Project
BUD-WATCH
1996-97

IMPORTANT NOTE: The diagrams are all drawn purely empirically. Everything entered on them is the result of pure observation of nature, - with the exception of the little downward-and upward-pointing arrows. These latter have been added to the diagram later, and their origin is theoretical. They have been taken from the ephemeris, amended by the current phase-shift shown on the phase-shift chart (page 4). They show the times at which the relevant features on the graph OUGHT to have appeared. Thus, if such an arrow is accompanied by such a feature it means that the bud at that moment was indeed following the planetary rhythm, but that when such an arrow is not so accompanied, the bud was not doing so.

This arrangement has been followed so that the eye can pick up such vital information at a glance.

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THE PHASE-SHIFT

The mysterious business of the changing phase-shift has now been followed up for nearly fourteen years (almost two whole cycles) and this has proved itself a consistent and verifiable phenomenon. The fact that it was unexpected and that it still cannot be explained does not mean that it can be ignored. It is described in some detail in 'The Vortex of Life' (Floris Books, 1983 and in several Supplements since published, all obtainable from the publishers or the author).

Suffice it to recall that during 1984 it was found that the buds of an old beach tree were responding to the effect of Moon/Saturn alignments about one-and-a-half to two days early whereas previously everything had been on time. At the time it was supposed that this might be a particularity of that tree at that particular time. However, further work showed that the generality of species was behaving similarly, and it soon became clear that the amount by which the effects were preemiting their astronomical alignments was gradually increasing as time passed. After another year the effects were found to be coming something like four days early. It seemed that the approximately 14-day rhythms of the lambda-curves in relation to the lunar/planetary alignments were being overlaid by another rhythm of much longer period. It was as though the whole lambda-curve was being gradually translated to the left in relation to the times at which the alignments were taking place. Or, in other words, the actual times of the alignments were coming at different phases of the lambda-curve; hence the name, the changing phase-shift. In order to discuss this phenomenon the following terminology was introduced. When a feature of the lambda-curve comes, let us say, three days earlier than the corresponding astronomical aspect, we say that we have a phase-shift of -3 days. It must be obvious to us that as long as we are dealing with cycles whose length is near to 14 days, to be 3 days early is very nearly the same thing as to be 11 days late. Phase-shifts of -3 and +11 days are approximately the same thing. It is therefore, for reasons of convenience as well as of accuracy, customary to express all phase-shifts in the form in which they appear between -7 and +7 days. During the years following 1982, the phase-shift was observed, purely empirically, to be decreasing through the smaller negative numbers, -2, -3, etc. It was clear that if it continued in this way it would in due course reach -7, pass through +6, +5, etc and eventually reach zero again. And it was clear that when (and if) this happened the longer and over-lying rhythm of the phase-shift would have completed one whole phase. We would then be able to know what is the length of this rhythm. Early in the work the desire to have some idea of this period was such that it was decided, round about 1985, to seek an answer by extrapolating on the results of those first few years. The results of that early calculation came to about 9 to 10 years, and this gave the
impression that the whole matter might conceivably be connected with
the movement of the lunar nodes. It was obviously necessary to find a
more exact way of studying this matter, and to this end the technique of
the phase-shift chart was developed.

This chart has time marked along the horizontal axis as usual, and
the amount of the phase-shift is noted on the vertical axis. Phase-shift
zero is represented by the central horizontal line, with +7 and -7, days
above and below it, these two being for all normal purposes identical.
Near the top and the bottom of the chart are horizontal lines showing
phase-shifts of plus and minus 14 days, these two being identical with
the zero line. Each point marked on the chart shows the phase-shift of
some species or other at the time represented by the position of that
point on the horizontal axis. From the whole way the chart is
constructed, each point, and indeed the whole curve, appears many
times in its many appearances up and down the vertical direction of
the chart. We show here the phase-shift chart made up to the date of writing
(Summer 1996). It has been made purely empirically from many
thousands of observations. For instance, if we look at the year 1995, we
see that at the start of the year the points are at a height of
approximately +2 but by the end of that year they have descended to
about +1. This means that the species represented by those points
were, at the beginning of that year responding to the astronomical
alignments about two days later that the actual timing of those
alignments in the heavens, but by the end of that year their re-actions
had speeded up to be only about one day.

Within certain small but unavoidable limitations of accuracy this
chart is seen to be permeated with a strong element of symmetry, and
regarding this we can convince ourselves that if things continue the way
they have been going all these years, the phase shift is due to become
zero about January 1997, as it was about January 1983, and again in
January 1990. If this turns out to be the case, the seven-year cycle
quality of the phenomenon will have been amply demonstrated, and
there can, I think, to-day be little doubt of its truth.

