The Boxwood Bulletin

A Quarterly Devoted to Man's Oldest Garden Ornamental

At Blenheim Palace in England, a grand water parterre was designed by Achille Duchêne, a garden designer who specialized in 17th-century French garden restorations. See article on Page 39. (Photo: David G. Frackelton, Jr.)

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The American Boxwood Society

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Technical articles, news, history, lore, notes, and photographs concerning boxwood specimens, gardens or plantings are solicited for possible publication in *The Boxwood Bulletin.* Material should be submitted to:

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1999 European Boxwood and Topiary Society

Notes on Summer Event

By Henry F. Frierson, Jr.

The 1999 British Summer Event of the European Boxwood and Topiary Society (EBTS) was held the weekend of June 12 and 13 in Hampshire County, England. The format, modeled after the ABS annual meeting, consisted of a business meeting, lectures, expert advice, plant auction, and dinner on Saturday followed by a garden and nursery coach tour on Sunday. The two prior EBTS summer events had themes of domestic topiary and grand topiary respectively, while the theme for 1999 was boxwood.

Accommodations were provided in the historic city of Winchester, which is noted for its important buildings that include, among others: Winchester Cathedral, dating from 1079 and featuring the longest nave in Europe; Wolvesey Castle ruins, formerly one of the greatest medieval structures in England; Winchester College, the oldest school in England, founded in 1382, and considered by many to be the most academically exclusive school for boys in the country; and Winchester City Mill, built over the River Itchen in 1744 and housing a vigorous race and delightful small garden.

The program on Saturday was held at Earlstone Manor, Burghclere, near Newbury, Berkshire, by kind permission of Mr. and Mrs. Bruce Ginsberg. After the general business meeting, Tom Saunders, current president of the ABS, delivered a lecture entitled "Boxwood in America and The American Boxwood Society." Mr. Saunders described the membership and activities of the ABS to an audience who were desirous to learn of our older society, as the EBTS, consisting of approximately 400 members worldwide, is only three years old. Jenny Hendy, garden writer and editor of *Topiarius* (the beautiful magazine of the EBTS), then lectured on "Frame Topiary." Just prior to lunch and a garden tour, Mr. Ginsberg spoke on the history of Earlstone Manor. The afternoon included a "Meet the Experts" discussion, plant auction and tea. The day concluded with a wonderful gourmet dinner at the Hotel du Vin,

Clipped boxwood and yew were highlighted in the peacock garden at Houghton Lodge. (Photos: Tom Saunders, except as noted)

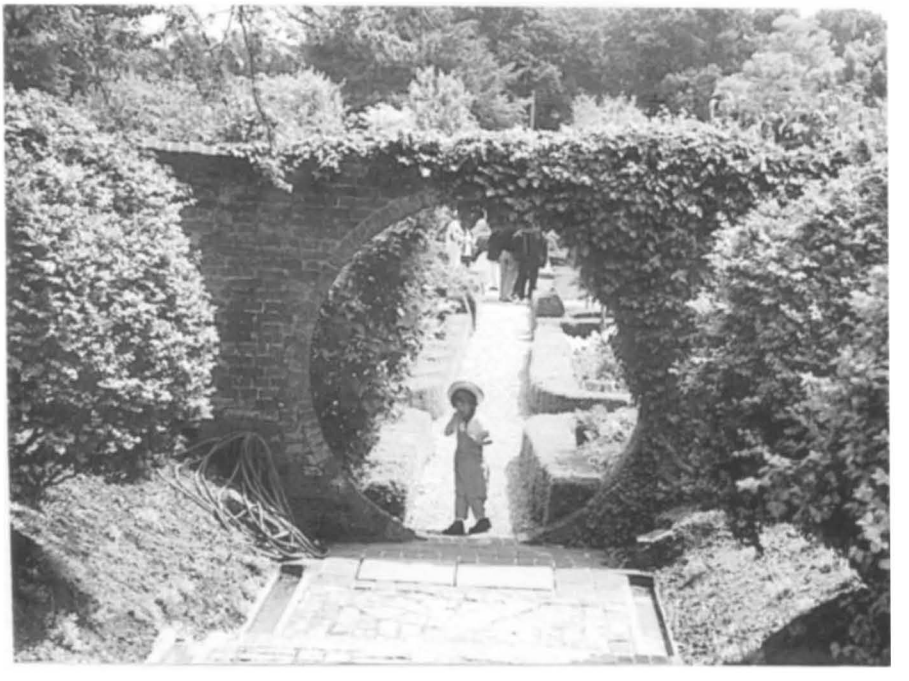
an attractively furnished Georgian building in Winchester.

The Sunday program consisted of a coach tour of Hampshire County, with numerous anecdotes of the history of the area provided by the driver. The first stop was Houghton Lodge gardens, home of Anthea and Martin Busk. The eighteenth century cottage orné, or rural retreat, was built prior to 1799, and is a rare, early example of an architectural style that evolved when fashion turned from the Classical to the Romantic (informal and picturesque). The house faces south, has lovely pastoral views, overlooks the River Test, and the property is classified as an Environmentally Sensitive Area. The one-acre kitchen garden was surrounded by one of the few remaining complete chalkcob boundary walls (made of a mixture of chalk and straw) in Hampshire. On the west side was a new hydroponicum, an enclosed structure for the growing of plants in nutrient-rich solutions or moist inert material instead of in soil. It was explained to us that plants need a balanced mixture of fifteen elements for optimal development. The main garden had become overgrown by the 1970s, and was replanted in an earlier and simpler style with the assistance of David Jacques, current Director of Historic Parks and Gardens at English Heritage. Only plants available to English gardeners in the eighteenth century were selected for the restoration. Neatly clipped boxwood parterres included wonderful yew and boxwood topiary. Below the lawn and just at the river's edge, Mrs. Busk had created a unique dragon topiary of *B. sempervirens* 'Suffruticosa'. The dragon, approximately 4 feet high and 15 feet long, delighted the crowd with its smoking nostrils, created by intermittent mists of water, perfectly simulating grey smoke.

The second garden that we visited was that of West Green House, a small manor built in the 1740s and hidden in a quiet corner of Hampshire. The 99-year lease of West Green House was sold by the National Trust, and the estate was opened as private gardens. The house and eight-acre garden had been acquired by the National Trust in 1971 and its first tenant was Lord Alistair McAlpine, who contributed a collection of garden buildings and neo-classical ornaments designed by

A smoking dragon constructed of B. sempervirens *'Suffruticosa' guarded an entrance to the River Test.*

A bear cub boxwood topiary in the Alice garden at West Green House. (Photo: Henry F. Frierson, Jr.)



Moon Gate leading into a parterre garden with edgings of clipped boxwood at West Green House.

A parterre laid out in checkerboard design in the Alice Garden. (Top photos: Henry F. Frierson, Jr.)

