"What can be more foolish than to think that all this rare fabric of heaven and earth could come by chance, when all the skill of art is not able to make an oyster."

—Jeremy Taylor

7 *The Rhythm of Production*

Several years ago the distinguished author Jim Bishop, in a *Playboy* interview, called attention to the number of coincidences in the lives and deaths of Abraham Lincoln and John F. Kennedy.

At 7:30 A.M. on Friday, November 22, 1963, five hours before he was shot in the back of the head, Mr. Kennedy told Kenneth O'Donnell, his appointments secretary, that anyone who wanted to exchange his life for the life of the President could do it. At 4:30 P.M., Friday, April 14, 1865, five hours and forty-five minutes before he too was shot in the back of the head, Mr. Lincoln said to his bodyguard, Major Crook, in reference to a possible assassination, "I know of no one who could do it and escape alive. But if it is to be done, it is impossible to prevent it."

In each case, as Bishop noted, death came on Friday; the assassin was a political malcontent; the wound was in the back of the head; the President's wife was at his side when it happened; and the President was succeeded by a southerner named Johnson.

Lincoln and Kennedy were both elected President exactly fourteen years after having been elected to Congress; Booth shot Lincoln in a theater and Oswald was captured in a theater. Both assassins were shot to death before coming to trial. When Lincoln was buried, his son Robert moved to 3014 N. Street in Georgetown. When Kennedy was buried, his son John lived at 3014 N.

economic affairs, we touch a nerve that initiates unusual reaction and definite rejection from a large group, especially economists. One of this group, who was chief economist for one of our large corporations, stated the case for his fellow economists when he said, "If what you say is true, then all I have ever learned about economics is wrong, and my life's work is tumbled like a house of cards. I simply cannot afford to accept anything of the sort."

This gentleman also taught our young at one of our large universities. Perhaps his attitude is a microcosm of university teaching attitudes in general, a fact that our youth has been trying desperately to call to our attention.

I remember another remark from one company's executive vice-president. "I believe you really have something," he said, "but I wouldn't want my people to know I took stock in anything like this or I'd never hear the end of it."

I was reminded of this gentleman's comments one evening when I read a thirteenth-century commentary about the compass in *A Short History of Science* by Sedgwick, Tyler, and Bigelow: "No master mariner dares to use it lest he should be suspected of being a magician; nor would the sailors venture to go to sea under the command of a man using an instrument which so much appeared to be under the influence of the powers below."

Cycles, in spite of those who have buried their heads in sand, do exist in economic affairs, and because of our country's concentration and worship of material things there are more statistics and data available to us in economics than in nearly any other area of study, although this is a small part of the whole field of cycles.

Let me proceed by showing you a representative sampling of cycles in the physical production of goods and services. These have been selected from the Foundation's monthly magazine, *Cycles,* which since 1950 has kept its members abreast of possible cycles in hundreds of phenomena ranging from war to the price of eggs.

My presentation may be somewhat unusual. Ten physical-production cycles from various industries will be shown, but only as they appeared when they were published originally in *Cycles.* The graphs presented for your consideration are the graphs that accompanied each original article, some extending back to the early 1950's. No attempt has been made to bring these graphs and their

cycles up to date. In most cases we had placed the cycle "on the table" for our members and then went on to other probings. My comments on each cycle will be excerpts from my comments accompanying the original article, for to include the full articles would fill nearly half this book.

Before we begin, let me anticipate one tantalizing thought that may have occurred to you. Am I not doing exactly what I gently chided Jim Bishop for doing in his Kennedy-Lincoln coincidences? By showing you just ten cycles in physical production, am I not marshaling those rhythms that will best prove my case while ignoring those that will not? No—for two reasons.

First, each cycle by itself presents evidence of rhythm that usually goes well beyond the area of mere chance, as you will see for yourself. Second, the ten cycles you will see represent only a microscopic portion of the cycles and alleged cycles from the Foundation's files at Pittsburgh. These few were selected because each has characteristics unique to itself, and they have been limited to ten so that our point can be made quickly and effectively. Many others will be placed "on the table" for your inspection as our investigation continues.

Now, as the auditors say, let's check the files.

The Six-Year Cycle in Orders Received by General Electric

Cycles, September 1950— "For more than 50 years the orders received by the General Electric Company have fluctuated in a rhythm of about 6 years in length [see Figure 16]. Through wars and depressions, in spite of changes in management and changes in the nature of the business, the rhythm has persisted.

". . . This rhythm has consisted of ten waves, clearly visible in the raw or unmanipulated figures.

". . . A rhythm of this length is very common in American industry. Of thirty companies studied it is present in the sales and production of twenty-five. A rhythm of similar length is present, on the average, in each of six 100-year sections of tree-ring measurements; it has been alleged to be present in the alternate thickness and thinness of rock strata; it is present in barometric pressure in New York City and it is clearly present in sunspots with alternate cycles reversed.