The seven-fold nature of this chart is an important phenomenon,
and it comes, in part, from the fact that the lambda-curves of the species
which are being represented here all have periods which are of
approximately fourteen days length. Given this fact, which had to be
discovered purely by observation, the way in which the vertical axis of
the chart "invouiles" on itself in seven and fourteen day intervals, follows
naturally and necessarily. Indeed, it could not be otherwise. The same
cannot be said of the other seven-fold symmetry which this chart
displays. As our eye sweeps from left to right along the horizontal axis
we see the phase-shift becoming zero once every seven years, and this,
on the face of it, seems to have no connection with the other seven-fold
rhythm seen in the vertical direction; although we cannot rule out the possibility of some relationship at the moment hidden from us.

Seeing that we have come across other cases of rhythms which are correlated with astronomical sequences, it has seemed natural to look for a similar correlation in the case of the phase-shift. However it must be admitted that up to date no such correlation has been found, and it has not been due to lack of looking! The question inevitably arises as to whether it might be of a terrestrial origin. We have to bear in mind the possibility that some more earthly influence may be impinging on, and modifying, what would otherwise be purely astronomical rhythms. One indication that this might be so would be if we were to find that at any particular moment the size of the phase-shift varies from one part of the world to another. Unfortunately the scope of the work is not yet sufficiently world-wide to be able to give any sort of definite answer, Yes or No, to this question. We have some definite evidence, from one year's past work, that the phase-shift in Switzerland appears to be indistinguishable from that in England and here in Scotland. That covers a distance of over 1500 km, but it consists to quite a large extent of difference in latitude. What if the degree of phase-shift should turn out to be a function of longitude? Last winter, 1995/96, we have had a series of excellent photos from a friend working on the eastern seaboard of America. These seem to show a phase-shift identical with that in Europe, but the series is too thin and fragmented to be able to supply a definite answer to our question. Obviously a great deal of further work is needed here, but as far as can be seen at the moment it looks as though the size of the phase-shift might be constant over quite large areas of the earth's surface.

That early extrapolation which suggested a period of some nine to ten years for the period of the phase-shift, and which was thought perhaps to be connected with the movement of the lunar nodes, was based on the assumption that the rate-of-change was constant from year to year, or to express it otherwise, that the points on the phase-shift chart would be found to lie on a straight line. However, as soon as these points were plotted it became clear that their form is anything but straight. I think their elegant and symmetrical curve will one day be seen to be eloquent of a mighty breathing rhythm which interpenetrates our world, indeed our whole solar system, as though it is a huge living organism.
MEASURING THE PHOTOS

It is needed to have on each photo TWO points which can be fixed and recognised without ambiguity from day to day. And unfortunately the normal bud gives us only ONE, - the upper pole, the tip. The lower pole, the base, has to be put in, in the last resort, according to the judgment of the worker, - and that's not good enough! We have to realise that the absolute value of lambda which we get is not the most important thing. What we are interested in is the way in which this value varies. We need to get our working as correct as possible, but the VITAL thing is that this working remains exactly the same all the way through the series. To ensure this we work thus: - suppose we have a pack of, say 60 photos to measure. The worker first goes through them, marking into each what he judges is the most probable position of the lower pole. He then measures the bud height, - lower pole to tip, - and arrives with 60 values for this. In the normal way these prove to be nearly equal to one another. Their mean is taken to be the 'correct' bud height for the series. A template is then made, showing this distance divided into eight equal parts, and they are marked into each photo, using this same template, measuring from the tip (the one unambiguously recognisable point) downwards. In all our work absolute uniformity must be ensured from day to day. Another worker might get slightly different absolute values for lambda, but their variation should be the same. We must use the same camera, and the same worker, right through the series, and we must convince ourselves that the bud retains the same size throughout the season. Normally we can see that this is the case, from our whole way of working, but when there is a change (very occasionally) other more tedious, and rather less certain methods have to be devised.
THE AGGREGATE GRAPH.

At this point it is worth repeating the essential features of the aggregate graph (A-Graph, for short). This aggregative technique has only been developed recently (since the publication of 'The Vortex of Life') and is probably not well known. It is less used for discovering new relationships than for testing the truth and validity of ones already conceived. The basic idea is very simple, but should not be despised because of that. It is best described with reference to a particular situation. Let us suppose we have a mass of observations of Oak buds, stretching perhaps over several years, and that having graphed these in the normal way, we are given the impression that their lambda-value suffers a fall in value each time the Moon and Mars comes into alignment with the earth, more frequently and intensely than the laws of probability should allow. How do we determine quite objectively, whether this is the case? The answer is, to aggregate. The mean period of time between one Moon/Mars alignment and the next, we call one Mars-cycle. It is very slightly over fourteen days. The actual day of the alignment we call Day-1 of the cycle, and following that come Day-2, Day-3, etc. until we come to day-14. (Note that when we are referring to a cycle-Day we use the capital D). Day-14 is the last Day of the cycle, and Day-15 will start a new cycle; in fact it will be Day-1 again, approximately at any rate, and will be treated as such in every respect. Next we take the lambda-values of our very many observations and allocate each one, using the ephemeris if necessary, to its relevant Day in the cycle. When we have the mean lambda-value for each cycle Day we have the material with which to draw our A-graph. Obviously this graph can be envisaged as extending indefinitely both to the right and to the left, repeating itself, endlessly, and exactly. When we have done this we say that we have aggregated over the Mars cycle, and the resulting graph crystallises for us, as nearly as it is possible to do so, the behaviour of a species over months or, we hope, years of observation, at a single glance. But it does so, note, only with respect to the given planetary cycle. Exactly the same set of observations could have been aggregated over some other planetary cycle, and would then have appeared quite differently.

