

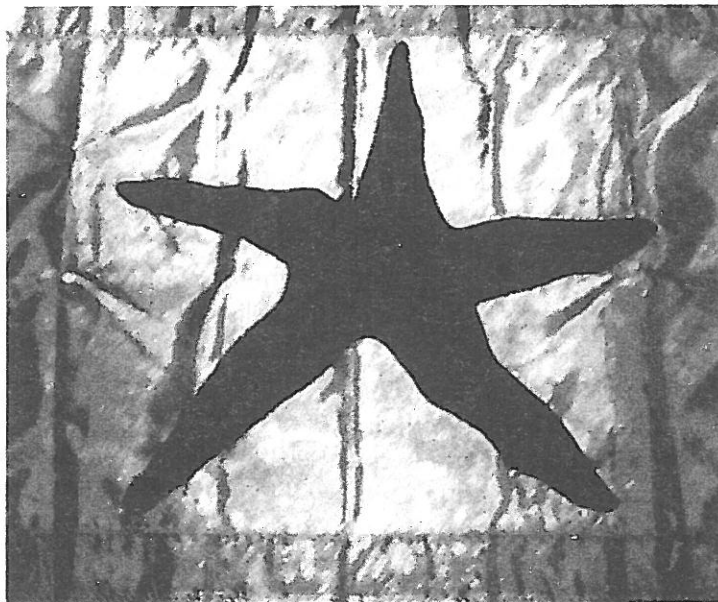


news, views, reviews and interviews on island community and conservation

## A Star is Born

By Robin Ridington

Sometimes, even the laid-back lotus eaters of Galiano can get stressed out with politics and controversy. Last year, Allan Forget and Peter Renner decided to do something to remind us that we live in a beautiful place and share a very special community. Their idea was to ask people to submit designs for our very own Galiano flag. In due course, twenty-seven submissions appeared and were put on display in Trincomali bakery. Members of the community were invited to write out their comments next to each one. Only Allan and Peter knew the identity of the designers. In October, a jury of islanders met with Jamie Webb, owner of The Flag Shop in Victoria, to select a winning design. The jurors were Jamaica Gilson, Margaret Howell, Andrew Loveridge, Robin Ridington, Alistair Ross, James Sharp and Elizabeth Steward. Jamie Webb gave us an informative discourse on flag design and showed us illustrations of flags from hundreds of countries, states, provinces and organizations.



*The New Galiano Flag*

We concluded that a simple design with no text would be best for Galiano. The flag did not have to proclaim "Polo" or "Tommy" or even "Galiano" or "Lotus Land." We didn't need either a drawbridge or a suspension bridge to the mainland. The less said about BC Ferries the better. The flag should transcend the issues of any particular time, but suggest an essence of this special place. Many of the submissions fit these criteria. There were some striking designs, some funny ones, and some that were ironic. Jamie

supervised several rounds of balloting, during which we eliminated designs that we thought might be too busy, or too difficult to manufacture.

The first rounds still left us with a number of excellent designs, but it seemed to be coming down to mountains, trees, sunbursts or starfish. Some designs combined two or more of these images.

In the end, we agreed that a simple, single image was visually most pleasing. So it was that the purple starfish designed (we learned later) by Marina Szijarto and Linda Lopez won the day. Its name suggests a union of sea and sky. The starfish, like Galiano, is surrounded and sustained by ocean water. Mostly, though, we liked the look of it. So did the crowd that gathered to honour its unveiling at the South



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Submissions, reactions, illustrations and poetry are welcomed for publication at the editor's discretion. Reprinting of articles is encouraged, but please notify us, and credit both the author and *Archipelago*. Opinions expressed are not necessarily those of the publisher.

### **A Star is Born** *From page 1*

Galiano Community Hall on November 20, 1999. All present applauded Marina and Linda for their simple, elegant design. Thanks are also due to the members of the selection committee, and to Keith Holmes, who helped The Flag Shop select material for the blue border and field and the purple starfish. Most of all, special thanks to Allan and Peter for coming up with an idea for bringing the sometimes disparate members of our community back together. Sometimes, I think, flag waving can be a good thing. ■

## **EDITORIAL**

Jillian Ridington

Red currants and hummingbirds returning; fawn lilies and *Collinsia*; the signing of the Land Use By-laws; a new office for the Galiano Conservancy Association and a new Galiano flag; all are signs of hope and renewal for this small island. And, I hope, so is the reappearance of Archipelago after too long an absence.

We disappeared for a while because Greg Foster found opportunities that took him away from Galiano, and the rest of us perhaps found his shoes too big to fill. Our feet haven't grown, but we think the need for *Archipelago* has. Galiano now has several excellent news media. *The Active Page* continues to keep us abreast on local events and activities; *Brass Tacks* is covering political matters in a timely, clear and informative way; the Galianointrust website is keeping residents informed on a weekly basis. *Archipelago's* focus will continue to be "news, views, reviews and interviews on island community and conservation."

We will publish articles that are reflective, philosophical, and informative about what it means to live on Galiano, and reviews of books and other media that we believe will enhance your life here. The information will, we hope, not go stale quickly, because we are not yet sure whether or not we will go back to our quarterly publishing schedule. We do promise to appear when we can, and to bring you the best we can offer.

The contents of this issue seem eclectic, but they meet the criteria mentioned above. All are relevant to living on our coastal islands, and we hope they enrich your life here, if only for a little while. Happy Spring! ■

## AWASH IN THE FRASER RIVER PLUME

by Paul LeBlond

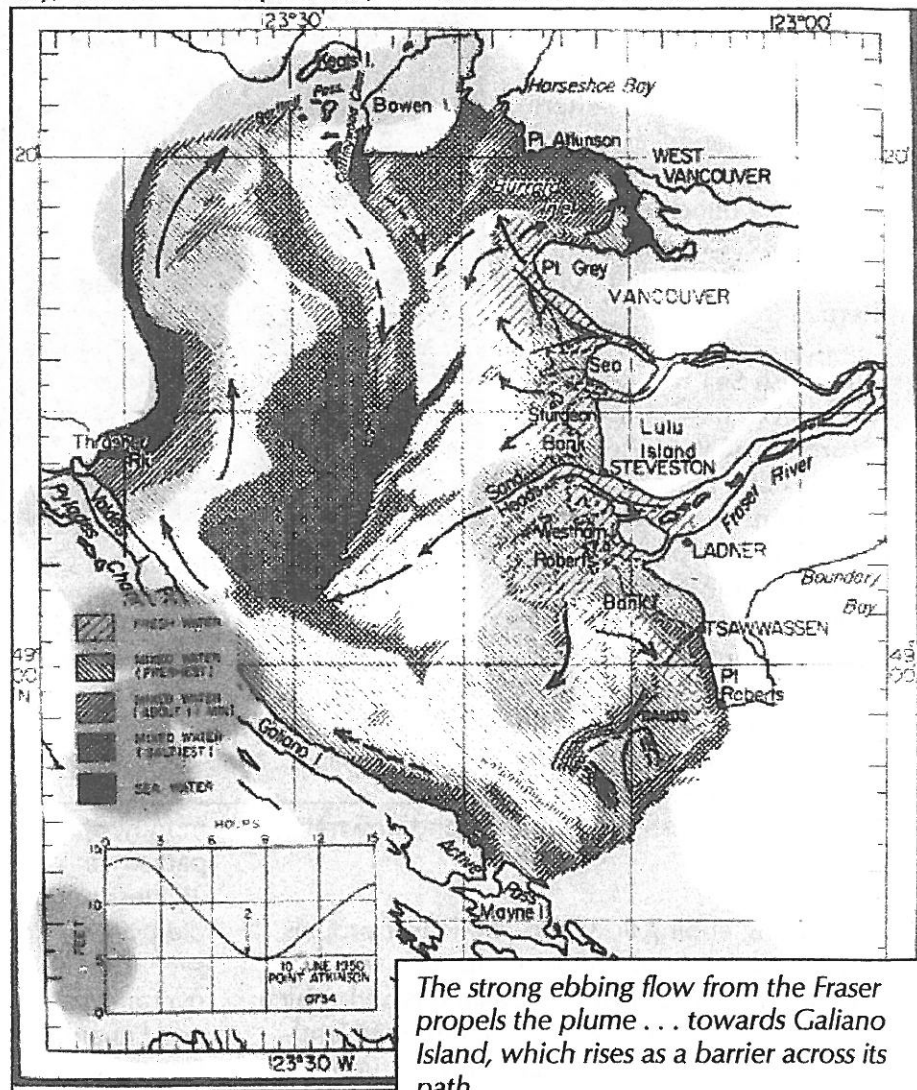
Islands are defined by the waters that surround them. In this area, our surrounding waters include the Strait of Georgia and the channels that connect it to the ocean, from Puget Sound in the south to Queen Charlotte Strait in the north. This coastal realm is often called the Salish Sea.

