

POTOMAC  
**BONSAI**  
ASSOCIATION  
**Newsletter**

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**BONSAI AND WINTER PROTECTION**

**by Joseph Burke**

EDITOR'S NOTE: The following article on winter protection by Joe Burke is an excellent and comprehensive treatment of the subject. Thanks goes especially to Joe for providing information contained herein and to Dave Dambowie for drawing our attention to Joe's article.

That old tree is stronger than the mountain - gotta be - it lived up at Pinnacle for near eighty years.

Crushed and twisted by ice, shrunk by the sun and wind, a perpetual thirst with a starvation diet - Survival Epic - chronicled in wood.

That robust old tree, proven winter hardy in the mountains, carefully dug and planted in an oversized container, might winter kill - because the roots could not survive the low soil temperature in the container.



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## TOP HARDINESS AND ROOT HARDINESS

For years, we assumed that plant roots and the above ground parts (trunk, etc.) were equally winter hardy. That assumption is incorrect.

1. Field Grown: We never concerned ourselves about roots because the ground kept the roots at moderate temperatures and root damage was seldom a problem. Winter ground temperature in the root area is quite stable, and in this zone seldom goes below thirty-one degrees Fahrenheit.

2. Container Grown: Container soil, however, assumes its temperature from the surrounding air; soil temperatures change rapidly, following the air temperature up and down. If the night air temperature is zero, the container soil temperature will drop to zero and the root temperature will be zero. The plant might tolerate zero temperature on top, but the roots would probably winter kill.

3. Sixty-Eight Degrees: For example, in a report presented in 1967 to the International Plant Propagators Society, Dr. Harrison Flint of Arnold Arboretum indicated that *Philadelphus Virginialis* had the extreme temperature hardiness range, between the above ground parts and the roots, of sixty-eight degrees Fahrenheit. Specifically, the top is winter hardy down to minus forty-four degrees Fahrenheit and the roots are winter hardy to only plus twenty-four degrees Fahrenheit!

Therefore, in a container grown plant there are two distinct areas of winter hardiness; top hardiness and root hardiness.

4. Plant Zone Rating: We rate plant winter hardiness with a zone number. Each zone encompasses a specific geographic area and each zone is assigned a specific number. Thus, this plant is hardy to zone 4, this plant is marginally hardy in zone 6, or whatever classification was indicated by empiric evidence. It's an orderly arrangement and we find it quite comfortable.

However, as the Mad Hatter probably said to Alice, "Somebody's always rocking the boat! It appears we'll need two zone ratings; one for the top and one for the roots. It's all on account of container growing!"

It's a disquieting concept, and we are just beginning to understand some of the special problems related to root hardiness in containers.

5. Summary: The primary objective of all this is to focus the problem of root hardiness which is inherent in bonsai growing.

If your bonsai is wintered over in a container, be aware that the plant top has one range of temperature tolerance, and the roots probably have quite a different winter temperature tolerance range. Your bonsai winter protection program might be improved if you recognize the need for moderating root temperatures.

### (A) WINTER DAMAGE

Specifically, (A) what are the special damages of winter?, and (B) what is the best winter protection to prevent damage?

What are the causes of winter damage? Perhaps the following five generalizations will serve to outline the problem:

1. Dormancy
2. Sudden Cold
3. Low Temperature
4. Drying
5. Physical Damage

1. Dormancy: The problem of sudden cold and low temperature might best be examined in the context of dormancy. In this plant zone (6), the shortened daylight period in the fall triggers the dormancy cycle.

Dormancy is never an instant happening, rather it's a gradual cessation from active growth to a quiet period. Nature prepares the plant for the adverse environment of winter. Leaves are shed, a heavy plastic coating builds up over buds and twigs and needles, and gradually the last vestiges of summer lush are gone.

Bare, stark, toughened by the dormancy cycle, the plant becomes gradually "hardened off" for winter. It's a gradual progressive cycle and the progressive hardening ideally precedes the progressive temperature drop as winter approaches.

2. Sudden Cold: A sudden early cold snap might split the bark, "burn" the buds. In brief, sudden cold might be fatal to the plant in the fall, but the same temperature in January, when the plant is "tougher", would cause no damage.

The rate of cooling is important. A hot winter sun which is suddenly blocked by a cloud, etc., can cause plant tissue temperature to plummet - sudden cold - winter damage - bark split.