This gives us an idea of the general principle on which the A-graph works, but when we come to apply it practically there are a number of complications which can intrude themselves. Firstly there is no planet whose alignment period is an exact number of days; moreover this period, at any particular moment may vary quite a bit over, or under, the mean period. Thus, if one starts with one's first observation on Day-1 and continues allocating the succeeding observations, day by day, it is quite possible to find, by the time one reaches the next Day-1, that one.
is half a day or even more, 'out' with respect to the heavens. This can of course be easily rectified but the error can be cumulative unless continuous care is taken.

Another important point arises in connection with what has already been said. The A-graph is used more often to test, and display, the validity of a hypothesis that has already been conceived, than to discover a new one. The hypothesis we are testing in this work have already got the working of the phase-shift embedded in them. Unless we take account of the current phase-shift in force at the time of each observation when we are allocating it to its Day in the cycle, we are not in fact testing our given hypothesis, but something quite other. If we neglect to do this, especially if our observations extend over many years, the changing phase-shifts will 'fight', and the end result will tend towards a completely formless graph. The current phase-shift we must use is that of the generality of all species of that time, and this can be easily determined from the phase-shift chart published earlier in this book. The simplest way to make our calculations will be to use the data published in Volumes 1 to 4, of the 'Supplement and Sequel'. The information is there shown in ordinary graph form, and Day-1 of our cycle will not be the date of the alignment as seen in the heavens, but the date of the downward or upward pointing arrows shown there. This will put the matter right, and it is probably the easiest way to proceed even if the ordinary graph has not already been drawn.

The general situation now needs to be seen like this. Our bud is immersed in a highly complex environment and is acutely sensitive to a multitude of changing influences, - temperature, humidity, strength and quality of light, maybe also atmospheric pressure, and the general life of the tree on which it grows. These influences must be seen as unpredictable, and random. By the very way the bud is growing it must be expected to show a whole host of random variations in the fine details of its form. It could hardly be otherwise. But the questions which then face us are: Is it possible that among these random variations there is also a cyclic element working in time with the lunar alignments? And, if so, how do we disentangle this element from all the others? The clear answer is, - to aggregate, - and to do so with as many observations and over as long a period of time as possible. We then experience remarkable properties of this process. As we aggregate one observation after the next, any cyclic variations which may be present gradually reinforce one another, whilst the random ones steadily cancel one another out, and finally disappear. It is like putting our results through a sieve. And the resulting A-graph shows us as clearly and
objectively as possible what cyclic possibilities our figures contain, - always of course with respect to the particular planetary rhythm we have chosen to study.

It is a remarkable fact of experience that, through the years, with very few exceptions our A-graphs have assumed one of three basic forms. Firstly there is what we may call the Dip Form, rather like this:-

![Dip Form Diagram]

This is probably the most common, and indicates that the lambda-value undergoes a fall at the date of effective alignment (i.e. the date of alignment plus-or-minus the current phase-shift).

Then there is the Peak Form, - rather like this, indicating that lambda rises at the date of effective alignment.

![Peak Form Diagram]
Finally there is the Formless, which lumbers uneasily across the page, without any recognisable features. The longer one aggregates, the more does this third type become straight and horizontal. It indicates that one's figures contain no correlation with the chosen planetary rhythm. If the work we are doing has no significance then ALL our A-graphs would be of this kind.

![Graph](image)

When making our aggregate graph for the Oak buds we put across the head of our piece of paper the headings for 14 columns, one for each Day of the Oak cycle. Every observation which had been made, and there were approximately 1200 of them, had to be allocated to its proper Day, and its lambda-value written in that column. By the time that this stage was complete, each column had about 90 values written in it. At the bottom of each column we wrote the average lambda-value for that day; and the collection of all these average values is what was to be plotted on the aggregate graph. But we still had to determine how reliable these average values were; and here we had recourse to a little statistical theory. It is easy to find the standard deviation, $s$, for the figures in each column; and this, in some sense provides a measure of the degree of reliability that can be attached to each figure in that column. The smaller $s$ is, the more we can rely on that figure. But the figure written at the bottom of the column, being the average value of something like 90 quantities, can be adjudged as being more reliable than the separate figures giving rise to it. In ordinary statistical theory an effective standard deviation, $s'$, is attributed to it, given by the formula

$$s' = s/\sqrt{90}$$

In actual practice we find that this effective standard deviation comes to very much the same figure for each of our columns, and it gives us a good measure of the reliability of the A-graph we are making.
In statistical theory a population of elements such as the figures standing at the foot of our 14 columns, having a certain standard deviation, is shown to have a normal chance of falling in value by two standard deviations below its mean, about 4% of the time. In other words such a fall has a 96% probability of significance beyond the normal laws of chance. We can call this a two-standard-deviation limit of confidence, and we can take this to give us reasonable assurance that the phenomenon is a significant one. A fall of three standard deviations below the mean is given a probability of significance at 0.002%.

