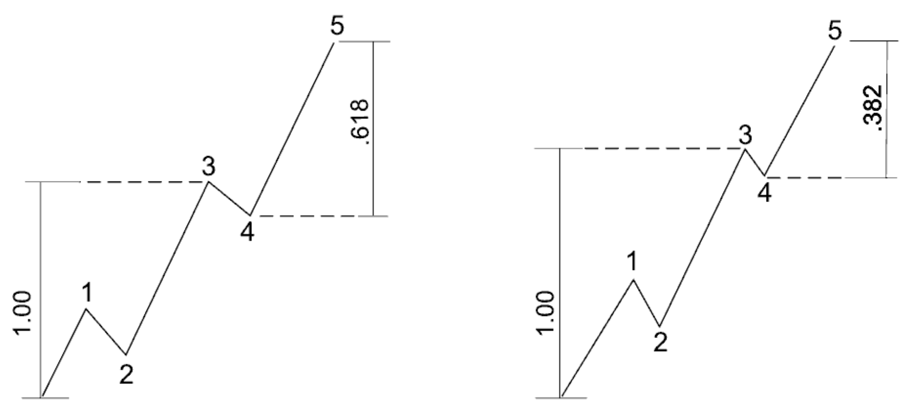


Figure 31

Let's now move on from retracement ratios for corrective waves to discuss multiples in impulse waves. I have displayed two common multiples having to do with wave 5. The first on the left is that wave 5 will often be related by the Fibonacci ratio of .618 of the net distance traveled of waves 1 through 3. So, in other words, you multiply the net distance traveled of waves 1 through 3 by .618 and then apply that to the end of wave 4. That gives you an estimate for the end of wave 5. Another common relationship is that wave 5 will be equal to .382 multiplied by the net distance traveled of waves 1 through 3. These are two common Fibonacci relationships for wave 5 when there are no extensions.

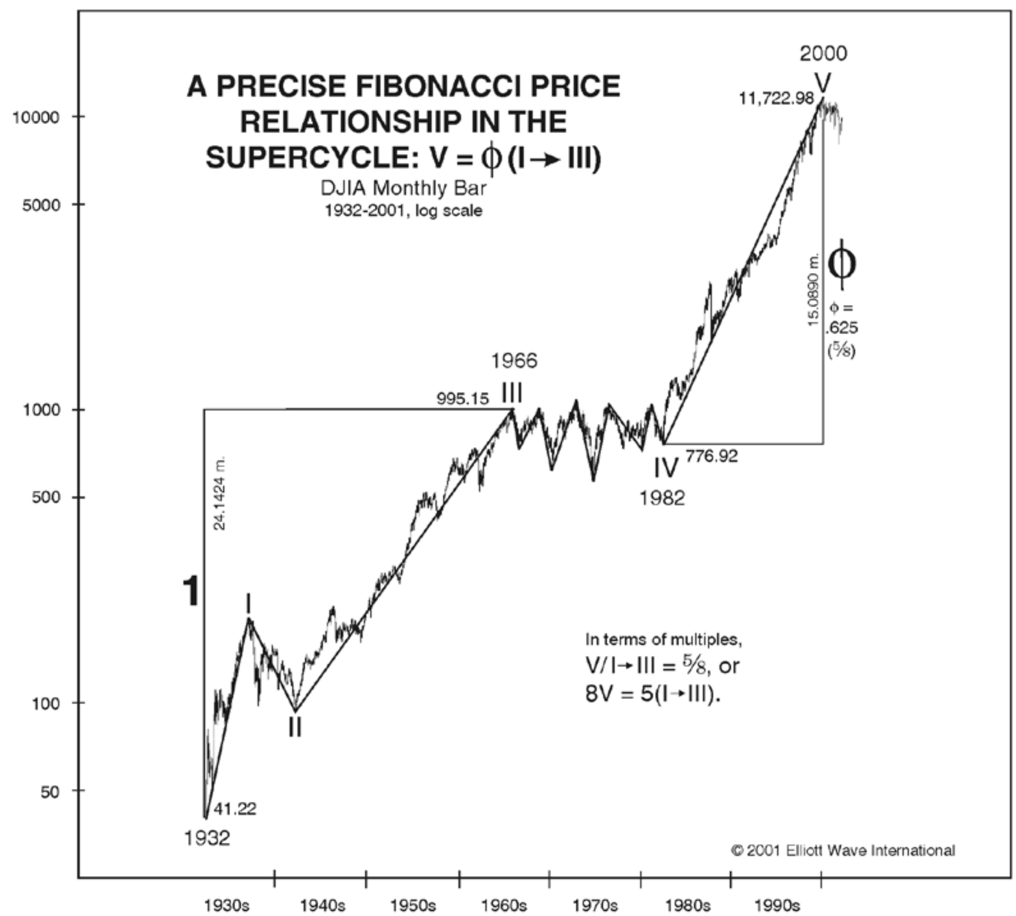


Figure 32

Let's look at some examples. This chart of the Dow Jones Industrial Average appears in Bob Prechter's book, *Beautiful Pictures*. It is a monthly bar chart on log scale, 1932 to 2001. Notice that this is on log scale in order to see the waves visually and apply the wave count. In this case, wave V is equal to .625 of the net distance traveled of the Cycle waves I through III. It is close to the Fibonacci ratio of .618. Look at how it is being measured. The values that result in this Fibonacci relationship are not the actual log values; they are multiples. The m. stands for "multiple." In other words, if we take the end of wave III and divide that by the beginning of wave I, it produces a certain multiple. If we measure that length and multiply it by .625, we get the multiple going from the end of wave IV or beginning of wave V to the end of wave V.

Many of the Fibonacci relationships exist in terms of measuring wave lengths as multiples. It is a bit uncanny but that is just how it turns out. Now, does that mean every time you chart on log scale you are going to look for multiples? No. Generally speaking, however, certainly if you are on arithmetic scale, it really does not matter. You just work with the arithmetic scale. If you are on log scale, I would start out looking at the log values. If you do not find any Fibonacci relationships there, you may want to try the multiples or even the arithmetic values.

Note: For an additional example, see **Figure 33** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

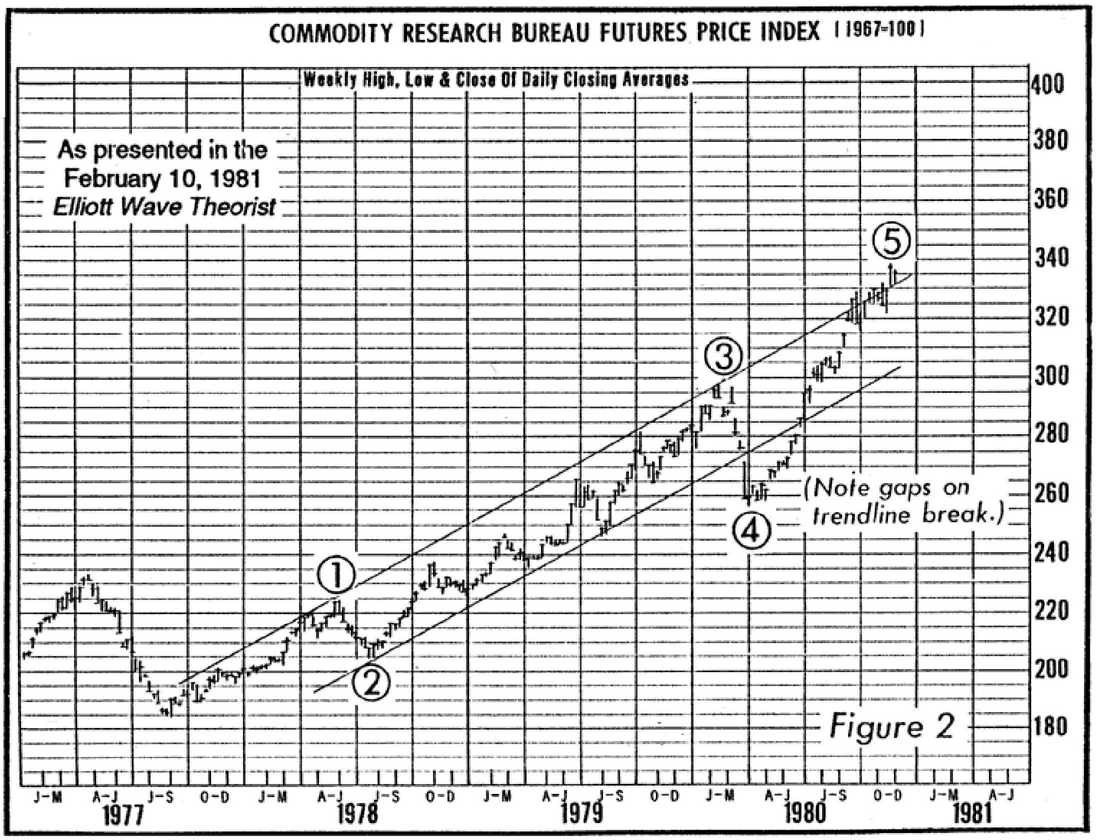


Figure 34
Now, this is a chart that was published quite a while ago, in 1981. It is the CRB Index from the late '70s up until the early 1980s. I just want to point out some Fibonacci relationships. You see Primary waves ① through ⑤. You calculate the net distance traveled of waves ① through ③ (from 185 to 297) to be 112 and multiply that by .618 to reach 69 points. When you add that 69 points on to the end of wave ④, which is at 255, you reach a target of 324. In fact, wave 5 ends at 337. So, wave ⑤ ends, ironically, 13 points – which is a Fibonacci number – beyond the .618. Wave ⑤ is roughly within 13 points of equaling .618 multiplied by the net distance traveled of waves ① through ③.

We do not want to forget about the Wave Principal and a lot of our rules and guidelines. Notice the trend channel throw-under in wave ④, signaling the throw-over in wave ⑤.

