

The *Boxwood* Bulletin

A quarterly devoted to Man's oldest garden ornamental



Boxwoods at a gate entrance to the rose garden at Dumbarton Oaks in Georgetown, District of Columbia, are examples of cloud-pruning. See story on page 39. (Photo: Mrs. Robert L. Frackelton)

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The American Boxwood Society

The American Boxwood Society is a not-for-profit organization founded in 1961 and devoted to the appreciation, scientific understanding and propagation of the genus *Buxus* L. There are more than 800 members in the United States and nine foreign countries.

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Memberships for the year May through April include \$12 for four quarterly issues of *The Boxwood Bulletin*:

Individual	\$15	Contributing	\$30	Life	\$250
Family	\$20	Sustaining	\$50	Patron	\$500

Non-member subscriptions for groups and institutions, such as botanic gardens and libraries, are \$15 by the calendar year.

Available Publications:

Back issues of <i>The Boxwood Bulletin</i>	\$ 4
<i>Boxwood Buyer's Guide (3rd Edition)</i>	\$ 8
<i>International Registration List of Cultivated Buxus L.</i>	\$ 3
<i>Index to The Boxwood Bulletin 1961-1986</i>	\$10

Contributions:

Gifts to the Society are tax-deductible and may be undesignated or applied to:

Boxwood Handbook Fund
Boxwood Memorial Garden Fund
Boxwood Monograph Fund
Boxwood Research Fund

Correspondence:

For address changes, memberships, dues, contributions, or to order back issues or publications, write:

Treasurer, The American Boxwood Society
P.O. Box 85, Boyce, Va. 22620

For general information about the Society, advice concerning boxwood problems or cultivar selection, write to The American Boxwood Society at the same address. You are also welcome to write directly to the President:

Mrs. Robert L. Frackelton
1714 Greenway Drive
Fredericksburg, Va. 22401

Call for Papers:

Technical articles, news, history, lore, notes, and photographs concerning boxwood specimens, gardens or plantings are solicited for possible publication in *The Boxwood Bulletin*. Photographs should be suitable for reproduction and fully captioned. Suggestions regarding format and content are welcome. Material should be submitted to:

Chairman, Bulletin Committee
1714 Greenway Drive
Fredericksburg, Va. 22401

Material to be returned to the sender must be submitted with a self-addressed envelope carrying suitable postage. Every effort will be made to protect submittals, but the Society cannot be responsible for loss or injury.

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ABS Announces Ninth Garden Tour

Mr. Richard D. Mahone has been busy arranging another outstanding spring tour for us. The emphasis will be on Gloucester County, steeped in early history because of its location across the York River from Jamestown and Williamsburg, Va.

On Saturday, April 27, we will depart about 8:15 a.m. to avoid the rush of Garden Week visitors.

Our first stop is The Pond, then we proceed to Little House (the Wilson home), Elmington and Exchange before having lunch at the Abington Church "Tea Room."

Elmington is on land Sir Thomas Gates received in 1611 through a crown grant. The present neoclassical structure (garden only open) was designed by Niernsee and Neilson of Baltimore in 1848. On the landscaped grounds are magnificent magnolias, crape myrtle, dogwood—and boxwood. Formal gardens contain beds filled with bulbs.

Exchange is on land that was part of a large grant deeded in 1692 to Henry Whiting and included Elmington. The house, built in the early 18th century with beaded clapboard, brick ends and English basement, is one of Tidewater's oldest homes.

After lunch we will visit private gardens not open on the Garden Week Tour. Lisburne, where boxwood and trees provide the setting for the 1810 frame manor house, is approached by an avenue of pines and Darlington oaks. The owners have created the design for an early 19th century landscape using plants and trees native to the area or brought from England at that time.

White Marsh and Purton grounds and gardens will be a special treat arranged by Mr. Mahone. Boxwood plantings are to be found at both places.

After we have tried to absorb all of this beauty, we will relax over a delicious dinner before the bus returns us to the Lord Paget to rest for another day's viewing.

On Sunday, April 27, we will tour in private cars. Those who need transportation and those who can provide will so indicate on the Registration Form. We will visit the William and Mary boxwood collection and two private gardens to be announced.

The tour will conclude with lunch at the Cascades so that those who need to get an early start for home may. Those with more time may visit places in Williamsburg at their pleasure.

ACCOMMODATIONS: Each person is responsible for making his own reservations. Our headquarters will be Quality Inn-Lord Paget (known locally as the Lord Paget), 901 Capital Landing Road, Williamsburg, Virginia 23185, (804) 229-4444 and (800)-537-2438. A block of rooms will be held until March 15, 1991. The special rate is \$34.00 for a single, \$38.00 for two, three or four in a room, plus tax. Be sure to indicate you are with The American Boxwood Society Tour.