At this point it will be useful to see how such things work in practice. Let us consider the Oak buds already described. In 1992 it was decided to make an A-graph over the Mars cycle, from all the results achieved up till then. We had at that time some 400/500 observations, and when they were aggregated they gave the top result on page 11. It is quite typical of such a case, of the Dip Form, with a strongly marked dip at Day-1. The central horizontal dotted line shows the mean value of our fourteen columns, and above, and below it, the dotted lines show the two-standard-deviation confidence limits. The graph reaches comfortably to the lower one, and this was considered a reasonably certain result.

However, three years later we found that we had some 1200 observations to deal with (we had been busy!) not only from Scotland, but also from England and Switzerland. It immediately became clear to me that, with so many more observations to hand, it was possible that the new graph might have a quite different form. Indeed when the results came we found that there was a difference: the absolute value of the mean lambda was higher (due to having so many results from lower latitudes? I do not know) but the FORM of the graph, which is the thing in which we are really interested, was almost identical, showing that the 600/700 new buds had been behaving the same way as the previous ones. What was new, and very interesting, was that, with so many more observations the width of the confidence limits had significantly decreased and we were now able to get the three-standard-deviation limits well on our page. And we see that the dip in the curve comfortably reaches the lower ones. 99.9% probability is as near as ‘proof’ as we are likely to get with this species!

But, for good measure, I went on to aggregate exactly the same set of observations over the Jupiter cycle; and got what we see at the bottom of page 11 - an almost straight and horizontal line. All the random variations have cancelled away, and no cyclic ones remain.
Another species of great interest in this respect is the Beech. By 1962 we already had about 1400 observations of it, and their A-Graph, the first one we ever made, is shown on page 13. We note the smoothness and the symmetry of it, and the fact that it goes far beyond the three-standard-deviation limits - qualities due to the fact that not only is this a real phenomenon we are dealing with, but one which can manifest on our page due to the large number of observations which were to hand. This is as probably as close to the question of ‘proof’ as we are likely to get at the moment. But it leaves unanswered that other, crucial question, concerning the quality of repeatability. If a similar course is taken, at some other time and place, perhaps by a different worker or set of workers, could the same, or substantially similar, results be expected?

**REPEATABILITY**

We have already seen a preliminary, and very partial, answer to this when considering the Oak. The second graph on page 11, is made with about two and a half times more observations than the first one. The influence of those extra observations must far outweigh that of the earlier ones. If the quality of repeatability is not present, it would be natural that the form of the second graph would be substantially different from that of the first, yet that we see that in all essentials it is almost identical.

As far as the Beech is concerned, by 1906 we found that we had nearly a further 1000 observations to work with. These were completely new, and independent from the first, made in several places, some as far distant as over 1500 km, and by different workers. Lower on page 13 we see the new A-Graph made from these. It is not exactly the same; - we could hardly expect that it would be, - the time, the place and the general conditions were different, but we see that its essential form is as identical as we could expect.

We follow this by showing an A-Graph of the Beech, made from work by a friend in Switzerland. Again we see, in all essentials, the same form, but there is one important difference. This new graph reaches downwards only just to the two-standard-deviation limit. These buds were behaving similarly to the many others we have measured, but because there are so much fewer observations to hand, the statistical probability of our results is that much smaller, - some 96% instead of the much higher percentage suggested by the three-standard-deviation level. This is typical of many other such graphs we could have shown; for instance compare with this year’s results shown on pages 14, 21, 24.

On page 15 we show A-Graphs made from the same two sets of figures which gave rise to the two A-Graphs on page 11, but now aggregated over another cycle, - this time that of Venus. Although made at quite different times we see again how similar they are to one another, and how strongly they contrast with the forms of page 11.
A-Graph BEECH over Saturn 1984-92
All relevant observations = about 1400 buds

BEECH
ALL relevant work during the years 1995 - 96
about 900 observations

A- Graph over SATURN
Graph BEECH over VENUS 1984 - 92
ALL relevant observations - about 1400 bds

Graph BEECH over VENUS
ALL relevant observations - about 900 bds

1993 - 96
1996 - 97

The general aspect of the heavens during this winter was not such as to make the work easy or specially rewarding. Amongst other things the intention was to make an intensive study of the Beech, both in relation to those growing under high tension cables and to those in the open. However, even in the first weeks of October it became plain that even some of the control buds, in the open, were not following the usual Saturn rhythms as consistently as usual, and at least one of them, not at all. On consulting the ephemeris we find that Saturn at the time was in close conjunction with the descending lunar node. This is an aspect which happens fairly infrequently, and we have no actual evidence from past work as to what effect it may have on the buds. But we do know that Saturn has always been very sensitive indeed to the proximity of other heavenly bodies, and unless it completely free of other alignments, its rhythms may become very irregular or even wholly inert.

