University Finnerty Garden Friends

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NEWSLETTER ● APRIL 2004

Dear Friends,

What a gorgeous day—temperatures in the high teens, clear sky and a real feeling of summer in the air. Now, of course, with March as dry as it has been, we need to water any plants that have been moved this spring, and so, I can start worrying about my water supply! A gardener's life has its problems, especially those gardeners working off a well and in an area with perfect (or should I say better than perfect) drainage. However, all the effort is worth it when we look at the spring display of flowers in our gardens and at the weather in the rest of Canada. We are indeed blessed.

The Finnerty Gardens are looking wonderful. Carmen and the advisory committee have steadily improved the planting in many of the beds, and the maintenance given by Tony's staff is first rate. Do plan a visit shortly to see the early species rhododendrons, the camellias and the assorted flowering bulbs. In another month, the garden will be at its best, so visit regularly. The Henderson bed is beginning to take shape with some widening and further plantings which will enhance it—we are trying for all-season bloom or colour.

This is the last issue of the Newsletter before the **Garden Sale**. This year, the sale dates are Saturday May 3 for the pre sale for volunteers and **Sunday May 4, for the main sale.** The plans are well underway and an exciting selection of plants will be available. In any case, it is a wonderful place to meet old friends as you browse through the many offerings. Plan to come.

And immediately after the Garden Sale, we are scheduling the **Annual Guided Tour of the Gardens.** It takes place on **Sunday May 9 (Mother's Day) from 1 to 4 pm.** I hope it is better weather than last year. I look forward to seeing you at the tour—it is **a wonderful time to renew your annual membership in the Garden Friends.**

Enjoy the spring weather and remember to walk through the Gardens.

Betty Kennedy

University of Victoria Finnerty Garden Friends

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Life—A Biography, Part II
(Continued from the last Newsletter)

Alec McCarter

Life Takes Hold

However it happened—it did. Whatever it was that was the first thing that could be called living, came to be. Whether by Creation or Chance, out of chaos came order. Life happened.

It would be rash to say that this period of the biography will be forever dark. Hopefully Homo sapiens has as many years still to come as are behind and it will surely be so that the processes that led to the formation of nucleic acids and to proteins from simple starting materials will one day be illuminated, but only if there is good evidence to support the conclusions.

We may also predict with equal certainty that debate between creationists and evolutionists will continue.

A very important thing happened—it could hardly be more important from our perspective. About 2.6 to 2.7 BYA, there appeared the first microorganisms, blue-green cyanobacteria that could carry out photosynthesis. Using radiant energy—light—from the Sun these new forms of life could break down water into its constituent free oxygen and hydrogen—the latter was bound to carbon from carbon dioxide in the form of sugars and for the first time, free oxygen appeared in the earth's oceans and atmosphere.

Oxygen is far too reactive to remain free for long without oxidizing something—fire is an example, rusting of metals is another, so it has to be replaced to maintain or increase its concentration. This was done by the photosynthetic microorganisms, and other life forms evolved to use oxygen better to meet their needs for energy. For the first time, ozone could form in the high atmosphere, efficiently absorbing harmful ultraviolet rays, and permitting life to spread onto dry land.

By the end of that Era, the Proterozoic (meaning First life), the first ancestors of multicellular life appeared, as recorded by their fossils. The Proterozoic Era gave way to the Cambrian and Ordovician periods of the Paleozoic during which an explosion of life forms resulted. Making this possible was the symbiosis of two or more of the primitive prototypes—the helping of one by the other—which soon led to the engulfing of one sort of microorganism by another.

In cells that were destined to become plants, engulfed cyanobacteria allowed the resulting hybrid to use light to drive its need for energy. The modified bacterium, now called a chloroplast retained its own molecule of DNA, separate from that contained in the nucleus of the host, and replicating independently of it. Even the nucleus of the cell is probably derived from some other creature that was taken up at another time.

And in animals, mitochondria, similar to chloroplasts but distinct from them, appeared in animal cells making it possible for animals to use oxygen, to get the most energy from their foods, and to provide the energy to move. Mitochondria too contain their own DNA which replicates independently of the chromosomal DNA in the nucleus. When it does replicate, it is distributed in the cytoplasm to daughter cells—that is why the mother—not the father, transfers it.

Things get More Complex but Less Speculative

There is strong evidence that this engulfing process has been a common event in the evolution of both plants and animals. It still happens in our own bodies. As one example, sexual reproduction requires two cells to merge. Another example is that our white blood cells take in bacterial cells should we suffer an infection, and they also absorb and clean up other debris like dead red blood cells.

