University Finnerty Garden Friends

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NEWSLETTER ● JANUARY 2004

Dear Friends,

I hope you all had a good holiday season and that the new year will be good for you and yours. It will be a leap year—the first in 8 years so something special should occur! As I look backward over my diary entries for 2003, the weather seems to be one of the dominant themes. First there was the very dry late spring and summer, followed by the floods of October and the heavy rain of November, and finally by the very mild winters we appear to be having. I note today that the nasturtiums, although slightly bedraggled, are still in full bloom in my garden! Last winter, my storage tanks for garden water were not filled until April; this winter, they were filled by the middle of November! In spite of all of the rain, I was surprised to find, while planting a shrub, that the ground was still fairly dry in some places.

The 2004 Finnerty Garden Calendar is very lovely. Daphne has done a superb job with the pictures. She combines an eye for a good shot with the love of plants and gardens—a great combination. The sales appear to be going quite well with many repeat orders coming in. I hope that we will make this an annual project, since we are gradually building up a clientele who appreciate its beauty. It also is a good way to make more people aware of the Gardens which, each year, become more beautiful. The American Rhododendron Society will hold its annual meeting in Victoria in the spring of 2005, and the Finnerty Gardens will be featured as a tour destination. We hope to have the 2006 calendar available at that time. Joe Harvey's article about rabbits brought in a number of letters to the editor—some in sympathy and some strongly opposed. I regret that we do not publish letters, but feel that we lack sufficient room.

Carmen Varcoe and the Advisory Committee are doing an excellent job in the Gardens. Opportunities for new and different plantings arise unexpectedly. After the heavy rains, we were all shocked to discover that several large oaks had fallen over, thus opening up new areas for sun-loving plants. One oak that fell had a trunk diameter of over two feet, and we were sad to see it go. Interestingly, it just tipped over and I suspect the very wet soil which has little holding power was a major factor in its demise.

The Plant Sale Committee under the able direction of Bill Cross is gearing up for the Sale on the first weekend of May. Remember that we always need volunteers to handle cash and to sell plants. Our selection will be wide, and there will be something to tempt each gardener. I look forward to seeing you there.

Do visit the Gardens this spring. There is a surprising amount of bloom and we are gradually increasing our plantings of early flowering native plants such as erythroniums thanks to the generosity of John Trelawny. The cyclamens have been particularly good this year, and many of our clumps are now big enough to

be split so that plants can be introduced into other areas. The committee has identified several areas which need to be improved, and will be working on them in the coming year. If you have questions when you visit the Gardens, do not hesitate to ask the staff. Rhonda Rose in particular is very knowledgeable and is always willing to help. I look forward to seeing you in Finnerty.

Betty Kennedy

Projects and Planned Maintenance

Tony James.
Curator, Finnerty Gardens

Planned maintenance or projects never quite go according to plan. The last Newsletter article outlined how we were renovating bed #16 with special concerns over the lack of light, mainly from overshadowing ornamental trees. We removed or attempted to move some large ones in this bed, which did result in better conditions. However, Murphy's Law was demonstrated in dramatic fashion one early morning when the largest and straightest Garry oak in the Gardens, which just happened to be in this bed, heaved up its roots. It settled at a 30° angle to the horizontal supported by two more Garry oaks which were struggling to stand the strain. This occurred not long after the first very heavy rains of the season when the wind swung to the north and opposite to its usual direction. Probably the extremely dry summer followed by that heavy 100-year storm which deposited 5" of rain in 24 hrs was a factor.

Getting the tree down to the ground became a major challenge. Since it was deemed too dangerous to climb even by the professionals, there was talk of using a crane to support the trunk and bring the pieces down slowly. But cutting off a trunk from the oak that it was hooked up in was also too dangerous. The tree had already done some damage to mature rhododendrons and to the bog garden material although, because the material was herbaceous, this could easily be rectified. After many suggestions it was decided to cut off large branches on one side, and sever the main trunk close to the ground hoping that it would roll out of the supporting oak and land on the pathway with just the smaller branches that might cause some minor damage. With fingers crossed, the fallers got to work and the tree came to rest very close to its planned position with very little more damage to surrounding plants. Clean up took some time with the branches being chipped for possible use as mulch on the beds while the trunks were cut into 10' plus lengths. These were skidded out and may be used in the Garry Oak Meadow Restoration area just outside the Gardens.

