

COSMIC PATTERNS

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INTRODUCTION

This book deals with one of the most controversial questions in the field of solar system science: **Do the planets play a part in the development and behavior of sunspots and magnetic storms?** The author, who has spent almost 30 years doing detailed research in this field, has produced very strong evidence that the **planets do**, when in certain arrangements, cause changes in the particular solar radiations that are associated with magnetic storms in the atmosphere of the earth.

John Nelson was employed to study sunspots by RCA Communications, the largest shortwave radio communication organization in the world, because sunspots were believed to be the cause of magnetic storms which from time to time would disrupt shortwave radio communications. The shortwave radio industry needed a reliable magnetic storm forecasting service so that advance preparations could be made for these periodic disruptions. (There were steps that could be taken by communications engineers to alleviate the effects of the magnetic storms on the shortwave radio circuits and for this reason a reliable forecasting service for the industry was needed.)

In 1946, when the author was assigned to do research for RCA on this subject no reliable forecasting system existed, although other researchers, both in government and observatories, were working on the problem. Little or no progress was being made, and what forecasting services were available at that time were not adequate for RCA's requirements. Therefore it was decided that an attempt should be made to develop a forecasting service within the company that would be tailor-made for their own requirements.

During the first two year period of intensive, but unrewarding, sunspot research, a two-way mutual assistance program was arranged between RCA Observatory in New York—which housed a very good six-inch refracting telescope—and several ionospheric-magnetic research centers in this country and abroad. This mutual assistance program entailed the exchange of detailed data and also periodic visits between the author and members of these organizations. The cooperative spirit of assistance and data exchange which began in the early period of this research program has continued to the present without interruption. During the International Geophysical Year which began on July 1, 1957 and lasted until the end of 1958, the cooperation between RCA Observatory and those several centers of research was far beyond the call of duty on both sides.

After about two years of careful research with both sunspots and magnetic storms Mr. Nelson concluded that sunspots were only a small part of the answer. It was evident to him that some natural forces besides sunspots were in some way involved in the phenomena he was studying. He read everything he could find relating to the subject of sunspots and magnetic storms and came into contact with material that led him to the thought that perhaps the planets, as they circled the sun in their never-ending journey through space, were a part of the answer. He then turned to this approach and researched the subject in depth. The results were very gratifying and within a few years he was able to build a satisfactory forecasting service for RCA and numerous other shortwave communications facilities throughout the world, based upon a study of sunspots combined with planetary interrelationships. This book explains in great detail the methods he used.

In April 1951, RCA released to the news media a detailed account of Mr. Nelson's research regarding the planetary position effect that he had found. This news release generated considerable interest among those in the field of astronomy, but with mixed reactions. Some astronomers were favorably impressed while others reacted with skepticism.

One prominent astronomer who went to see Mr. Nelson was quite skeptical and typified the astronomers' opposition. He argued that the planets were too small and too far from the sun to possibly have any effect upon its behavior. Mr. Nelson countered this by saying that he agreed the planets had very little, if any, effect upon the main body of the sun but that they could have considerable effect in the solar atmosphere where sunspots existed. Here, in the very unstable electrified area of the sun's surface, a very small force from the planets could produce an avalanche effect and create turbulence in the solar atmosphere which resulted in solar storms and sunspots.

Mr. Nelson had expected a reaction from the world of astronomy that would be both pro and con but he was totally unprepared for the reaction that came from the world of astrology—this, he says, came as a complete surprise to him. In the January 1974 issue of the *Saturday Evening Post* there is an article on astrology in which the writer states that with this news release Mr. Nelson immediately became the darling of astrologers all over the world.

It was not long after the 1951 news release that Nelson learned there had been quite a battle going on between the astronomers and the astrologers for generations and that he was right in the middle of it. He decided at this point that he would be friendly and cooperative to both the astronomers and the astrologers and take a neutral stand, a position he has maintained through the years. He has lectured on numerous occasions during the past 25 years to astronomers, amateur astronomers, radio engineers, and amateur radio operators. He has also lectured to science classes in both high schools and universities, and to several astrology clubs. (During the question and answer period following one of his lectures to an astrology club he was asked by a reporter if he believed in astrology. He answered that he had never studied astrology and was therefore not qualified to believe or disbelieve in the subject.)

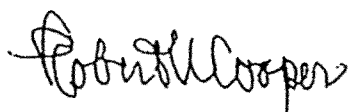
Probably his most important lecture was to a group of NATO communications engineers and scientists at the University of Naples, Italy in May 1961. His trip to Naples was

sponsored by both RCA and NASA and was the result of a request from NASA asking Mr. Nelson to write a formal paper for delivery at this very important meeting.