REGISTRATION: Registrations are limited to one bus load (44) and will be accepted in the order received. No registrations can be accepted and no refunds made after March 11, 1991. The cost of \$95.00 includes bus transportation Saturday, April 27, 1991, cost of admissions to the places on the Garden Week Tour, lunch and supper Saturday, and lunch Sunday. It does not include lodging, breakfasts nor transportation on Sunday. To register, please use the enclosed form or a facsimile and return to Mrs. Robert L. Frackelton, 1714 Greenway Drive, Fredericksburg, VA 22401. Make checks payable to The American Boxwood Society.

Cloud-Pruning

Mrs. Robert L. Frackelton

Cloud-pruning is a term used to describe a method of pruning plants to make an architectural design, revealing the interior structure. It is sometimes referred to as the pompon or poodle effect.

An article in the *Time-Life Encyclopedia of Gardening on Pruning and Grafting* suggested drawing the design first. The Japanese have used this method of pruning for years.

Clusters may be rounded into tufts or flattened to give the cloud-like effect. Sometimes it is used in a



A boxwood hedge at Boxwood Acres, Memphis, Tennessee, is an example of cloud-pruning. (Photo: P. D. Larson)

modified form, rounding clusters to give common boxwood the billowing effect of *Buxus sempervirens* 'Suffruticosa'. This is done without striping the stems below the tufts as in the more structured design.

Three examples of cloud-pruning on boxwood are shown here and on the cover.

The method is used on many evergreens, and examples are seen in pictures of Japanese style and Japanese gardens.

Mrs. Frackelton is President of The American Boxwood Society.



At a landing in the Dumbarton Oaks gardens, boxwoods behind a low stone wall have been cloud-pruned. (Photo: Mrs. Robert L. Frackelton)

Boxwoods Prosper at Veach Home in Asheville, N.C.



The Veach home in Biltmore Forest, Asheville, N.C. illustrates the owners' love of boxwood.



Mature Buxus sempervirens border a pair of stairways to an upper terrace at the front of the house.



Beds are bordered with boxwood.

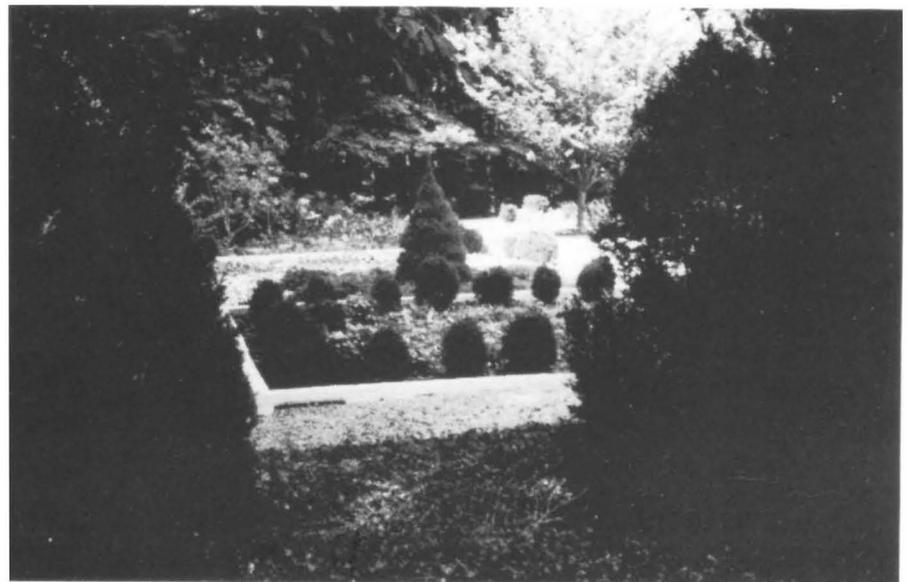


Large boxwood with Norway spruce in the background.

Longtime members (since 1962), Mr. and Mrs. John Veach have shared some photos of their garden and grounds, planted with mature boxwood and boxwood edgings.

Overhanging limbs of Norway spruce planted by George Vanderbilt's forester, Dr. Carl Schenck, about 1900 and 65-70 year old boxwood are features of the landscape.

(Photos: Mr. John Bemis Veach, taken in 1989 and 1990.)



Young boxwoods were grown in the mountains near Mt. Mitchell, N.C.

Garden Group Tours Recovering Charleston, S.C.

Nature has not always been kind to Charleston. There was an earthquake in the late 19th century and more recently Hurricane Hugo in September 1989. The people of Charleston are not only very special, but they are survivors.