The Salish Sea as a whole is an estuary, defined by oceanographers as a semi-enclosed coastal area receiving significant freshwater runoff. This oceanographic definition is somewhat broader than the more familiar geographic concept, which defines an estuary as the area around the mouth of a river. In all estuaries, the interaction of winds, tides and runoff causes vigorous mixing and upwelling, which create an environment rich in marine life. Everything that happens to the waters around our islands can be understood in terms of the estuarine context.

Under the action of the moon and the sun, the waters of the Pacific Ocean slosh back and forth twice a day: we call these movements the tides. As the sea level goes up at the mouth of Juan de Fuca Strait, water floods in towards the inner channels of the Salish Sea, gradually filling them as the tide rises. A few hours later, the sea level falls in the Pacific, and the coastal sea empties as the tide ebbs. Back and forth, twice a day.

Islands stand in the way of the rising tide, channelling flow to the passages between them. As the tide rises on the southern side of Active Pass, for example, water is pushed through to the Strait of Georgia. Because only a relatively small

in water level between the ends of the pass continues to increase as the tide rises, and the currents become quite strong. The rushing of the water causes waves to steepen and break; strong turbulence is generated, mixing and homogenizing the waters in the pass. Eventually, the Strait of Georgia fills up, the water levels equilibrate, and the current slackens. Then the

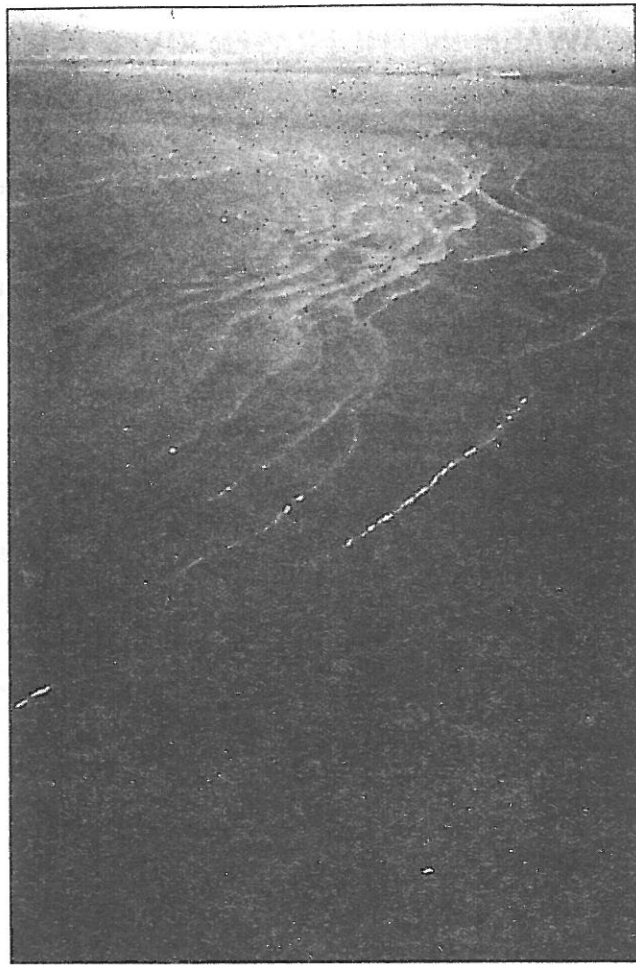


tide falls and the current reverses. It is clearly no accident that Active Pass is such an interesting and biologically productive area: those tidal currents keep the currents well mixed and distribute nutrients and food through the water column.

Meanwhile, rivers continuously bring to the sea all the rain and snow that falls on our coast. Freshwater is lighter than saltwater, so it floats on top of it. As it spreads out on the sea, the fresh, muddy water layer, pushed by winds and tides, forms a pattern similar to that of smoke rising from a chimney, swept hither and fro by the winds. Engineers, ever poetic, call that pattern a "plume" (French for feather). French engineers, even more romantic, call it a "panache," meaning a bunch of undulating feathers, like those attached to the helmet of a hero.

The Salish Sea receives more water from the Fraser River than from all the other streams that drain into it. In the summer, during freshet (the peak flow period), the plume fills the central Strait of Georgia and, on ebbing tides, spills out through channels such as Active and Porlier Passes. The plume covers the Strait with progressively salty water seawards; winds and tidal currents push the plume up and down the Strait.

The strong ebbing flow from the Fraser propels the plume (and ships afloat on it, such as Captain Galiano's in 1792) towards Galiano Island, which rises as a barrier across its path. Our mainland-side shore is bathed by plume waters, turbid, brackish and WARM. Yes, the low-density plume, floating as it does above the colder salt water, traps the heat of the sun and is responsible for making it so much more pleasant to swim at Pebble Beach than at Montague. The plume does NOT reach around to Montague, because those



*Internal Waves in the Strait of Georgia. Waves on the interface between the fresh water upper layer and the salty water below alternately stretch and compress the much shorter windwaves at the sea surface, creating successive bands of breakers and smooth slicks. Note the barge for scale.*

muddy, spreads over an older lens, already partially mixed with salt water and thus denser and less muddy. The transition between new and old lenses is sometimes very abrupt, and can be seen from above as a sharp change in colour over a distance of just a couple of metres. This rapid change in water properties is called a front. Fronts often accumulate flotsam; they are particularly noticeable under calm conditions, and can readily be seen from the ferry.

The plume also supports internal waves. Everyone knows what waves do. Water, displaced from its equilibrium, seeks to regain it,

raging tidal currents in Active Pass mix it with a lot of colder salt water, leaving the waters of Trincomali less turbid (notice those shell beaches at Montague? clams thrive in clearer waters) and a lot more frigid.

As the tide rises, it backs up the flow out of the Fraser, causing upstream flow as far as the Deas Tunnel and pushing water up in tides all the way to Mission. The freshwater outflow at Steveston pulsates from nothing at flood tide to a strong jet at ebb. The plume is thus formed of a series of lenses of water, contributed by successive ebb tides. The latest lens, very fresh and

overshoots and bounces back again, pushes the water next to it, and so on . . . a wave is born, which can travel far away from its source, a radiant messenger of the disturbance that created it. Surface waves travel on the interface between water and air. Internal waves travel on internal density changes, especially along sharp changes like those between plume and salt water. The density progressively salty water seawards; winds and tidal currents push contrast between fresh and salt water at the bottom of the plume is about a hundred times smaller than the change from air to water at the sea surface.

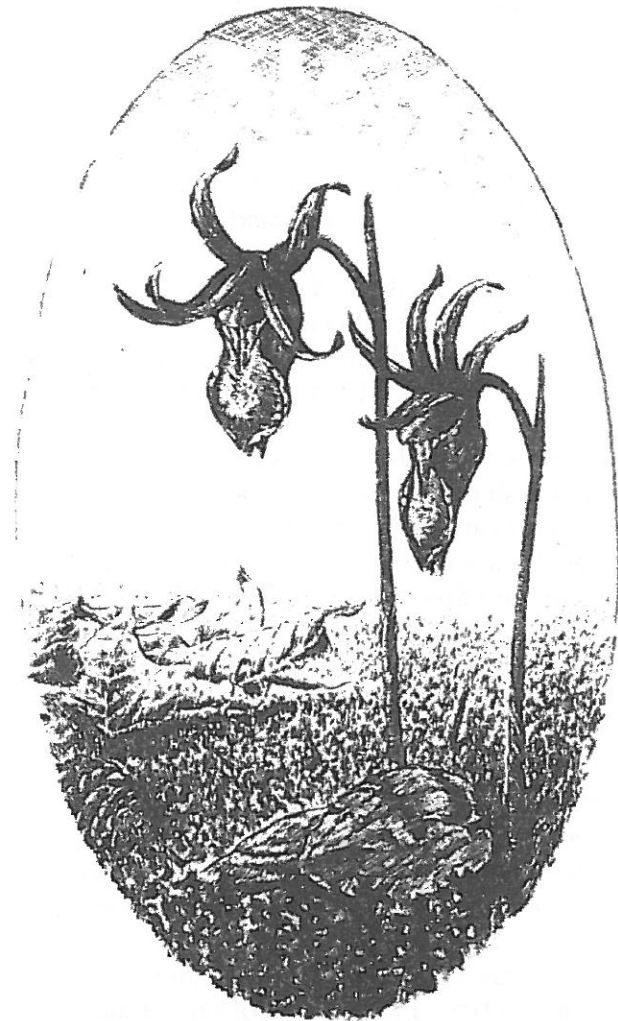
Internal waves are thus a lot more sluggish than surface waves. Rising tides disturb the edge of the plume at strong tidal passages (especially Boundary Passage and Active Pass) and create internal waves that radiate away in broad spreading patterns. In typical internal waves, the plume-salty interface dips down to about twice the plume depth every hundred meters or so in a sharp trough. The long snaking troughs advance at a speed of about 1 meter/sec: a walking pace. In contrast, an ordinary surface wave one hundred meters long between crests (or troughs) would travel, in the deeper parts of the Strait, at a speed of 18 m/sec, or 65 km/hour: as fast as some of us drive down Porlier Pass Road.