A ball on a stick B. sempervirens *topiary emerges from a* B. sempervirens *'Suffruticosa' edging in the gardens of West Green House.*

architect Quinlan Terry. Shockingly, in 1990, the IRA detonated a bomb in the forecourt, inflicting so much damage that the Trust seriously considered a demolition of the house. The Trust decided to repair the external surface, however, leaving the interior and garden for restoration. Marylyn Abbott, an Australian gardener and purchaser of the lease to West Green, gave us a brief introduction to the gardens. She has produced a book *Gardening with Light and Color*, to be published in September 1999.

Each garden within the garden had a different atmosphere and included the green theater, parterres, nymphaeum, lake field, Alice in Wonderland garden, and snowdrop lawn. Nearer to the house and said to be contemporary with it, was a small orangery approached along high allées, walls of yew and holly below beech and lime trees. The herbaceous borders (containing Delphiniums, Eremurus, Digitalis, Iris and Verbascum) were enclosed by knee-high clipped 'Suffruticosa' hedges, having survived three centuries. A checkerboard of boxwood parterres included topiaries of the White Rabbit, the Mad Hatter, and the Tea Pot in the Alice garden (Figs. 3 and 4). Another parterre was in a design of circles. Also, water lily tanks were enclosed by hedges in a formal design.

Elizabeth Braimbridge discusses her worldwide collection of rare and unusual Buxus *species at her Langley Boxwood Nursery.*

After lunch at West Green, we reboarded the coach and traveled through numerous quaint, historic villages, to a boxwooder's dream nursery, that of Mark and Elizabeth Braimbridge's Langley Boxwood Nursery in Rake, near Liss, Hampshire. Elizabeth began by showing us her vast collection of worldwide *Buxus*, many of which she has collected herself, and others having been obtained as gifts. Many of the species and unique plants undoubtedly cannot be seen in any collection in the United States. Her collection of unusual and tropical *Buxus* includes, among others, *B. rugulosa* var. *intermedia* (from Nepal), *B. henryi* (China), *B. leoni* (Cuba), *B. glomerata* (Cuba), *B. macowani* (South Africa), and *B. natalensis*

An employee of the Langley Boxwood Nursery demonstrates how to clip a spiral topiary from a B. sempervirens *specimen.*

Tea was served at the home, garden and holly nursery of Louise Bendall in Liss, Hampshire, England. (Photos this page: Dr. Henry F. Frierson, Jr.)

(South Africa). The variability in leaf size, shape, and color, and the particular habits were striking. *B. rugulosa* var. *intermedia* was especially notable for its tiny blue leaves and compact growth. Elizabeth had meticulously grouped the *Buxus* according to region and species. One only wishes that hours could have been spent with her in discussion of the traits, requirements for growth, and horticultural potential of each plant. A quick tally of boxwood grown at the nursery for sale to gardeners included at least fifteen species and more than fifty cultivars.

The nursery specializes, in addition to specimen plants and rare varieties, in a large selection of boxwood topiary, the likes of which cannot be seen in the United States. Available for purchase were cones, balls, spirals, complex shapes, cubes, obelisks, and animals (rabbits, teddy bears, peacocks, etc.). The creation of a spiral topiary from a 4-foot *B. sempervirens* plant was demonstrated to the delight of everyone. Although it is disheartening that plants from Great Britain cannot be shipped with any ease to gardens in the United States (plants seemingly must be handled specially, inspected, and shipped bare root without any attached soil), it did preclude the extremely difficult choices one would

Dr. Frierson (left) and John Halliday, a tour participant and owner of Potters Farm Nursery in Shropshire, England, converse around the extraordinary Buxus *topiary for sale at the Langley Boxwood Nursery.*

have to make for purchases for one's own garden. The time spent in the Langley Nursery was clearly too little, as this boxwood aficionado could have easily devoted a full day or longer to observation and discussion.

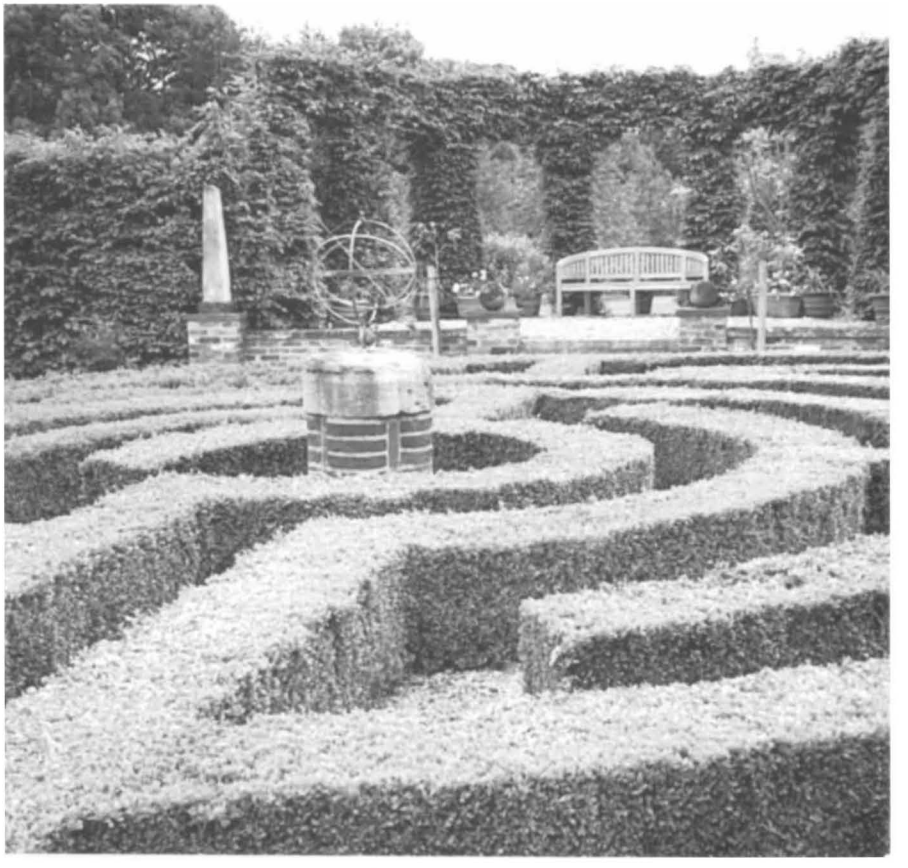
The final site of the day was the garden and nursery (Highfield Farm) of Louise Bendall in Liss, Hampshire. Ms. Bendall's nursery is England's only specialist farm producing a wide gamut of hollies for all uses. Prior to her tour and discussion of the hollies, she generously provided the group with tea. She then showed us particular hollies to be used as large specimens, topiaries, hedging, container plants, and miniatures. Nearly 100 cultivars were grown, and many of them were singled out for their specific attributes. The group reluctantly reboarded the coach and returned to Winchester at 6:30 p.m.

To this observer, the use of boxwood seen during this EBTS weekend can easily be contrasted with that in the United States. The use by the English is largely confined to edging and topiary, while boxwood as specimens without severe shearing is preferred in America. It is anticipated that boxwood gardeners from both sides of the Atlantic will adopt traditional uses of the plant from each other, as more exposure is gained to the many ways *Buxus* can enhance the landscape.