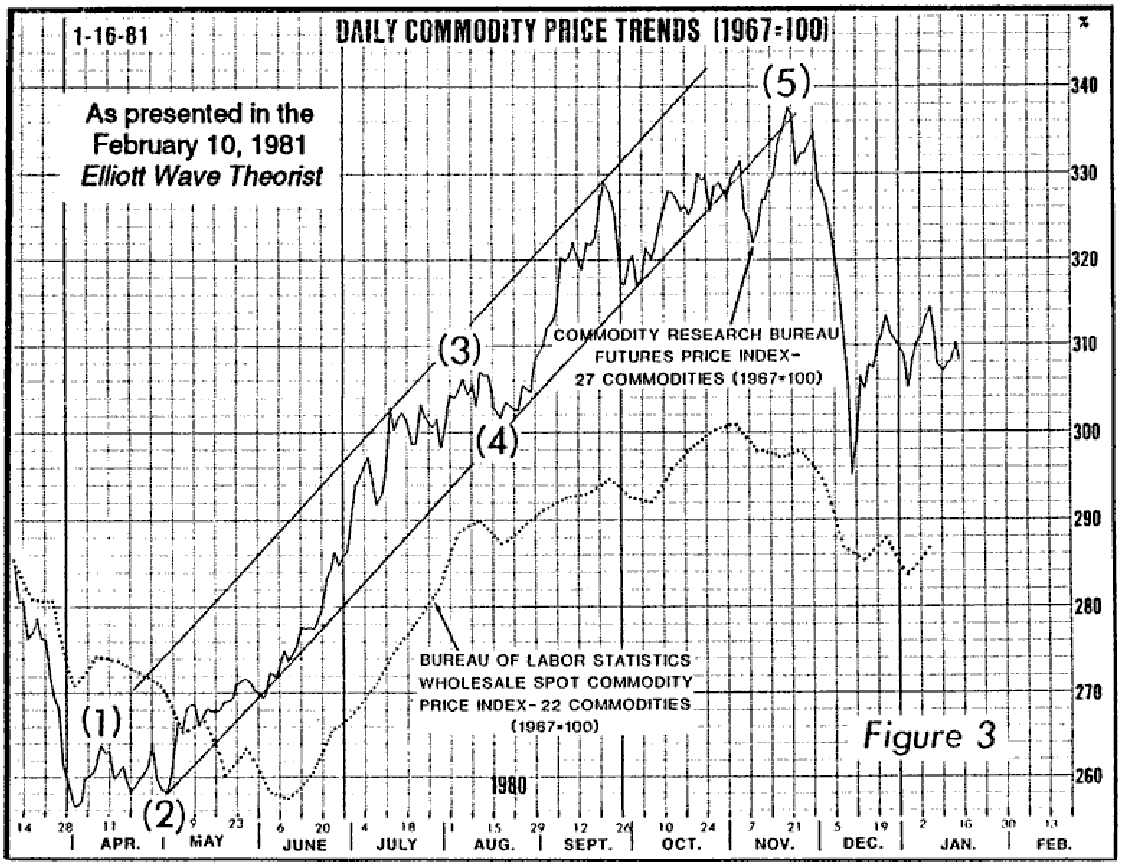


Figure 35

If we take wave ⑤ (see previous chart) and break that down, we are down to Intermediate degree. We also see that there is a Fibonacci relationship at the Intermediate degree. Wave (5) is also related to the net distance traveled of waves (1) through (3) within wave ⑤. If we multiply waves (1) through (3) by .618, we get a target of 333. The actual wave (5) goes to 338. Again, it happens to overshoot by 5 points, which is also a Fibonacci number. To overshoot by a Fibonacci number is not necessarily a Fibonacci relationship, but it is ironic that it turned out that way.

Why am I pointing these things out? You need to look at your Fibonacci relationships at various degrees. Do not just be focused on one degree.

> **Note:** For an additional example, see **Figure 36** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

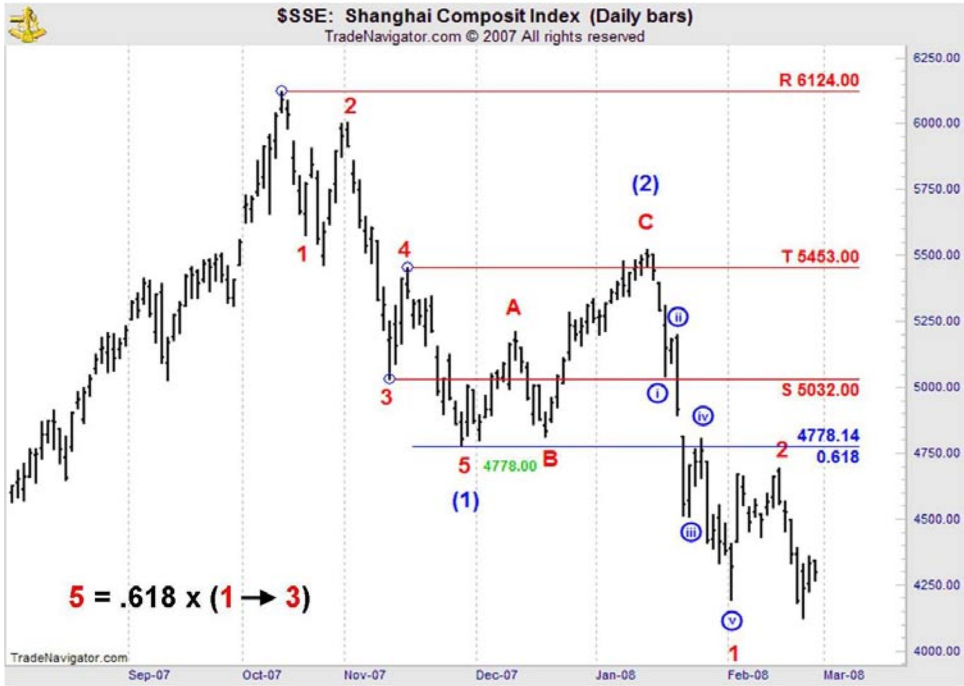


Figure 37
Let's get back to the Shanghai Composite Index, and I will point out some Fibonacci relationships. In order to graphically illustrate it, point R is always our starting point for Fibonacci expansions or extensions, but not retracements. Point S is our end point. In this case, we are going from R to S, and then T is where we are extending from. In other words, R is the beginning of wave 1 in red and S is the end of wave 3 in red. We are looking at the net distance traveled of waves 1 through 3 and applying that to the end of wave 4 by a Fibonacci .618. Wave 5 is equal to .618 multiplied by the net distance traveled of waves 1 through 3. The exact number is 4778.14. The low of wave 5 is 4778 even. So basically, it is an exact .618 relationship.

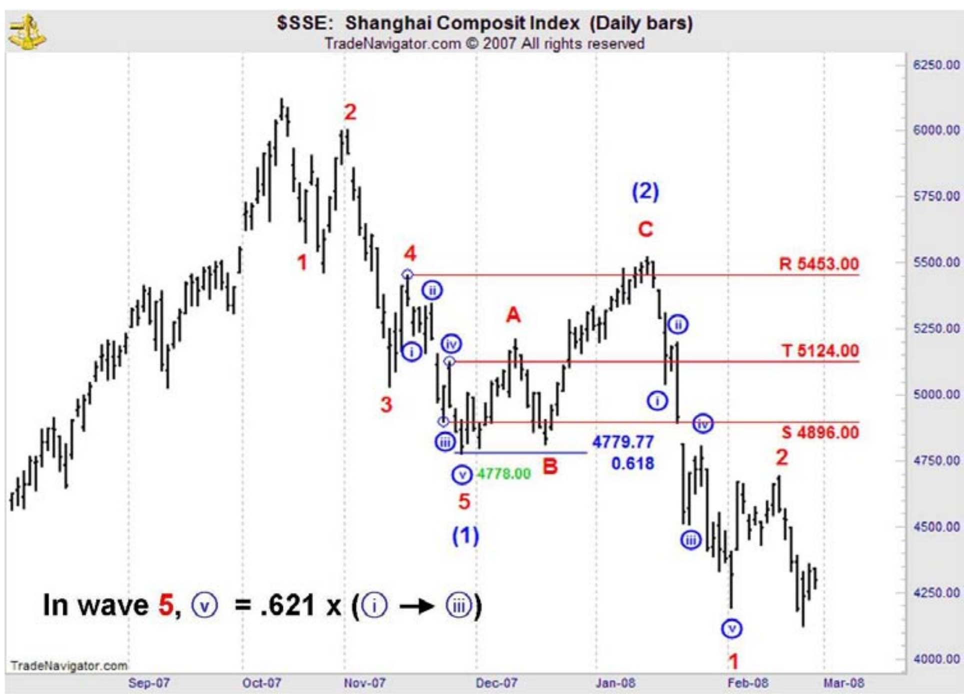


Figure 38
Now, when we go to the next lower degree, we are looking at the internal subdivisions of wave 5 in red. The internal (v) is equal to .621 multiplied by the net distance traveled of waves (i) through (iii). In other words, the actual exact .618 comes out at 4779.77. Wave (v) ends at 4778, which is in green. So, the green number is the actual. The blue number, 4779.77 is where the exact .618 would have come in. We are saying, in other words, that if this is the exact figure and here is where the actual is, then it is .621, which is close to .618.

Note: For an additional example, see **Figure 39** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

Multiples in Impulse Waves with Extensions

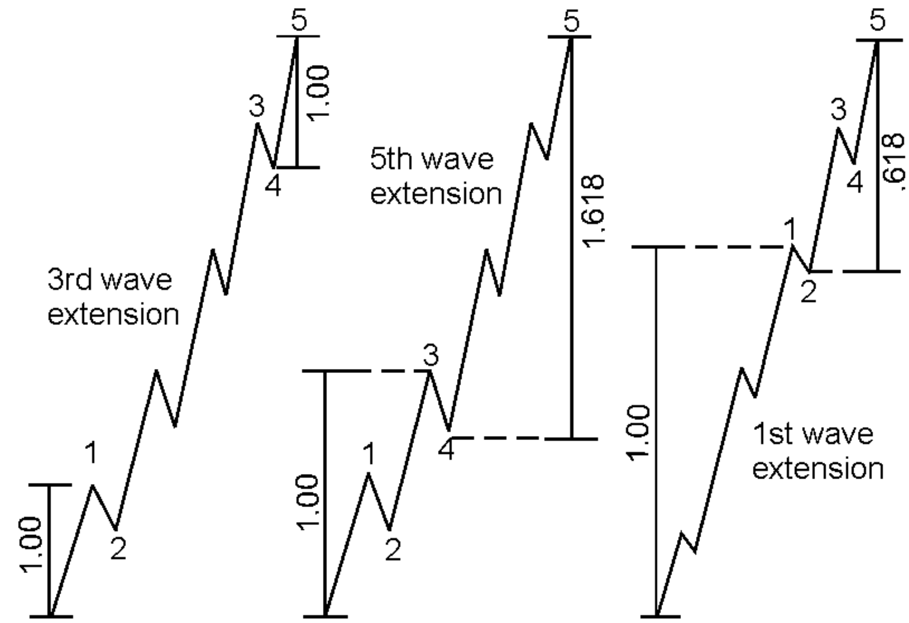
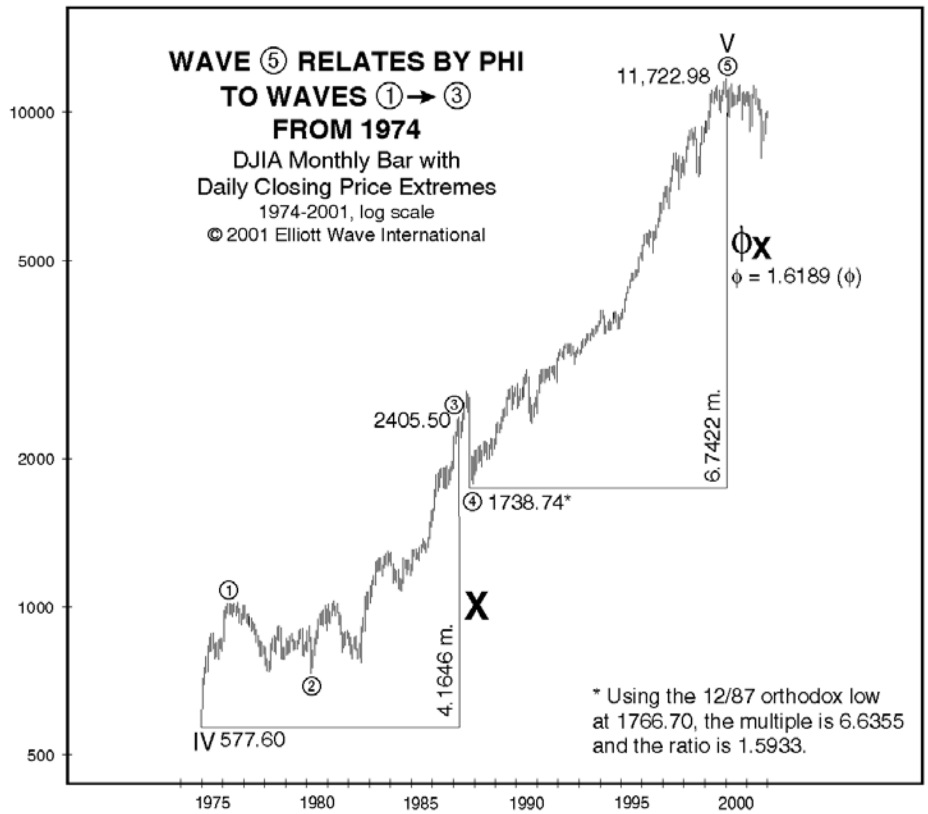


Figure 40

Let's now talk about multiples in impulse waves with extensions. But first, for those who are not familiar with log scale, log scale is when you express each price as an exponent to a certain base. So, you can have log to the base 10. You can have natural log, which is to the base e. You are expressing your whole data series in a totally different manner as an exponent to a certain base. We do this because you are really looking at percent change in the data series, as opposed to arithmetic changes, or going from one arithmetic value to another.