Mr. Nelson has also written numerous articles describing his work for various technical journals and magazines. He wrote one article for an astrology magazine.

The Foundation for the Study of Cycles in 1952 presented Mr. Nelson with a gold medal for his work in the field of radio propagation. The foundation maintains a file on him which contains not only his research material, but letters of commendation from the many people Mr. Nelson has served throughout the world.

Because of the well-known success of the forecasting system derived from the planetary position approach, and its usefulness both to astronomers and users of the forecasts, the opposition of the astronomers dropped to negligible proportions after a few years. Nelson has been under considerable pressure from various groups to produce an extensive report on his work rather than the periodic progress reports that he has made from time to time in the form of formal papers. This book is the result, and it is hoped that it will generate enough interest in the subject to prompt other researchers to investigate the area further.



Executive Secretary
American Federation of Astrologers

CHAPTER 1 Introduction to Sunspots, the Ionosphere and Shortwave Radio

Sunspots were first observed in a systematic manner (by telescope) about 200 years ago and since that time have been a source of wonderment to both professional astronomers and laymen. This situation hasn't changed much, although today with the development of highly sophisticated instrumentation and years and years of research we do know a great deal about them. We do *not* know why the sun has spots on it, and we do *not* know for certain what a sunspot really is. However, we have learned much about the behavior of sunspots and how they manifest their existence by causing changes in the magnetic field and in the ionosphere which surrounds our earth. We know that they **discharge electromagnetic particles** into outer space and that when these particles impinge upon the magnetic field of the earth, the **ionosphere becomes** disturbed, which in turn creates a disturbance in shortwave radio communications throughout the world, usually referred to as a **magnetic storm**.

Severe magnetic storms not only affect the ionosphere but also cause earth currents in old-fashioned undersea cables, and in telegraph lines and power transmission lines. So we see that sunspots actually do have an effect on the life of man upon this earth.

We know that sunspots come in cycles and that the principal cycles are approximately 11 and 22 years. But there are shorter cycles and longer cycles, both of which modulate the regular cycles causing them to be either higher or lower than normal. We also know that sunspots have a **polarity**, and that

the sunspot which leads a group in the northern hemisphere will have the opposite polarity of a similar group in the southern hemisphere. And we know that when one cycle dies out and the next cycle begins, the sunspots in each hemisphere will reverse their polarities. We do *not* know why this happens.

The sun rotates upon its axis in relation to the earth once in ~~27-28~~ days, and as it rotates, it carries spots into view at its eastern edge (limb). I have observed spots on the extreme eastern edge of the sun on numerous occasions using the RCA six-inch telescope with a 100 power eyepiece. On several occasions there was a "nick," shaped like the letter V, or a half-oval depression on the edge of the sun while the spot was in this favorable position for such a view. This indicates that some sunspots are actually holes in the outermost gaseous layer of the sun's envelope, quite probably a vortex caused by whirling gas similar to a tornado on earth. I have never reported this in any past literature or lecture because it was so obvious that I assumed others had also seen it; however, I have not found reference to this in any of the books or articles I have read. So, from my own experience, I will state that at least some sunspots are holes in the visible surface of the sun.

There is considerable **variation in the size of sunspots**. Some are barely visible pinholes while others are super-giants measuring from 80,000 to 100,000 miles long and 40,000 to 50,000 miles wide. The small spots are mostly **umbra** with very little **penumbra**. The giants are mostly penumbra interspersed with several dark umbral areas. The majority of sunspots are between these two extremes but vary greatly in appearance; rarely are two alike except in the cases of **single spots which are known as unipolars**. These unipolars may appear for a week or more, exhibiting no apparent change. The groups, on the other hand, show day to day changes, some increasing in size, others decreasing until they are finally so small that they can no longer be seen. The length of time that an individual sunspot exists also varies widely, with some lasting only one or two days while others exist for several solar rotation periods.

Now to bring sunspots and shortwave radio together. Due to

the fact that severe shortwave radio blackouts have been reported in the news media from time to time—in sometimes dramatic fashion—sunspots have been given a bad name. The truth of the matter is that they are actually very **beneficial to shortwave radio** and there is only an occasional maverick spot that causes trouble. The efficiency of shortwave radio would be considerably impaired if sunspots were taken away from us entirely. The reason for this is as follows:

Sunspots radiate strongly in ultraviolet light, which is the principal radiation from the sun that creates and sustains our ionosphere. Without it, the ionosphere would be weak and we would have to use frequencies much lower than those we do use for long distance communications. The usable frequency spectrum would become very narrow and the thousands of radio circuits now operating between 3 and 30MC (Megacycles) would be forced into a much narrower band, possibly between 3 and 10MC. This would create untenable crowding which would result in an interference problem of major proportions. So, in the shortwave communication industry, we say “We like sunspots.” It is just that occasional maverick we do not like.