By way of a concomitant event with this conjunction with the node, we see that only a few days earlier there had been a total eclipse of the moon falling only one half of one degree longitude from Saturn, almost close enough to be an occultation. And only a fortnight later there was an eclipse of the Sun, further away from Saturn, but still close enough to have an effect. These combined events in a normal year might have seriously interfered with the Saturn rhythms for the space of at least a month, or more.

But there was more to come. In the last week of December Mars moved into close opposition to Saturn and stayed steadily in this situation until late March. All these things together ruled that during a large part of the winter of 1996-97 neither Mars nor Saturn was free from encumbrance, and only at the best could one expect more than disturbed performance from the Oak or the Beech.

There was a temptation to postpone detailed observation of these species until their ruling planets had become free of encumbrance. Fortunately wiser feelings prevailed. It was realised that to know what was going on in these special circumstances was just as important as when things were more normal. The result was that detailed work on both those Oak and Beech which were growing in the open, continued; but concentrated work on those growing under cables was postponed until the following year. As the season progressed photographs came pouring in from several workers and just coping with the preliminary work with these did not leave me time to examine my own photographs with care.

The consequence was that during the early part of the winter I was photographing many buds, believing that they were not following the rhythms, at any rate with full reliability, whereas when I had time to measure, the photographs and calculate, more carefully, weeks or months later, I found that these rhythms had in fact been working more consistently than I had realised. Let us see, in more detail, exactly what happened.
BEECH

At the start of the winter we had eight of these trees under observation. Three of these were growing under the cables and, as described above, for better or for worse, their detailed behaviour over the long term was postponed for another year. Another one I find, for some reason, was only able to contribute a rather short and spasmodic account. This leaves us with four buds, one in Lancaster, one in Mull and two in Strontian which need to be described in detail.

BEECH 1 (Strontian). This bud was growing on an old, mature tree which in the past has given consistently reliable and accurate signs of the Saturn rhythm. This year, alas, not so! Right from the start it became clear that the usual rhythm was not working, and this perhaps mislead me into thinking that Saturn's involvement with the lunar nodes was having a greater effect than it now seems that it really had. It is enlightening to see what the graph looks like in such a case. On page 18 we see the ordinary graph for this bud, and on the next page the A-Graph. The ordinary graph shows nine downward-pointing arrows where, if things were going in the normal way we should expect to see significant dips in the curve, and at only four of them, November 20, January 1, February 10 and March 10 could the most optimistic eye descry any dip which could possibly be considered significant. To decide how far this situation could objectively be seen as favourable to the hypothesis that the Saturn rhythm was really at work here, we must turn to the A-Graph on the next page. Doing so we see that it quite definitely could not be so considered. With the exception of a single point, on Day-10, the graph is remarkably horizontal and smooth; and even that point on Day-10 is not greatly divergent. There is no hint of a dip at Day-1 and the whole appearance of the graph is of a bud that is quite inert.

Next let us compare this with BEECH 2 (Strontian), also growing in the open. The graph and corresponding A-Graph are shown on pages 20 and 21. The season started with an excellent dip, on October 25, and ended, from the middle of February onwards, when Mars was separating from its opposition to Saturn, with two more excellently timed ones. In between, at the time when Mars was still in alignment with Saturn, the situation is more confused. Several of the downward-pointing arrows seem to be accompanied by significant dips in the curve, but not always well timed. Only a study of the A-Graph will allow us to make a really objective judgement of the whole situation. When we do so, we find a curve which is remarkably similar to the general run of A-Graphs for the Beech which we have seen for so many years. Compare pages 13 and 21. Their general form is almost identical, their range of variability is the same, but the element of symmetry which is so strong in the former graph is not seen quite so markedly in the second, almost certainly due to the smaller number of observations which have gone to make the latter.
Next we consider the Beech growing on Mull. - graphs on pages 23 and 24. The graph was very lively in the first few weeks, but soon settled down to more normal variation, and the first three downward-pointing arrows were all accompanied by well-timed dips in the curve. The crucial time, at the turn of the year, when Mars came into actual alignment with Saturn, is unfortunately not covered by the observations, but we see that the alignments of January 14 and 28 are neither of them accompanied by accurately-timed dips. However during February, healing is setting in and the alignments of the 10th and 25th of that month are both well shown, as was also the case with Beech 2 of Strontian. Indeed both these buds show the general behaviour quite in accordance with that of many years past.

Finally, for this year, we look at the results from Lancaster. Unfortunately these are rather few, but they start with two well-marked and punctual dips. When it continues, in January, there certainly seems to be a small dip to mark the alignment of January 14, but this is flanked by two others, at the wrong times, one of which is much larger than the one being considered, and I think it is reasonable to say that, whereas the Saturn rhythm was clearly to be seen in October and November, it was not so in January.