To add to the problems, further winds from the same quarter a week later resulted in two more Garry Oaks coming down. One snapped at the base which was rotten but the other again heaved its roots out and was quite close to the previous oak. Luckily not too much damage occurred and as this one came completely down, it was an easy matter to chip the branches. The trunk will be left on site as a natural blow down.

The result of this left a large open space and,where once there had been a problem with too much shade which we had corrected by selectively thinning the ornamental trees, we had now gone to the other extreme. This has since changed the thinking on bed #15, which was originally envisaged as a sunny spot and planted accordingly. Recently it was being renovated to remove the sun-loving perennials and look to more shady material. Now it has the potential to remain a sunny bed. Gardens are certainly dynamic.

A brief look was also taken at bed #6 with a view to reorganizing it in a similar fashion. Previously some balsam firs had been removed to reduce heavy shade and it was now decided to remove a red oak. At least there are no large native trees in this area so the blow down scenario above should not occur. Some old and poor plant material suffering in the dry and shady conditions has been removed and the sword ferns near the edge placed in the centre as a screen. There will be plenty of room for new plantings which should brighten up this area.

The Garry Oak Restoration area along Cedar Hill X Road has at last seen some action. The jogging trail has been moved away from the

Gardens and the trick now will be to get people to use it instead of the old trail. The works area is complete and a small berm will be constructed in the near future around the north edge of the meadow. The old trail will become a part of the Garden's path system once we have decided how best to keep people out of the works yard and storage area. It may then have some type of fence and/or gate to border it off.

Apart from the possible involvement in the demise of the Garry oaks, the extremely heavy rains during November had little effect in the Garden. There was no flooding with the drainage works incorporated over the years seeming to have done their job. The consensus was that in a short period we recorded one 100-year and two 50-year storm events and if the gardens survive that, they can survive anything.

Considering Good Shrubs and Companions

Eryl Morton

As a landscape designer, I am often asked to select minimum care plants with year-round interest, providing maximum effect at minimum cost! Therefore, shrubs fill the bill, with an interplanting of perennials and bulbs to achieve the layered look. However, this is not interior decorating. We are dealing with living things. The maxim "right plant, right place" applies, although I do stretch it sometimes, as the plants do not always read the same books as myself!

The next consideration is just how much evergreen plant material to use. Too much can create a static and boring design that looks almost the same in winter and summer. Too little means no "bones" to the winter landscape and paints a rather desolate picture for nearly six months. Choose plants, therefore, by their foliage as the leaf lasts longer than the flower.

My favourite, and hence most used shrubs, need to be fairly robust, adaptable and well behaved (like children!), but with interesting foliage. At present, Lonicera nitida "Lemon Beauty" tops the list. It is evergreen, with a compact arching habit, holds its colour even in shade, is deer resistant and seems to grow anywhere that is well drained. It does briefly lose its lemon variegation in spring when it produces new shoots, but by early summer all is restored. "Lemon Beauty" looks even more beautiful grown with Cotinus coggygria "Royal Purple". This is the best deciduous red leafed plant currently available. Take care, however, to ensure that it is "Royal Purple", as impostors exist like C.c. purpureus, that fades to a dirty green in summer. Cotinus coggygria is capable of growing to a small tree size which I find rather unattractive. In order to prevent this, simply layer the new long shoots by bending them over and burying a portion of the shoots in the ground, weighted down with stones. Amongst these new shoots, plant something grey leafed. For example, Helichrysum "Icicles", Artemisia "Powys Castle", Senecio monroi or S. greyi "Sunshine" (now renamed with the ugly sounding Brachiglottis greyi). This latter plant is really a standby as it hides a multitude of sins. Unfortunately, it needs drastic pruning to keep it bushy and under control in smaller areas. However, it is a good companion plant to Hebe "Alicia Amherst". This plant has marvelous purple-tipped foliage and deep royal blue flowers. The deer prune mine, so I combine it with Choisya ternate "Sundance" for added protection. This shrub needs some protection from the hot, afternoon sun and a little pruning to keep it in check. The ornamental culinary sage, Salvia officinalis "Purpurascens" and S. o. "White Edge" make good companions to this arrangement.