A working relationship between the ABS and the EBTS would be of great interest to members of each organization and details of this interaction should be developed.

The autumn event of the EBTS will be held September 24-26 in Tuscany, Italy. Attendance at an EBTS event is enthusiastically recommended.

Dr. Frierson is Second Vice-President of the ABS and Chairman of the Research Committee.



A boxwood maze with a raised terrace for viewing at the gardens of Earlstone Manor.

Round forms on "sticks" and in pots accent this parterre garden at Earlstone Manor.

The Taxonomy of Cultivated Plants

Third International Symposium

Lynn R. Batdorf

Proceedings of this symposium were developed from notes by a participant. His participation was partially supported by the ABS.

The Third International Symposium on the Taxonomy of Cultivated Plants was held in Edinburgh, Scotland, July 20-26, 1998. The symposium was conducted under the auspices of The International Society for Horticultural Science. It was organized by the Horticultural Taxonomy Group on behalf of the Royal Botanic Garden, Edinburgh; the Royal Botanic Garden, Kew; and the Royal Horticultural Society. The purpose of the symposium was to permit discussion and interaction among plant taxonomists, national collection holders, international registration authorities, and experts in the areas of plant breeder rights, intellectual property rights and databases for managing plant information.

An additional purpose of the symposium was to present and discuss new techniques, share information and concerns on an international level.

The symposium was divided into two parts: the presentation of papers and the display of posters. The presentations were divided into ten sessions. A summary of the major topics discussed in the ten sessions follows.

Session I. Plant and Germplasm Collections

Three presentations were made in this session. The first was by Dr. Hugh McAllister from The University, School of Biological Sciences, Liverpool, England, on the importance of living collections for taxonomy and nomenclature. The second, by Dr. Tom Hazekamp of the International Plant Genetic Resources Institute in Rome, Italy, and Dr. Guarino of the International Plant Genetic Resources Institute in Colombia focused on taxonomy and the conservation and use of plant genetic resources. Finally, Mr. Martin Gardner of the Royal Botanic Garden, Edinburgh, in Scotland, spoke on establishing and maintaining *ex situ* conservation collections of conifers.

Some scientists believe the collections held in botanic gardens are responsible for recent advances in systematics that would not otherwise have been possible. That is, serious molecular studies and research on chromosome counts require live plants. Chromosome counts on living plants have led to many discoveries. Diagnostic trichomes are often not present in processed plants that have been mounted on herbarium sheets. Trichomes are present in live plants, and they have led to important discoveries.

Other scientists find that the inherent weakness of live collections in botanic gardens make the collections unsuitable. In general, live plants from botanic gardens and arboreta are lacking in availability or lack proper labeling. Poorly or undocumented plants are usually of very little value for scientific study. In botanic gardens it is the gardener or horticulturist who has control of plant growth, not the taxonomist. Therefore, botanists do not examine plants in cultivated conditions. Further, the plant or plants are of a very limited population and are generally not representative of the taxon.

The preservation and use of plant germplasm begins with exploration and collecting. This requires an ecographical survey to evaluate and determine distribution patterns, ecological preferences, reproductive biology and ethnobotany. The identification of field collections is aided by traditional keys and molecular analysis. After collection, conditions such as seed storage, documentation parameters of plant evaluation, and the available gene pool affect the taxonomic data that can be obtained.

Obtaining and managing plant information involves establishing and maintaining core collections with documented plants. The Plant Genetic Resources Network aids in this process by providing a network to exchange and compile information in a central database.

The living plant collections in public gardens and arboreta are underutilized by researchers. Only about 10% of these plants are used in any research program. Conserving and researching wild collected plants in these institutions is vital in today's society. For example, 52% of conifers in the wild are threatened. Competition among conifers, fires, and grazing by goats, especially in the Mediterranean Area are responsible for some of the threats.

Session II. Nomenclature in the Ornamental Seed Trade

One presentation was made by Mr. Tony Hender, Floranova of Norfolk, England, discussing "Introduction to the Flower Seed Industry."

The international flower seed

industry, operating in most countries of the world, does about 180 million dollars of business at the wholesale level. The largest markets are in the USA, Europe and Japan. Several steps are necessary to make seeds available. First, there must be breeders to create new plants. Many genera of ornamentals have been intensively bred, especially in the case of pansies, impatiens, petunias and geraniums. Production is the next step, using plants that are hand pollinated or open pollinated. Distribution of seed to various markets is the final step.

There are numerous and rapid changes occurring in propagation techniques. These require new techniques for labeling and maintaining the proper naming of the species and cultivars during propagation.

Session III. International Property Rights and Plants

The third session presented a lively debate on a variety of topics by some world-renowned experts. "Plant Variety Protection and Variety Denominations under the UPOV Convention (this French acronym translates to: International Protection for Union of New Plants)" were presented by Dr. André Heitz, Director of UPOV, Geneva, Switzerland. "Plant Variety Protection in the USA" was outlined by Mrs. Janice Strachan, Examiner of the Plant Variety Protection Office, U.S. Department of Agriculture, Beltsville, Maryland. "Adoption, Use and Maintenance of Trademarks for Marketing Plant Material" was presented by Mr. Albert Tramposch from the World Property Organization, Switzerland. "Trademark Rights, a Sometimes Overlooked Tool for Plant Variety and Marketing Protection", were discussed by Mr. Vincent Gioia of Christie, Parker & Hale, California. "Plant Variety Rights Trials for Ornamentals: the International Testing System and its Interaction with the Naming Process for New Varieties" was presented by Dr. Elizabeth Scott of the National Institute of Agricultural Botany, Cambridge, England.

The aim of UPOV is to recognize and protect the rights of breeders and in particular the limitations that the requirements of the public interest may impose on the free exercise of such rights.

The members of UPOV represent 37 countries with membership pending for 11 more countries, mostly in Europe. UPOV grants rights to the breeder, thus giving the breeder exclusive rights over the production and sale of seeds and plants of the protected variety, hybrids derived from the variety and essentially derived varieties. The objective of this right is to enable the breeder to collect compensation and organize an optimal exploitation of the variety. The protected plant must be distinct from other varieties.

All tubers and plants that are sexually reproduced, including F_1 hybrids, but excluding fungi and bacteria, are protected by UPOV. There has been a marked increase in plant protection. For example, the United States joined the UPOV Convention in November 1981. Prior to that time, the Plant Variety Protection Office received 200 to 300 applications. Since 1981, the Plant Variety Protection Office processes 400 applications annually. An examination of the applications shows that 75% are for agricultural crops, 20% for vegetables, and 4% for ornamentals.

Information necessary to complete the application includes: a breeding history, distinctiveness statement, objective description, and basis of ownership. To verify seed germination 2,500 seeds are required, of which 85% must successfully germinate.