It has already been pointed out that although we had three further Beech buds, growing under the high tension cables at the start of the Autumn, it was decided to defer detailed study of these until next winter. Nevertheless, before this decision was taken, quite a number of photographs of them had already been taken, and it is instructive compare what their combined A-Graphs look like, with the ones we have just been considering. We see it on page 26. Owing to the small number of observations the two-standard-deviation limits of confidence are widely spaced, and come both above and below, right off the printed area of the graph. We see that the curve nowhere even approaches them, and that for almost the whole of its course it is really quite remarkably flat and featureless.

To sum up for the Beech in 1996-97, we can conclude that, apart from these three buds growing under the cables, although the Saturn rhythm was hardly working with its normal force and clarity, it was showing itself unmistakably in all except one of the buds studied, demonstrating that this phenomenon is much less fragile than one is perhaps sometimes led to believe. The case of Beech 1, Strontian, which clearly was not active in this way, causes us to remember that, when working with the single bud method, we know from past experience that such a situation can very occasionally arise; and it appears to have done so this winter.
It has already been mentioned that during the first week of January, Mars came into opposition with Saturn. Shortly after this, Mars became retrograde, and the opposition started to widen. By the middle of March, it had become some ten degrees open. And it did not become really close again until the end of July, after the motion of Mars had become direct again. We would expect these conditions to reflect themselves in the behavior of the Oak buds; in particular that the Mars rhythms would not show themselves with strength during January and February; and it is interesting to see to what extent this actually was observed.

Let us first examine the graph of the Strontian Oak, page 29. There we see seven downward-pointing arrows, and to these we can add in our imagination an eighth, on March 23, which comes just off the right hand boundary of the graph. We see that no fewer than five of these are punctually accompanied by the expected dip in the curve, and the three that fail in this respect are all in January. The healing of this situation, from early February onward, seems to have come a little earlier than we might have expected, but apart from this it is an almost textbook demonstration of what has been experienced in the past. Looking at the A-Graph, page 30, we see that the lowest part of the curve did indeed come around Day-1 to day-2, but that the range of variation would be much too small to be able to use this graph as evidence for the working of the Mars rhythm,—an outcome which was to be expected since Mars was so heavily encumbered during the most important weeks.

Next, we look at the graph for the Mull Oak, page 31. We see straight away that the alignment for November 5 was definitely not shown by this bud. Why the rule should have failed on this occasion we shall probably never know, but it must be acknowledged. Maybe some special factor was at work. But apart from this every other alignment during which observation was taking place (unfortunately the important one on January 1 was not included) has its associated dip, except for those in January. Notice the A-Graph, on page 32, like the Strontian one, has the characteristic dip form, but not sufficient range of variation to furnish firm evidence for the Mars rhythm. In these respects, and also because the rhythm seems to be re-establishing itself on February 10, the Strontian and Mull graphs are remarkably concordant.

While these observations were being made, Michael Hertel, working in the polluted district of Annen, in the industrial centre of Germany, was again keeping an Oak under observation. This tree was growing in an environment which must be as unlike that of the west coast of Scotland as it would be possible to find, so a comparison of its graph with the two preceding ones must be a matter of interest. And a first glance at it, page 33, seems to confirm one's expectation of a total difference between them. However, a
more careful consideration reveals more. The alignment of December
17 is marked by a moderate, but definite, dip, - as it was, on the same
day, at both Strontian and Mull. On December 20/21, when Mars was
approaching near to its opposition to Saturn, the Mars rhythm was
broken, at it was, on the same day, at both Strontian and Mull. And it
remained so through the whole of January, the next dip co-inciding with
a downward-pointing arrow, being that of February 10,- again being the
same as it had been at both Strontian and Mull. This shows us that
even under such strongly contrasting conditions the behaviour of this
German bud was indeed compatible with the idea that it was following
the same planetary rhythm.
BIRCH

Although the Birch might be described as almost indigenous to the Scottish Highlands, only a very limited amount of work was done upon it in the early days of this research. The buds are not at all easy to work with, being small, and mostly rather irregular in shape. There is a tendency for them to vary considerably in the details of their form, especially between those growing near the main trunk of the tree, and those growing nearer the outer parts of the branches. This cuts down very considerably the number of buds which one can find which are really comparable; and this, combined with the fact that the Highland Birches are mostly quite small trees at the best of times, has led to a severe shortage of buds when the multibud method was in use, as was the case during all those early years. This meant that any series of measurements embarked upon had to be short, and the results therefore tended to be somewhat inconclusive.

What these results should show was not at all clear at the outset, apart from Rudolf Steiner's indication, supported I think by many people's gut reaction, that this species has strong connections with the planet Venus. But we must of course beware of allowing any such feelings to unconsciously sway our judgement in any future assessment of our results.