Look at the graph on the far left. If there is a third wave extension, we can expect wave 5 to equal wave 1. This is the most common relationship. With fifth wave extensions, a common relationship is that wave 5 will equal 1.618 multiplied by the net distance traveled of waves 1 through 3. If there is a first wave extension, then we can expect that waves 2 through 5 will equal .618 multiplied by the length of that first wave extension. These are all common Fibonacci relationships with respect to Elliott wave extensions.

Figure 41



This chart also comes from *Beautiful Pictures*. It is an example of an extended wave ⑤ that is almost an exact Fibonacci multiple or Fibonacci relationship. We see that wave ⑤ is equal to 1.6189 multiplied by the net distance traveled of waves ① through ③. This is a chart of the Dow from the 1974 low up to the 2000 high on log scale. Again, in this case, we are talking about multiples. We are measuring in multiples even though it is on log scale. Remember, the log scale helps us to see the waves better. The log values do not necessarily have to be used to do your Fibonacci calculations.

Note: For an additional example, see **Figure 42** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

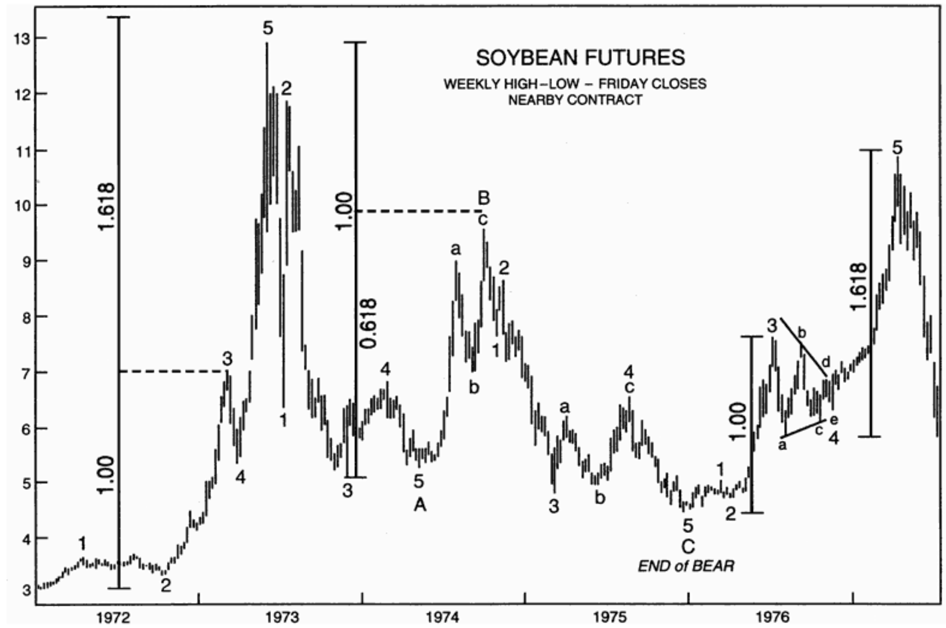


Figure 43
This is a chart of soybean futures back in the '70s – 1972 up until 1977. If you look at the right side, you see that wave 5 is equal to 1.618 multiplied by the net distance traveled of waves 1 through 3. In this case, it is not an exact 1.618. Waves 1 through 3 come out to 3.2 multiplied by 1.618, and that is 5.2. When that is added to the low of wave 4, it gives us a target of 10.9 for soybeans. Up at the top right, the end of wave 5 is 10.76. That is a difference of just 0.14.

Fibonacci Dividers in Impulse Waves

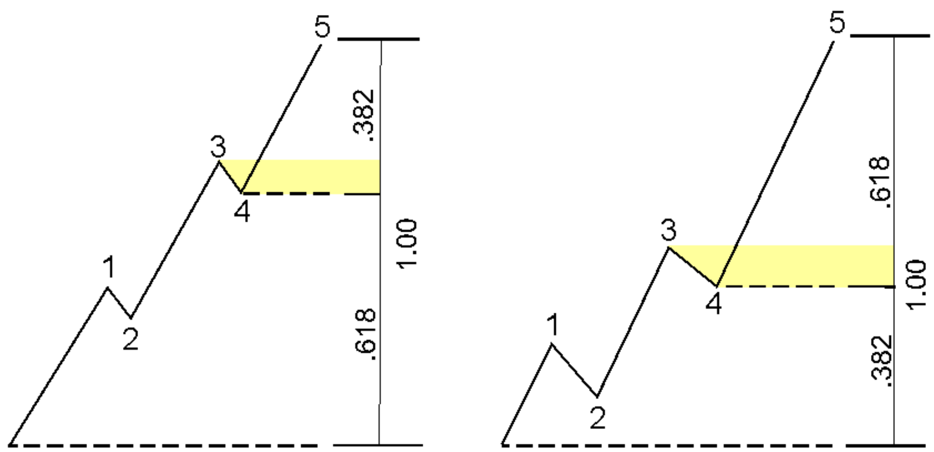


Figure 44
I now want to talk about Fibonacci dividers. If you look at wave 4 on both of these charts, you will notice some shading. It is common that wave 4 will divide the entire price range into the Golden Section comprising these two sections: .382 and .618. Instead of going from waves 1 through 3 and then adding that to the end of wave 4, right from the end of wave 4 or the beginning of wave 4, the distance will be .618 of the whole price distance; the shorter distance will be .382. Because we are not going from 1 to 3 and then from 4 to 5, it is a difference. On the right side, you could have the upper portion of the Golden Section: .618 versus .382. Rather than looking at the net distance traveled of 1 through 3 and adding that to 4, it is common that the end of wave 4 will just divide the entire price range into this section. As you will see, that is useful for projecting these waves.

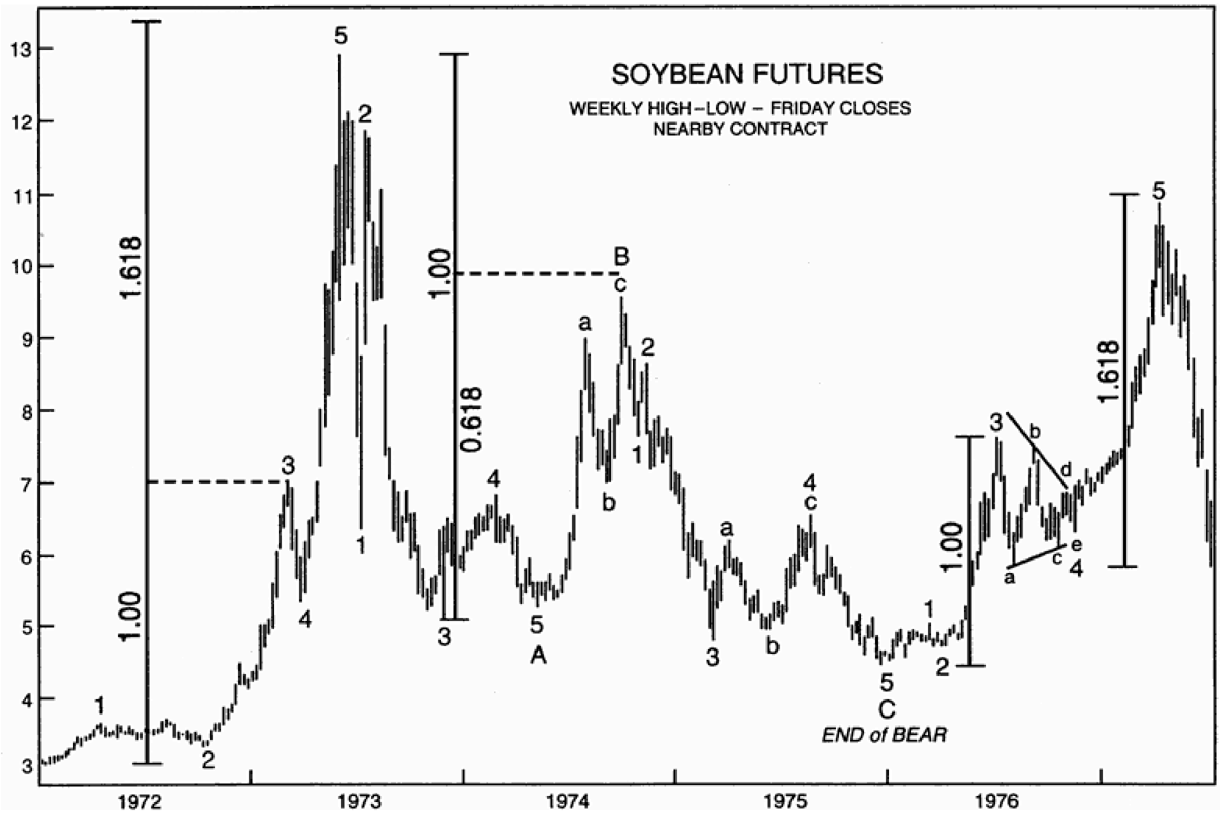


Figure 45

If we look at that soybean futures chart again, we will see that on the left side, the end of wave 3 or the beginning of wave 4 divides this entire price range of wave 1 through 5 into the Golden Section. In other words, if we say that the distance from 1 through 3 is 1, the distance from 3 to the end of 5 is 1.618. Well, what does that mean? That means that we can express the whole distance as 2.618. 1.618 divided by 2.618 is .618. 1 divided by 2.618 is .382. This is just another way of saying that the longer length is .618 of the whole, and the shorter length is .382 of the whole.

The target is 13.39. The exact number at which the end of wave 3 divides this into the Golden Section requires wave 5 to end at 13.39. It ends at 12.9, which is a little bit lower, but still close. These are guidelines. When we get into the trading scenarios in part 2 of this ebook, we are going to use these guidelines to actually set up trades and create trading strategy. Not only will we use them to project prices, but also to set stop levels.