Include some "spiky" leafed plants for added interest. Phormiums are the obvious choice. Phormium tenax "Bronze Baby" has good purple-brown colour without growing excessively large, whilst a new variety Phormium "Evening Glow" with its red-pink coloured leaves blends well with Cotinus "Royal Purple" and the winter flowering heather Erica x darleyensis "Kramer's Red".

Finally, a summer floral bonus is needed. Agapanthus, in any variety or colour, is always an asset. It is an easy care plant and dies gracefully without requiring dead heading. Its seed heads look attractive especially for the birds. Perovskia (Russian Sage), when combined with Cotinus, looks good in both summer and winter with the commingling of white and black stems. I must

also mention two Japanese Anemones in this list, but with a caution, as most are rampant. Anemone x hybrida "Whirlwind" with its white flowers is well behaved and charming. Also, a new variety, (to me and hence untried), is Anenome hybrida crispa with its pink flowers and intriguing, lettuce leaf, frilly foliage, looks good enough to eat and reminds me that Christmas is approaching.

Happy planning for the New Year and plenty of planting pleasures for the spring!

Life—A Biography, Part I

Alec McCarter

The Chemical Approach

During my lifetime, the understanding of the chemistry of life has far surpassed the imaginings of sixty years ago or even twenty. Sixty years ago researchers were studying the basics of foods and nutrition, discovering vitamins and hormones. They were just beginning to understand the chemistry of fermentation and the metabolism of sugars. No one knew how these things worked and techniques for their study were sadly lacking. Knowledge of genetics was in its infancy.

If a living cell could be compared to a watch, the researcher had only determined that there were wheels inside the case and that these structural elements were made of metal. The different wheels, the springs and the jewel bearings were being analyzed to determine their composition. To do this and see what they were made of, they had first to be pounded to bits and brought into solution. So it was with tissues of animals and plants. Instruments and procedures for their study had not not yet been developed.

Chemistry was in an analytical phase of its development. Animal and plant tissues were found to contain nitrogenous substances that could be separated from one another and purified to some extent. These nitrogen-containing, large molecular weight substances are proteins. By breaking them down they were found to contain subunits (amino acids) that had been linked together. There were 20 different amino acids, and the amounts of each differed from protein to protein. At least one protein, insulin, had been purified to the point of being crystallized, but the arrangements of the amino acids within the molecule and the structure of the protein itself were unknown. It was recognized that insulin had something to do with the regulation of the concentration of glucose in the blood, and that some other proteins were involved in digestion; amylase in saliva could break down starch into sugars while trypsin from the pancreas could break down proteins into amino acids.. It was an age of Chemistry—not of its application to Biology. Nucleic acids were also discovered, and were found to be very large molecules composed of subunits called purines (there are 3 of them) and pyrimidines (2), not amino acids.

For some time, it was thought that Ribonucleic acid (RNA) was characteristic of plants and that Deoxyribonucleic acid (DNA) was characteristic of animals—the importance of DNA as the material of which genes are made, and of RNA in translating the genetic messages and the making of proteins were totally unknown, although it was known that DNA occurs in the chromosomes, and chromosomes were known to contain genetic material.

Progress in understanding the structure of proteins resulted from X-ray analysis of a protein. The rays are diffracted and captured on photographic film in particular patterns depending on the molecular structure of the material being irradiated. Linus Pauling found that parts of proteins may be helical in form while others may be in sheets. Applied to nucleic acids by Wilkinson and Rosalind Franklin, this technique showed that DNA was helical in structure.

Using this information, Watson and Crick published in 1953 their model of the structure of DNA. The structure is that of a double helix, that is, consisting of two long molecular strands wound around one another and cross-linked by weak bonds between purines and pyrimidines. The arrangement of the subunits on one strand determines the arrangement in the other: because purine A (for adenine) in one strand is always paired with pyrimidine T (thymidine) in

the other, while G (guanine) is always paired with C (cytosine). If this does not happen precisely, then a single mistake will result in death of the cell containing it or, if the cell does not die, the result may be a mutation.

At once the importance of DNA in inheritance and as a blue print for life was recognized. In cell division, as the DNA is replicated, each strand specifies the assembly of the other so that daughter cells then contain exact copies of the orginal DNA molecules. And it was also clear that the sequence of bases in a strand must contain the genetic code for the transmission of biological traits.