". . . This rhythm is significant because of the number and regularity of the waves. If it continues as in the past 57 years it is something well worth taking into account in trying to predict the future, not only of the General Electric Company, but of the country as a whole."

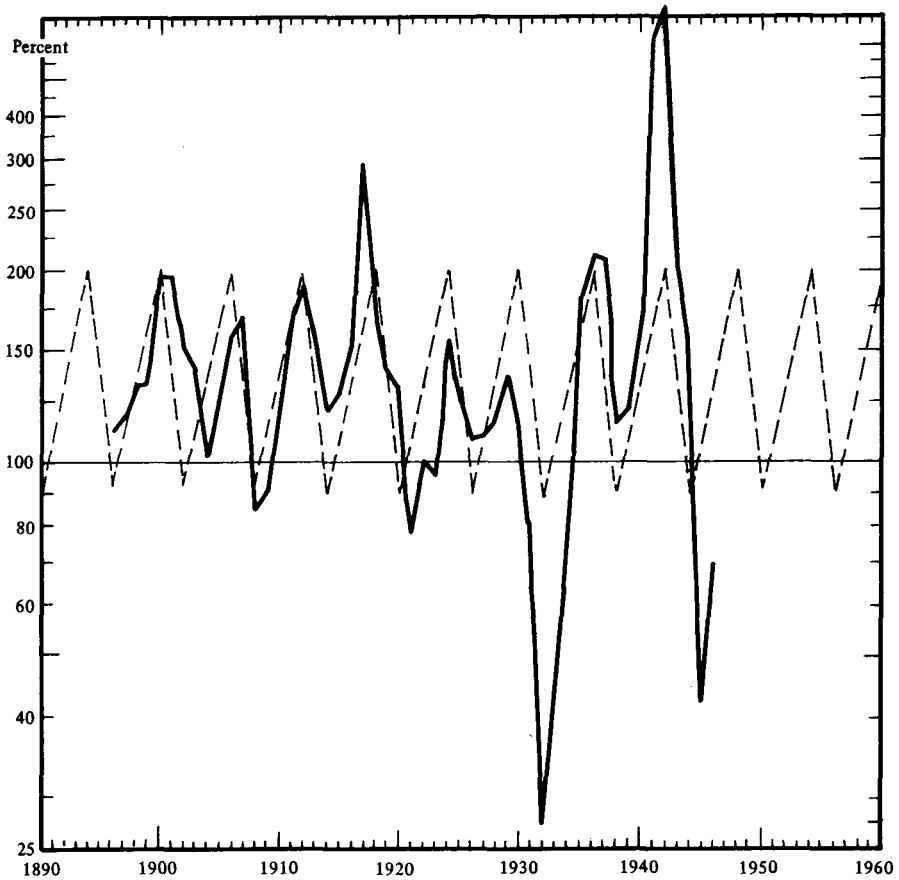

Fig. 16. The 6-Year Cycle in General Electric Orders Received, 1896–1946

The 5½-Year Cycle in Airplane Traffic

Cycles, December 1950– "Mr. Albert J. Kapteyn of East Hartford, Connecticut, a former airlines engineer at Pratt and Whitney, has called my attention to a 5½-year cycle in airplane traffic in the United States [see Figure 17].