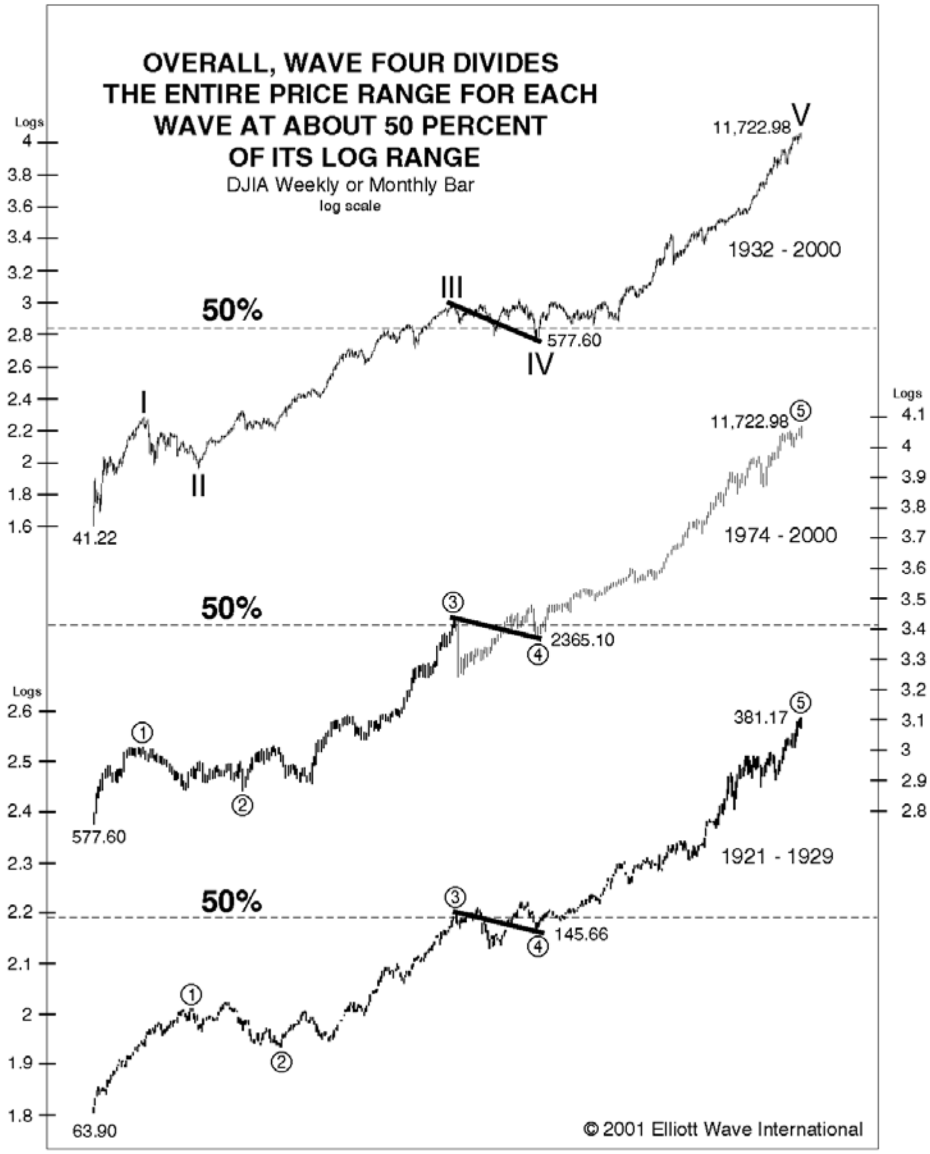


Figure 46

Now, remember that I said we are also going look at .5 or 50%. I want to show this chart of the Dow Jones Industrial Average that comes from *Beautiful Pictures*. Wave 4 (the beginning of wave 4 or the end of wave 4) will not only commonly divide an entire price range into .382 and .618, but also into .5 or split it 50% and 50%. That is what you see here on this chart. We see three different time periods – 1932 to 2000, '74 to 2000, and '21 to '29. In each of these cases, the dotted line represents the 50% mark in the price range. In each case, either the end of wave 4 or the beginning of wave 4 divides the price range by 50%. We will also see later examples where it will divide it into .382 and .618.

Note: For an additional example, see **Figure 47** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

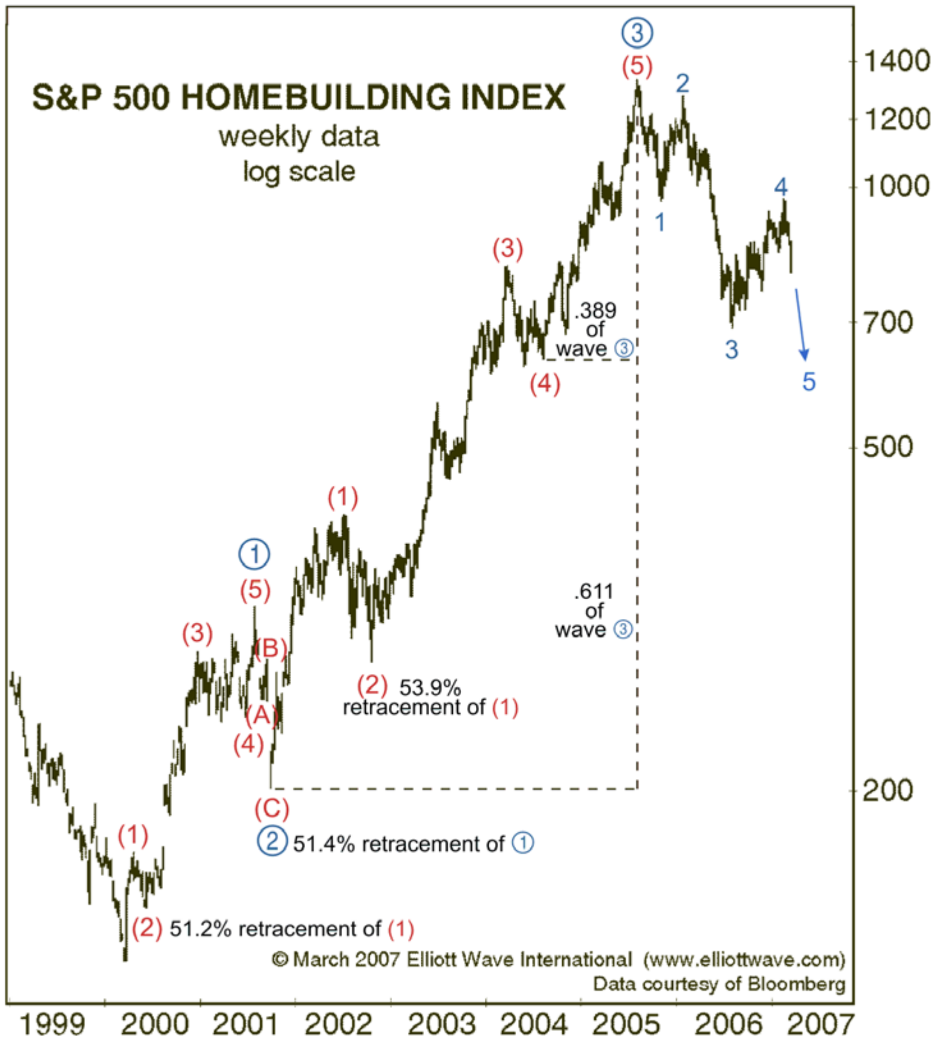


Figure 48
This is the S&P 500 Homebuilding Index. We certainly see the Golden Section and relationships related to Fibonacci. All of these second waves make approximately 50% retracements of their respective first waves. We do see the 50% number come up often. The end of the Intermediate wave (4) in red within Primary wave ③ divides this entire price range of Primary wave ③ close to the Golden Section — .389 and .611.

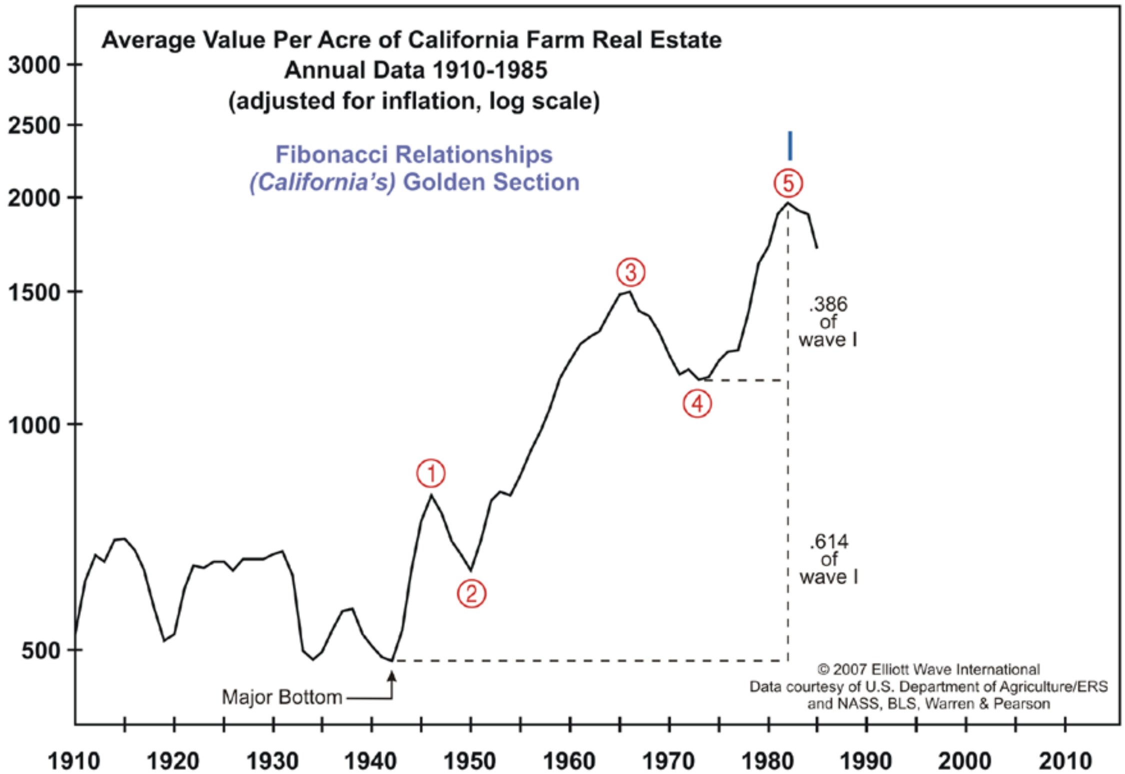


Figure 49
This is from the farm real estate section of the real estate course. It is the average value per acre of California farm real estate, from 1910 to 1985. This is on log scale and goes from 1942 to 1982. Farm real estate in California had peaked at that time in 1982 before making a correction. The end of wave ④ takes us close to the Golden Section — .386 for the upper half and .614 for the lower half.

Note: For additional examples, see **Figures 50, 51 and 52** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

Multiples within Corrective Waves — Zigzags

Figure 53

We also have Fibonacci relationships with corrective waves. I first want to discuss zigzags. The most common relationship in a zigzag is that wave C equals wave A. If there is a double zigzag W-X-Y, it is the same logic. In other words, it is common for wave Y to equal wave W, but there are other Fibonacci relationships as well.