At the dips in the interface, the plume is thicker than elsewhere. From above, the water looks muddier in the dips, because there is a deeper layer of muddy water near the surface. Coloured lines seen from above correspond to troughs (the thicker plume) of the internal wave; darker bands in between correspond to crests (the thinner plume). These shadings are best seen from the air, but are also often visible from the upper deck of the ferry.

The sea surface is hardly displaced at all by the internal motion, but shorter wind waves riding above it are distorted by the water displacements that are occurring within the internal wave. Over the dips, converging flows steepen waves, making the surface rougher and less mirror-like.  
Editor's note:

Bands of shiny and darker water, best viewed from the air, reveal internal wave trains.

Keep an eye open when you cross the Strait this summer – you may travel through the Fraser River plume. Look out for fronts, and for the long bands of ruffled or slick water that betray the presence of internal waves. ■



Calypso Bulbosa    Ronaldo Norton

## SEAWEED POTPOURRI - AN OVERVIEW



Tony Kingscote

*Tony Kingscote was a philosopher, naturalist and biologist who lived on Galiano for many years, prior to his death in 1994. We believe Tony's observations are timeless.*

*The seaweed image repeated at the top of this page was scanned from seaweed collected & dried by Diana Thompson, Saltspring Island.*

Have you heard the bell ringing out on the shoals beyond Rip Point off Galiano's Cain Peninsula? On the shoals' submerged rocks, Bull Kelps thrive - they are the largest seaweeds in the world. Before the bell's time, the Kelp beds warned mariners of the shoals' presence. The Kelp saved many a ship from being wrecked. In winter Kelp dies and vanishes, and in fog it could not be seen, hence the buoy bell's installation. There are other Kelp beds along the shores of Galiano. Look for them near rocky cliffs in Active Pass, Georgeson Bay, along the Trincomali Channel, in the turbulent waters of Porlier Pass and down our shores bordering the Strait of Georgia. An excellent spot to study Bull and other Kelps is at dead low tides on the reefs of Gray Peninsula in Montague Harbour Marine Park. (Wear shoes with non-slip soles. Rocks are slippery and tides swift where Kelps grow.)

Interspersed between our rocky shores are sheltered bays and beaches of sand, mud, shell, cobble stones or mixtures of these. Because of their shifting nature, they do not have as many seaweeds as rocky shores. We'll come back to the exciting seaweed finds we may make on these beaches anon. Meanwhile back to the rocky habitats of Seaweeds, also known as Marine Algae or Algae Marine.

**On the Rocks:** On cliffs and big boulders, where sea and earth meet, is a broad black band that encircles such places the world around. You can spot it here and there on beach strolls or from the ferries and other boats. Orange encrustations may be seen in this same marginal world, and sometimes green growths. Another strange growth in this upper shore zone looks like tar on the rocks. These plants are variously lichens, algae, or in the case of the last, possibly some mysterious phase in the life of a seaweed? They tolerate salt spray, heat and cold.

Lower down on intertidal areas seaweeds of multitudinous forms, colours and species carpet the rock floor. Colours are green, browns and reds, blending to form bright or subtle shades and tints. A thrilling discovery is that of the Rainbow Seaweed which flashes, from its moist blades, all the colours of the spectrum (a treat for very low tide days).

In the upper tidal zones are Rockweeds and Sea Lettuce and other species of seaweeds. The Rockweeds blanket their areas with masses of growth, yellow, brown much branched plants. Their swollen tips are conspicuous. Sea Lettuce looks just like its name suggests; it is even good to eat raw (if from unpolluted waters).

Let us pause a moment to master seaweed language! It is quite easy, but different from that of land plants. A root becomes a Holdfast, which does only what the name implies. A stalk becomes a Stipe in the sea, and a leaf a Blade. In addition some seaweeds have Floats which are carbon-monoxide gas filled to keep them upright

and sometimes to contain their reproductive cells.

In the same area as Sea Lettuce, and where fresh water seeps onto the rocks, we may find conspicuous green Sea Hair - long thin hollow tubes. There are some beds of this seaweed in Murcheson's Cove off Sturdies Bay Road. Sea Hair also is found where seepage from septic tanks occurs on shoreline rocks.

Great quantities of Rockweed, Sea Lettuce and Kelp are washed up on our beaches after storms. They are eagerly sought and collected by island gardeners for mulching, digging in and for plant seaweed tea.

Let us now go down to the low tide and subtidal zones of our rocky shores. (If the tide were in we would be ten or more feet under water!) Here seaweeds thrive in great profusion. They cover the rock bottom with tangles of the huge brownish blades, some several feet or metres long. In the water they undulate and dance in the flowing tides, fascinating and almost hypnotizing to watch.

What are the names of some of these seaweeds? Their common names are often quite descriptive: Feather Boas and Split Kelps, Sea Cabbages and Cauliflowers or Turkish Towel. Iodine Seaweed may be detected by its smell. Some others, less obvious, are identified quite readily by referring to the texts, especially those of Snively, Kozloff and Waaland. (See Sources of Information at the end of this article.)

Amongst some especially interesting Kelp species are Sugar and Acid Kelps. We've probably eaten the former in ice cream or imbibed it in beer. Acid Kelp, on decaying, liberates sulphuric acid - salt water aquarists beware of its use!

Sargassum Seaweed, now in our waters, brings visions of tall ships of long ago, becalmed forever in the Sargasso Sea.<sup>1</sup> How did this seaweed reach Galiano? It came with oyster spat from

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<sup>1</sup> Located in the North Atlantic between the West Indies and Azores, the Sargasso Sea is known for its large amount of floating Sargassum Seaweed.

Japan in the 1920s. All along B.C.'s coast Sargassum proliferated, forming floating masses which tangled up in propellers. Fishing with rod and hand line became hopeless. Somehow mercifully Nature slowed the Seaweed's growth. Sargassum Seaweed is brown, up to about a yard or metre



*Rockweed (Fucus gardneri)*

in length, much branched with numerous small blades and an abundance of minute floats about the size of small match heads. Look for this plant anchored among subtidal Kelps (of which it is one), floating in masses offshore, or washed up on beaches.

Two other interesting seaweeds are Dulse or Red Laver and Sea Sacs. Both grow on rocky shores. The former resembles Sea Lettuce, except for its colour and other details. Dulse is greatly in demand for food and medicine by British Columbia Coastal Indians. Sea Sacs catch the eye - they are thin-walled sausage-shaped plants almost filled with water; their height is several inches or centimetres tall. Squeeze one gently and see what happens!

Exploring tide pools at any level on our shores is often rewarding. Take along some hard boiled egg or raw hamburger; cast a little in a tide pool. Either food will attract many small creatures hiding in the pool's seaweeds. You may have to wait a while until the aromas of the food reaches

their olfactory organs (some have not got noses) - then the excitement begins!