3. Low Temperature: In general, low temperatures test hardiness, but here again we should evaluate winter damage in the context of the dormancy cycle, plant condition and growing conditions.

Specifically, the low temperature must also be evaluated in the context of top and root temperature tolerance if the plant is in a bonsai container.

Roots and tops do not go through the same hardening off cycle, or perhaps we should say, at this time it appears that roots do not harden off at the rate, or to the same degree as the top. At low temperatures, containerized roots are likely to die long before any top damage occurs.

4. Drying: Low temperatures slow down the transfer of moisture from the roots to the top. If most of the roots are frozen, the top of the plant must use the available moisture locally present in the cells to sustain itself. Therefore, a winter watering program aimed at maintaining maximum cell turgidity is vital especially if the plant is growing in the limited soil mass of a container. In sustained low temperature conditions, the plant must start out with every advantage. The so-called "winter burn" is tissue desiccation; the plant dried out; the low temperatures lasted longer than the available water.

5. Physical Damage: The physical damage sustained during the winter include those obvious hazards of broken branches from ice or snow or wind. The damage from container flooding can be less apparent, but more real. First, the container freezes to the ground. The top thaws and water runs into the soil. Since the drainage area at the bottom is frozen, the soil mass becomes a lump of ice. There very probably are living creatures which can sustain life in a lump of ice, but unfortunately, bonsai roots cannot.

Consider the animal hazards. My friend has a cat which eats bonsai at any season. Mice eat bonsai and last winter a mouse ate the best mame bonsai I ever saw. Rabbits eat bonsai, especially in the winter.

Physical damage is also caused by insects, in summer and in winter. Fungus thrives in the damp, quite air of winter storage. Remember, the systemic fungicides and the systemic insecticides require a vigorous sap flow, so use contact sprays in the fall.

### (B) WINTER PROTECTION

The objective of a Bonsai Winter Protection program is, to put a plant into winter storage in good condition in the fall and remove it in good condition in the spring. We do not intend to force growth; our intent is to provide winter protection for a dormant plant.

Winter protection can vary from a completely automatic temperature-humidity controlled greenhouse, to doing nothing but allowing the wind to blow a few dry leaves over the plant.

Some of the proven methods of winter protection are:

1. Mulch Protection
2. Shade Protection
3. Unheated Structures
4. Heated Structures

1. Mulch Protection: In the beginning was nature's way. The wind heaped leaves around a plant, a natural mulch.

A mulch (a) conserves soil moisture, and (b) stabilizes soil temperature in the root area.

Possibly, the best winter mulch for your bonsai is the earth itself - temperature stable and moist. Remove the container and plant the bonsai - in ground with perfect drainage - in your best winter environment; (i.e., protected shade, deep frame, etc.). Sometimes the bonsai is left in the container and buried in ground which has perfect drainage. A loose peat mulch is heaped up to the lowest branch.

In this area, many club members winter their bonsai in the ground - heavily mulched, with a burlap windbreak - on the north side of the house. The survival rate is excellent.

I know one apartment dwelling bonsai enthusiast who uses a discarded garbage barrel (bottoms broken - good drainage) for winter protection.

First he throws in about six inches of peat moss. The deciduous bonsai is thoroughly watered, lightly dusted with fungicide and placed in the barrel. Peat moss is drifted into the barrel, over the top of the bonsai, and up to the top of the barrel. After the cover is put on, the barrel is placed in full shade on the apartment house roof for the winter.

A garbage barrel for an unheated structure and a peat moss mulch over the entire plant sounds crude, but it has proven successful.

Probably, the most sensible suggestion would be, if what you do is successful, stick with it.

2. Shade Protection: Snow fence, nailed over an "A" frame structure makes an excellent shade house. Shading blocks the sun, breaks the wind, inhibits drying and stabilizes temperature.

Who doesn't remember the Mad Hatter singing: "Mulch the bottom - shade the top, Don't be late, It helps improve the survival rate".

The reality is, winter shade protection provides an improved environment for the plant. Result, an improved survival rate.

3. Unheated Structures: Plastic film revolutionized the nursery industry in slightly more than one decade. The poly-bow house provided, within economic possibilities, the critical environmental control necessary to the container nursery.