If there is one thing known about the chemistry of life it is that hundreds or thousands of macromolecules must interact in very specific and regulated ways to bring about the assembly and function of all the parts and components of a living cell, and a living plant or animal—as they are known today. During their evolution, they have kept what is useful and economical and have discarded much, but perhaps not all, of that not needed. Constant change was here to stay.

The membranes that enclose the cell and its included bodies are masterpieces of engineering. The cytoskeleton, the nucleus, the chloroplasts, all are constructed to perform functions that are essential for the life and activities of the cell. It has already been pointed out that these organelles, are probably the remnants of ancient engulfed origin, whether of bacterial or a higher cellular form. Because these structures can be sequenced so that the arrangement of subunits can be determined with great accuracy, it is possiible to compare different organisms and to construct pathways of inheritance—to determine which sequences were retained or conserved over time and thus to construct a likely phylogeny—a lineage of inheritance.

How it Works

As all gardeners know, chloroplasts contain chlorophyll. Light falling on the leaf activates chlorophyll so that the radiant energy is taken up as chemical energy—the conversion of an energy-poor to an energy-rich molecule. This is then transferred to receptor molecules as needed in other reactions in the cell.

The energy is used to break down water to release oxygen. The hydrogen part of water reacts with carbon dioxide, starting the synthesis of sugars. This is an almost embarrassingly short description of what actually takes place.

Subsequent chains of reactions allow the manufacture of everything that the plants contain: sugars, starch, cellulose, proteins, fats and oils, sterols, scents, pigments, drugs, microtubules, chromosomes, membranes, chlorophyll and chloroplasts—everything.

On the other hand, animals need many substances premade, because they cannot make them for themselves—we are dependent on plants for our food.

The pathways by which the constituents of the cell are metabolized—meaning how they are made and how they are broken down—are mostly known and understood. The fundamentals for all living creatures are very similar. It has been said with some truth, "There is little difference between the grass and him who mows it."

This knowledge extends to there now being available detailed maps of the arrangement of the building blocks of nucleic acids to anyone who has a computer and who has some facility in searching the net for information. It is known how the genetic code is constructed, and used. And it is known how to manipulate the genetic information—to add to it, change it, and to modify function. "Antifreeze" genes from fish have been introduced into plants in an effort to increase frost hardiness

The genes of chloroplasts of many plants have been mapped on their single chromosome. Their functions are known as are those of the cell in which the chloroplasts are housed. The ways in which the genetic codes are read and translated, and the controls of these functions are largely understood. They are to control and direct the synthesis of proteins.

How they are made, their detailed structures, the sequences of amino acids and other components of many proteins are also known. For many of them also the three-dimensional structures, which parts are coiled

(helical) or not, and how they are folded have been determined in great detail. It has been possible to synthesize proteins that have enzymatic activity—and to study how changes in the structures of the active parts of the molecule might have changed with time—in other words, to discover something of how the molecules evolved.

These are bold statements, but they are not exaggerated. Our vision is no longer limited. Out of this new science of protein interactions, called Proteomics, we can expect knowledge that will lead to new medicines and new treatments for diseases of mankind..

An Appreciation

Are living cells only machines? We human beings are privileged in having inquiring minds that can unravel and appreciate the intricacies of how things are constructed and how they work! From the smallest sub-atomic physics to the farthermost stretches of the Universe, the whole fabric of existence is being enlarged. More than ever we see the beauty of this Universe and appreciate our experience of it. Far from being fearful of it, or crushed by it and our growing knowledge, we know that we are a part of it. We share a very long history with all living creatures on Earth.

I sometimes wonder if Man is somewhat in the position of a being on a hypothetical, timeless planet looking at a watch. We can look at it, take it apart, analyze the bits and describe all the pieces, what they are made of, how they fit together and move. We can make a watch and have it function. We can inspect it working but if we have no concept of time, we are not likely to figure out the essence of the timepiece.

But perhaps, I am short on vision of what might be. There are scientists (including Francis Crick, who with James Watson elucidated the structure of DNA) working on the nature of consciousness, of sentience, apparently with some success.

It is an amazing story that, to my mind far surpasses any other in beauty and complexity, in wonder and marvel, a testament to the human ability to think, to perceive, to imagine, to invent, to comprehend, and appreciate what is around us and how it happened to be. I do not pretend to understand this existence. But what I do know increases my sense of awe and joy in being, and reverence both for life and the non-living.

Jelena de Belder

M. J. Harvey

In 1952 two brothers in Belgium, George and Robert de Belder, bought an acreage of derelict land covered in weeds and clumps of shrubs and trees. The area, called Kalmthout, had been used for growing vegetables in World War II, but early in its history had been a nursery started in 1856 by Geer and taken over in 1896 by Antoine Kort who raised Rhododendrons and conifers on the sandy soil. Kort was also involved in hybridising numerous shrubs including *Hamamelis* species. The nursery business closed in World War I, Kort retained the property but eventually the rows of shrubs grew into each other forming impenetrable tangles in places.