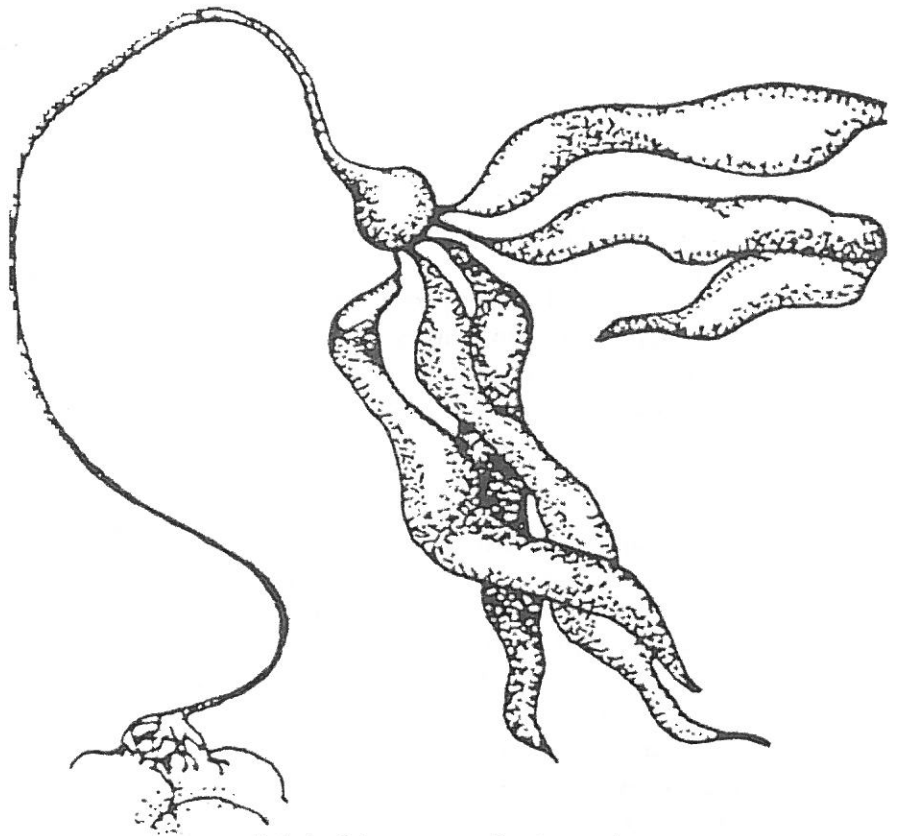
**Into Deeper Water.** Subtidal bottoms on rocky sloping shores may descend rapidly into great depths, in places to between 100 and 200 feet (30-60m). At ten fathoms (60 feet or 20 metres) few plants remain save the Coralline Seaweeds, pink or red predominately in colour. These plants are composed of small articulating plates, shell-like in texture and appearance. There are several species of corallines, some are attached to the rock by holdfasts, others by encrusting themselves on its surface. Besides living at great depths, corallines thrive in tide pools especially along the eastern shores of Galiano. You may find these beautiful seaweeds washed up on our beaches, white perhaps if dead, but always a thrill to find. At the above great depth too, Bull Kelp may start its remarkable double life.

### Generation After Generation

How do seaweeds reproduce their kind and pass their lives? Let us take Bull Kelp, *Nereocystis luetkeana*, as an example.<sup>2</sup> It is springtime. A single celled Bull Kelp egg, one of millions floating about in the sea, settles on a rocky bottom. The first job the egg must do is to attach itself securely to the rock. The genes in the egg direct its activities. The cell begins to multiply, building of the holdfast is completed, stipe or stalk construction follows, solid and strong at its base, from then on hollow; other proliferating cells soon have the bulb-like float created and filled with carbon monoxide gas. Tiny blades or leaves appear attached to the float. Green chlorophyll is stored in the blades but its colour is obscured by brown pigments.

<sup>2</sup> There will be variations in the lives of other Seaweeds.

Chlorophyll and available light synthesize carbohydrates for the growing plant's food needs. (A by-product of photosynthesis is the gas mentioned above.) Now this eventual giant Bull Kelp, largest of the world's seaweeds, is perfect but only 6 inches (15 cm) in height. Its float is grape-sized and the blades are pencil length - an infant in the depth of the sea!



*Bull Kelp (Nereocystis luetkeana)*

At this time, if we could look through some underwater viewing device, we would see vast numbers of the young Kelps swaying and dancing on the rocky bottom - a sight to remember.

But now our young Kelp is in trouble. All about it, other seaweeds are growing up - some at higher levels; sea soup (plankton) is daily thickening, Fraser River floods are silting Galiano waters. All these factors are combining to reduce sunlight reaching the depths.



Our Kelp, to reach the sea's surface and sunlight, must grow from 60 to 100 feet (20-30m). This growth takes place at a phenomenal rate. Cells begin to multiply by the millions. The genes direct uniform growth of holdfast, stipe, float and blades until the holdfast may be a foot (30 cm) in diameter, the stipe hose-like and perfectly round on cross-section; the float more or less the size of a large grapefruit with enough gas in it to support the long wide blades and heavy weight of the stipe. By early summer the Kelp is fully grown, all parts sleek, shiny, strong and clean.

This state of perfection does not last for long - just for the summer months. Our plant becomes host to many permanent guests. Bryozoans live and build their colonial homes on the Kelp's surface. Sea Lettuce decides to attach itself to the float - a good spot for sunbathing. Crabs and strange invertebrates make themselves at home on whatever space there is left. The ramification of the holdfast area are a palace and hiding place for small creatures. Passing schools of herring glue their eggs two inches (5 cm) thick on Kelp's blades. (Some First Nations people still collect the blades with eggs for food. For anyone else this is by law a no-no.)

Our Kelp now lives in a community of many similar. Such communities of Kelp beds . sometimes cover large areas of rocky sea bottoms. At low tides floats and blades and long parts of stipes form rafts on which sea gulls, Great Blue Herons and other seabirds come to rest or fish watch.

Below the waves these Kelp beds are underwater jungles in which other Seaweeds thrive and many creatures dwell. Some are strange invertebrates: spider crabs, sea urchins, starfish, sea cucumbers or huge jellyfish are among residents and visitors. Ling Cod, Rockfish, Otters and Seals hide in or hunt their prey in or around the beds. Octopuses find their lairs and establish their territories in the Kelp bed terrain.

Autumn comes. On our Bull Kelp's flowing blades conspicuous dark brown spots appear. From these areas millions of microscopic spores are delivered into the sea. Early winter comes,

our Bull Kelp is ripped off the rocks and washed away by storms. It has completed a sexless generation of life. Paradoxically it lives on into a sexual generation. The spores, mentioned above, grow into minute seaweeds (only clearly seen under a lens), either male or female, respectively producing sperm and ova. Able to swim, pairs find each other and unite to create fertilized eggs. The sexual generation has completed its role in the life of Bull Kelp. The eggs scattered over the surface of Galiano's rocks ensure new crops of Kelp annually.

Dangers to our Kelp beds and Seaweed in general are pollution, over-harvesting and natural enemies. Of the latter, Sea Urchins destroy whole beds of young Kelp. Sea Otters kept the urchins under control until fur hunters practically wiped the otters out.



*Polysiphonia* (a fine filamentous seaweed)

**Undersea Meadows.** Do you believe that flowering plants grow under the sea? The Eelgrasses do! Like our whales they originally came out of the sea, adapted to life on land then returned to the sea, with male and female flowers, capable still in some species of producing seeds. Coastal Indians gathered these seeds to grind into flour.

Large underwater meadows of Eelgrass are established on the sandy bottom of the sheltered bay adjoining the south boundary of Bellhouse Park. Another Eelgrass meadow, not quite as lush, lies north of the boat launching ramp at Montague Harbour Marine Park. Eelgrasses have well-developed roots and rhizomes that not only anchor the plants firmly to the bottom, but hold the sand and silt from being continually shifted by wave action. Their leaves are long (3 to 9 feet, 1-3m) ribbon-like, narrow and very green. These Eelgrass meadows are the home of many sea creatures - flounders, Dungeness crabs, spider crabs, nudibranchs, heart cockles, moon and bubble snails, just to mention a few. At low tide the grass lies wet and prostrate, protecting its denizens, including fish, from sun and predators.

Related Surf Grass is usually found on open coast water. Eelgrass blades examined closely with a hand lens, or searched by running them gently between fingers, often are found to be host for other plants and animals. Other finds may be Stalked Jellyfish, camouflaged isopods, Skeleton Shrimps, Bubble Snails or egg masses of passers-by.