Session IV. Registration of Plant Names

This session, of special interest to registrars, illustrated registration procedures in different genera and in different countries. The presentations were: "An Overview of Plant Variety Rights and National Listing in the UK" by Dr. John Austin of Plant Variety Rights and Seeds Division, England; "Cultivar Registration for Statutory and Non-Statutory Purposes in South Africa" by Mrs. Joan Sadie of the Directorate Plant and Quality Control, South Africa; "Cultivar Development and Registration in Australia" by Mr. Iain Dawson of the Australian National Botanic Gardens, Australia; "Compiling, Maintenance and Identification of *Bougainvillea* Cultivars" by Dr. Brijendra Singh of the Indian Agriculture Research Institute, India; "Rose Registration: Cultivar Names, Code Names and Selling Names" by Professor Malcolm Manners of Florida Southern College, Florida.

Many systems for plant variety rights are based on the International Convention for the Protection of New Varieties. It is possible to obtain plant breeder rights for all varieties, whereas the National Listing covers only important agricultural and vegetable crops. The requirements for National Listing apply to the European Community (EC) Council Directives on the Common Catalogues. Plants must establish themselves as distinct, uniform, and stable for the breeder to obtain plant breeders rights. To obtain National Listing, a variety must also be shown to have value for cultivation. To sell seed in the European Community, it must be on the National List or in the EC Common Catalogues.

Both the National List and the Plant breeder rights have rules on naming plants. Most EC members adopt the UPOV guidelines on

naming. The EC Common Catalogues Directives do not provide naming guidance. As a result, there are quite a few difficulties in these various rulings. To remedy this, voluntary rules on naming were developed by an EC Working Group and the Community Plant Variety Rights Office in 1997.

There are many techniques for classifying cultivars. Morphological characteristics such as leaf shape, size and variability in leaf color and flower (or bracts) characteristics such as single, multibracted and variegated may be used. Other approaches such as pollen variability hold great promise.

Session V. Principles of Cultivated Plant Classification

Modifying the guidelines for classifying plants has been an ongoing process. Discussion on this topic was continued with presentations by: Dr. Wilbert Hetterscheid of the Vaste Keurings Commissie in The Netherlands, "The Netherlands on Stability Through the Culton Concept"; Dr. Ronald van den Berg of the Wageningen Agricultural University in The Netherlands, "The Netherlands on Cultivar-group Classification"; Willem Brandenburg from The Netherands on "Crop-weed Complexes and the Culton Concept"; Mr. Niall Green of the Scottish Agricultural Science Agency, Scotland on "Simplification of the Naming and Classification of Statutory Registered Cultivars, with Particular Reference to Vegetables"; and Dr. Barbara Pickersgill of The University of Reading, England on "The Variation and Classification of East African Highland Bananas."

Species are expected to be variable. This variability illustrates evolution and as a result, invites name changes. One proposal would set up a new classification system separate from the International Code of Botanical Nomenclature. In presenting a tentative classification system, it was demonstrated that cultivar groups are culta, not taxa. For example, there are vegetable groups (i.e., *Brassica)* with subspecies, covarieties, and varieties that are better served by group names. If this new cultonomic system were accepted, it must then be linked with the traditional taxonomic classification system. Cultivars have been confused with form and variety. It was proposed that the new culton system would stop this confusion. Name confusion would also be reduced by allowing users to access cultivar names by International Registration Authorities through the Internet.

Session VI. The Cultivar - Definition and Recognition

Again, in an effort to classify plants, this approach focuses on using various plant characteristics to establish the most appropriate classification scheme. There were three presentations. The first, "Cultivated Plants and the Codes - Towards a Resolution of a Demarcation" was given by Dr. Roger Spencer, Royal Botanic Gardens, Melbourne, Australia. The next, "'Inspired Word' or 'Pandora's Box': DNA Markers for Cultivar Identification and Classification" was presented by Dr. Alastair Culham, The University of Reading, England. Finally, "DUS (Distinct, Uniform, Stable) Testing of Cultivars in Poland" was given by Dr. Julia Borys, Research Centre for Cultivar Testing, Poland.

Plants that occur by natural selection are covered under the International Code of Botanical Nomenclature (ICBN) while plants created by artificial selection are covered under the International Code of Nomenclature for Cultivated Plants. However plants can arise through other means. To identify such plants, some believe that a new and separate designation may be necessary. A cultigen would be a plant that arises in some way by human intervention (species, i.e., maize, oats, lettuce) and through hybrid species. Conversely, indigens are those discovered in the wild. However, transferring cultigens from the Botanical Code to the Cultivated Plant Code, is not possible. Cultigens do not clearly equate to the concept of culton. This is partly due to the fact that taxa are arranged hierarchically and culta are not. The culta concept is omitted from most taxonomic works. When present, culta are generally filed in the back of the herbarium in separate folders.

Scientific discoveries and the subsequent dissemination of information have permitted DNA-sequenced plants to be listed on the Internet. DNA sequencing is becoming less expensive and faster to perform. The cost is about £50 (c. US $80). There are several advantages: large quantities of data are gathered, homology is assured by sequencing specific gene spaces, a large data base of published sequences becomes available, and genes or spacers can be chosen to suit individual requirements.

The use of DNA markers offers objectivity, high resolution, repeatability, positive identification, and a system for classification. However, it may cause difficulties such as failure to determine morphological differences, expense, inability to classify "field" or garden characteristics of a plant, and inability to use pictures to get DNA.

DNA discoveries are illustrating its usefulness and its future promise. For example, we have learned that *Actaea* evolved before *Cimicifuga* and that dwarf conifers have viral DNA.

Session VII. Databases for Collections, Nomenclature and Taxonomy

Management of various types of plant information has been made easier and more available through computer applications. These presentations focus on a few of the most important databases currently available: "Nomenclature of World Economic Plants from the USDA's (United States Department of Agriculture) GRIN (Germplasm Resources Information Network) Database" by Dr. John Wiersema of the Beltsville Agricultural Research Center, Maryland; "Q-Collector: Development of a Portable Database for Expeditions by the Royal Botanic Gardens, Kew" by Mr. Chris Clennett of the Royal Botanic Gardens, Kew, England; "Agricultural Biodiversity: A Database for Checklists of Cultivated Plant Species" by Dr. Helmut Knüpffer, Institut fur Pflanzengentik ünd Kulturpflanzenforschung, Germany; "Think Globally, Act Locally: Using BG-Base to Manage Collections Data in an International Context" by Dr. Kerry Walter of the Royal Botanic Gardens, Edinburgh, Scotland; and finally, "Reconciling Good Taxonomic Practice with the Interests of Gardeners" by Dr. Simon Thornton-Wood of The Royal Horticultural Society, England.

BG-Base was designed specifically for collection holders and is now widely used around the world. It can manage a tremendous variety of information including taxonomy, nomenclature, geography, bibliography, images, verification, wild collections, phenology, propagation, horticultural treatments, special characteristics, gene sequence, seed bank, and herbarium specimen loans. While each institution using BG-Base is responsible for managing its own data, all sites are compatible with one another. As an example, data has been used to produce various catalogues and plant lists, some of which are available on the Internet, by way of direct transfer from BG-Base running at the Royal Botanic Garden, Edinburgh, and the World Conservation Monitoring Centre. To facilitate its use in the field, BG-Base can be used in laptop computers and it can be hooked up to a bar code reader.