While the brothers were restoring the old nursery they were visited in 1954 by Jelena Kovacic, a recent graduate of horticulture from Slovenia in what was then Yugoslavia. Robert and Jelena fell in love, married and carried out the restoration of Kalmthout which is now one of the world's more famous arboreta. Handing Kalmthout over to a trust, they later created an even larger arboretum—Hemelrijk ('kingdom of heaven' in Flemish)—near Esschen on the border with the Netherlands.

Robert and Jelena were responsible for not only the Kalmthout restoration but also introduced several shrub cultivars. The witch hazel *Hamamelis x intermedia* 'Jelena' was teased out of one of Kort's thickets, as was 'Diane', named for their daughter.

Here in Victoria 'Jelena' is one of the best winter shrubs. In fact, let me throw caution to the wind and say it is *the* best. The narrow, ribbon-like petals are a coppery orange with a

bit of yellow and start to bloom in mid December. A bunch of twigs arranged in a vase in the house open their blossoms in three or so days in December and put out a perfume resembling the Christmas mandarin orange peel. Frost and snow damage neither the buds nor the open flowers—they bounce back on the next warm day. The flowering period, being in the cool season, lasts into March. There is no better value in winter shrubs and in the fall the leaves change to vivid orange and yellow colours.

Other cultivars for which the couple were responsible include *Hydrangea* serrata 'Spreading Beauty', H. *paniculata* 'Brussels Lace', 'Burgundy Lace', 'Unique', 'White Moth' and 'Pink Diamond'.

Jelena de Belder was elected a Royal Horticulture Society Vice-President in 1998, and died 31 August 2003, aged 78. Part of this account is derived from her obituary in the RHS journal, *The Garden.*

What did the Drought do?

A. McCarter, October 31, 2003

The summer of 2003 was one of the driest on record. It was a challenge to keep the garden watered, and there were consequences —some bad—others welcome.

About fifteen years ago, we had installed a sprinkler system that consisted of seven zones, designed to put down a fine overhead spray on all the beds and lawns at a rate of about one-inch a week. So many zones were needed to allow each to be watered in turn, thus preserving the water pressure and the same rate of delivery everywhere in the garden.

In 2001, restrictions on the use of water were ordered by the muncipality making it illegal to use the overhead system. It was legal, however, to use a system that consisted of many micro-head sprinklers placed where they could do the most good for individual plants. The theory was that this would reduce the amount of water wasted by falling on ground that did not need to be watered, and would also reduce the amount that evaporated, not inconsiderable when applied in a fine spray to a large area.

Considering all the effort that my wife had put into building a fine garden—I was determined to see to it that it would not suffer from drought. I was offered a good price to retrofit the system with micro-head sprinklers and this work went ahead in the spring of that year, 2001.

Oddly, the municipality laid down rules about the days of the week on which one could sprinkle, and the methods to be used (or not used), but did not regulate how much water could be applied in any session, or per week. The rule could be made useless simply by running the slow sprinklers for a longer time. The installing company set the sprinklers to run each zone for twenty minutes, every-other day. For the summers of 2001 and 2002, this was adequate. A few heads needed moving, but altogether the garden fared well. The past summer of 2003 was another matter.

We lost Lem's Rhododendron bureavii, We also lost the Arnold Arboretum's Hamamelis 'Arnold Promise', the Chinese Hamamelis mollis, and several Himalayan blue poppies (Meconopsis betonicifolia). These were treasures whose loss I very much regretted. Our beautiful Iris ensata and the Cardinal flower (Lobelia sp.) also took a beating.

But there were some losses about which I rejoice. Among these, Sagina, or Pearl wort was a real nuisance that in previous years had smothered so many plants and was so difficult to eradicate. Another smotherer was Mimulus moschata, and a third was the lovely- pink-flowered sorrel, Oxalis adenophylla. This plant had been getting sadly out of control, appearing everywhere in the garden, though now its numbers are greatly diminished. And a fourth that seems to have virtually disappeared (I hope I haven't spoken too quickly) is Allium inodorum—the false-garlic..

Despite the sprinklers being on for twenty minutes every other day, the ground was moist only in the immediate vicinity of the sprinkler heads. The inadvertant cutting of some of the

small bore tubing by weeding instruments resulted in a loss of pressure to all of the heads in a zone—and the breaks were difficult to find.