Inside the poly-house, a plastic sheet is used to cover the ground. Snow fencing is placed over the plastic sheering. The containers stand on the snow fence - the drainage holes don't clog, no container flooding. Mulch around the outside perimeter stabilizes container root temperature. Shading of the poly-house is done with paint, any water base paint and any color is rolled or sprayed on. Discontinued colors and leftover paint is the cheapest. It's a blessing the plants aren't color conscious.

Commercial container growers, using an increasing percentage of marginally hardy plant material, cannot change their entire plant inventory to the wishful whimsey that it might be a mild winter. Using a poly-bow house plus whatever other winter protection is feasible, the professional grower strives to improve his plant survival rate and his spring plant saleability.

The research and resulting specialized horticultural procedures of the commercial container growers has resulted in an intensive review of our own specialized contiguous area - bonsai as a container plant.

(Concluded on page 9 )

## Collecting With Dan Robinson

The photographs contained herein have been selected from those that Felix Laughlin took while on the collecting trip which he described in the last PBA Newsletter.

1. First select an area to collect trees where natural forces sculpture trees suitable for bonsai.

Unless you have lots of time to wander aimlessly about, you might expedite things by asking for the whereabouts of weird, funny looking, stunted trees from either a forest ranger or local folk at the country store, filling station, or trading post. Photo 1.

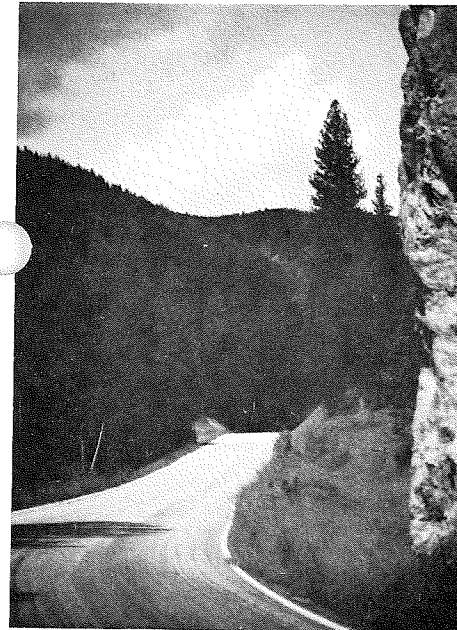


Photo 2

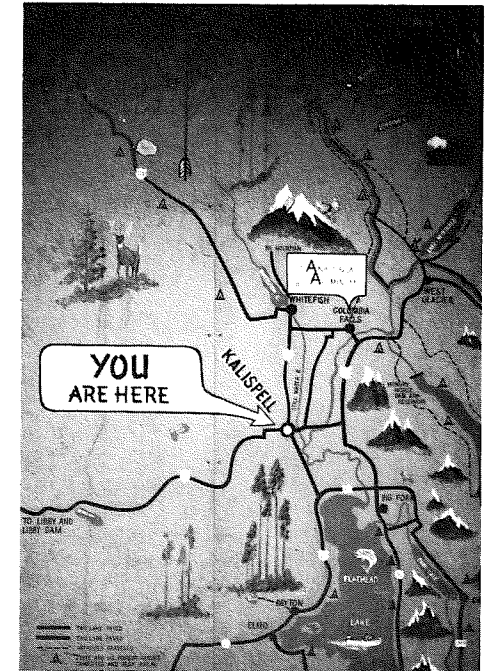


Photo 1

2. Dan can drive along this road at the speed limit and spot a prospective bonsai at any distance within his line of sight.