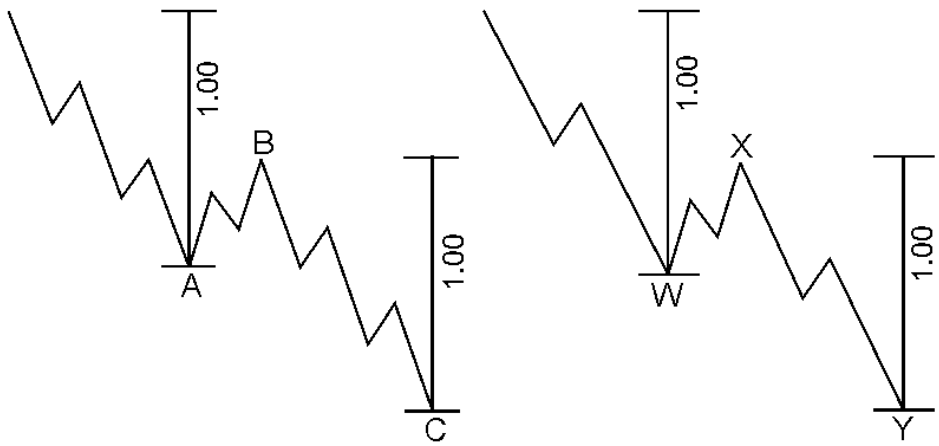


Figure 54

This table is a summary of the most common Fibonacci relationships for zigzags. Notice that I did not put up 2.618. Can wave C be equal to 2.618 of wave A? Sure, it could happen, but it rarely does. The most common relationship for a single zigzag is wave C equals wave A. If you are referring to a double zigzag, the most common is wave Y equals wave W. If there is a triple zigzag, look for equality between wave W, Y or Z or look for the ratio of .618. For example, you might look for wave Z to equal .618 multiplied by wave Y.

Fibonacci Relationships

Single Zigzag
- Wave C = Wave A
- Wave C = .618 Wave A
- Wave C = 1.618 Wave A
- Wave C = .618 Wave A past Wave A

Double Zigzag
- Wave Y = Wave W
- Wave Y = .618 Wave W
- Wave Y = 1.618 Wave W
- Wave Y = .618 Wave W past Wave W

Triple Zigzag
- Equality for W, Y and Z
- Ratio of .618, i.e. Wave Z = .618 Wave Y

I will just go through the single zigzags because doubles and triples are analogous. Wave C might equal .618 of wave A, or wave C might be equal to 1.618 multiplied by wave A. Another relationship is that wave C may equal .618 multiplied by wave A past wave A. In other words, you take .618 of wave A and subtract or add it to the end of wave A, depending on whether it is a bull-market or bear-market correction. That gives you an estimate for wave C.

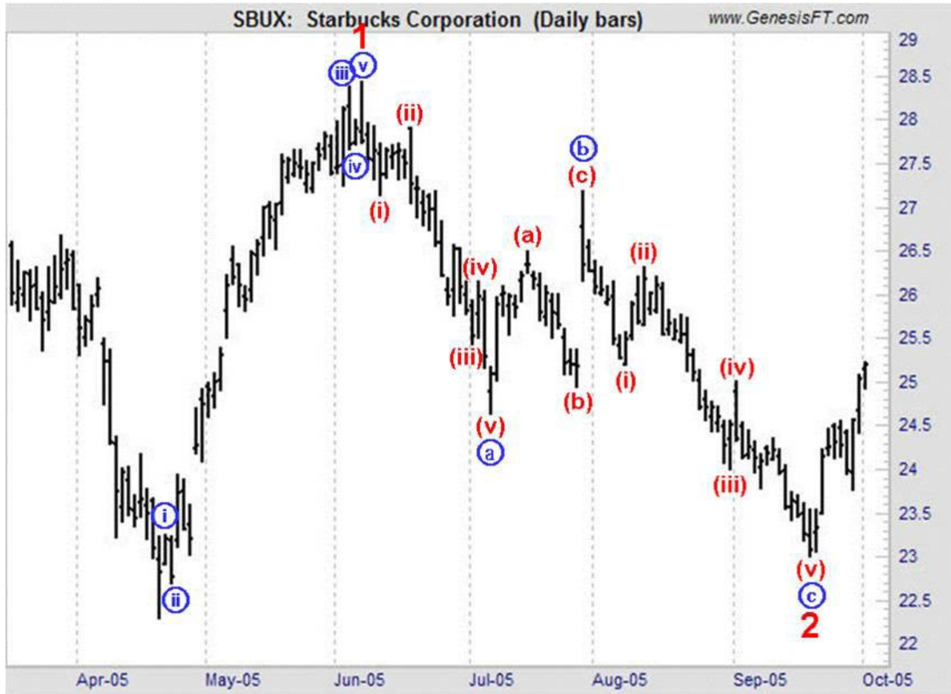


Figure 55
Here is a chart of Starbucks Corporation, April 2005 to early October 2005, with a zigzag. We see a Minor wave 1 and 2 in red and a zigzag ⓐ-ⓑ-ⓒ, 5-3-5. Wave ⓒ in blue is equal to 110% of wave ⓐ in blue. These are very useful relationships for setting up trades.

Figure 56
Here is a zigzag for wave (4). This is Dow Chemical Corporation and goes from 2002 up until the middle of 2005. Notice the channel lines; let's not forget some of our Elliott wave guidelines. We see in this zigzag that wave C is about 91% of the length of wave A.

Figure 57

We also have a Fibonacci guideline in terms of wave B, depending on what kind of structure wave B is within zigzags. For example, if the B wave is a zigzag, you can expect a retracement of 50% to 79%, with 79% corresponding to the .786. I listed all of the different types here, so that you can use these as guidelines.

Guidelines for Typical Retracements of Wave A by Wave B in Zigzags

Wave B	Net Retracement (%)
Zigzag	50-79
Triangle	38-50
Running Triangle	10-40
Flat	38-79
Combination	38-50

Multiples for Flats and Expanded Flats

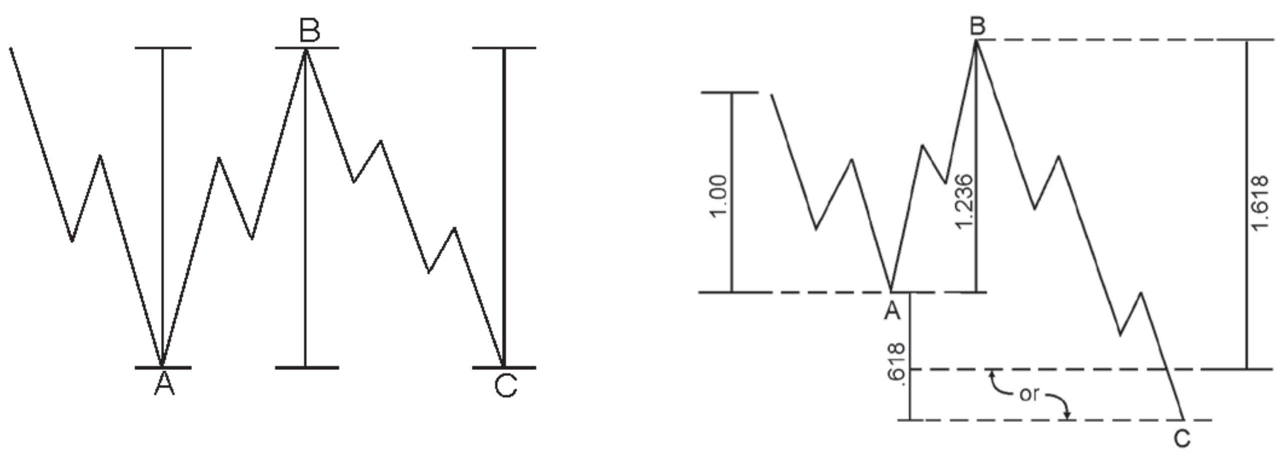


Figure 58 and 59

By definition, if you are referring to a regular flat, then of course you are going to be looking for wave C to equal wave B, which is also going to equal wave A. But what about an expanded flat? There are common relationships for expanded flats. In an expanded flat, one common relationship is that wave C equals 1.618 multiplied by the length of wave A or that wave C ends at a price level that is equal to .618 of wave A past the end of wave A. In an expanded flat, it is common for wave B to equal 1.236 multiplied by the length of wave A or to equal 1.382 multiplied by the length of wave A.

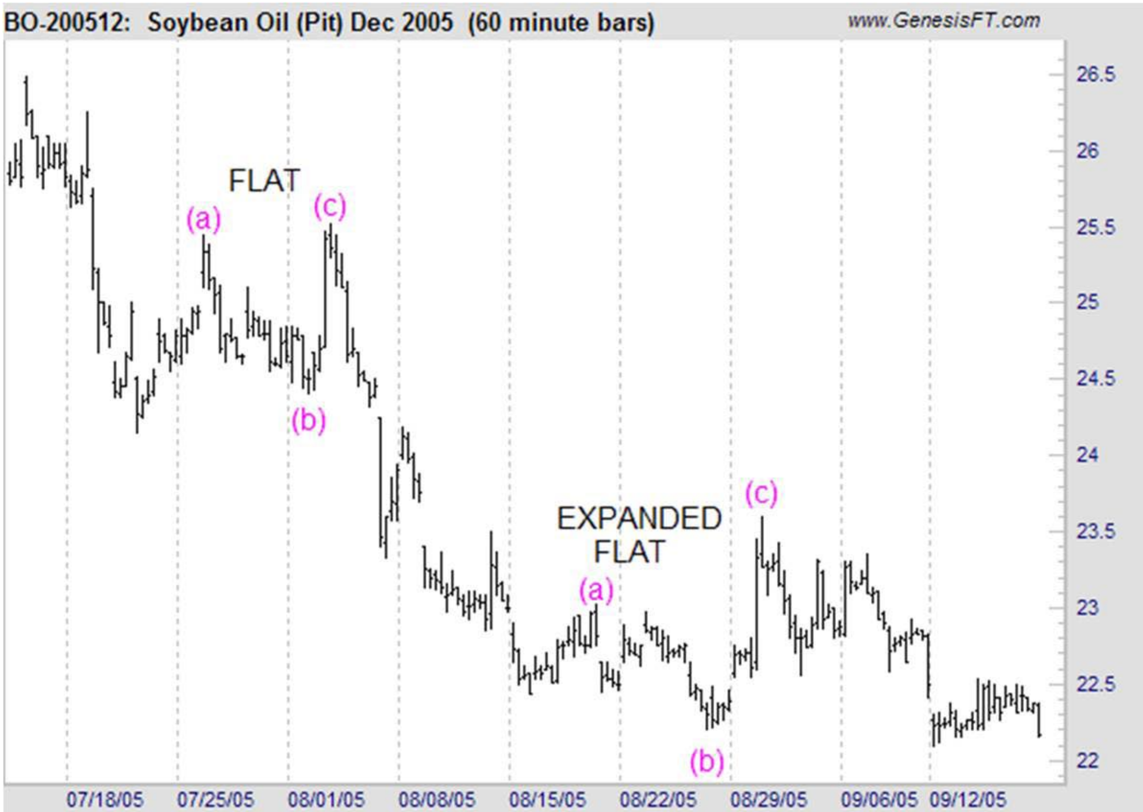


Figure 60
Here are some examples. This is soybean oil from back in July 2005 up through September 2005. We see a regular flat structure up at the top left. It is not expanded because wave (b) does not go beyond the origin of (a). The length of wave (a) is 1.3, and (c) is 1.11 (so close to parity). There is an expanded flat down at the right. Wave (b) goes beyond the start of (a), and wave (c) goes beyond the end of wave (a). In this case, wave (c) is quite long; it is equal to about 2.4 the length of (a). So, if we are looking for 1.618, we actually go well past that. However, if we take the length of wave (a), multiply it by .618, and add that to the end of wave (a), that gives us the estimate for wave (c). The target then for wave (c) is 23.37, and the actual comes out to 23.6. This is a case where the guideline of using .618 of wave (a) past (a) to estimate the end of wave (c) is useful.