The ionosphere is the highway surrounding the earth in all directions, under which our shortwave signals travel. Without it, shortwave communications would be limited to short distances. It is electrical in nature and has the ability to reflect shortwave signals (on the proper frequency) back to the earth where they can be picked up on an antenna.

Our ionosphere varies greatly in density since its very existence is dependent upon sunlight. Where sunlight is strong and prolonged, the ionosphere is strong. Where sunlight is weak or non-existent, the ionosphere is weak. The strong ionosphere of the daylight portion of the earth's surface will reflect back to earth the higher frequencies of the 3 to 30MC band. Conversely, on the night side of the earth, the ionosphere is weak and will not reflect the higher frequencies so we have to alter our frequencies to a lower part of the band. The best communication is attained by altering our frequencies throughout the day and night in such a manner as to match this daily change. The height

of the ionosphere we use for long distance communications is approximately 200 miles.

In addition to the amount of sunlight changing the density of the ionosphere, we have other variables; the principal one of which is the sunspot. I mentioned previously that sunspots radiate very strongly in ultraviolet light, and that ultraviolet plays a very important part in the creation of the ionosphere. Thus it is seen that when there are but few sunspots, or no sunspots at all, the ionosphere will be weaker than when there are many sunspots. There is an 11-year cycle in sunspots which produces an 11-year cycle in the strength of the ionosphere. There are short-term changes in sunspot abundance and these also must be taken into consideration by the propagation analyst due to their influence upon the choice of frequencies.

The size of a sunspot has very little to do with its disturbance-producing potential. This is what misled me during the early days of my research. I did not realize that the gigantic spots were a source of abundant ultraviolet radiation and that this radiation was actually producing a strong stable ionosphere that was beneficial to the shortwave signals. Some of the large spots were associated with disturbances, but most often the disturbances came from new, smaller, very active spots.

I also learned by experimentation that there were two "preferred" zones of location on the sun from whence a sunspot had its greatest destructive potential. The first zone discovered was in the form of a semi-circle just east of the sun's central vertical meridian. This zone was about 30 degrees wide. Several years later, during the International Geophysical Year, I delineated another similar zone that appears to be 25 to 30 degrees wide on the extreme western edge of the sun.

These zones were found to be quite reliable during the high parts of the past two sunspot cycles (which came in 1958 and 1969) but have been found to be less reliable during the intermediate parts of these cycles. During the extreme low parts of sunspot cycles, severe magnetic storms can and do take place with no visible spots on the sun at all. Fortunately these storms are predictable by the planetary arrangement technique out-

lined in detail later in this book.

There are other important variables too numerous and intricate to mention here. For those who wish further information on either the subject of sunspots or shortwave radio, I suggest a visit to your local library. My purpose here is to give you the highlights of the subject so that you can better understand the following chapters. A complete knowledge of either sunspots or shortwave radio would require years of study and experimentation. Both are very complex subjects.