The sand, muddy bottoms on which Eelgrasses grow are ideal habitats for burrowing creatures, such as marine worms, shellfish and crustaceans. Microscopic examination of sand, silt or mud collected around the roots of Eelgrass is a bonanza in which to find a vast and varied collection of diatoms and their beautiful glass-like skeletons, single-celled algae, and other interesting forms of life.

“To see the world in a grain of sand,  
And a heaven in a wild flower;  
Hold infinity in the palm of your hand,  
and Eternity in an hour.”

William Blake  
(1757 - 1827)

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### **A TREE FALLS ON RETREAT ISLAND**

Robin & Jillian Ridington

The ancient fir trees on Retreat Island stand as much alone as together against the winter winds that blow across Trincomali Channel. Unlike the trees of a larger forest, which grow together as a community against the elements, each island fir bears an individual testimony to its encounters with winter's southeast gales, the strong west winds of summer and the short-lived but extreme south-westerly Qualicums that lash the island when the edge of a system passes and the wind veers sharply.

Most of the firs have survived by losing their tops to one or another of these winds. Side branches eventually become new tops that reach toward the sky, and sometimes these too are blown to

earth. Eagles perch on the high snags that remain, and nest where high branches still spread.

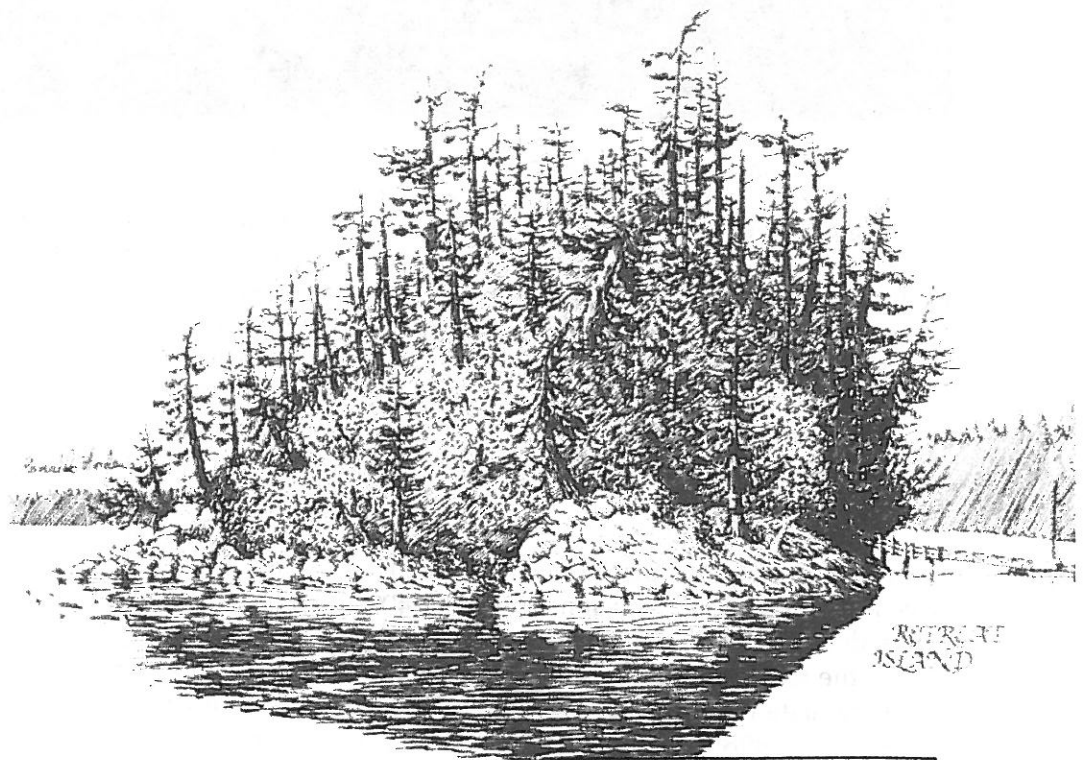
This winter, a gust of wind stressed the elbow supporting one of those side branches, which had grown into a substantial new trunk. Fifty feet of gnarled fir and tangled branches crashed to earth, crushing a young arbutus tree as they fell. A tall snag remains, soon to become home to grubs that will in turn become food for woodpeckers. The trunk and branches lie across the trail. In early March, as the fawn lilies came into bloom nearby, we saw a lily patch struggling for light under the fallen trunk. In the past, we might have been tempted to get out a chain saw and "clean up the mess." Alternatively, we might have decided to let nature take its course, knowing that the tree would be colonized by alligator lizards, and that in years to come, it would become a nurse log for new fir seedlings. In time, the lilies would return, nourished by the organic matter brought to earth. This year, we didn't have a choice. The tree had fallen on that part of the island now owned by the Galiano Conservancy Association. Lot A of District 7 is a Nature Protection Area, sheltered by conservation covenants that prevent any human intervention, beyond the removal of invasive non-native plants such as broom. This is the story of how that came to pass.

In 1992, we took over from Malcolm Hegge and the heirs of the late George Plange as stewards of Retreat Island. Retreat is home to us, as well as to eagles, minks, otters, alligator lizards, woodpeckers, herons, crows, ravens, hummingbirds and the many other plants and animals that make up what Gary Snyder calls an "earth household."

Retreat Island has been listed as District Lot 7, Cowichan District since Her Majesty "Victoria, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen, Defender of the faith and so forth", granted Mr. Angus Rutherford Johnston the land in 1888 for the sum of seven dollars.

As far as we can tell, the island has never been logged. The gnarly old trees probably weren't attractive in the era of high-grading. The Mouats of Saltspring owned the island in the 1930s, when one of their daughters was a teacher at the Retreat Cove school. George and Malcolm bought the island from the Mouats in 1964 and were careful stewards for twenty-eight years.

As we settled into accommodating our lives to the life of the island in 1992, we thought about how best to preserve and protect the Garry Oaks and ancient firs, the fawn lilies and chocolate lilies, the spring carpets of sea blush and *Collinsia*, the creatures great and small. We began by pulling the broom that threatened the wildflowers and Garry Oaks on the southwest-facing bluffs.



Retreat Island pen&ink drawing,  
Ronaldo Norton 1985

After eight years, the broom is nearly gone, and wild flowers have resettled the slopes where broom flourished. A more complex problem was ensuring that the island was protected from further development.



*Fawn Lilies (Erythronium Oregonium) on Retreat Island  
April 1 2000*

Real estate values rose rapidly soon after we moved to Retreat. According to federal tax law, property in excess of that needed for an immediate permanent residence is considered as a "deemed disposition" at the time an estate is settled. Capital gains tax must be paid on the difference between the value of the land when the late owners acquired it, and the market value at the time of their deaths.

Translated, that means that our children would have had to come up with something like 40% of the difference between what we paid for that part of the island that is not deemed essential to our immediate residence, and its current market value. As of 1998, that could have been several hundred thousand dollars. It might very well have been quite a bit more some years into the

future. Our zoning conferred the right to subdivide and build another dwelling, guest house and outbuilding. We worried that, if land-use by-laws did not get put in place or were changed in the future, a Retreat Cove Marina or

a "monster house" might be built on our quiet little island. None of our children are wealthy; they would probably have had to sell half the island in order to keep the other half for themselves. How could we preserve Retreat, without placing an onerous burden on

our children?

Pondering these matters, we walked the bluffs and trails and tried to imagine where another house might be located. We also thought about the infrastructure of access trails, septic field, and power lines that would be required for another residence. We realized that new owners would be at liberty to cut as many trees as they wished. We concluded that there simply was not any place on the undeveloped portion of the island that could sustain that kind of development without doing considerable damage to the Garry Oak meadows and old growth firs.

When Willie McGillivray, of the Garry Oak Meadows Preservation Society, visited the island, and pronounced its young Garry oaks among the finest he had seen anywhere, we began to think

about placing conservation covenants on the island. We discussed this idea with our lawyer and our accountant, but it wasn't until Bill Turner (then of the Islands Trust Fund Board, now of The Land Conservancy) came to visit the island in 1995 that we found a solution. Bill came over to walk the bluffs with us, and to explain the possible mechanisms for covenanting ecologically sensitive areas. But then he came up with a radical suggestion. "Why don't you just covenant the land, then give it away to a Nature Conservancy?" suggested Bill. It sounded irresponsible, maybe a bit crazy, at first. But the more we thought about it, the more sense it made. We asked our children what they thought and they agreed that it sounded like a good idea. We discussed it further with Bill Turner, then asked the directors of the Galiano Conservancy Association whether they would accept the donation. They were supportive, subject to our finding an appropriate covenant holder. Then we began the long process of covenanting and subdividing.