Dozens of arboreta and botanic gardens have developed their own systems to manage their living and herbarium collections. Unfortunately, these different systems are not able to share information with one another. For example, the Q-Collector, developed by the Royal Botanic Garden, Kew, is not compatible with BG-Base.

Session VIII. Modern Techniques in Breeding and Taxonomy

New techniques and scientific discoveries permit new opportunities. Evaluating their benefit and their best application to plant science was the challenge for the speakers in this session. The presentations were: "DNA Fingerprinting of Cereal Cultivars for Intellectual Property Rights Protection" by Dr. Bernard Baum of Eastern Cereal and Oilseed Research Centre, Ontario, Canada; "Molecular Markers for Characterization and Identification of Genebank Holdings" by Dr. Konrad Bachmann of the Institut fur Pflanzengentik und Kulturpflanzenforschung, Germany; "New Approaches to the Taxonomy of *Saintpaulia* and *Streptocarpus*" by Dr. Michael Möller of the Royal Botanic Garden, Edinburgh, Scotland; "Classification of Cultivated *Cephalotaxus* Species Based on rbcL" by Mr. Donglin Zhang of the University of Maine; and "Genetically Modified Crops: Current Status" by Dr. Wendy Cooper of the National Institute of Agricultural Botany, Cambridge, England.

In the next 25 years the world's population is expected to double. Also in 25 years, the available agricultural land will be reduced by 25%. This presents a great challenge for technology to produce more food on less land. Genetic engineering will play a major role in addressing this important challenge.

A gene modified organism (GMO or GM) can be a plant, bacterium, virus or animal which expresses a characteristic that has been altered using molecular methods rather than traditional breeding methods. There are many GMO plants, including tomatoes and soybeans, that will soon be registered.

The symposium participants had a long and spirited discussion on the perceived risks and benefits associated with this new technology. The benefits include high yield, disease resistance, or improved flavor characteristics that can be attained in a relatively short period of time. Concerns include producing varieties containing unexpected or harmful toxins, increasing weed resistance to herbicides, and the potential for bacteria to develop antibiotic resistance by way of gene transfer from ingesting GMO food.

Session IX. Case Studies in the Taxonomy of Cultivated Plants

By looking at individual plant groups, solutions to other or larger problems can often be examined. The following case studies were made: "Cultivars of *Quercus cerris* x *Q. suber:* the Lucombe oak and DNA Microsatellites" by Ms. Anne Plovanich-Jones of Michigan State University, Michigan; "Fundamental Taxonomic Problems in and Arising from the Genus *Helleborus*" by Mr. Will McLewin of Phedar Nursery, Cheshire, England; "Complexities in the Infraspecific Nomenclature of *Buxus*" by Mr. Lynn Batdorf of the

U.S. National Arboretum, Washington, D.C.; "The *Lantana camara (Verbenaceae)* Complex in KwaZulu-Natal, South Africa" by Professor Charles Stirton of The National Botanic Garden of Wales, Wales; and "Cultivar Groups in Japanese Cedar, *Cryptomeria japonica"* by Dr. Paul Fantz of the North Carolina State University, North Carolina.

All presenters focused on what became a central theme for this session; identification, classification and documentation. These issues arise from numerous cultivars described by their morphological characteristics that cannot be relied upon for clear identification. For example, originally-named cultivars being propagated in the nursery industry may end up with incorrect names. Possible solutions include more emphasis on phyllogenetic criteria and phenologic characteristics at the genus level, and at the species level, giving much more weight to provenance and more attention to homogeneity or the lack of it in wild populations. Improved communication between international registration authorities and growers as a result of providing information through the Internet would assist in reducing the occurrence of synonyms.

Session X. Special Lecture

The final session was presented for the learning pleasure of the participants. It was a very special treat to hear this keynote address given by Professor William Stearn who was the Senior Principal Scientific Officer at the Department of Botany, British Museum of Natural History, in London, England. He has received several honorary doctorates and many other prestigious awards and honors. He has authored more than 360 publications, one of which includes the standard comprehensive guide used around the world, *Botanical Latin.*

Professor William Stearn delighted the participants in the symposium with his presentation entitled: "Introduction of Plants from Japan into European Gardens." It was Professor Stearn's goal to present 300 years of plant exploration history in 30 minutes. This very enjoyable talk provided many pointed examples where Japanese flora have greatly enriched gardens throughout the world.

Glossary:

Core collection - the primary collection of plants, void of its supporting documentation or any secondary plant collections.
Cultigen - a plant known only in cultivation with no determined nativity.
Culton/culta - a group of cultivated plants.
Ecographical - the physical factors of a habitat.
Ex situ - out of its normal place.
Phyllogenetic - relating to the development of leaves.
Trichomes - any hair-like structure on the leaf surface

Mr. Batdorf is International Registration Authority for Buxus *and an officer of the ABS.*

Boxwood in America and The ABS

Tom Saunders

Excerpted from a talk given before the European Boxwood and Topiary Society (EBTS) on Saturday, June 12, 1999.

Today I'd like to spend a few minutes telling you all about The American Boxwood Society, about boxwood in America, and about our family nursery located in central Virginia. I'll start by telling the story behind The American Boxwood Society (ABS).

In the late 1950s and early 1960s, many gardens in Northern Virginia which contained large, billowing old plants of *Buxus sempervirens* 'Suffruticosa' were losing these beautiful specimens and hedges to an unidentified problem. Portions of the plants would slowly turn straw-colored and then die, soon followed by the total loss of color and life of the entire plant. Concern about this decline of old and long-established plants brought together a group of amateur and professional boxwood enthusiasts who contacted friends and colleagues to attend an organizing meeting in May 1961, out of which grew The American Boxwood Society. One hundred charter members became the active nucleus of the new association. The headquarters were established at the University of Virginia's Orland E. White Arboretum, located at Blandy Farm in the beautiful Shenandoah Valley of Virginia. The Arboretum has since become the State Arboretum of Virginia. A Constitution for the Society was adopted in 1962 and non-profit status with tax exemption was enacted in 1968.

In America, for some strange reason, "American Boxwood" and "English Boxwood" have become the commonly-used names for *Buxus*

sempervirens and *Buxus sempervirens* 'Suffruticosa', respectively, by both gardeners and nurserymen. The progressive dying off of old plants seemed to affect ONLY 'Suffruticosa', and therefore the problem or disease became known as "English" Boxwood Decline. It was the urgent need to identify the cause of this widespread disaster which gave the new Boxwood Society its impetus.

The Society's mission was defined as education in the fields of boxwood history, care and culture. One of the early projects was the financial support of graduate study at Virginia Tech into the causes and possible cures for English Boxwood Decline.