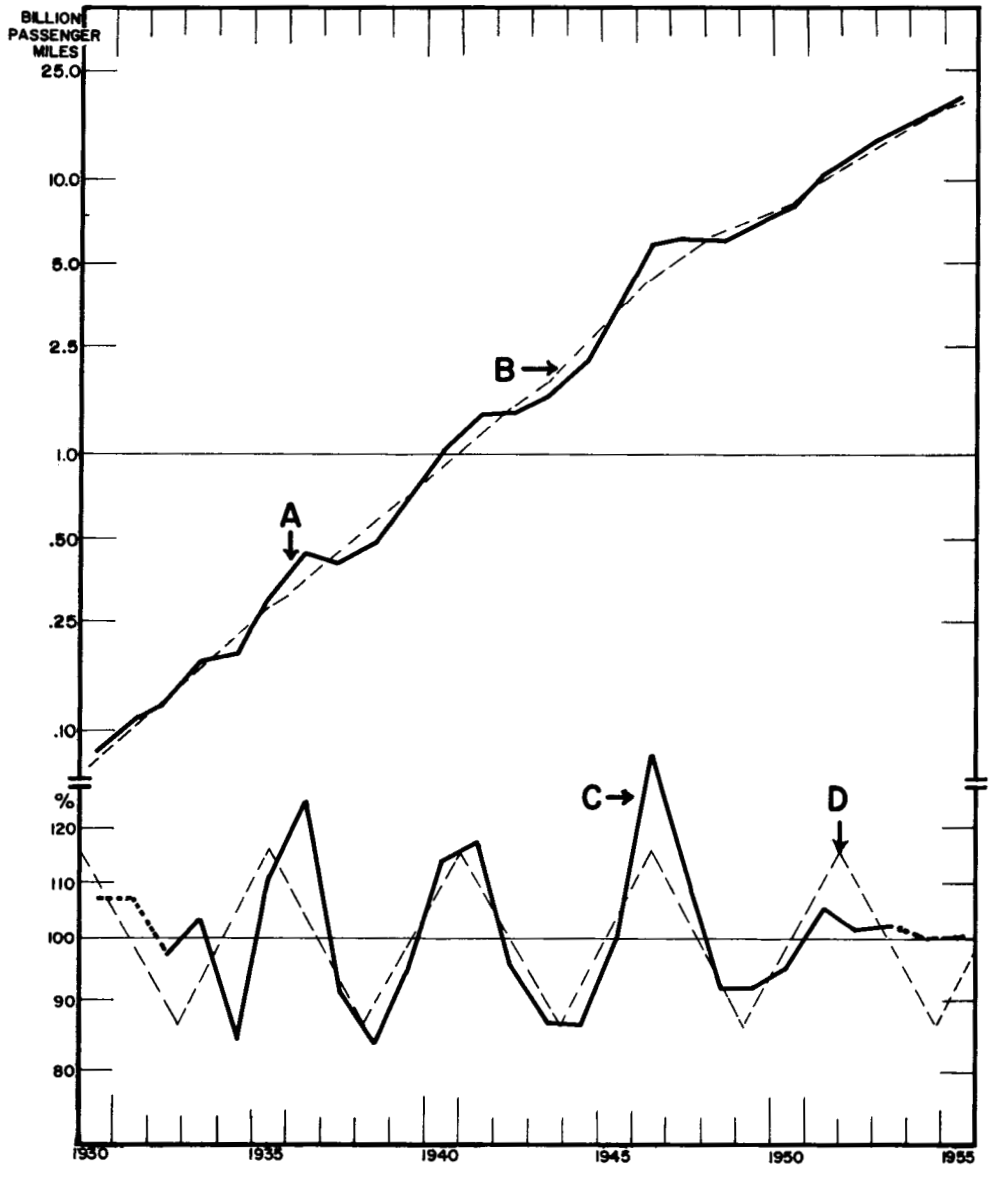

Fig. 17. The 5½-Year Cycle in Airplane Traffic, 1930–1955

Upper portion shows growth (solid line) and trend (broken line). Lower portion shows amounts above or below trend and an obvious cycle approximately 5½ years in length. With so few repetitions there is no assurance that the cycle will continue; however, it cannot be ignored since a cycle of similar length has been discovered in many other phenomena.

Street in Georgetown. Both widows declined with thanks all invitations to the White House. Both widows could speak French.

Bishop also pointed out many more correspondences of a general nature such as courage, concern for the rights of the Negro, and such personal characteristics as wit. He says, "The parallels between the 16th President and the 35th run deep, beyond the credibility of the word *coincidence.*"

His implication was obvious. The coincidences he had discovered, in his opinion, were more than *mere* coincidences. They had special significance or meaning.

If Jim Bishop is correct, the significance he implies is occult or mystical. It is neither statistical nor scientific.

What is the difference?

First of all, there is nothing wrong with coincidence from the scientific point of view. If you combine two parts of hydrogen and one part of oxygen, you get water. If you try this experiment again, you get the same result, a coincidence. A third try and you get water again, a second coincidence. After a sufficient number of coincidences, science will accept this behavior as the way things act.

What then are the differences between the coincidences that Bishop spoke of and those accepted by science? Basically there are two. First, science will accept as meaningful those coincidences that will enable you to predict. You can predict with complete accuracy that when you mix two parts of hydrogen with one part of oxygen you will get water. Second, science will accept as meaningful those coincidences that will lend themselves to statistical evaluation.

Bishop's coincidences do not enable you to predict. The fact that Lincoln and Kennedy were both followed by men of the same name did not enable us to say that Lyndon Johnson would be followed by a man named Grant. The fact, if it is a fact, that Eliza McCardle Johnson could speak German did not enable us to predict that Lady Bird Johnson would have this same skill. The fact that both Lincoln and Kennedy were shot between five and six hours after speaking of the ever-present possibility of assassination does not enable us to predict that any future President might experience a similar fate should he make a similar remark.

Nor can Bishop's coincidences be evaluated statistically, which, in fairness to him, was probably not his intent anyway. For to evaluate something statistically you need to know the number of *noncoincidences* as well as the *coincidences* so that you can compare one with the other.