Photo 2

Photos by Felix Laughlin

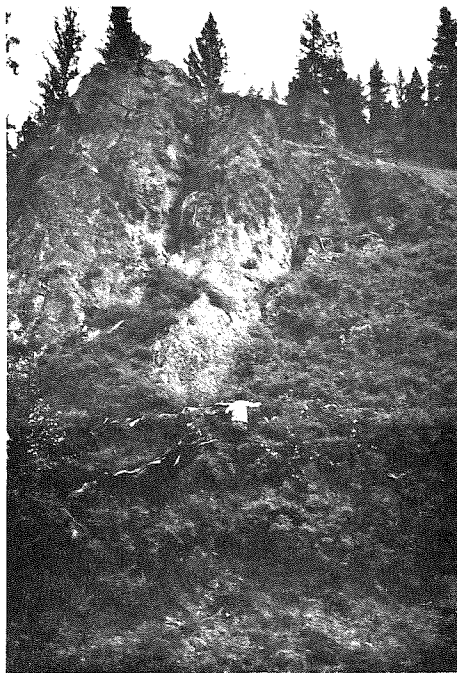


Photo 3 Sighting the quarry and in hot pursuit

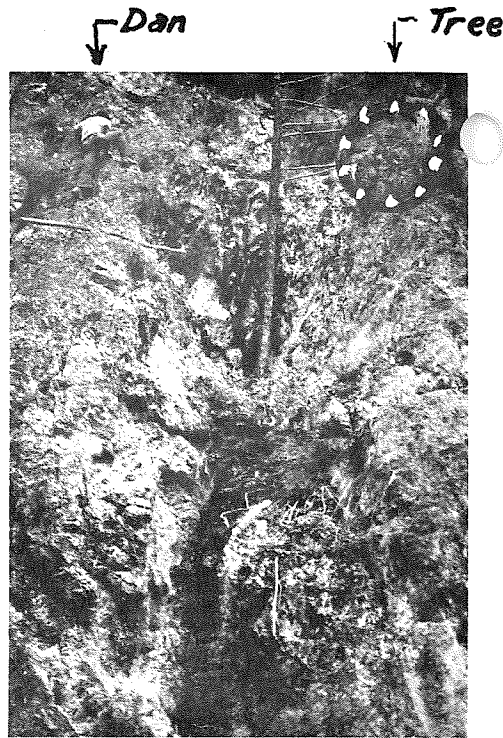


Photo 4 Scaling a cliff is no deterrent to an ardent bonsaiist with only high shoes.

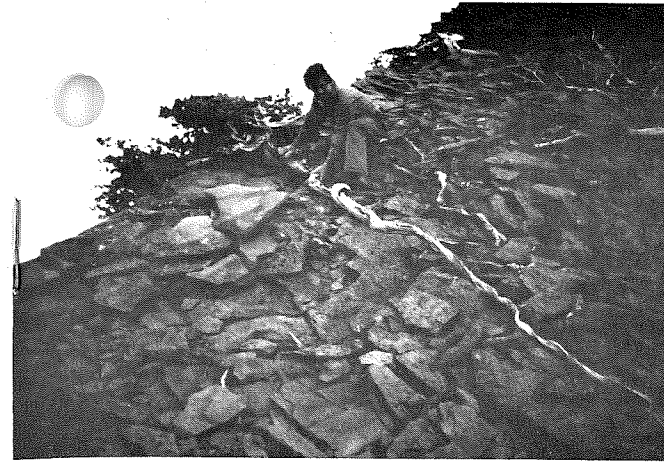


Photo 6

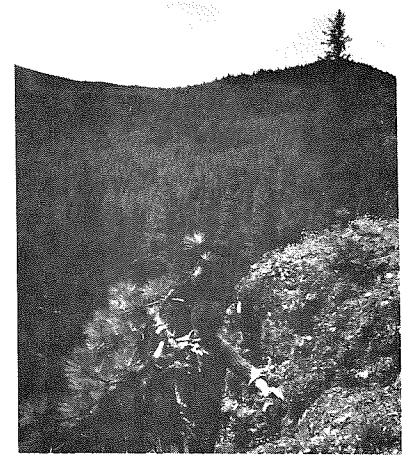


Photo 7 Sometimes the easiest way out is up.