As part of its educational mission, in 1961 the Society began to publish a quarterly journal, *The Boxwood Bulletin.* An Advisory Board was appointed with many distinguished botanists and scientists, men who contributed greatly to the breadth and interest of information to be shared with Society members. An Editor was named for *The Bulletin* and it continues to provide scientific and cultural information for boxwood growers.

In later years The American Boxwood Society was chosen to be the International Registration Authority for *Buxus* by the International Society for Horticultural Sciences.

Publications printed by the Society also include four editions of the *Boxwood Buyer's Guide*, listing nurseries which grow or market box. The first authoritative book covering all phases of boxwood information, history, care, pests and diseases, *The Boxwood Handbook,* appeared in 1995, followed by a revised edition in 1998. A *Manual of Boxwood* is now in preparation. All of these publications are the result of the dedicated efforts of Mr. Lynn R. Batdorf, Curator of *Buxus* at the U.S. National Arboretum in Washington, DC. Another excellent publication which has helped boxwood growers worldwide is the book, *Boxwood Its History. Cultivation. Propagation* and *Descriptions* by P. D. Larson. It was printed in 1996.

Beginning in 1977, the Society undertook two new types of activities, the organizing of boxwood workshops in different areas of Virginia, and planning boxwood tours. These programs proved extremely popular and have been effective ways to spread knowledge about boxwood care and offer attractive locations where boxwood can be seen.

The formation of two other groups devoted to the study of boxwood have demonstrated the continuing and lasting interest in this outstanding plant: The Boxwood Society of the Midwest, formed in St. Louis, Missouri, in 1977 and your own European Boxwood and Topiary Society, with its very broad representation, both geographically and horticulturally. After the passage of the many centuries when boxwood has flourished and been admired, it is reassuring to realize that its fascination continues to draw new gardeners to add its distinctive presence to their surroundings.

Our Society has a very active research committee, chaired by Dr. Henry Frierson, with major funding generated by a plant auction held at the annual meeting. Donated plant material netted the Society more than $3500 at the auction held last month in Richmond, Virginia. The garden tours held on the final day of the conference still rank as one of the highlights for all attendees. Undoubtedly, the society's success has been due to the unselfish work of individuals such as Decca Frackelton and Joan Butler, both of whom were recognized at our recent annual meeting.

At this time, I'd like to give you a brief tour of Saunders Bros., Inc., and also talk about boxwood in America. Our nursery beginning was in 1947 when my father, Paul M. Saunders, started rooting boxwood as a 4-H project. Propagating "English" boxwood at an early age to later field plant the liners created an interest in *Buxus* for Dad that has only grown with time. Early crops paid for his first car and Mom's diamond engagement ring. Growth took place in several directions early. The nursery expanded rapidly and because of a record flood in 1969 our field production changed quickly to container production. In addition, the family grew quickly with the birth of seven sons; naturally, there was never a labor shortage. From Dad's 4-H Club beginning, Saunders Brothers Inc. today produces in excess of one million plants annually in the scenic Blue Ridge Mountains of Central Virginia. Other major crops produced by the company are peaches (including some of the new white flesh high sugar varieties) and apples from New Zealand such as 'Fuji' and 'Gala'. High density production of these crops takes place on 150 acres.

Still active in the business, my father is current President of Saunders Bros., Inc. He is extremely active coordinating the National Boxwood Trials at arboreta and universities across the eastern United States. In addition to him, there are five sons, a daughter-in-law, and a French-Canadian brother in the business, each responsible for a different phase of the diverse operation. I'm the oldest son at Saunders Brothers and serve as nursery production manager, with specific responsibility of woody plant production.

At present, we have over 275 overwintering houses on 60+ acres. Still specializing in *Buxus* production, we currently list 15 cultivars that are marketed throughout the northeast United States. Some of the major cultivars produced are:

"English" (which is still our number one boxwood cultivar), *B. sinica* var. *insularis*, 'Elegantissima (which is outstanding when used with red fruited winterberry and/or other contrasting foliaged plants in winter), and 'Justin Brouwers', a seedling discovered in Williamsburg, Virginia that is rapidly gaining popularity as an edging plant or as a landscape specimen. Also, 'Graham Blandy' has gained more notoriety as an upright cultivar along with another plant, 'Dee Runk' which has a more pyramidal habit. A final cultivar, 'Green Beauty', has been a big hit for us as either a specimen plant or as an edging cultivar. The secret to all the new cultivars is how well we can jointly sell them to the public. Some good media releases regarding "life after boxwood decline" should educate the consumer to the different growth habits, foliage colors and uses of these non-"English" and "American" cultivars. No landscape is the same without them.

In addition to boxwood, Saunders Brothers produces over 30 cultivars of azaleas, including a variegated evergreen one we discovered and named after my daughter, Christi Lyn, who was revived after being pulled out of a swimming pool at 2 years of age unconscious and without a pulse. Tissue cultured rhododendrons, including one from Japan named 'Yaku Princess', hollies, *Nandina*, and flowering shrubs such as *Buddleia, Hydrangea*, and *Caryopteris* are some of the plants we produce in our Zone 6 nursery. Colorful conifers including *Junipers, Arborvitae,* Leyland cypress, *Chamaecyparis*, spruce, and *Cryptomeria* are produced. In recent years, *Hosta* and *Liriope* production has escalated as well as the large number of perennials for both sun and shade. To sum up recent production changes, we're looking for color as we alter our product lines.

In an attempt to extend our market, my brother, Robert, decided we should produce Dwarf Alberta Spruce in a red pot for the Christmas holiday season. Another brother, Sam, designed a perennial tag to use in a locking tag pot to offer the consumer more knowledge for their new gardening treasure. Additional new products in recent years include hanging baskets, and color bowls.

All of our plants are grown in a soilless media that often is purchased with slow release fertilizer added before it is delivered. Pots are filled by hand by piece rate and then liners are planted directly into the container. An occasional pruning is often needed to keep plants in bounds. To eliminate some manual labor, we chemically prune all azaleas with a product called Off-Shoot O to create plants denser and less labor intensive. Containers that do have fertilizer added to the media are topdressed by hand once the liners are set. To maximize growth, soluble salts checks are made on a weekly basis during the growing season. If levels are low, liquid fertilizer is injected as a supplement.

To keep plants clean of weeds, granular herbicides are applied on all woody crops on three-month intervals. For the weeds that come up in other areas, Roundup is applied to prevent any weed from going to seed. Insecticides and fungicides are also applied on regular intervals to have the cleanest product possible.

For water pathogens, we chlorinate our water always. Fortunately, clean water is available for irrigation purposes from the local Tye River. It, as well as the runoff water, is monitored regularly. A number of ponds allow us to recapture most of our runoff and re-use it for irrigation purposes. Rainbird irrigation time clocks are the means by which most of our water controlling is handled. A computer generated schedule allows a field supervisor to provide cool down irrigation as well as the complete night watering. Any plants that need to be sprayed or have their irrigation time changed can be done in minutes. The computer can compute vertical inches of water applied, total number of gallons to be used, and can change box start and stop times to fulfill any work to be performed.