For example, using imaginary facts, it may be that Kennedy had three buttons on his jacket while Lincoln had four; that Kennedy had eggs and bacon for breakfast, Lincoln, oatmeal; and that, on the morning of the fateful day, Kennedy showered while Lincoln merely sponged.

The point is that out of millions and millions of facts, known and unknown, the investigator selected only those that fitted into the picture he wanted to paint. We do not know how many instances existed where there was *no* correspondence between the two Presidents. Without such knowledge, statistical and scientific evaluation is impossible.

Now let us apply all of this to cycles.

We too deal with coincidences, but they are of the scientific kind, not the mystical or occult. They are scientific simply because they can be used as a basis for prediction and because they can be evaluated statistically. When cycles have repeated enough times with enough dominance and enough regularity we have a firm basis for making predictions.

A young man once asked his father, "How do we know the sun will come up tomorrow?"

His father answered, "Because it always has!"

How different this is from Bishop's coincidences.

If the young man's question had been slightly different, if he had asked, "How do we know the sun will shine at noon tomorrow?" the father, mindful of eclipses, might have answered that it *probably* would because it *almost* always did. Prior to the sixth century B.C., that is as far as he could have gone in his prediction. However, after the Babylonians learned to predict eclipses, he could have answered with assurance, one way or the other.

In modern economic-cycle study, which we will begin to deal with in this chapter, we are about where the astronomers were before the Babylonians. We know about the cycles but we don't know, in advance, with *certainty,* when they are going to come

early or late. Like the evening grosbeak on his biannual return to New England, we're not even sure if the cycle will appear at all every time that it is due. To know all this, in advance, is the next great step forward.

The second difference between our coincidences and Bishop's (our ability to predict, although admittedly only partially, being the first difference) is that we know, or can learn, all the coincidences that are *not* present in a series of figures we are examining, as well as those coincidences that *are* present. Thus we can measure the significance of the coincidences that interest us.

If every single fact of Kennedy's life, Lincoln's life, your life, my life, and a score of other lives could be recorded, there would doubtless be many coincidences shared by Kennedy with each of us. From the scientific point of view the question then would be, are the coincidences shared by Kennedy with Lincoln more numerous than the coincidences shared by Kennedy with any of the rest of us, or by each of us with each other? If so, are they more numerous *enough* to mean anything?

Obviously a comparison of this sort cannot be made in this case, but it is possible to do so in cycle study. To oversimplify the matter, you can find the best cycle (succession of coincidences?) in a real series of figures, for example, sugar prices. You can then randomize these figures, scramble them again and again, and look for the best cycle in each new series of figures you obtain. This will enable you to count how many scrambles it takes you to obtain, by chance alone, a cycle as good as the one you had discovered in the actual sugar prices with which you began. If it takes a hundred tries, you will know that your original sugar-price cycle could not be the result of a chance arrangement of the figures more often than once in a hundred times. Thus it is a fairly strong assumption that the cycle you found in sugar prices is meaningful.

The Mysterious Pendulum of Production

It is fairly easy to accept the notion of cycles in plants, animals, and even human beings, for many of these are well known and accepted by biologists and physicians.

But when it comes to the matter of meaningful cycles in

"Airplane traffic is measured in billions of passenger miles. Figures are available from 1930 and are plotted as Curve A [remember all lines on graphs are called "curves" even if they are absolutely straight]. . . . The tendency for growth to be more rapid at intervals of about 5½ years is evident by inspection.

"Curve B shows a 5-year geometric moving average trend of Curve A. The two values at each end are estimated. Curve C shows percentages above and below trend. Curve D is how a perfect 5½-year cycle (a periodicity) would look.

". . . With a series as short as this we have had time for only about five repetitions of this cycle, not many on which to base judgment in regard to its significance. However, a 5½-year cycle is well established in other things. It was discovered in corn prices in 1875 and has been coming true ever since and cycles of about this length have also been found in European weather, cotton prices, pig iron prices, sunspot numbers, and the sales of at least two manufacturing companies.

". . . By adjusting for the effect of this 5½-year cycle we can get a more accurate estimate of the fundamental underlying growth trend than we can get in any other way."

The 6.4-Year Cycle in Aluminum Production

Cycles, January 1963— "The Foundation for the Study of Cycles has uncovered a 6.4-year rhythmic cycle in aluminum production [see Figure 18]. . . . This rhythm has repeated twelve times during the 78 years that we, in the United States, have been producing aluminum. It characterizes and dominates the variations of this activity.

". . . Growth is a characteristic of this industry. From 1885, when we produced less than 500 pounds, to 1962, production has increased eight million fold! Our interest in growth is because growth is the underlying structure around which the cycles oscillate. But our concern is primarily with the cycles.

". . . The fluctuations recur with regularity [as you can see in Figure 18]. That is, they *tend* to conform to a perfectly regular pattern that can be fitted to them . . . in this instance, an ideal pattern that repeats regularly every 6.4 years.