Rhododendron bureavii, Lem's plant, was used by him to cross with R. 'Fabia' to make such fine hybrids as 'Hansel' and 'Gretzel'. Unfortunately, bureavii was just beyond the reach of one of the sprinklers and I did not know that until it was too late. That is one of the faults of an automatic system—it gives one a false sense of security. A day lily near bureavii flourished—perhaps it got all the water. The same was true of Hamamelis 'Arnold Promise'—something else got the water. Unlike the other Arnold's Promise, (he of California), the witch hazel won't be coming back.

Until the greater supply was cut off by municipal regulation, these plants received enough water, but a microhead didn't supply enough. H. mollis had been planted in too dry and sunny a spot and not enough water was supplied. Interestingly, other things took the places of these plants and no one would know the difference now. Instead of Arnold's Promise we have Vinca major with variegated leaves. H. mollis has been replaced by a vigorous, grey-leaved Senecio laxifolia, (aka Brachyglottis laxifolia) growing from nearby into the space left by its departed neighbour.

Perhaps we could have prevented the loss of some of these plants with a deeper mulch—but that was not done and there is no going back. Peggy planned the garden so well that it really does look after itself remarkably well. Three summers have passed since she became ill and the garden is still beautiful.

We grew the blue poppies from seed and could easily produce more. They are not difficult provided only that they be stopped from flowering in their first season. This is said to ensure that they will be perennial. I do not have a control experiment on this, so that I cannot swear that what I have just written is not a myth—though I suspect it is. I think that quite a long article could be written on plant and gardening myths.

Sagina or Pearl wort formerly grew inches deep in some of the wetter parts of the garden. Trying to control it by using a Dutch hoe, would just leave the roots behind and new growth would soon follow. Now, there is little to be seen. I don't miss it.

As for Mimulus moschata, this is an interesting plant that was readily spreading throughout the garden, growing up and over dwarfed evergreens and other choice plants in green and yellow abandon. I remember the late Ernie Lythgoe asking Peggy for some. I have often wondered if he had the same experience of it as we have had.

It is said that soon after its introduction into cultivation, it lost its native musky odour in all parts of the world at the same time! It is a pretty thing with its numerous small yellow flowers against pale green foliage. The stems are densely hairy. When a handful is grasped to pull them out, the reward is a slimy hand. The fleshy white roots break off as they are very brittle and are left in the soil. Digging them up invariably leaves many small bits, each of which is enough to allow another plant to start. This reminds me of Houttynia (Painter's Palette) which also starts from bits of root left in attempts to remove it. I despaired of ever bringing these thugs under control—but induced thirst and desiccation never occurred to me as the method to use.

Oxalis adenophylla was given us as a choice plant. It is advertised as a good one, suitable for a rockery and resistant to drought. It is also said to get sick in wet soil. I have news: In our garden it thrived as long as there was lots of water—and it has almost disappeared where there has been little. No wonder some friends have difficulty growing it. They are following the story about it being good in the rock garden. Give it lots of water and see what happens!

And lastly, Allium inodorum, or Nothoscordum inodorum, or False Garlic (with no odor of onion) is a dreadful pest. I have referred to it earlier as 'the weed from hell.' I have learned that it is much more widely present in Victoria than I had known or imagined. A fleshy, white, bulbous base sends off many offshoots of bulbils that are white when immature (looking very grub-like, or perhaps, like a root aphid). When ripe, it is of the size, shape and color of an apple seed. These are

left behind when the main bulb is dug up. That is hard to do because the fleshy roots are long and the whole apparatus is about ten inches (or more) deep in the soil. The long green iris-like or flattened onion-like leaves and the long thin stalk with an umbel of cream-coloured, onion-like flowers are readily pulled up without budging the bulb. The umbel of flowers matures rapidly and produces a large number of seeds which fall to the ground if disturbed. Every one, as far as I can tell, is the source of a new plant. This adds up to being a recipe for everlasting life as far as the plant is concerned, and for the production of a healthy clump of more bulbs, more tops and more seeds. They seem to thrive on 'Roundup'. I even tied cotton balls soaked in 'Roundup' to the leaves—but to no avail.

The flowers, though small, are rather pretty and sweetly scented. The drought, however, has been a distinct setback to the plants that were (are?) in our garden. I can hardly wait for spring to see whether they have just been hiding to make an early appearance after the winter rains—or if they have gone for good.

"This", as they say on radio, "this is the story that we are following as it develops. Stay tuned."

IMPORTANT DATES FOR YOUR CALENDAR

GARDEN SALE.
Main Sale, Sunday May 4.

ANNUAL GUIDED TOUR OF THE GARDENS.
Sunday May 9 (Mother's Day) from 1 to 4 pm.
This will be an ideal time to renew your Annual Membership in the Garden Friends.

.NEWSLETTER EDITOR

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