Orders for plants are loaded onto four-wheel tracking wagons and soon after conveyed onto trailers for immediate delivery. We ship into 10 states with the majority of our product going to large landscaping firms and garden centers. The busiest season is spring but recently plants such as pansies have kept even the short kids busy for the better part of the late fall season.

Overwintering plants grown outside is accomplished simply by laying white plastic and shade fabric directly over the plants. Sealing the edges with mulch prevents the winter winds from blowing the covers off. Uncovering yields plants greener than those that have been exposed all winter long. A plastic roller allows us to get multiple years out of a single roll of polyethylene.

Experience has taught us a lot over the years, but we still have a long way to go. We welcome your visit and your suggestions that can make us a better business. We can be reached at 2498 Tye Brook Hwy., Piney River, VA. 22964 or (804)277-5455.

Mr. Saunders is President of the ABS.

New E-mail Address:

The e-mail address for Mr. Lynn Batdorf, International Registration Authority for *Buxus,* has changed. It is now:

batdorfl@ars.usna.gov

Boxwood in England

In 1997, David G. Frackelton, Jr., dutifully took pictures of boxwood when in England at Brasenose College, Oxford, and forwarded them to his grandmother, Decca G. Frackelton, a Director of the ABS. He was there studying military history under a Woodberry Forest School (Madison County, Va.) summer program.

Among the places visited on their study excursions were Sulgrave Manor, the ancestral home of the Washington family and Blenheim Palace acquired by the Duke of Marlborough through his benefactor, Queen Anne, following the 1704 Battle of Blenheim.

Below the water garden, clipped boxwood and yews overlook the river at Blenheim Palace.

A "parterre de broderie" garden at Blenheim Palace, enclosed with clipped boxwood hedges of varying heights. (Photos: David G. Frackelton, Jr.)

Sulgrave Manor with a pair of animal topiaries at the corners of the entrance walk.

Four knot gardens of boxwood edging with grey Santolina *and various herbs were the center attraction of one of the side gardens at Sulgrave manor.*

At Sulgrave Manor a section of the main garden had boxwood parterres planted with perennials or roses in the parterres surrounding the center bed of lavender. Neatly edged turf paths separated the parterres.

Annual Meeting Comments

ABS President Thomas Saunders asked the attendees at the ABS Annual Meeting to send in comments regarding that meeting and suggestions for future meetings. Replies received included the following:

"Appreciate the opportunity to renew friendships at the Annual Meetings"

"Grateful for the effort of those who plan the events"

"Thought the extra day provided a beneficial diversity in the program content (soils, annuals, perennials, Japanese maples)."

"The evening cruise was an enjoyable social event."

"At Agecroft, especially enjoyed the quiet and restful formality of the sunken garden, the herb knot garden and wattle fences."

"My personal favorite garden was Mr. Reed's varied gardens, especially the circular bed of blue and yellow pansies accentuated by a center statue of a girl with a bird which said "Wow!" to me. (Paul Saunders had said during his lecture that there should be a "Wow" plant or focal point to every garden.)

"Just a little note of thanks especially to you for a very enjoyable meeting. We had a very interesting and nice time."

Another took the time to stop by and comment on the program which was indeed a compliment to us, showing such interest in the organization.

Board Thanks Annual Meeting Participants

Congratulations to Katherine Ward for a well-planned and well-executed meeting.

Thanks to all who helped in various ways to make the Annual Meeting such a success.

Grateful thanks to Mr. K. Lee Hahn who brought the plants which Mr. Charles Hildebrant donated to the Auction.

"Beyond the call of duty," he also returned to Virginia to deliver two gift plants of 'Appalachian Pyramid' which Mr. Hildebrant donated to the ABS Memorial Garden, plus an additional order of the same plant.

Mr. Hahn had been unable to deliver these to the Annual Meeting because of lack of space.

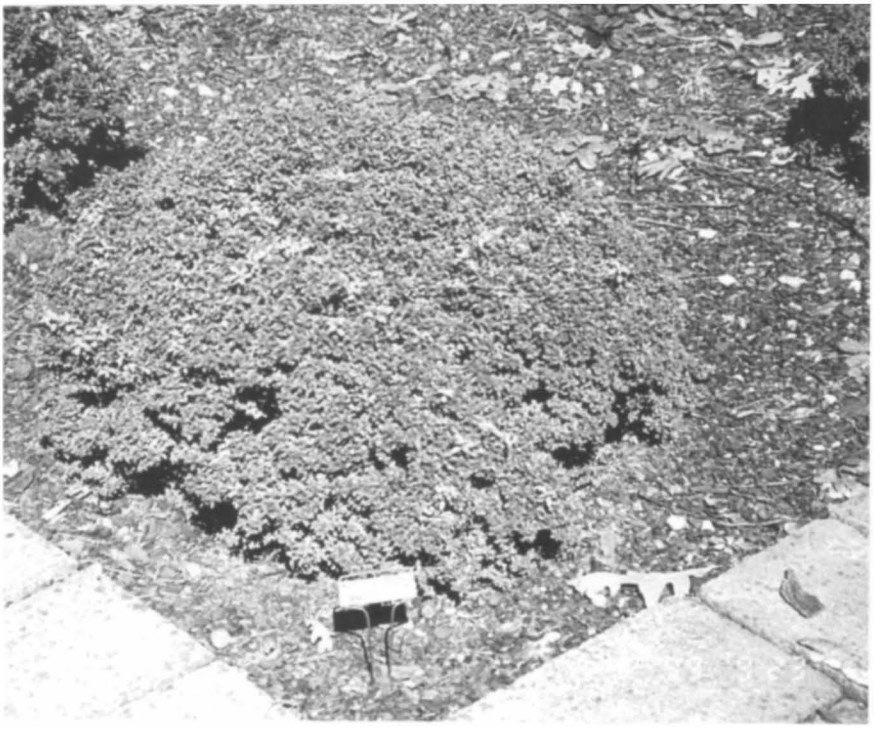
In Memoriam

Mrs. Charlotte Ballard
Member since 1982

Mrs. Richard C. Plater, Jr.*
Charter Member

*Note: Mrs. Plater took a great interest in the boxwood at their home, the Play Garden, in Clarke County, Virginia, where she entertained the ABS upon occasion. She rooted boxwood from many of her travels and from the collection at Blandy.

In 1970, she presented to Decca G. Frackelton an 8-year-old specimen of *Buxus microphylla* 'Compacta' which she had grown from a cutting taken at Blandy.



Mrs. Plater's Buxus microphylla *'Compacta' at 37 years is 14" high and 26" wide.*

Minutes of the Fall Board Meeting

The fall meeting of the Governing Board of The American Boxwood Society was held on Wednesday, September 8, 1999, at the Western Sizzler Restaurant in Waynesboro, Virginia. In attendance were Thomas Saunders, President, Charles T. Fooks, First Vice-President, Dr. Henry F. Frierson, Second Vice-President, Katherine D. Ward, Executive Treasurer, Sigrid G. Harriman, Secretary, Lynn R. Batdorf, Registrar, and the following directors: John W. Boyd III, Scot Butler, Decca Frackelton, Richard D. Mahone, Dr. Gary Richardson, Ian Robertson, Clyde Weber. Joan Butler was present in her capacity as liaison to the Orland E. White Arboretum reporting on the ABS Memorial Garden at Blandy. Absent were Dr. Michael Bowers, James Saunders and Steve Zapton.