In spite of the difficulties, during the years 1987 to 1990 quite a bit of work was done on this species, and the detailed results of this has been published in The Supplement and Sequel, Vol. 1. The details of these results will not be repeated here, but it can be safely said that, almost without exception, every alignment of Moon and Venus during that period was accompanied by a marked dip in the lambda curve. This phenomenon was so persistent, through a range of over two hundred observations, as to be quite remarkable. However its impact was somewhat lessened by the fact that there were also quite a number of occasions when there were dips in the curve at times when there was no such alignment. The rule was expressing itself, if indeed we are entitled to call it a rule, with a certain flexibility which had not been observed with other species. And it was with some feeling of unease that one realised that at that time it would have to be left to purely human judgement to decide whether the effect which had been observed was really significant or was just the result of a series of coincidences.

Then, in 1992, there came the arrival of the technique of aggregation, and this offered an opportunity for a further step into the realm of objective judgement in this realm. We were able to make an A-Graph for all the observations made up to that time. It was made from about 250 observations and therefore might be considered to have a fairly good degree of reliability, although not of course nearly as strongly as with the Beech and Oak, which had been so much more heavily worked with. We show it on page 36. We see immediately the very marked dip at Day-1/Day-2. This comes well below the 3-standard-deviation line, and is a result that was firmly expected from the regularity with which the dips had accompanied the alignments through the years. But the fact that there was more to the variation than just this, was indicated by the rather wavy nature of the upper part of the curve, in particular
the second low point of the curve, coming at Day-6. This comes safely below the 2-standard-deviation line, and might well be considered to have a fair degree of probability of significance, although far from any kind of certainty. Also we notice the marked asymmetry of the curve, with its main high region being as advanced as Day 9-13.

Since this species is difficult to work with, not very much more was done with it, until this winter, 1996-97. Then, using the single bud method, three Birch buds were selected for study, one in Strontian, and two in Mull. Due to the fact that the smoothing effect of the averaging, which is employed in the multi-bud method, was absent, and also to the irregularity and smallness of the buds, their ordinary graphs are rather erratic, and difficult to interpret reliably; but it seems worth while printing them here, for the sake of the record, and so that any other worker who may wish to work with this data may find it to his hand when he needs it. They are printed together on pages 41, 42, 43. But it is the A-Graphs for these which will chiefly interest us, and they are on pages 37, 38, and 39. In the A-Graph for the Strontian Birch, we see an asymmetric high point at about Day-11, preceded by a secondary low point at Day-6. In the graph for Birch 1 of Mull, the asymmetric high point comes at Day-10 with the preceding low point again at Day-6, while for Birch 2 of Mull, we find the asymmetric highpoint at Days-9/11, and the earlier low point at Day-5. At first glance these graphs appear to be rather diverse, but when we come to examine them more carefully we find that in their essential elements they are much more similar than we could have expected. (It is interesting to note that these features were shown less markedly in the case of the first-shown of the Mull Birches, and to note that this bud was growing fairly close to a small electric cable.)

At this point in our studies it was remembered that we had indeed observed a Birch by the multi-bud method once before. It was in the winter of 1993-94 and was reported on, in Supplement and Sequel, Volume 3. We reproduce its A-Graph here, on page 40. Examining it, we find that all the features of the other Birch A-Graphs are faithfully present, to an extent that may well suggest significance to us.

Now it must be evident to us that, with the possible exception of the first of these Birch A-Graphs shown here, no single one of them can be credited with the authority to stand up as evidence all on its own. The number of buds involved is too few, and the range of variation too small. But when we find that every one of no less than five A-Graphs shows similar features we are justified in feeling that their common form is something which may be considered significant. Much more research is needed in this matter, which we hope can be carried out next winter.
BIRCH, growing under a small electric cable

A-Graph over Venus, 1996-97

MULL
The bud of the Ash is a somewhat strange phenomenon. It is small, black, and not at all easy to photograph accurately. When it appears on a sapling there are very few buds to be had, and when it is on a great tree most of them are high up and out of reach. For this reason it was very little studied when we were working with the multiple bud method, but since turning over more to the single-bud method there is a growing body of evidence that this species is regularly responding to the alignments of Moon with Sun. The bud appears to be of a multiple nature, being composed of a least four little buds pressed very close together. None of these is a good path curve form when considered by itself, but when they are pressed close together they form a very good path curve outline, although the lambda value varies considerably when seen from one direction after another. This propensity of the separate parts to sink their identity into the final form is connected with two of the principal difficulties one meets when working with this species: the absolute necessity to photograph the bud from exactly the same point of view day by day, and the disconcerting habit which some of them show of quite unexpectedly starting to loosen and disintegrate into their separate parts after having presented a united front to the world, perhaps for many weeks or even months. When this happens, as it did towards the close of this season, I have to now tend to believe that the bud's useful life (to me, at any rate!) is ended, to discard it, and to move to another bud if there is still time for useful work during that season. This time, it being near the end of the season anyway, I decided to continue with the study, to see whether, even in its loosened state, it might in some way still be continuing with the luni-solar rhythm. The time was too short for coming to any very definite conclusion on this matter, but the signs seem to be that, even when it seemed to be disintegrating, it was still apparently subject to the solar rhythm, at any rate to a considerable extent. More evidence on this is needed, and will perhaps make it easier to deal with this rather wayward form in future.