"A great many other things besides aluminum production are

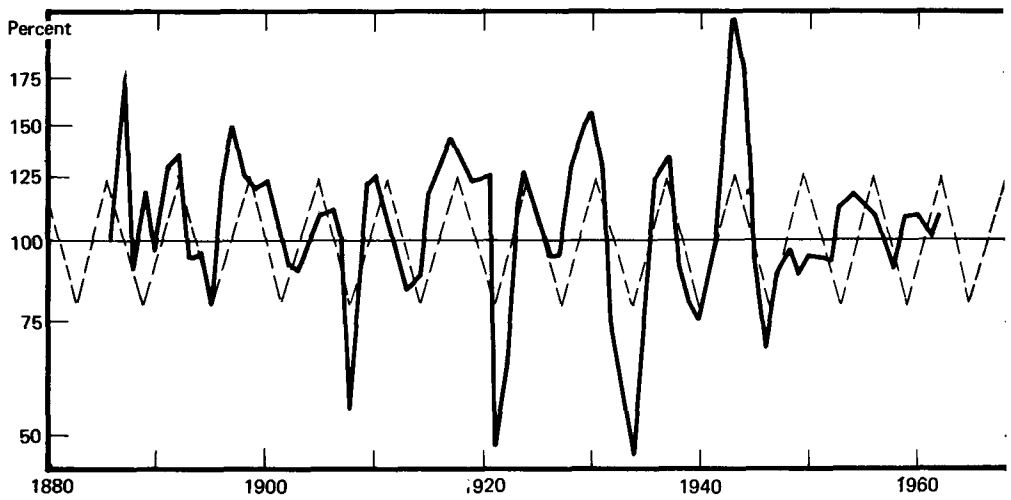

Fig. 18. The 6.4-Year Rhythm in Aluminum Production, 1885–1962

alleged to have rhythmic cycles of about 6.4 years in length. In the economic field we have a cycle of about this length in the liability of commercial and industrial failures, in the unit sales of General Motors passenger cars and trucks, in pig iron prices, in cotton prices, in rail stock prices.

"Are these cycles all one and the same? Only very accurate measurements will tell. If they are the same, is this mere happenstance, or is there some relationship?

". . . At all events, with this strong and important rhythm in aluminum production, we have one more example of the almost universal presence of rhythm in the world around us."

The 18⅓-Year Cycle in Real-Estate Activity

Cycles, February 1959— "Real estate activity in the United States has fluctuated since 1795 in a very regular cycle slightly over 18 years long. Whether the real estate people realize it or not, this cycle has been the basic fact of life in the real estate business. The graph [Figure 19] shows an ideal 18⅓-year cycle by means of a broken line and compares it to the actual Index of Real Estate

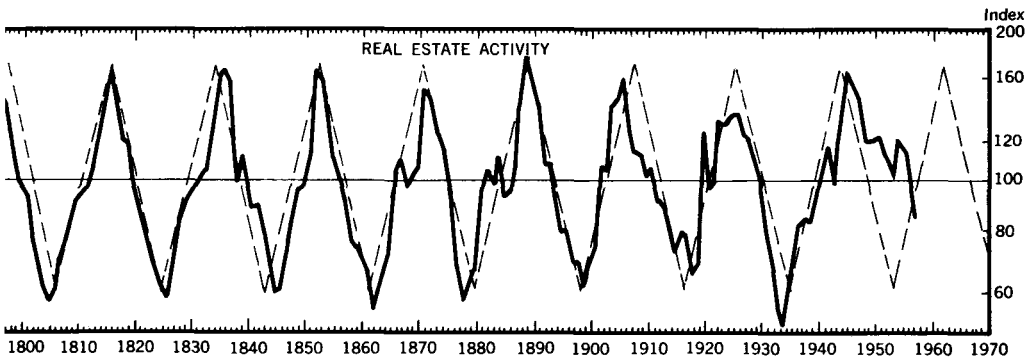

Fig. 19. The 18 1/3-Year Cycle in Real-Estate Activity, 1795–1958

Data are for January of each year.

Activity. The Index is expressed as a percent of normal with the 'normal' level of real estate activity as a horizontal line at 100 and the fluctuations shown above and below this line. This information is from Roy Wenzlick & Company who publish it regularly in *The Real Estate Trends.*

". . . From 1795 through 1946 there were eight repetitions of the 18⅓-year cycle. The experience covers a time span of 150 years and the waves are too clear and regular to be denied or ignored. However, in view of the current picture, this cycle should be reviewed yearly and should not be relied upon until it is again clearly on the track."

The Eight-Year Cycle in Cigarette Production

Cycles, April 1962— "From 1879 through 1958, cigarette production in the United States has been characterized by a rhythmic cycle with a wave length very close to 8 years in length [see Figure 20]. According to the test of significance developed by J. Bartels, this behavior could not be the result of chance more than 3 times out of 100. [Bartels, a German mathematician, developed a method of computing the odds of any cycle occurring by chance.]