The meeting was called to order at 1:00 p.m. by the President, who thanked Katherine Ward for organizing the successful 1999 Annual ABS meeting in Richmond. Thank-you letters were sent to all speakers as well as the July issue of *The Boxwood Bulletin* which summarized the meeting.

The minutes of the Spring Board Meeting, May 20, 1999, issued in *The Boxwood Bulletin* vol.39, no.1, p.21, were approved with one modification. Inadvertently Katherine Ward was listed as Secretary. It should have read Sigrid Harriman.

Treasurer's Report: Mrs. Ward presented the Treasurer's report showing a balance in checkbook of $17,413.06 which includes the special funds. She also reported on the "Handbook" sales and stated that a good supply is still on hand. Mrs. Ward expects to move to her permanent quarters in Winchester sometime in October, which will have hook-ups for all her needs as well as Internet access.

Budget Committee Report: Mr. Fooks requested that all budget matters be sent to him or Mrs. Ward.

Boxwood Memorial Garden: Mrs. Butler reported that cash donations which were received in memory of Ralph E. Smith will be used to finance the information panel on Boxwood at the Information Booth at the entrance to the Orlando E. White Arboretum at Blandy. Mrs. Butler passed out a draft design for comments during her report. She said that in addition to the famous boxwood sprig drawing there will be some photographs of the garden. Mrs. Butler also reported that the plants in the garden looked surprisingly well in spite of the drought, especially the 'Morris Midget' plants in the two new parterres. Mrs. Frackelton passed around a snapshot of the new sign for the Memorial Garden which was done according to the designs for all other signs at Blandy.

Registrar's Report: Mr. Batdorf reported on the progress of the fifth edition of the *Boxwood Buyer's Guide*. He hopes to have the last revision done within a short time. The *Buyer's Guide* should be out later this year. It lists a total of 332 sources for a number of boxwood cultivars.

Following the Registrar's report, Mr. Saunders reported that on July 20, 1999, he sent a letter to the director of the National Arboretum in Washington, to determine the status

New sign at the entrance to the ABS Memorial Garden, according to the approved design for all signs at Blandy. (Photo: Decca Frackelton)

of the ABS' donation of a $1,935 in 1996 for a new sign at the National Boxwood Collection. Mr. Elias, the National Arboretum's director, responded promptly by saying that they have finalized their new signs for the entire Arboretum and hope that the signs will be in place this autumn or winter.

***Boxwood Bulletin* and Membership Report:** Mrs. Frackelton reported that the August 1999 membership was 627, some 1998 members have not yet paid their dues. Seven new members were registered. Some of the new members were the result of the American Nurserymen's mailing list. Articles in magazines and *The New York Times* usually result in new memberships.

Mrs. Frackelton repeated her plea for contributions to *The Boxwood Bulletin,* and informed the governing board that 1,000 copies are printed of each issue. Earlier issues are stored at Blandy and at Mrs. Frackelton's house to supply requests for back issues.

Nominating Committee Report: Mr. Weber had no report from the Nominating Committee at this time. He then proceeded to lay out his ideas for a procedure of recognition, potential recipients, and manner of nomination. He distributed copies of his draft for comments.

Other Business

Report on European Boxwood and Topiary Society Meeting: Dr. Frierson and Mr. Saunders went to England to attend the semi-annual meeting of the society. The meeting, according to Dr. Frierson was structured much like the Annual ABS meeting with tours of gardens and a boxwood and topiary auction. Approximately 60 members attended. Their second issue of *Topiarius* has just been published. Frierson prepared a report for publication in the next issue of *The Boxwood Bulletin* and Mr. Saunders supplied many photographs. Mrs. Frackelton will select photographs illustrating the report.

DNA Study on Cuban Boxwoods: Dr. Frierson reported briefly on the DNA work conducted by one of Dr. Koehler's students, Maria Landgraf. It is a complex study because the variability between DNA makeup in different boxwood varieties nay be not very great. It also seems that the *Buxaceae* family is very close to the base of the plant system.

Recently Dr. Koehler spent six weeks in Cuba and found some *Buxus* that he had not seen in the wild including one new one. He is planning another trip early next year. Dr. Frierson would like to accompany him on this next trip if he is legally able to enter the country.

Dr. Frierson reported that Mac Griswold, who is doing work at Sylvester Manor on Shelter Island, New York, called for information to contact Dr. Koehler. She is a garden historian and ABS member, who is applying for a grant from the National Endowment for the Humanities to support archeology work at Sylvester Manor, believed to be the location of the first boxwoods brought to this country after the New York site was settled in 1651.

Planning for 2000 Annual Meeting: Dr. Richardson presented an outline for the next Annual meeting of ABS. It will be held June 1-3, 2000, in Annapolis, Maryland. The board will meet on the afternoon of June 1.

The Wyndham Hotel off Route 50 can accommodate participants, provide box lunches and has meeting rooms available. Some of the speakers will be Mr. Paul Saunders to report on his ongoing boxwood evaluation project; Stratton Semmes, landscape architect, on the use of boxwood in small gardens; Karen Long on the restoration of the Paca Gardens; Lynn Batdorf on boxwood cultivars; and Chas. Rosdale on the use of boxwood for bonsai. Dr. Richardson plans touring two country gardens and some town gardens for the 3rd of June.

Year 2001 Annual Meeting: This meeting will be held at Blandy to commemorate the 40th anniversary celebration of the ABS. Mrs. Butler reported that she was approached by someone at Herronwood (the former home of Admiral Phillips, who served as President for many years), located near Upperville in Virginia. She was able to suggest someone who can take care of the boxwood. No chairman for the 2001 meeting has been appointed at this writing.

Gift Plants: Mr. Weber was chosen to find gift plant donors for the next three annual meetings. Copies of a list containing year, cultivar, and donor of former gift plants were distributed. The list will be kept up to date by the secretary. Mr. Fooks offered to supply 'Curly Locks' for 2000. John Boyd is to accept auction plants for each annual meeting and to continue being the auctioneer.

Spring 2000 Boxwood Garden Tour: A boxwood garden tour in Georgia is planned for April 10-14, 2000. Mrs. Ward informed all that the bus transportation for the trip and tours (10 1/2 hours one way) will cost $125.00. She is awaiting final plans from Mr. Chance Whitaker and will have more information at the winter board meeting.

Next Board Meeting: The next Board meeting will be in Charlottesville on January 14, 2000. Exact time and place will be announced in early January.

The meeting adjourned at 3:45 p.m.

Sigrid Georgii Harriman
Secretary

THE AMERICAN BOXWOOD SOCIETY

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