. A Nobel prize was awarded to Crick, Watson and Wilkinson but unfairly, not to Franklin. A new discipline, Molecular Biology was born. Progress followed swiftly. It is not within my knowledge, ability or my comprehension to do more than give an outline of what has been discovered—but perhaps this will allow others to have some appreciation of the advances to date, incomplete though they must be.

The World Before Life

If we are to understand how living things are made and function, and how they came into being, we must look for evidence of early life on the planet and what conditions might have favoured its appearance. The age of the Universe has been measured to be about 14 to16 billion years when space, time, gravity and energy were borne from nothing. There is recent photographic evidence of the existence of radiation formed at that time and still present in space. Earth was formed about 9 to 11 billion years later, that is about 5 billion years ago (BYA) by the accretion of materials formed earlier.

As it swept around the Sun, Earth intercepted and collided with a great many objects. It was bombarded by comets, meteors and even planet-sized objects,growing in size as it did so and kept very hot by the enormous energy released in the collisions. At first it was too small, and too hot to hold an atmosphere or oceans. It was molten.

It was far too hot for life to exist much less to be sustained. But it was cooling as energy radiated away into space and a crust formed, small islands at first, floating on the molten interior. Lighter minerals, magnesium, silica, aluminum, calcium floated to the top forming solid rock while iron and heavier elements sank deeper to form the core. It gained an atmosphere and the oceans and continents formed.

Some of the solid rock has remained; the oldest (4.05 BYA) is in the North West Territories of Canada. Almost as old are rocks in Greenland and Australia and in these, signs of life have been found, dating from when they were young, about 3.5 BYA. Much other of the old crust has been recycled as plates slid under one another and were melted, and therefore unavailable for analysis. The evidence for earliest life is not from fossils but from the observation that some sedimentary rocks contain isotopes of carbon (light carbon) known to be asssociated only with matter that has lived. These rocks had once been hot vents at the bottom of an ocean.

Only a few years ago, fossil bacteria were found in Australia in rock derived from such vents that were estimated to be 3.2 billion years old.

The First Stirrings

Two hundred million years later, at 3 BYA, bacterial forms were abundant—the fossil record tells us so. That is, five hundred million years after the first signs of life appeared there were self-contained, self-replicating, primitive creatures, enveloped in a membrane of some kind,. that left their imprints in the sediments that became rocks. How could this have happened? What happened during those 500 million years?

Given the right set of circumstances, as the Earth seems to have provided, is it inevitable that life will arise? If so, presumably, it must be capable of originating from the simplest starting materials.

It is a truism that life depends on the presence and availability of water. Its properties fit it more than those of any other substance for the development and sustainability of life. The

oceans made by incessant hot rain falling for millions of years must have contained, as they do today, quantities of soluble compounds leached from the material of the World as well as being brought up from the deeps through the thermal vents at the bottom of the oceans.

We now know that microorganisms inhabit hot springs and thermal vents, even at temperatures above the boiling point of water. Recent evidence supports the idea that life originated close to such hot vents, in the dark, using the heat and organic molecules (meaning ones based on carbon), made in the oceans and in the atmosphere. The composition of the atmosphere of Earth at that time presumably contained water vapour, ammonia, nitrogen, carbon dioxide, and methane, but no free oxygen. These gasses exist on other planets in our Solar system as on ours.

Organic compounds are formed

In 1953, Dr. Stanley Miller of Chicago, carried out experiments to see if organic compounds could be made from these gasses—compounds that would be expected to be necessary as building blocks of life. As the source of energy, he chose continuous electric discharge because after the Earth's crust had formed, volcanic eruptions were common. They must have been accompanied by violent electrical discharges, because they still are. Flashes of lightning are still seen in the atmosphere of Jupiter, and it contains ammonia, water vapour and so on as did the primitive Earth.

After a week of boiling water in a vessel containing the gasses referred to above, and subjecting them to a continuous spark, a tar was produced. It contained significant quantities of 13 of the 20 amino acids known to make up proteins. Further research showed that the subunits of nucleic acids were also made.

I know from my own work in this field that there is complete conversion of carbonate to cyanide when it is heated in an atmosphere of ammonia in the presence of zinc and iron. Cyanide is a very important starting material for making other compounds based on carbon. So is formaldehyde and there must have been plenty of both about.