The first step was a survey. Mike Manson of Anderson and Associates in Victoria understood what we wanted to do, and was able to translate our idea into a concrete survey plan. With that map in hand, we approached the Garry Oak Meadows Preservation Society and the Islands Trust Fund Board as possible covenant holders. After some study and deliberation, they became enthusiastic partners in our plan.

We decided to start drawing up the covenants, and to begin the sub-division process at the same time. Bill Turner was an immense help with the covenants, as were Carolyn Stewart, director of the Islands Trust Fund Board, and Darren Williams and Rodney Wilts, two young lawyers who were serving internships with the Island Trust Fund Board. Darren and Rodney were particularly helpful as the subdivision process moved slowly through the bureaucracies – the Ministry of Transportation and Highways, the Ministry of Environment, Lands and Parks, the Capital Regional District, and the Islands Trust. They were in Victoria, they were lawyers, they

could read bureaucratese, and we couldn't have done it without them.

Because each bureaucracy has its own requirements, it took four years for the process to be completed. Finally, in September, 1999, District Lot 7 of Galiano Island, a.k.a. Retreat Island, was subdivided, and one of the lots became the property of the Galiano Conservancy Association.

It all took far more time and cost far more money than we had anticipated– but that money will be returned through the charitable tax receipt we will be able to use over the next few years. Certified ecological donations can be deducted at 100% of value, and we have now received such certification.

Would we do it again? Yes – because we can now paddle around Retreat Island and know that it will never change, other than through natural processes. The young Garry oaks, which are so plentiful on the island but rare elsewhere, will grow into mature trees; we won't be there to see it, but we know it will happen. And the wildflowers will come back each spring, long after our time on Retreat is over. But we would recommend that the provincial government find ways to expedite the covenanting process, and also the sub-division process. The covenanting process would not have been too onerous by itself – at least not with the expert help we had. However, at present, property owners who are sub-dividing in order to make a donation of land with substantial ecological value must go through exactly the same process as would a developer seeking to have a large housing project approved. Perhaps the regulations could be changed so that owners who sign a declaration that the property is to be subdivided for an ecologically valuable donation could somehow "short-cut" through the process.

Covenanting is much simpler, and in many cases, would serve most of the purpose. We encourage eligible property owners throughout this archipelago to consider it .■

## WATER PURIFICATION: PART 3.

Dennis Olson

How can we make sure that the water we drink is pure? Water may contain various micro-organisms (bacteria, viruses and parasites) that can cause many different diseases. We may not even be aware of mild infections, but severe infections may cause serious health problems. Those of us who have weak immune systems are naturally more susceptible. Water may also be unhealthy to drink because it contains minerals or trace elements, though these are not likely to be a problem in rainwater.

The most common sources of contamination are animal faeces or human sewage. Wells can be contaminated by nearby sources, such as septic fields or barns. The most likely source of rainwater contamination is bird droppings; contamination from the faeces of animals like squirrels and racoons also happens occasionally. Cisterns and tanks, if they are not sealed, may also be contaminated by mice or insects.

Different contaminants require different treatment methods. Methods that destroy bacteria and viruses may not be effective against parasites such as Giardia (beaver fever), or amoebic dysentery. One advantage of having water tested is that you can be more confident that a particular method of treatment will be effective. Collected rainwater is unlikely to contain parasites. Consequently, it is easier to disinfect, unless for some reason the water has become heavily polluted. There are several different methods for treating contaminated water. These include:

**Boiling.** The surest way for households to treat water is by boiling it. Boiling kills bacteria, viruses and parasites. Water should be kept at a full boil for at least two minutes (longer at elevations over 2000 meters). Boiled water will taste better if it is allowed to stand for a few hours before you use it. Obviously, this method of purification is only practical for small amounts of water. However, if your water source has become contaminated but not heavily polluted,

you can boil enough for drinking, cooking and brushing teeth.

**Chemical Methods.** A simple way to disinfect household water is to add ordinary laundry-type bleach to the water. Household bleach usually contains five per cent chlorine (industrial bleach is often ten per cent). The chlorine content should be listed on the label. Household bleach does lose its strength with age, so if your container is more than one year old, you should double the recommended dosage. Household bleach makes a good disinfectant for the more common bacteria and viruses. However, it is not a recommended way to treat heavily polluted water, or water which contains Giardia or some other parasites.

For small containers, add one drop of bleach per litre of warm water or two drops per litre of cold water, then mix or shake well. It is important to let the water stand for at least thirty minutes to allow the chlorine to act. You can then use the water, although a slight chlorine taste will remain.

To clean and disinfect storage containers or tanks, a stronger concentration of bleach is required. For this purpose, add one third of a cup (3 oz., or 75 ml.) to five gallons of warm water. Use this to wash and disinfect the storage containers, then rinse them with clean water.

Household bleach also works well to treat larger amounts of stored rainwater. Add the quantity indicated below to the water and mix well. If the water being treated is from a stream or lake, the amounts should be doubled.

Amount of Water	Amount of Bleach to Add
5 gal. (23 L)	11 drops (0.9 ml)
45 gal. (205 L)	1.5 teasp. (8 ml)
00 gal. (450 L)	3.5 teasp. (18 ml)
1000 gal. (4550 L)	6.5 fl.oz. (180 ml)

These amounts of bleach will produce water with two parts per million chlorine. Larger amounts of water should be allowed to stand at least two hours before using. Note: The above

recommendations are taken from a brochure entitled "How to disinfect Drinking Water" (Number 49b, August 1997) issued by the B.C. Ministry of Health.

*Editor's Note: The use of bleach is controversial because of possible impact on human and environmental health; if you share these concerns, visit the resource centre at the Galiano Conservancy Office, for more information, and to discuss alternatives.*

**Water Treatment Devices.** Mechanical equipment or devices are a means of treating water, but good ones are relatively expensive and require regular maintenance. Some purifiers use filters; the best of these filter out all particles one micron or larger, making them very effective. Others use ozone or other means to destroy contaminants. If you decide to install a manufactured water treatment device, you are probably best off having a professional supply and maintain it.

#### **PART 4. HOW MUCH WATER DO YOU NEED?**

If you plan to use rainwater as a principal source of domestic water, you will need to determine how much water you will use. Once you know what your needs are, you can determine how large a roof area you will need, and how much storage capacity you will require. These two questions are related. If you have a large roof area and catch a lot of water every time it rains, you will require less storage. On the other hand, if you have a big tank that can store the heavy winter rains, you can get by with a much smaller roof area. Summer, of course, is the critical period. Because summer rains are less frequent, you will have to have some winter rain in storage to see you through.

Obviously, the amount of water you will need to store will also depend on how frugal you are with water, and what you use it for. How many people will be using the water system? Will you be using a clothes washing machine? Will you use this water for the garden? The amounts of

water used in homes varies widely. I suspect that most islanders use only a fraction of the water used by a typical household in Vancouver, but that we use more than we would guess. The table below gives the amount of water used for various activities. As you can see, there is a big differences between models of appliances that serve the same function.

**Table 1. Water Consumption in the Home**

Household Activity	Amount of Water Required	
	gallons	litres
1. Typical full sized top loading clothes washing machine (Sears, Whirlpool) per load of approx. 12 lbs. (5kg)	40-50	180-230
2. North American front loading clothes washing machines (Maytag, Frigidaire) per load of approx. 12 lbs. (5kg)	20-22	90-100
3. European front loading clothes washing machines (Asko, AEG, Miele) per load of approx. 12 lbs. (5kg)	14-22	63-100
4. Typical North American dishwasher, per load	7-10	32-45
5. High efficiency North American dishwasher (Amana) per load	5	23
6. European dishwasher (Asko, Bosch) per load	3.5-4.5	16-20
7. Standard flush toilet, per flush	3-5	14-23
8. Low water use toilet, per flush	1.3-1.5	6-7
9. Washing dishes by hand	2.5-4	11-18
10. Bath in standard 60" tub	15-25	68-114
11. Shower	10-15	45-68
12. Shower with BC Hydro water saver	7.5-12	34-54

13. Washing hands with water running for one minute	0.75	3.4
14. Washing hands stopping and starting water flow	0.20	0.9
15. Brushing teeth with water running for one minute	0.6	2.7
16. Brushing teeth stopping and starting water flow	0.15	0.7
17. Oscillating lawn sprinkler for one hour at 35 psi	120	545

On average, Galiano gets approximately 30 inches of rain per year. Therefore, in an average year, a 1000 square foot roof would collect about 2500 cubic feet, or 15,550 gallons of rainwater. (1 cu. ft. of water = 6.22 gallons) However, in the four summer months from May to August, Galiano only receives four to five inches of rain. The same roof would only collect about two thousand gallons in an average summer. This is probably not enough water for your needs, unless you also have some rain from winter in storage.