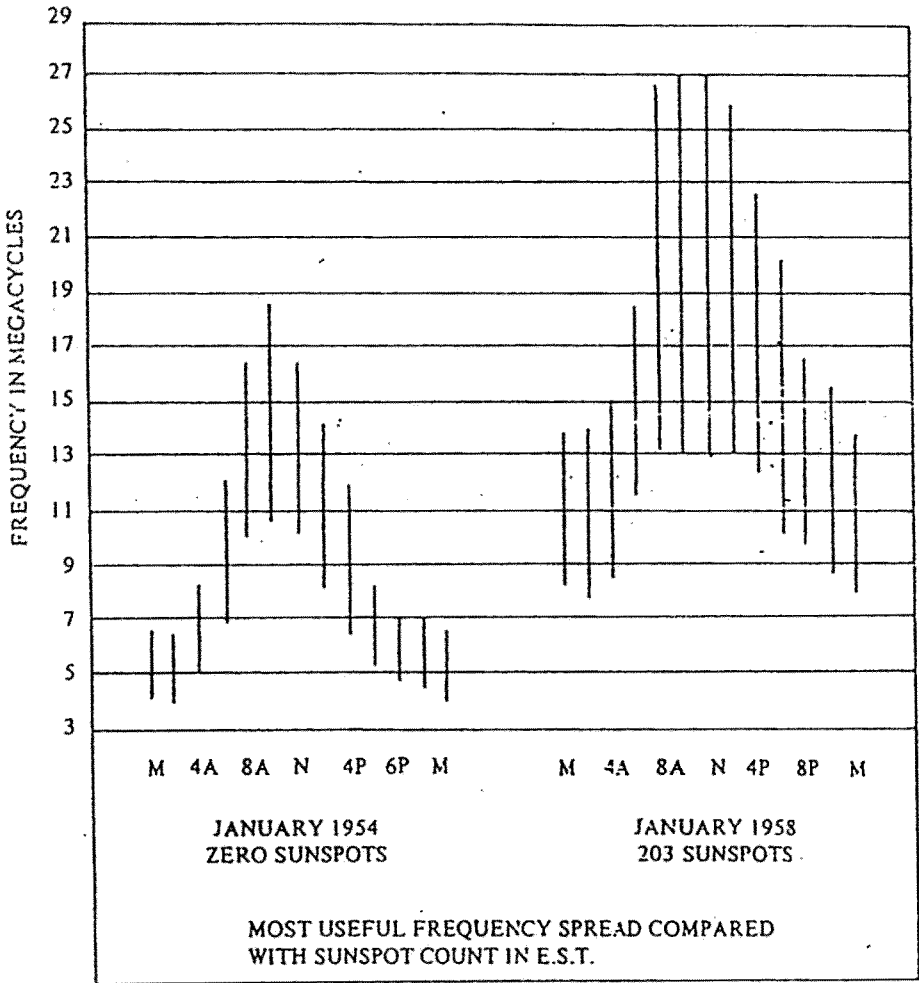


Figure 1. Chart showing the monthly average of optimum working frequencies between New York and Central Europe at sunspot minimum and sunspot maximum. Note the considerable difference in useful frequency ranges between the two periods.

Meanwhile, you can conduct a simple test on your ordinary home AM radio that will show you the very considerable effect that sunlight has on a radio signal. The frequencies used on the ordinary broadcast band are very much lower than those used on long distance communications. These lower frequencies are subject to sunlight absorption to a much greater extent than are those used on shortwave. During the night hours, a broadcast station can cover a great area but after sunrise the station fades out. Usually it is no longer audible after it travels for about 100 miles, but this distance can vary somewhat depending upon the power of the transmitter. At about 10:00 or 11:00 pm local time, tune in a distant city broadcast station and note the quality of the signal. Then shut the receiving set off. Leave the dial as it is. At 10:00 or 11:00 am the next day turn the set on again. You will notice that the signal you heard so well the night before is no longer there, or if it is there, it is very weak. During the winter months, when sunlight is not strong, the signals will travel greater distances both day and night.

On the other hand, the frequencies used for international satellite communications are very, very much higher than those used on either ordinary broadcasting stations or on shortwave radio stations. These extremely high frequencies are not subject to interference from sunspots, and they pass through the ionosphere as if it were not there. They can work at fantastic speeds with excellent reliability. During the 1960s decade, long distance international communications were rapidly shifted from shortwave to satellites, until now practically all the important long distance circuits are on satellites worldwide.

This high performance capability of the satellites has naturally reduced the importance of forecasting but it has not reduced the importance of research to find out why the phenomena I have been studying and writing about take place.

For instance, what makes a sunspot become a maverick and change rapidly from a quiet beneficial spot into a disturbing destructive sunspot? The research I have been engaged in for the past 25 years indicates very strongly that planetary interrelationships have something to do with it. My interest in this

subject has compelled me to continue this research and now, almost five years after my formal retirement from the commercial world of radio, I find myself as enthusiastic as ever. I have a six-inch reflecting telescope at home with which I continue to watch the day-to-day changes in sunspots. I have a good short-wave receiver with which I continue to listen to distant stations and record their day-to-day changes in quality. I have continued to forecast on a consultant basis for several communications centers throughout the world.

It is a fascinating field of research. Even after the many, many years that I have been involved in this subject, I find that there are many new things to learn. No two sunspots are alike, no two combinations of planets are alike—consequently there are new things to learn almost every day. Today, I work almost entirely with what I have classified as **Simultaneous Multiple Harmonic Relations** involving several planets. These relationships cannot repeat exactly in thousands and thousands of years when four, five, or six planets are involved.

I have no solid theory to explain what I have observed, but the similarity between an electric generator with its carefully placed magnets and the sun with its ever-changing planets is intriguing. In the generator, the magnets are fixed and produce a constant electrical current. If we consider that the planets are magnets and the sun is the armature, we have a considerable similarity to the generator. However, in this case, the magnets are moving. For this reason, the electrical-magnetic stability of the solar system varies widely. This is what one would expect.

A shortwave radio signal is objective and convenient because it is very sensitive to changes in solar radiation characteristics. It produces an overall evaluation of the ionosphere, which tells us in this manner what is taking place on the sun. Thus we can trace the observed changes in the signals to their fundamental causes, which my research has led me to believe lies in the ever-changing arrangements of the planets around the sun.