Note: For an additional example, see **Figure 61** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

Multiples for Triangles

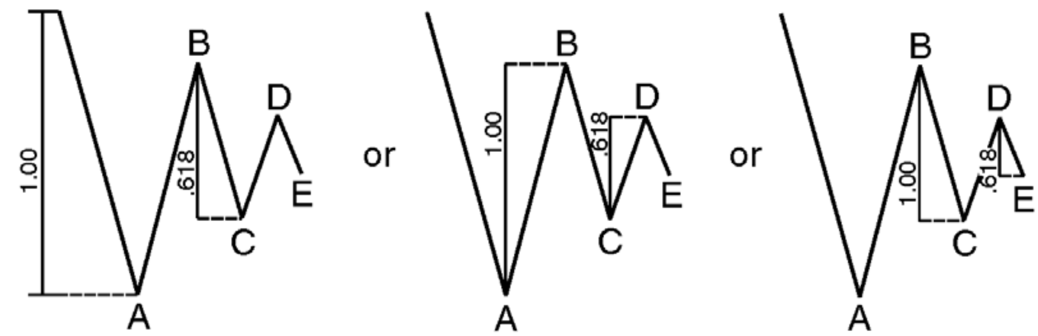


Figure 62
There are Fibonacci relationships in triangles. The alternate waves of a triangle will relate to each other by the Fibonacci ratio of .618. Look at the example on the left. Wave C might equal .618 of wave A. Notice the middle example. The length of wave D might equal .618 of the length of wave B. Look at the example on the right. Wave E might equal .618 of the length of wave C. In an expanding triangle, the waves are getting larger – it is not contracting. Then we use 1.618 as our guideline.

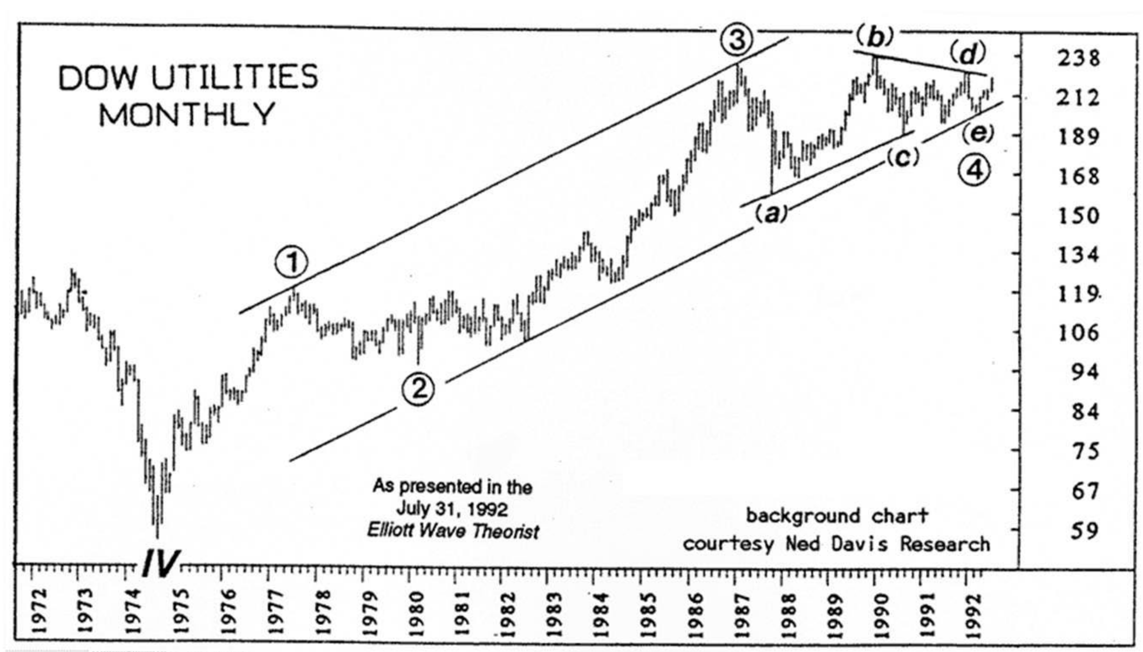
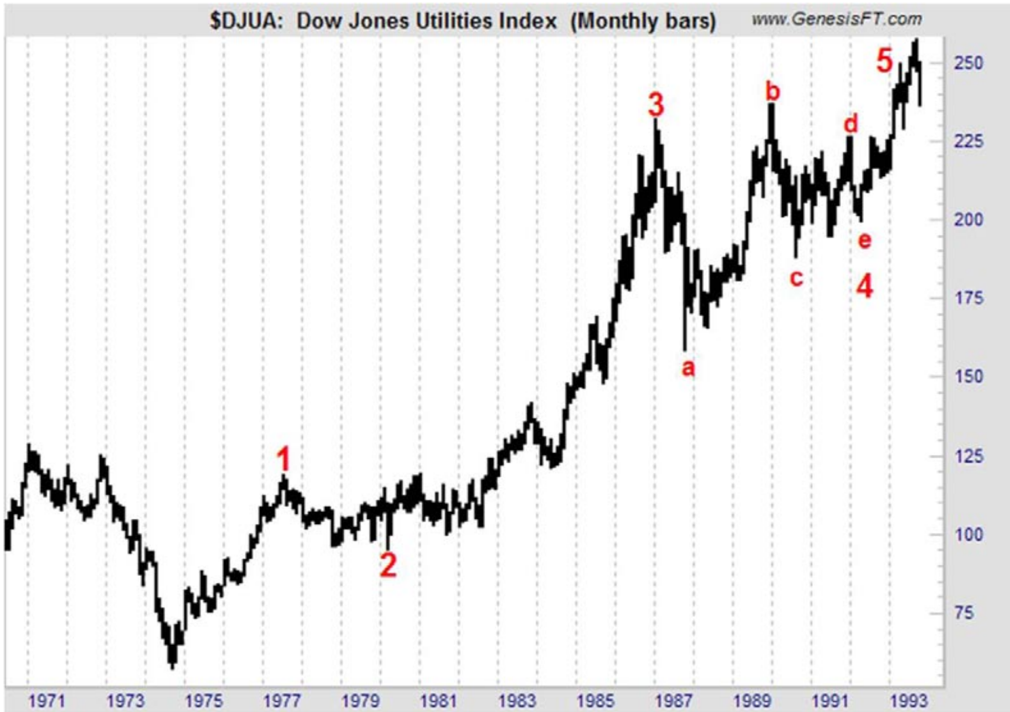


Figure 63
This is a monthly chart of the Dow Jones Utility Average. It was published by the *Elliott Wave Theorist* back in 1992. We see Primary waves ① through ④.

Figure 64
Now look at this same DJUA price data on arithmetic scale. We cannot find the relationship on log scale, but on arithmetic scale, we do see a relationship between alternate legs of the triangle. Wave a is 73.79 points. When I multiply that by .618, I get 45.6 as an estimate for wave c; wave c is 49 points. If I multiply 49 by .618 to get an estimate for wave e, I get 30.3; wave e comes out to about 27 points.



Note: For an additional example, see **Figure 65** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

Chapter 3 Key Points:

Commonalities

- Retracements: Second waves retrace .618, .786 or .500 of first waves; fourth waves retrace .382 or .236 of third waves.
- Multiples in impulse waves: Multiply the net distance traveled of waves 1 through 3 by .618 and apply that to the end of wave 4; wave 5 equals .382 multiplied by the net distance traveled of waves 1 through 3.
- Multiples in impulse waves with extensions: third-wave extension — wave 5 equals wave 1; fifth-wave extension — wave 5 equals 1.618 multiplied by the net distance traveled of waves 1 through 3; first-wave extension — waves 2 through 5 equal .618 multiplied by the length of that first-wave extension.
- Fibonacci dividers in impulse waves: Wave 4 divides the entire price range into the Golden Section comprising these two sections — .382 and .618.
- Multiples for zigzags: Wave C equals wave A.
- Multiples for flats: Wave C equals wave B (and A).
- Multiples for expanded flats: Wave C equals 1.618 multiplied by the length of wave A, or wave C ends at a price level that is equal to .618 of wave A past the end of wave A; wave B may equal 1.236 multiplied by the length of wave A or 1.382 multiplied by the length of wave A.
- Multiples for triangles: The alternate waves of a triangle relate to each other by the Fibonacci ratio of .618; in an expanding triangle, use 1.618.

Chapter 4: Time Relationships

Figure 66

Now I want to go over Fibonacci time relationships. This is an example of how we see Fibonacci numbers giving us major tops or bottoms, when we start at a certain point, like 1929, and add a certain number of years based on Fibonacci numbers (5 or 8, and so on) to it. Time duration of waves also seems to reflect certain Fibonacci relationships, whether it is the number of years in a wave, as we are showing here, or days or months.

Fibonacci Time Relationships

The progression of years from the 1928 (possible orthodox) and 1929 (nominal) high of the last Supercycle produces a Fibonacci sequence:

1929	+	3	=	1932 bear market bottom
1929	+	5	=	1934 correction bottom
1929	+	8	=	1937 bull market top
1929	+	13	=	1942 bear market bottom
1928	+	21	=	1949 bear market bottom
1928	+	34	=	1962 crash bottom
1928	+	55	=	1983 probable Supercycle peak

Fibonacci Time Dividers

Figure 67

We also see Fibonacci dividers with respect to time. This is a chart of the Dow Jones Industrial Average from 1932 to 2000. At the end of wave III or the beginning of wave IV, it divides the entire time or duration into two equal parts, 50%/50%; notice that both of those parts are equal to a Fibonacci 34 years.