The amount of precipitation we receive also varies a great deal from one year to the next. In a very wet year we get twice as much precipitation as in a very dry year. One year out of every three varies by 20 per cent or more from the average. In planning, therefore, one should not use the historical averages, but rather precipitation levels approximately 20 per cent below average. The table below gives the average monthly precipitation on Galiano as reported by Environment Canada.

**Table 2. Average Monthly Precipitation on Galiano Island (1" = 25.4mm)**

January	141.7mm
February	83.6
March	75.6
April	39.9
May	29.9
June	34.5
July	23.2

August	30.2
September	45.6
October	87.1
November	114.9
<b>Annual Total</b>	<b>855.7 mm (33.7 in.)</b>

To estimate your water storage requirements, go to Table 1 and estimate average daily water use. Since some usage does not occur daily, make a tally for one week and then divide the total by seven. From this you can calculate your monthly use. If your average daily use is 85 gallons, your monthly use (30 days) would be 2,550 gallons. Based on your roof size, calculate how much water you could collect in the four driest months. Remember to use precipitation levels approximately 20 per cent less than those in Table 2.

For example, with a 1000 square foot roof you could expect to collect at least 1600 gallons during the four driest months of a normal year. If you use 85 gallons a day, your usage during those four months would be 10,200 gallons. You would therefore need to have at least 8,600 gallons in reserve when the summer months start. To be sure that you have sufficient water, you need to have a total storage capacity of about 10,000 gallons. Good watering, and happy spring and summer! ☀️

**Note: A handout "Help to Conserve Water: Know Your Well Water Level" is available from the Galiano Conservancy Association**

*AN APPRECIATION*

The Galiano Conservancy Association would like to thank all those members and friends who helped with our recent move. There are too many of you to thank individually, but we are truly beholden to each and every one of you. We invite all of you, and all Galiano residents and visitors, to drop by the office. Our expanded resource centre is open from 1 to 4 pm on Thursdays and Saturdays.



## ORION AFIELD

Reviewed by Jillian Ridington

*Orion Afield* is as different from its sibling *Orion* as the Pleiades, or Seven Sisters, are from the celestial warrior Orion, who shares their corner of the winter sky. Orion blazes with beauty, while the Pleiades cluster together, gaining their lustre

through their combined light. *Orion*, the magazine, (reviewed in the fall, 1998 issue of *Archipelego*) dazzles us with lyrical writing and beautiful photography. *Orion Afield* sheds light on connections, creating a web of information that can strengthen environmental organizations throughout North America.

Each issue of *Orion Afield* focuses on a section of the spectrum of environmental issues. Recent topics have included "Educational Environments", "Toxic Waste and Pollution", and "On Behalf of Animals". The articles, photographs, newsletter excerpts and profiles of leaders in the environmental movement can inspire our own work at the local level. We learn of struggles that succeeded and efforts that failed; we gain strength from knowing that our efforts are not isolated, nor our dilemmas unique. Each issue has relevance to the problems we are trying to resolve here on Galiano. Are you trying to save a sensitive area from logging? "A Stranger in My Own Home Town: The Fight to Save Teal Slough" (Winter 1997-98) has a surprising simple solution that worked in at least one place. Want to make the public sit up and pay attention? How about girdling a government building with a banner, as community groups, adults and children did in Michigan? ("A Banner Tour of the Great Lakes," Spring 1998.)

Mapping is an idea whose time has come, here and in many other places, so the Winter 1997-98 issue of *Orion Afield* was devoted to the subject. As the editors pointed out, "Maps are our way of storying our places – of knowing, in a deeper sense, where we are." Mapping projects have

been at the top of the agendas of Gulf Island environmentalists for the past few years. The Galiano Conservancy Association has used Geographic Information Systems technology and aerial photography to develop detailed maps and an orthophoto. Sheila Harrington did a mapping project of several Gulf Islands in 1995, and is now working with Briony Penn, and with Galiano's Kate Hennessy, Meg Holden and others on a Mapping Project of "The Salish Sea at the Millennium." "*Orion Afield* has taken notice of this work; Briony's piece, "Mapping the Last Blank Space" was featured in the Mapping issue. Her words, and the maps of familiar places featured in the article brought the issue home for me.

*Orion Afield* is an invaluable resource for teachers who want to give their students a deep and lasting sense of the connections between humans and the natural world. Mapping is one tool for this kind of teaching. As David Sobel points out in "Mapmaking from the Inside Out: The Cartography of Childhood", (*Orion Afield* Winter 1997-98) creating maps helps children express and develop a sense of place; they develop cognitive skills and emotional bonds simultaneously. Sobel notes that, "Maps are clothespins – tools for hitching children's lives to their places."

Not all teachers are as lucky as those on Galiano, who have a nature study classroom just outside their doors. In "Inside a Stone: Nature Writing in a City classroom" (*Orion Afield* Spring, 1998:32) Christian McEwen tells of teaching 300 15-year-olds in a Manhattan High School to understand the natural world. The students came from a variety of places, and spoke a multitude of tongues. As a visiting teacher, McEwen was not permitted to take them on field trips, so she used her collection of stones and shells as teaching tools. She asked them to inspect the objects as if they had never seen anything like it in their life before, then asked such questions as, "What colour is it? Are there any patterns on it, funny shapes? What if you were very, very tiny, microscopically tiny, so small that the stone or pod or shell became your landscape? What if it could somehow open up to let you in?" She

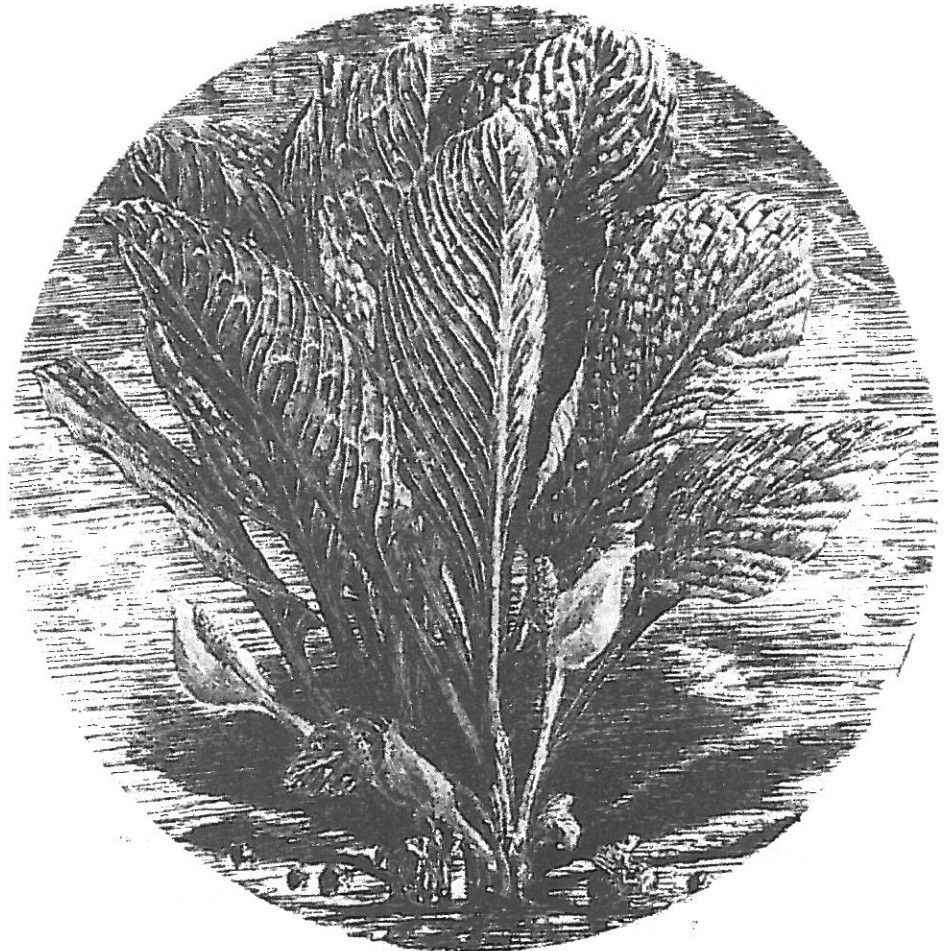
read them poems, played the flute for them. The result was "a strange, unerring pilgrimage inside the stone." I envision McEwan's article as itself a stone, flung into a pond whose ripples can inspire teachers in cities everywhere.