"In the actual data, this rhythm has usually expressed itself in

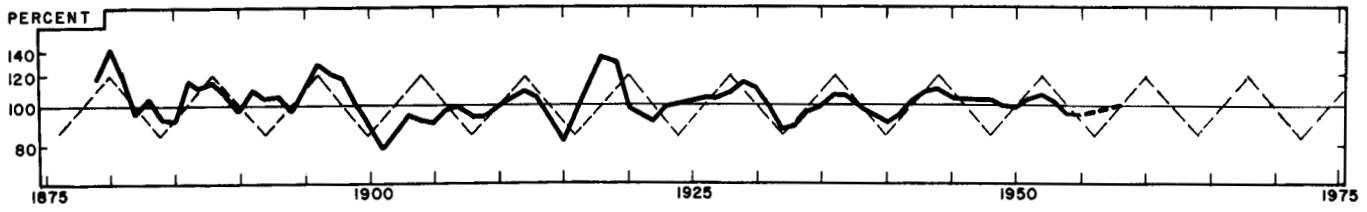

Fig. 20. The 8-Year Cycle in Cigarette Production, 1879–1958

changes in the rate of growth. Growth is first rapid, then less rapid. The reason for this rhythmic behavior is unknown.

". . . 8-year rhythms are present in many other phenomena and these other 8-year cycles tend to crest at more or less the same time. Could there be a common cause for some of these various behaviors?"

The Six-Year Cycle in Steel Production

Cycles, June–July 1955— "The production of steel ingots and castings from 1874 through 1947 has been characterized by a 6-year rhythm [see Figure 21]. This rhythm has repeated enough times and with enough regularity so that it cannot be the result of random forces.

". . . Steel production is rather complex and the 6-year cycle is only one of many tendencies. Note that the 6-year cycle tends to fade out in the period 1890–1905. It looks as if it might be starting to fade out, again. If so, we can expect, based on the 1890–1905 precedent, about three rather poor 6-year cycles after which the 6-year cycle can be expected to reassert itself.

"A cycle which gradually fades out and then reappears can be the result of the influences of another cycle, slightly longer or slightly shorter than the cycle which fades. I suspect that such a cycle is present in steel production. I shall investigate it and tell you more about it in another article. I shall also tell you about other cycles present in this series of figures. You need to know about several cycles before you are in a position to do any forecasting."

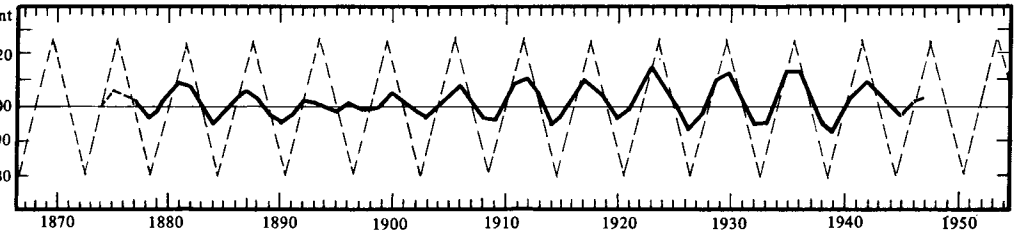

Fig. 21. The 6-Year Cycle in Steel Production, 1874–1947 (Randoms Removed)

The Thirty-Three-Month Cycle in Residential Building Construction

Cycles, August 1956—"The 33-month cycle in residential building construction has continued for six and a half cycles since it was discovered by Cornell economists over 17 years ago.

"The chart [Figure 22] is in two sections. The left section is taken from *Farm Economics* of February, 1939. The right section is based on the F. W. Dodge Corporation's valuation of residential building construction contracts awarded in 37 states and has been drawn with a heavy line to indicate that the behavior unfolded *after* the discovery of the cycle.

". . . Note the major distortion during the war period and the gradual return to normal after the war's close . . . picking up the old rhythm again. Why?"

"The 33-month cycle is one of the best substantiated cycles in our files. There is no doubt in my mind as to its significance."