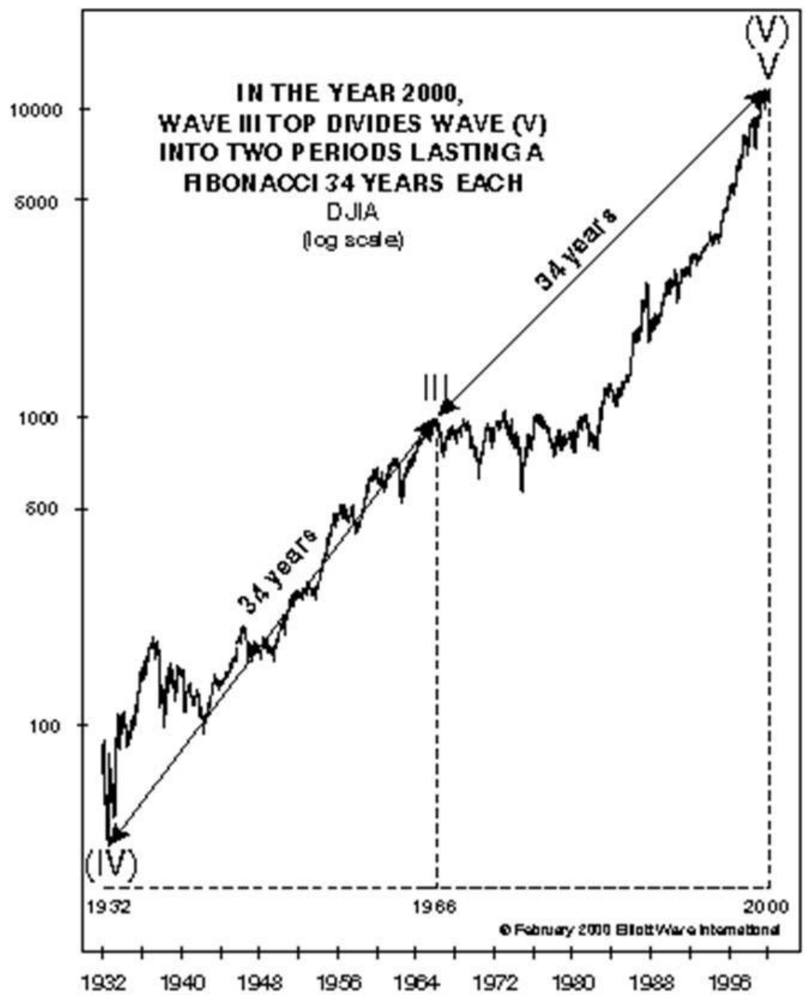
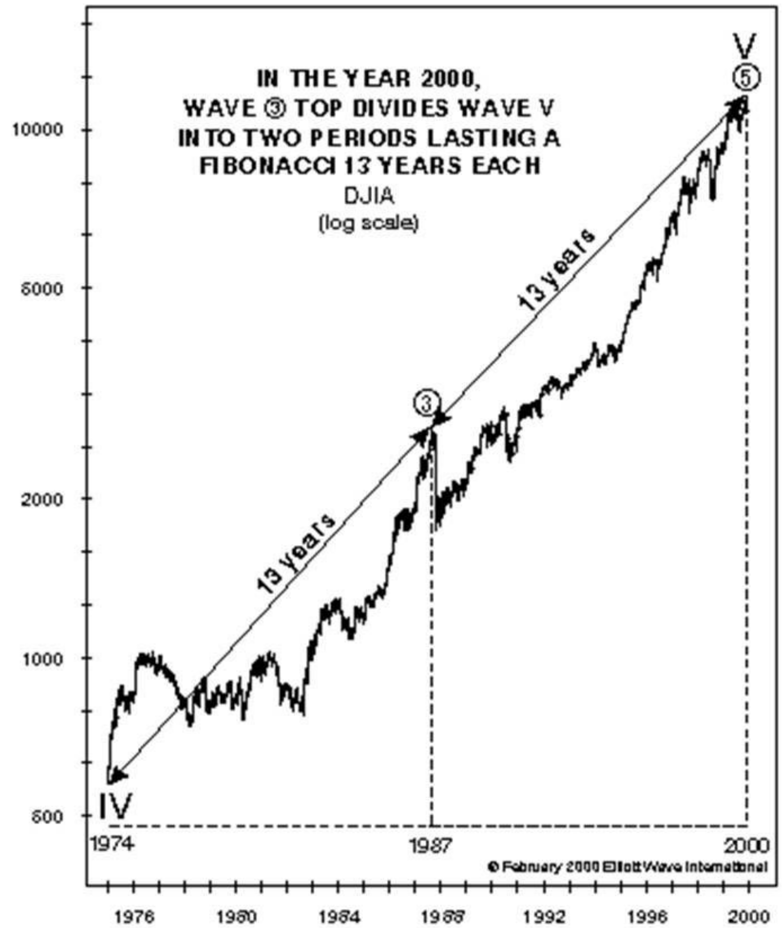


Figure 68
This is the Dow from the 1974 low up to the 2000 high for Cycle wave V. We see that the end of wave ③ or the beginning of wave ④ divides the entire time into two equal parts; it is not a Golden Section, but they are two equal parts each equaling a Fibonacci 13 years.



Fibonacci Time Dividers in Impulse Waves

Figure 69
Here is what I mean about Fibonacci time dividers in impulse waves. It is analogous to the dividers in price. Wave 4, whether it is the beginning of wave 4 or the end of wave 4, will commonly divide the entire time duration of the impulse wave into the Golden Section. If wave 5 is extended, as you see on the right, then the larger time half, the .618, will be farther away from the present at the far right or equal to wave 5, and waves 1 through 4 will be .382. If there is no extension, then you can probably expect waves 1 through 4 to be .618 of the time duration and wave 5 to be .382 of the time duration.

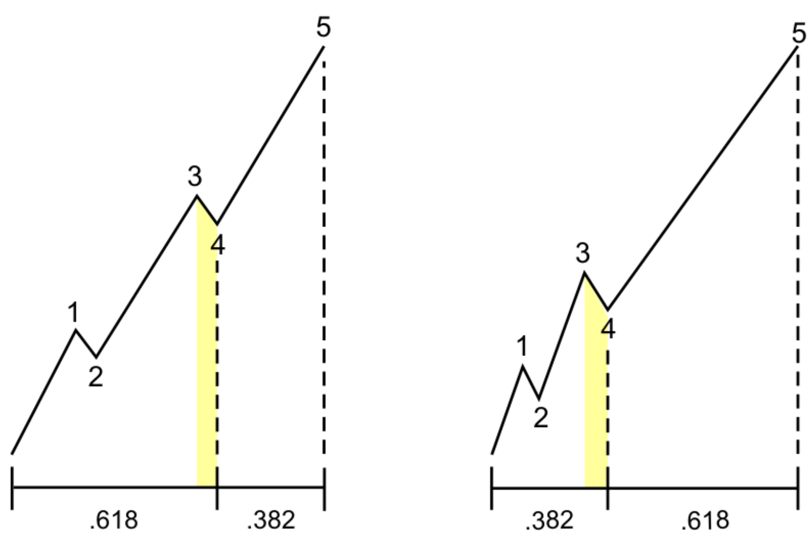
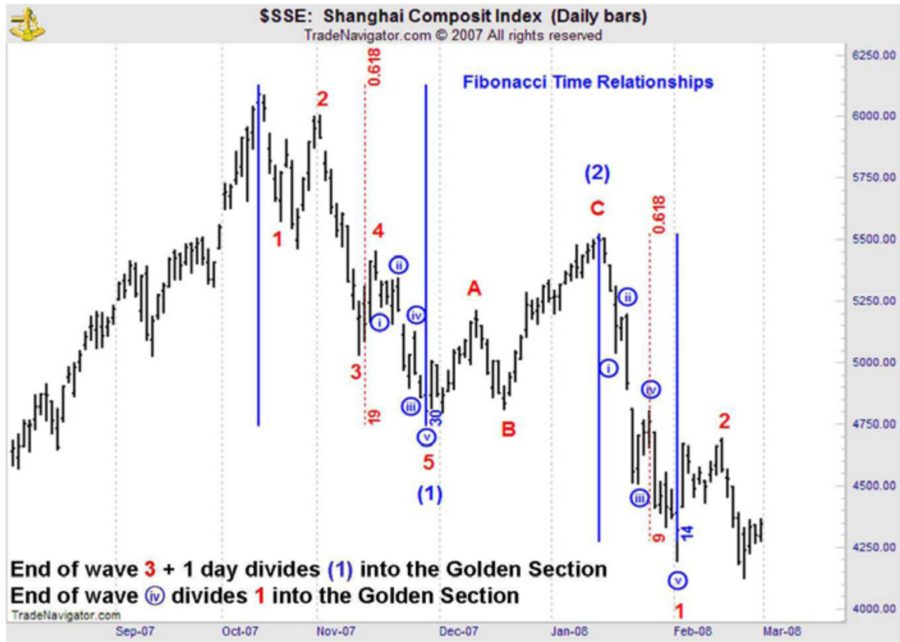
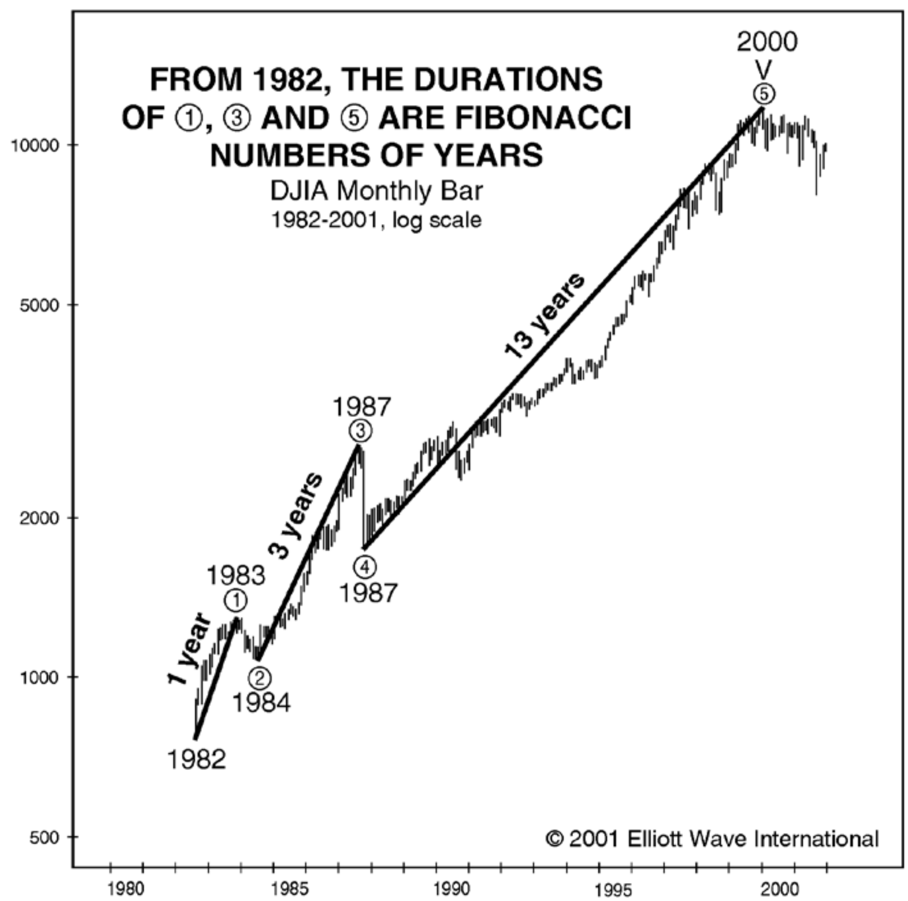


Figure 70
Let's look at some examples of this. I am coming back to the Shanghai Composite Index – it reflects some beautiful Fibonacci time relationships. Notice that at the bottom it says "End of wave 3 plus 1 day." We do allow, in looking at these relationships, a tolerance for plus or minus one day. So, in this case, end of wave 3 in red plus 1 day divides wave (1) into the Golden Section. We have .618 for waves 1 through 3 plus a day, and wave 5 plus one day is .382 of the total time. Now look at the wave pattern toward the right of the chart. The end of wave ⓘⓥ divides wave 1 in red into the Golden Section.