Regular features of each issue include "Community Portraits" and "In Focus". Both these columns profile individual and organizational members of the Orion Society whose work is worthy of note, and of emulation. "Spots of Time" brings us journal entries, each capturing a moment of creative reflection in both words and sketches. My favourite column is "The Tangled Bank", the musings of Robert Michael Pyle, a rainforest dweller with a naturalist's vision and a poet's sensibility. Feeling burnt out? Take a wander in the wild with Pyle, who tells us:

Nothing freshens the wrinkled will like immersion in the natural world. . . . and nothing restores the wonderment like sheer stupefaction: the shockingly novel sensation that awaits every watcher who goes forth to indulge in the blessed ordinary, then rediscovers that it seldom is. (Spring 1999: 8)

*Orion Afield* was honoured as "Best New Title" in Utne Reader's 1998 Alternative Press Awards, and it richly deserved it. In its premiere issue, **Art and Activism**, (V1#1, 1997) *Orion Afield* addressed problems faced by many of us who try to combine creative work with environmental activism: Which comes first – the creative expression, or the political work? How do we link or balance the two? Many of the writers and artists who wrote on this topic found an uneasy co-existence between art and activism, yet to me *Orion* and *Orion Afield* provide proof that the two can and must go hand in hand. *Orion* inspires our

imaginations and our hearts; *Orion Afield* tells us how to translate that inspiration into action. Subscriptions to both are included with membership in the Orion Society, which costs \$35 US a year; write to 195 Main St., Great Barrington, MA 01230. The Orion Society also sponsors workshops, conferences, and "The Forgotten Language Tour" of readings by nature writers. Copies of *Orion* and *Orion Afield* are available in the Galiano Conservancy Library. ■



**Skunk Cabbage** *Ronaldo Norton*

## **In the Absence of the Sacred: the failure of technology and the survival of the Indian Nations**

By Jerry Mander

1991 Sierra Club Books

Reviewed by Meg Holden

This book is not out to convince you that technology is evil. Modern technologies provide all of us with some benefit, be it televised hockey, on-line libraries, email romances, or broccoflour. What Mander argues in this book, persuasively enough to put the fear of Big Brother in this reader, is that modern technology acts as a comprehensive force to lead our society toward a post-biological future. He shows how all modern technologies are bound up with one another and depend on our acceptance that they are better able to organize life than life's own organization systems. He holds that new technological developments are driven only by market demand, not by a sense of right or wrong, promoting the conversion of nature to commodity and the conversion of human communication to machine form and machine logic. Shouldn't we at least stop to consider whether this is what we desire in society? Mander urges us to realize this: alternatives exist. They have been preserved in the ways of aboriginal societies. We remain free to choose them.

In Mander's view, modern technologies are not as clean and magical as we have been led to believe, and none of their benefits, substantial though they may seem, has improved human satisfaction, happiness, security, or our ability to sustain life on Earth. The computer industry, for example, uses millions of gallons of acids and solvents, and has an incidence of occupational illness three times that of the average manufacturing industry. The realm of information that computers allow isn't a unilaterally good thing, either. It's a specific kind of information, intended to keep us in line with corporate values. At the same time, it downplays the ways information is passed around in native societies: through personal observation, sensory

interaction, historical and geographical contexts, and teachings about the human-wildlife relationship handed down from previous generations. Computers enable corporations to keep records and surveillance beyond what otherwise would be possible. The major effect of dependence on computers has been the elimination of jobs, and the major effect of the accelerated production of information has been increased human anxiety, as most of the information is unusable. Nor do modern technologies increase freedom, if freedom is the sense that one has control over one's own mind and experience. Computers are more important to large corporations than they ever could be to small organizations or individuals – and computers are most important to the military. Mander brings this point home poignantly: without computers, there would be no possibility of globally destructive warfare – so if computers disappeared completely, the world instantly would become safer.

Mander's aim is not to pick out the negative aspects of computers, television, or any other specific technology. He is calling for a wider view of the direction in which these technologies as a group are leading our society. He calls this direction a "pro-technology paradigm" and says we have all been sold, since we all:

1. Accept technologies at the shiny face value advertised by the corporations that produce them;
2. Allow technologies to be the "framework of our awareness," the world we touch, observe, and react to;
3. Judge the impact of technologies only at a narrow, personal level;
4. Are dazzled by the promise and flash of new technologies, despite the fact that they often don't do as they promise and their problems only appear later on; and
5. Believe technology is neutral, not attached to a corporate, centrally-controlled, culturally-homogenous worldview.

Simply put, technologies produced by corporations have a corporate bias. Corporations operate by machine forms and rules that influence

our ideas of how life should be lived. Scarcely a moment passes in North America that we aren't in contact with a corporation or its products. Corporations are the largest landowners, aside from government. They are the largest lobbyists and backers of electoral campaigns. They are the major providers of educational material and commercials. Corporations are not like people or groups of people: they aren't tied to place or history; they can vanish and then rematerialize elsewhere to exploit more submissive workers and lower working standards; they never express shame for the many deaths, illnesses, and injuries they cause; and they are required to produce income and to grow. Think of the range of corporate reach today, with the space program sending technological society out to colonize beyond the limits of the earth, and with genetic engineering and 'nanotechnology' opening our genetic and molecular structure to corporate control.

It doesn't take a Luddite to conclude that we should question the ends of our growing dependence on modern technologies. What outside point of reference do we have from which to examine the road we have taken, that we call Progress? Mander suggests that native peoples can offer us the most serious, comprehensive criticism of our way of life because they suffer most from the expansion of technological society. Mander brings us up to date on global aboriginal struggles alive today in two chapters of "World News Briefs" as well as more detailed case studies of the Hopi and the Navajo, the Inuit, Western Shoshones, and the Native Hawaiians. He shows that aboriginal cultures are alive and viable, although threatened, and that we will need to open our minds to the possibility of learning from them. This is so even though many native people have lost their traditional appearance:

We find it particularly hard to take [lessons] [when] spoken by the more radical young Indian leaders of today: street-smart tough guys with an aggressive urban style. We think they're using a ploy on us with that language, that they're not as sincere as their elders who have not been Americanized. (213)

Yet those young leaders may well also participate in traditional rituals and spend long hours listening to elders tell the stories of their people.

Aboriginal cultures differ widely around the world. Some hierarchical cultures, like those of the Aztecs and the Incas, are more similar to modern society than to the majority of other aboriginal societies. However, Mander points out some fundamental similarities of most native cultures that could be most helpful in creating a sustainable Western civilization. Generally, in native cultures, goods are provided for use, not for sale, with goals of subsistence, not profit. The average work day is 3-5 hours. The earth itself is regarded as a living organism, the actual mother of life. In many aboriginal societies, decisions are based on consensual, democratic processes and laws are interpreted individually and transmitted orally. People live in small groups, intergenerationally, and the young learn skills and customs from the old people. Traditional dwellings are designed for communal space and biodegradability, and built from locally gathered materials. Religions are polytheistic, integrating past and present, dead and living, in all aspects of daily life. Learning is experiential and shared.

The idea of organizing our society in ways parallel with the above is radical and foreign, to say the least. If we all suddenly believed, as people in many aboriginal cultures do, that it is sacrilege to remove minerals from the earth, or to buy and sell land, society as we know it would evaporate. We might begin the path to change by understanding that our technological society is not sustainable, and that beneath the technological veneer that constitutes our current world, a living earth remains and begs for attention.



Charley Yahey with dreamer's drum, 1966 Blueberry River, BC