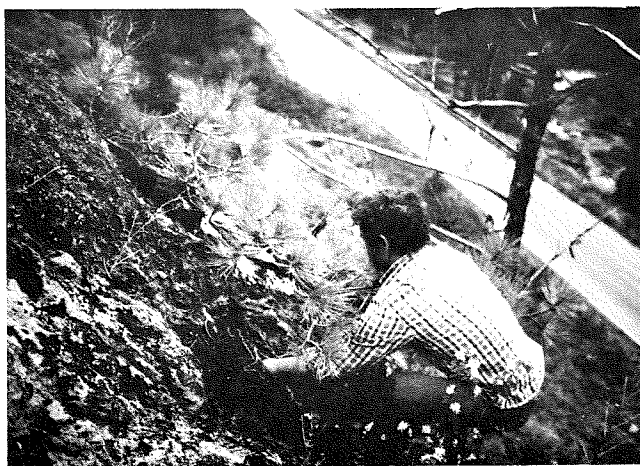


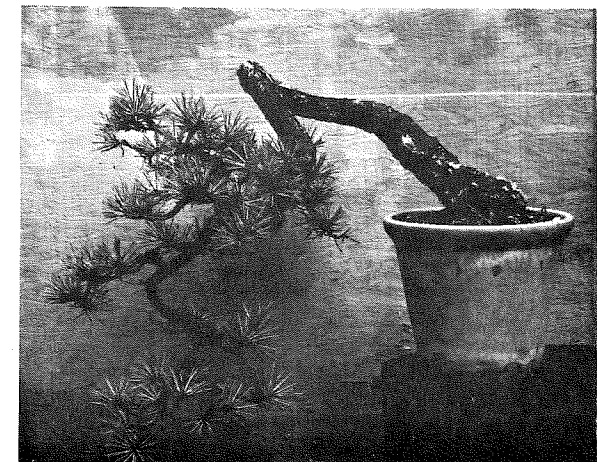
Photo 5 Being able to rock the tree, Photo 5, indicated there were surface roots and not a single, long taproot as shown in Photo 6.

Photos by Felix Laughlin

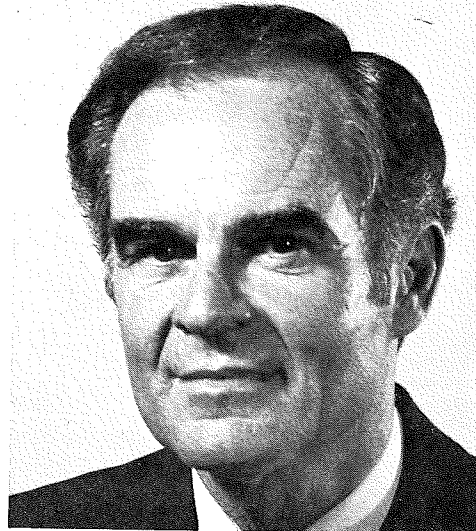


Photo 9 One of Dan's collected masterpieces.

Photos by Felix Laughlin



## Dr. Marc Cathey - Arboretum Director



DR. HENRY MARC CATHEY

On May 27th of this year, Dr. Henry Marc Cathey a world authority on plant growth regulation and ornamental plants, succeeded Dr. John L. Creech as Director of the U. S. National Arboretum in Washington, D.C.

As many of you know, the National Arboretum on its 444 acres .sss for research in plant breeding and cultivation, houses the National Bonsai Collection and the National Herb Garden, - the latter a joint venture of the Arboretum and The Herb Society of America, as well as a thriving colony of Nishiki Koi, Japanese ornamental carp.

Dr. Cathey is probably best known to the bonsai world as the author of the USDA pamphlet "GROWING BONSAI" available through the U.S. Government Printing Office. This pamphlet with its concise presentation of all the aspects of bonsai, has been, for many of us, our first introduction to this art form.

A native of Davidson, North Carolina, Dr. Cathey received his B.S. Degree from North Carolina State University in 1950, then worked for a year as a florist in North Carolina. He received his M.S. and Ph.D. degrees from Cornell University in Wageningen, Netherlands, before joining USDA as a research horticulturist in 1956.

"Marc" Cathey was president of the American Horticultural Society from 1974 until 1978. During the past year, he has been the first appointee to the D.C. Kiplinger Chair in Floriculture at Ohio State University, where he assessed the future priorities and problems of ornamental and flowering research.

Before coming to the Arboretum, Dr. Cathey was Chief of the Florist and Nursery Crops Laboratory in ARS's Horticultural Science Institute at Beltsville, Maryland. At the Beltsville Agricultural Research Center, Dr. Cathey's research on the interrelations of light and temperature and chemicals in the growth of plants benefitted both commercial growers and consumers. From this research, Dr. Cathey developed guidelines for applying light and chemicals to control the size, shape, color, pollution tolerance, and flowering of a large number of florist- and nursery-grown plants.

Marc Cathey is also known for his televised horticultural presentations and has been a regular guest on NBC's "Today" and "Morning Break" shows. A prolific writer, he has produced 22 USDA Home and Garden bulletins and has made frequent contributions to the American Horticulturist, the official publication of the American Horticultural Society. He was elected a fellow of the American Society for Horticultural Science in 1972.

All of us in PBA wish you a successful and happy tenure as Director of the U.S..National Arboretum !!!!!