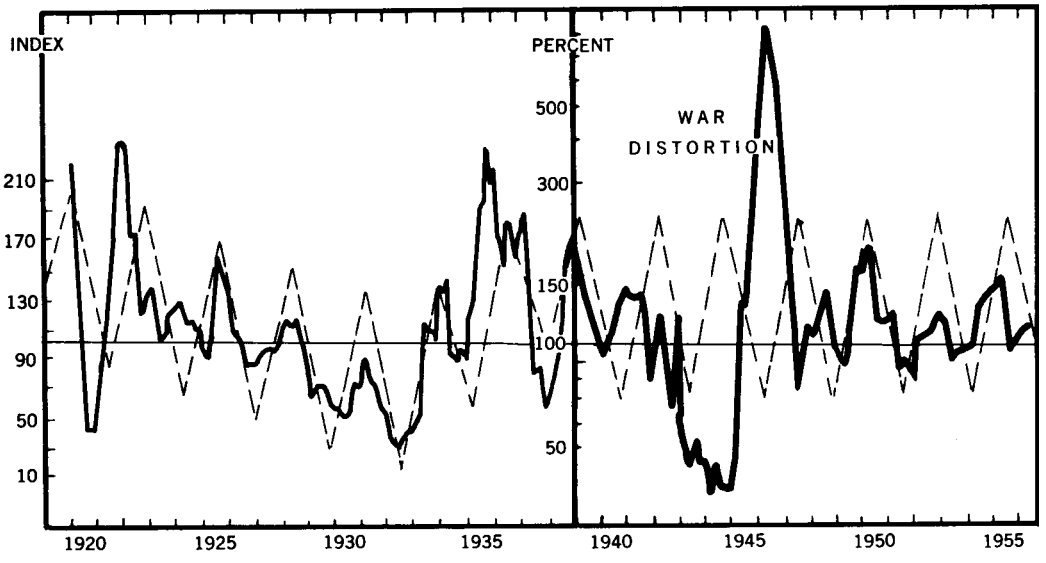

Fig. 22. The 33-Month Cycle in Residential Building Construction, 1920–1955

Solid line indicates percentage up or down from the same month of the previous year.

The 9.6-Year Cycle in Wheat Acreage

Cycles, May 1951— "We are happy to announce the discovery of a cycle of about 9.6 years in length which has been present in the acreage of wheat in the United States from the earliest figures, 1868, to the present [see Figure 23]. The recurrence of this cycle over the span of 85 years, and the strength and regularity displayed, made this cycle an important factor for agriculturalists involved in our great multi-million dollar wheat industry.

"As nearly as I can determine in a series of this length and regularity, the length of this cycle is 9.6 years. [Remember the Canadian lynx, and the salmon . . . and the deaths from heart disease?]

"The pattern was badly distorted just prior to and during World War I, but with World War II there was no distortion."

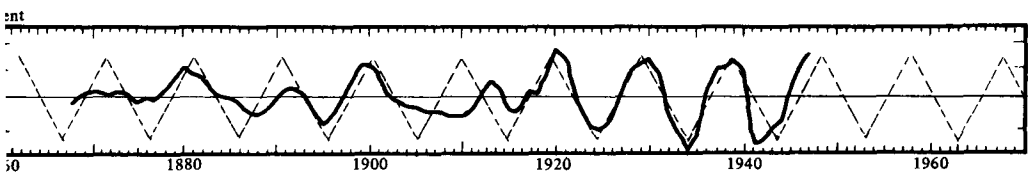

Fig. 23. The 9.6-Year Cycle in Wheat Acreage Harvested, 1868–1947

The 9.03-Year Cycle in Insurance Sales

Cycles, March 1967— "Ordinary life insurance sales have risen consistently, year-by-year, since 1949. In 1965 sales totalled over $89 billion. [Since any professional insurance man refers to his sales as his "production," we bow to his categorization and include insurance sales in our sampling of cycles in economic production.]

"A statistically significant 9.03-year cycle has been present in the sales record of ordinary life insurance since 1858, the first year of record [see Figure 24]. This cycle is not only statistically significant, which makes it important to cycle study, it is also prominent enough to exert an important effect on insurance sales which makes it important to the insurance industry."