It thus appears that organic compounds made up of carbon, nitrogen, hydrogen and oxygen can be made from the simplest starting materials by simple processes and that this could have taken place almost 4 billion years ago. They accumulated because there was nothing to consume or to oxidize them.

By 3BYA, microbial life was abundant and wide-spread. In the long interval leading up to that, self-replicating systems had developed that were able to make themselves from the abundant simple starting materials, and eventually from even simpler ones; water, carbon dioxide, ammonia or nitrogen, hydrogen sulphide and so on, as plants do today.

Thus far, we are on solid ground. As we try to unravel the story from here to more recent times, it becomes more speculative.

It had long been the notion that life originated in the oceans, possibly in lagoons where evaporation would concentrate the ingredients and allow the linkage of organic subunits to make the larger molecules. Then it was supposed that by chance alone, subunits linked together to form a protein with biological function. That is exceedingly improbable, and the idea has been supplanted by another.

Ribonucleic is the best candidate so far for being the first biologically important stuff and it, in several forms, remains central to the synthesis of protein.

This idea is supported by experiments that won the Nobel Prize in 1989 for Altman and Cech who discovered that RNA can be a catalyst, breaking and making bonds between its own subunits. Prior to 1989 it was thought that only proteins have enzymatic activity —that is, can act as catalysts of chemical reactions. The newer data show that view to be incorrect, and it has therefore been discarded.

Only 4 subunits have to link together, 3 at a time to form a code specific for each of 20 amino acids— each has its own three letter code. Interestingly, mathematically, there are 20 possible permutations of 4 things taken 3 at a time!

Furthermore, only certain pairings of a purine with a pyrimidine are possible, (Uracil with

Adenine, Cytosine with Guanine) so that the probability is greatly increased that a synthesis of biologically functional RNA could result from chance linkage.

(The conclusion to this article will be published in the next Newsletter)

MIDSUMMER MAGIC IN THE GARDENS OF ENGLAND + HAMPTON COURT FLOWER SHOW

A Royal Horticultural Society Approved Tour

26th June 2004 - 10th July 2004

By air from Victoria - $4299*

Eryl Morton will be escorting yet another garden tour to some of England's finest gardens—gardens that will be a blaze of colour in their midsummer splendour, many of which feature exceptional displays of roses and perennials. The tour aims to provide a relaxed itinerary that centres on four quality hotel locations.

Starting with 5 days of garden visits in the Cotswolds, the base is an old 14th century coaching inn at Chipping Camden. Gardens in this area include Hidcote Manor, Kiftsgate Court, Hodges Barn, Sudeley Castle, Rousham House, Oxford Botanic Garden and two outstanding private gardens. Application has also been made to visit Prince Charles' Highgrove Manor gardens.

The tour then moves down to Winchester area, in Hampshire, where guests will stay in a beautiful hotel with beamed ceilings and a distinctive gabled thatched roof. From this base, arrangements have been made to visit the private garden of the National President of Britain's Hardy Plant Society along with such notable gardens as Longstock Park Water Gardens, Mottisfont Abbey and Sir Harold Hillier's Gardens.

Then on through the beautiful Sussex and Kent countryside to a lovely hotel, styled as an Oast house, close to the elegant spa town of Royal Tunbridge Wells. Visits will be made in this area to such English classics as Hinton Amper, Nymans, Sissinghurst Castle, Great Dixter, Hever Castle and the RHS gardens at Wisley.

The final transfer is to a fine hotel in central London, providing an opportunity for shopping and theatre visits along with the final highlight of the tour—a day at the Hampton Court Flower Show, considered by many now to eclipse even Chelsea.

For more information contact Jane Purdie at Athlone Travel, Tel: 250 598 5252 or visit their web site at www.athlonetravel.com

* Based on double occupancy, + Air taxes
Single supplement - $675
Land only - $2899
Tour is limited to 28 applicants

A Note from the Editor

We have received a number of letters, some of which argue for or against the article on rabbits by Dr. Harvey. While we thank the writers for their communications, we regret that it is our policy not to publish correspondence in this Newsletter.

.NEWSLETTER EDITOR

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Finnerty Garden

(Photographs by courtesy of June Macey}

R. Malahat

The Stepping Stones