Note: For an additional example, see **Figure 71** of Wayne Gorman's online trading course "How You Can Identify Turning Points Using Fibonacci — Part 1."

Figure 72
We can also see time relationships in terms of number of years, as shown on this chart from *Beautiful Pictures*. Primary wave ① is one year; wave ③ up to the '87 high is three years; from the '87 low up to the 2000 high is 13 years.



Fibonacci Cluster

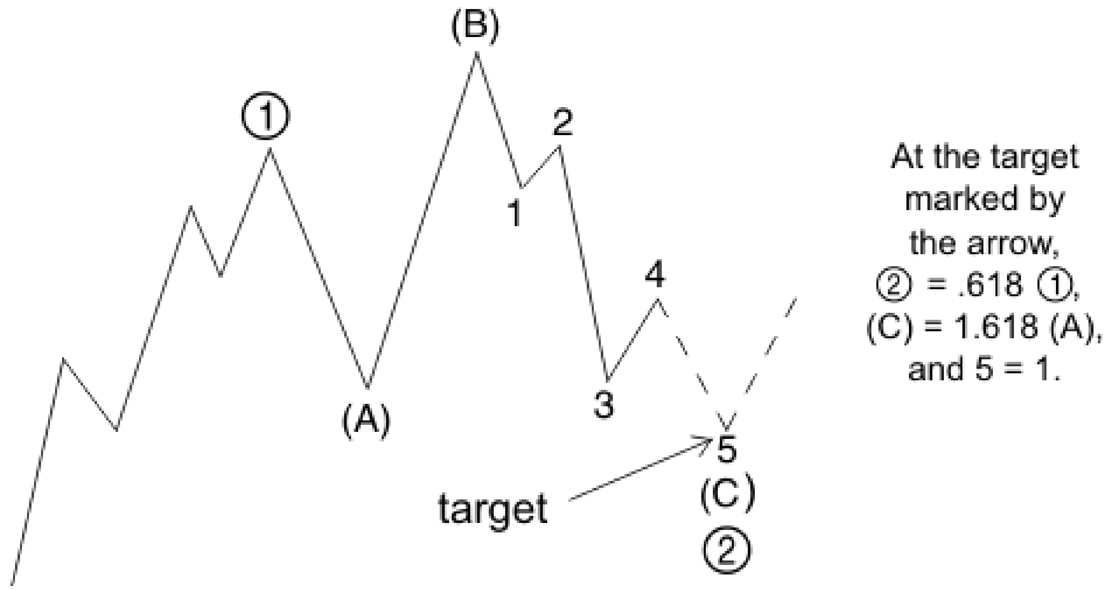


Figure 73

We looked at individual Fibonacci relationships, both in price and time. However, the way to really use this in an effective manner when you are trading, investing or forecasting is to look for more than one relationship. A Fibonacci cluster is where you see more than one Fibonacci relationship at a certain juncture, in terms of price or time. You should try to look for multiple ones to estimate price movements, turning points and stop levels.

In this example, we have wave ① and then a wave ② expanded flat. Wave ② makes a .618 retracement of wave ①, wave (C) equals 1.618 of wave (A), and 5 equals wave 1. They are all different relationships.

Chapter 4 Key Points:

- Time duration of waves seems to reflect certain Fibonacci relationships, whether it is the number of years, days, or months in a wave.
- We also see Fibonacci dividers with respect to time.
- Fibonacci time dividers in impulse waves: Wave 4 will commonly divide the entire time duration of the impulse wave into the Golden Section; if wave 5 is extended, then the larger time half (.618) will be equal to wave 5, and waves 1 through 4 will be .382; if there is no extension, then you can probably expect waves 1 through 4 to be .618 of the time duration, and wave 5 to be .382 of the time duration.
- A cluster of more than one Fibonacci relationship at a certain juncture in terms of price or time can help you estimate price movements, turning points and stop levels.

Summing Up with One Last Chart

I have added this last chart for you as a reference chart showing a number of Fibonacci relationships and to help me sum up what we have covered in this entire course:

- The Fibonacci ratio, represented by the Greek letter *phi*, Φ, is an irrational number approximating .618. It is also known as the Golden Ratio, found in nature, human biology, human thought and aggregate human behavior, such as the stock market.
- The Wave Principle is called a robust fractal governed by Fibonacci mathematics. Fractal means that it is similar in pattern at different degrees. A robust fractal means that it is similar but not exact.
- Sharp wave corrections tend to retrace 61.8% , 78.6% or 50% of the previous wave. Sideways or shallow corrections tend to retrace 38.2% or 23.6% of the previous wave.
- Subdivisions of impulse waves tend to be related by Fibonacci numbers .618, 1.00, 1.618 and 2.618. Of course, there are higher multiples after that, as you saw on one of the charts. Subdivisions of corrective waves tend to be related by Fibonacci numbers .382, .618, 1.00 and 1.618.

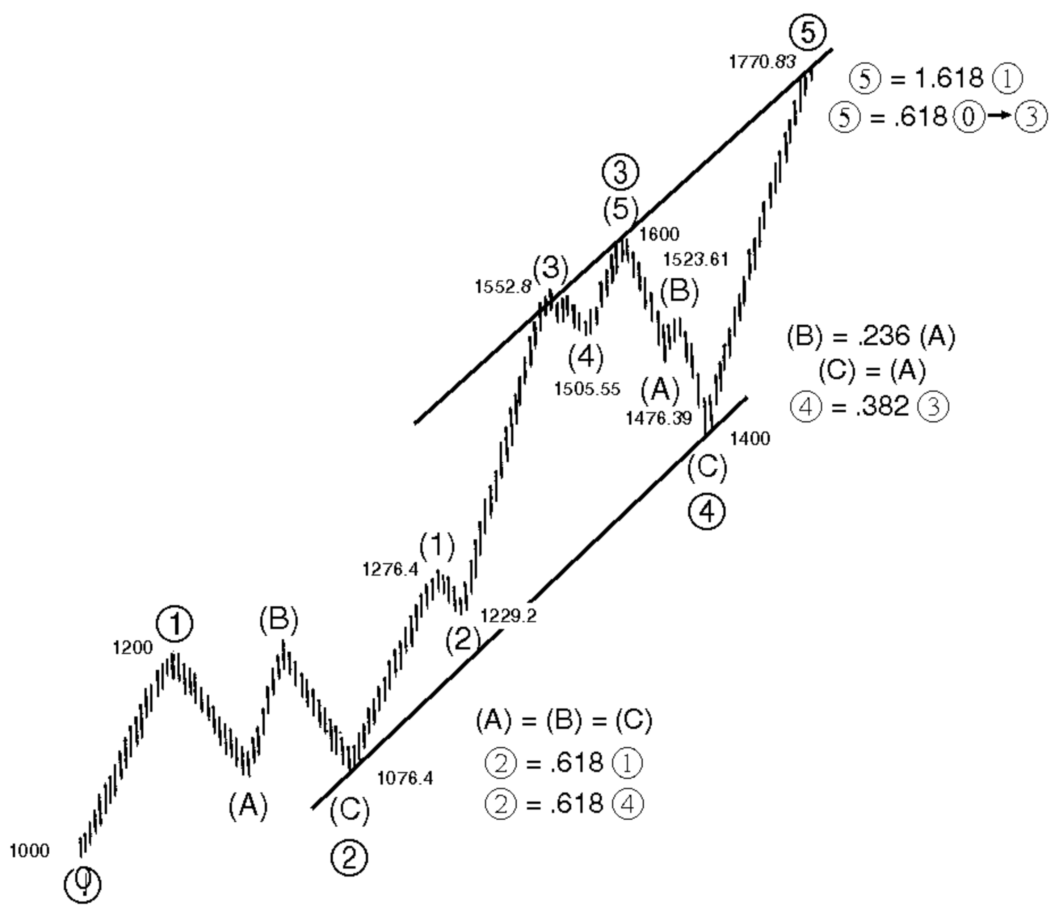


Figure 74

Chapter 5: Questions and Answers

Here are a few selected questions and answers that followed Wayne Gorman's original webinar presentation, "How You Can Identify Turning Points Using Fibonacci" on March 17, 2008.

Q: Usually the wave 5 target is estimated from the end of wave 4. But is measuring from the end of wave 3 an option when that wave 4 estimate fails?

Gorman: Absolutely. It's more common to try to project a fifth wave by using waves 1 through 3 and then projecting it from the end of wave 4. But you could also do it from the beginning of wave 4, which is basically trying to see if the end of wave 3 or the beginning of wave 4 divides the entire range, price range or time range into the Golden Section. So, by all means, yes. I would check a number of these.

Now, this raises an interesting point. Notice I didn't talk much about wave 3. I mean, if you know wave 1 and you feel wave 2 has ended, can you use these Fibonacci ratios to estimate wave 3? Well, you could take 1.618, multiply it times wave 1 and come up with an estimate. And a lot of analysts do that, but it's not so reliable. Wave 3 can be all over the place. So then you might say, "Well, then how am I going to estimate wave 3 using this?" The way you would estimate wave 3 is to come down a degree. If you know waves 1, 2, 3 within wave 3 or 1, 2, 3 and 4 within wave 3, then you can estimate wave 5 of wave 3 and, thereby, estimate the end of wave 3. Because, if you notice, most of the relationships have to do with wave 5 – unless we're talking about retracements, of course.

Q: You were saying to use log scale to identify the waves, but that sometimes it may be effective to use arithmetic scale. What goes into discerning which scale to use for the Fibonacci ratios?

Gorman: Well, you just have to try both. Certainly if you're on arithmetic scale, there's no ambiguity. If the chart is such that you're looking at log scale, I would start with the log values, and if you don't see anything there, then I might start looking at multiples and, lastly, the arithmetic values. You just have to look at all of them, and it's usually consistent either in one calculation or in the other.

Q: In regards to log scale, in your opinion are there any indicators that you wouldn't want to use log scale on?

Gorman: No, I don't think so. Whether you use log scale or not is a function of how wide the values are. So, again, going back to the example of the Dow and the stock market – I mean, if I'm looking at a chart from 1930 to 2008, I'm going to use log scale because, as I said, a 100-point move in the 1930s is not the same as a 100-point move today. And I wouldn't even be able to discern the chart unless I put it on log scale.

Q: Does wave 2 always retrace .618 of wave 1?

> **Gorman:** No, not always. It's common. It's something to look for, but you might see 50%. You might see .786. The key is that second waves are deep, and so you have to look for .618 or .786. Fourth waves are normally shallow.

Q: Is the ratio of .786 used mostly with corrective structures?

> **Gorman:** Yes. Most the time, when we're using .786, it's retracements in corrective structures.

Q: Let's say wave 1 starts at a value of 10.15. Can wave 2 retrace to that same value of 10.15, and wave 1 still be considered as such?

> **Gorman:** No. The exact rule is that wave 2 must retrace less than 100% of wave 1. And that is also stated in *Elliott Wave Principle*, the book by Frost and Prechter. Normally, people will say wave 2 cannot go beyond wave 1. But to eliminate this ambiguity if you really want to be exact about it, wave 2 must retrace less than 100% of wave 1.

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How You Can Identify Turning Points Using Fibonacci

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