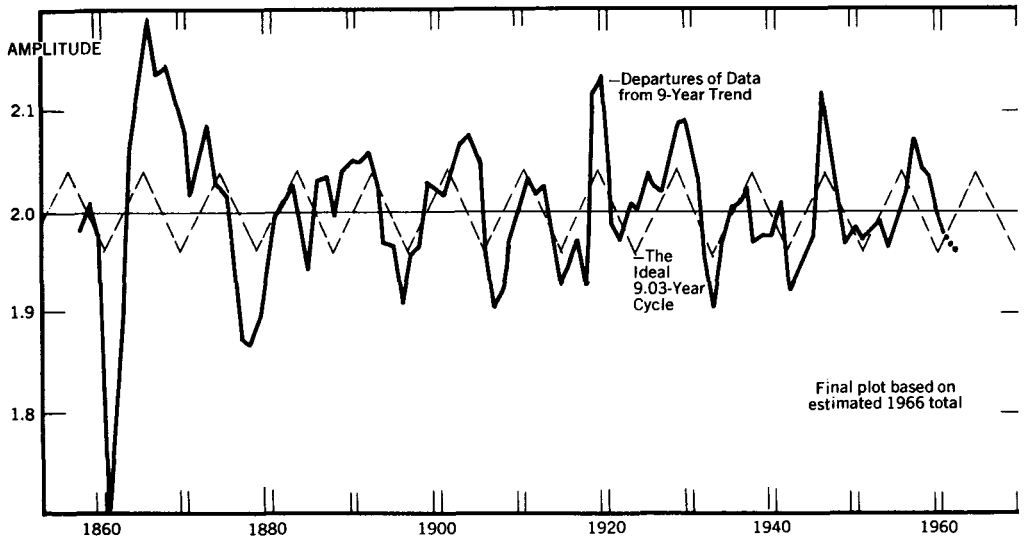

Fig. 24. The 9-Year Cycle in Life-Insurance Sales, 1858–1962

The 9.18-Month Cycle in Ton-Miles of the Canadian Pacific Railway

The Canadian Pacific Railway cycle was first announced in *Cycles* in a long article in its June 1951 edition. Rather than include many excerpts I will tell you the story, briefly.

Mr. G. Meredith Rountree was the Canadian Pacific Railway's chief statistician in the 1940's. In 1942 his company dispatched him to the Foundation for the Study of Cycles to make a study of the rhythmic fluctuations that might be present in their business. He worked at Foundation headquarters for approximately one year and his findings are a milestone in cycle research.

His work involved ton-miles, the number of tons of freight carried multiplied by the number of miles each ton is hauled. Like most railroads, the Canadian Pacific's freight business was somewhat seasonal. Mr. Rountree first removed the distortion of this seasonal business from his monthly figures, which were available back to 1903. The remaining data produced an unbelievable cycle that marched across his graph paper with *forty-nine repetitions* averaging 9.18 months per cycle (see Figure 25). This rhythm continued through World War I, stumbled twice between 1920 and 1925, picked up the cadence again until 1934, stumbled again, then corrected its step, and marched right up to World War II.

During World War II the cycle almost vanished, in contrast to World War I, but after the war it reasserted itself on the *same time schedule, same wavelength, and same calendar timing as*

before the war! One cannot conceive of finding a pattern as regular as this, repeating so many times, in random numbers.

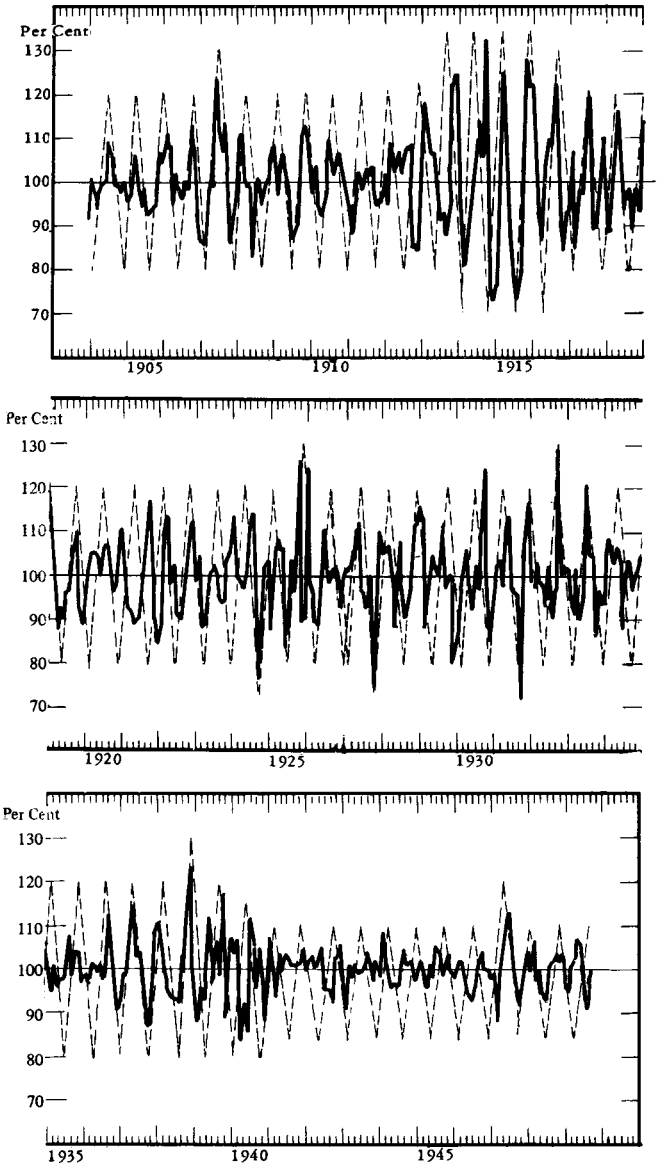

Fig. 25. The 9.18-Month Cycle in Ton-Miles, Canadian Pacific Railway, 1903–1948