(Continued from page 4)

4. Heated Structures: As winter protection, a pit frame dug against the house foundation is in reality a heated structure. The foundation wall radiates heat, and the wall temperature stays above freezing.

Drainage in a pit frame, often neglected, is absolutely vital. Somewhere in the pit bottom a drainage hole must be dug down to a sub-surface gravel strata. If that's not possible, an inexpensive sump pump will solve the problem. The inside drainage hole will handle seepage water, and a frame cover will prevent entry of surface and rain water.

The waterproof pit cover is, in extreme cold, covered with a few old rugs, and over all a plastic sheet is tied down. Inspect periodically, and mist the plant lightly if necessary.

The poly-bow house, originally an unheated winter protection structure, is increasingly being minimally heated; just enough heat to prevent freezing of the containerized roots.

In this area, a greenhouse is used for propagation, or for forcing growth for a seasonal market. The cost per square foot for a heated glass house does not make it economically attractive for a wintering over program.

However, the degree of protection varies with plant hardiness, plant value, and the predetermined risk factor. Generally speaking, the greater the plant value, the greater the protection, and the greater the cost.

5. In Conclusion: Consider all the pertinent data, experiment, develop your own winter protection programs; a program specifically suited to your needs.

## Walter Schmidt

It was learned before going to press that Walter Schmidt is recovering from serious surgery at the Washington Hospital Center. All of the members wish him a speedy recovery and look forward to seeing him at the Symposium.

## Beginners' Course

COMING SOON: A Beginner's Course sponsored by the Washington Club. Watch for details in the December PBA Newsletter.

## California Bound!

Arrangements are being made for a 20 passenger charter flight from Baltimore-Washington International (BWI) airport to Los Angeles, California. Participants will leave as a group on March 31, 1982 for California but individuals are free to schedule their own return times to either BWI or Newark, New Jersey. Current roundtrip fare is \$ 287.00. Trip is scheduled to coincide with the Silver Jubilee of the Golden State Bonsai Federation which is going to be a big, gala event. Any person interested in going contact Mary Holmes by December 1, 1981. Telephone - home: (301) 721-1309, office: (202) 287-6496. Address: 1676 Walleye Drive, Crofton, MD 21114.

## CLUB CALENDAR

November 14: 10:00 a.m. - Gulf Branch Nature Center. Making bonsai pots. This Saturday will be the first session in a series in which members can create their own bonsai pots using the slab technique. A review of techniques will be presented along with movies of bonsai pot making in Japan. Be prepared to design and sketch your own pot to be made at a future session. Principles of pot design will be discussed. The above will be followed by forum discussion of wintering techniques.

NORTHERN VIRGINIA BONSAI SOCIETY (202) 862-1040 Weekdays

November 19: 7:30 p.m. Main Building of Audubon Society, Chevy Chase, MD. Thursday "Chrysanthemum Bonsai" is the main topic. Robert Dreschler, Curator of the National Arboretum Bonsai Collection, will discuss his special hobby, developing miniature mums into bonsai. Hopefully, his plants will be in full flower at the time of the meeting. In any case, his success has been outstanding and all of us can benefit from his experiences in this seldom exploited area of bonsai in this country. Members are encouraged to bring examples of promising chrysanthemum species that might be candidates for bonsai. Raffle!

BROOKSIDE (301) 299-6194

November 21: WASHINGTON CLUB AND OTHER PBA MEMBERS!! All day field trip to Saturday Longwood Gardens to see their bonsai display. Julie Walker will coordinate the transportation. Call her on 547-8497 (evenings) for details as to times and rendezvous location, and if you can drive or need a ride.

WASHINGTON (202) 583-2676

November 22: 2:00 p.m. at Chuck Bird's residence. This will be a pot making Sunday session. Everyone will be able to make pots. This will be followed by a round table discussion. Those who do not know how to get to Chuck's home, telephone for directions.

KIYOMIZU (301) 423-8230

For meeting information on the Baltimore Club, call:

BALTIMORE CLUB (301) 922-9310

November 12: 7:30 p.m. West Street Library. Subject to be announced. Tuesday

ANNAPOLIS (301) 263-3995

If you plan to attend a meeting other than your parent club's meeting, it is recommended to telephone the number listed above to confirm the arrangements. Because of any of a number of reasons the schedule above can be changed. To be further on the safe side, you can telephone as early as possible to let the club know that you expect to attend and then request that you be advised of any schedule changes.

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