This apart, this year's A-Graph for the Ash, using all the observations for this season, both before and after the start of apparent dissolution, printed on page 45, is typical of those we have had during the past few years, and can be compared with them in past issues of the Supplement and Sequel, Vol. 2 page 58, Vol. 3 page 54 and Vol. 4 page 56. In each case, the general principles of the form are clearly similar to the present one.
CHERRY

It has been known now for a good many years, just by pure observation, that buds growing in a strong artificial electro-magnetic field, for instance under a high tension cable, or close to a large transformer, will not follow the normal planetary rhythms. Thus it was that, some twelve years ago, the rule was enunciated that such an e-m field seemed to have the effect of isolating the buds from any astronomical connection which they may have had; and for quite a time this rule seemed to be as satisfactory as was then possible. Further, and more critical, investigation was rendered difficult by the paucity of good measurable species which are allowed to grow under such circumstances.

However, in very recent years observations have been made which have led us to question the adequacy of this rule. Without exception it has been found that buds growing under the cables do not follow the normal planetary rhythms; but there have been a number of cases in which they have seemed to follow rhythms which are a direct inversion of what in the ordinary way would have been expected, showing a peak, at the crucial moment, instead of a dip, and vice versa. These cases have by no means been as ubiquitous and striking as with the buds growing in the open, but they have been numerous enough to raise the question as to whether something significant may be at work here. This year, 1996-97, we had found three Beech saplings which, although growing under a small cable, were themselves small enough to have been allowed to continue their life, but in view of the fact that Saturn was heavily encumbered with other aspects this winter, it was decided to defer further investigation into this until the following year.

However, during the early summer we received three excellent series of photographs from Herr Michael Hertel, working in the industrialized and electrically polluted region around Amnen in Germany. These were from Cherry trees, two of which had been studied the previous year, 1995-96, (they had been reported on in Supplement and Sequel, Vol.4), in the course of which stone eggs had been buried under their roots, and the third one was a fresh tree that had not been in any way tampered with. The two which had been studied the previous year had on that occasion shown small sign of planetary rhythm, but that did not give any evidence against the possible efficacy of the eggs since the bitterness of the weather at that time had made it impossible to place them into position until the budding season was almost at its end. During the following year those eggs were left in position, but what remains of them to-day, after such a lapse of time, and such weather, it is hard to say. All three trees were, and still are, growing under massive cables.

This year, 1996-97, we have photographs from these same trees, and it must be a matter of great interest to us, to see, once again, whether or not their graphs show any sign of this phenomenon, - inversion. Unfortunately the evidence, to date, is not sufficiently inclusive to come to a complete conclusion, but it will be valuable to review such evidence as we have.

Firstly let us look again at what we know of the behaviour of this species
under ordinary conditions, when growing in the open. There are many varieties of Cherry, which may not all of them follow the same pattern, but the one we are concerned with so far in this work is the wild cherry, the so-called Jean, whose buds are rather "dumpy" in form, hard, rough and woody, and not like the more refined types with smooth tapering buds resembling more the leaf buds of the Beech. This is the Prunus Avium. This species has been studied on five previous occasions; and the A-Graphs resulting from these are shown on page 48. It will be seen that they all, except one, - 1994-95, at Humble, near Edinburgh, - show almost exactly the same form, with a pronounced Peak round about Day-15 to Day-1 and a long trough in the middle part, Day-3 to Day-12. What happened in 1994-95 we shall never know. This bud was growing on the same tree as those in the preceding and the following years, and the very next year it conformed to type. We must remember that when we are working with the single bud method, we are confined, in any one year, to the vagaries of an individual bud, and we have found, from experience, that an unfortunate choice of our bud can occasionally lead to such a result. It must be left to the individual reader to decide what weight should be attributed to four cases out of five.

Against the graphs of page 48, unfortunately we have only two to put, due to the difficulty of finding mature trees which are growing under the cables. These are both from Ammen, and are shown on page 49. The one from 1995-96 might well be deemed to show a small resemblance to the generality of such curves, but equally it is hard to make out a case from it for inversion. The graph of 1996-97 however would seem to be a clear case of inversion, with all the high values from Day-3 to Day-13, and the low ones round about Day-14 to Day-1. One swallow does not make a summer; but compare this result with the statement made last year, from a consideration of other species: "There is some evidence to show that buds growing in such circumstances tend to follow a rhythm which is a direct inversion of the normal one, although it is not as strong or consistent as with the normal behaviour of the buds in the open." Here is the evidence, such as it is, so far. The verdict, so far, must be left to the reader.