These pictures were taken in November 1989, less than two months after Hugo, during a tour by members of the American Horticultural Society.

Some roofs were still partially covered with blue plastic where repairs were still to be done. Not all furnaces were back in working order.

The waters had receded leaving boats on the streets, but the people had gone to work and help had come from sources all over the country.

Although trees had been destroyed in vast numbers, the gardens in the city itself were ready for visitors.

Perhaps visitors appreciate Charleston and its gardens even more knowing what had transpired.



An American Horticultural Society group views boxwood accents and parterres in the garden behind the Heyward-Washington House in Charleston.



A boxwood garden in Charleston which survived Hurricane Hugo.



A well-manicured private garden features boxwood.



Boxwood accents the corners of a path surrounding a sundial.

NOTICES

Annual Meeting

The ABS Annual Meeting will be held in May at Blandy Experimental Farm, Boyce, Va.

Tuesday, May 14, 1991: Evening Program and Reception

Wednesday, May 15, 1991: Memorial Garden Tour, business meeting, lunch (optional pre-registration or bring your own), educational program and auction of named *Buxus* cultivars.

Directions, details and registration forms will be in the April issue of *The Boxwood Bulletin*.

Auction

Anyone wishing to donate named cultivars to the boxwood auction (for the benefit of the Society), please notify Mr. Dale T. Taylor, 105 South Princeton Ave, Wenonah, New Jersey 08090, giving name, size and number of plants and bring them with you to the meeting. Plants in containers 6-inch to one-gallon size are the most convenient to handle. Mr. Taylor will again serve as our tabulator and he needs to prepare the list as far ahead as possible.

54th Annual Maryland House and Garden Pilgrimage

The schedule for 1991 is as follows: Sat. Apr. 13 - Bolton Hill, Baltimore City; Sat. Apr. 20 - Anne Arundel County; Sun. Apr. 21 - St. Mary's County; Fri. Apr. 26 - Woodmook, Baltimore County; Sat. Apr. 27 - Dorchester County; Sun. Apr. 28 - Kent County; Fri. May 3 - Carroll County; Sat. May 4 - Somerset County; Sun. May 5 - Howard County. For further details or brochure contact Maryland House and Garden Pilgrimage, 1105 A Providence Rd, Towson, MD 21204, (301) 821-6933. We expect a pre-tour article in the April issue of *The Boxwood Bulletin*.

Buyer's Guide, 3rd Edition

This Guide is an enlarged and updated edition of sources for purchasing boxwood. It lists more than 300 nurseries offering more than 100 species and cultivars, and includes an updated *International Registration List of Cultivated Buxus L.* Make checks (\$8.00) payable to The American Boxwood Society; mail to The ABS, Box 85, Boyce, VA 22620.

58th Annual Historic Garden Week

Mrs. J. Robert Massie, Jr., Editor Guidebook and Director of Publicity has announced that The Garden Club of Virginia will celebrate its 58th Historic Garden Week Saturday, April 20 through Sunday, April 28, 1991. "Two hundred owners of Virginia's outstanding homes and gardens will welcome visitors to this springtime event. Also open will be 50 of Virginia's historic landmarks. The Garden Club of Virginia has provided fitting landscapes for 32 of these historic places with the more than four million dollars it has received from its Historic Garden weeks." For guidebook or other information, please contact the Garden Club of Virginia Headquarters, 12 East Franklin Street, Richmond, VA 23219. The guidebook is usually ready about the first of March.

IN MEMORIAM

Dr. W. H. Paine
Life Member

Mr. Woodson P. Houghton
Member since 1963

Minutes of Fall Board Meeting

The ABS Board of Directors met in Staunton, Virginia on Friday, September 21, 1990. Present were: President Mrs. Robert L. Frackelton, First Vice President Dale T. Taylor, Treasurer Mrs. Katherine D. Ward, Secretary Mrs. Scot Butler; and Directors Lynn R. Batdorf, John W. Boyd, Jr., Cdr. Phillip D. Larson, Alex X. Niemiera and Mrs. Tyra Sexton. Also present were Ex-Officio Director Dr. Edward F. Connor of Blandy Farm, the State Arboretum of Virginia, Nancy Takahashi, Professor of Landscape Architecture, University of Virginia, and Elizabeth Sargent, the graduate student intern who had worked all summer on the design of the enlarged Boxwood Memorial Garden.

The President called the meeting to order at 10:30 a.m. and thanked the Treasurer for arranging the meeting at McCormick's Restaurant. The minutes of the spring board meeting of March 19, 1990, were approved as published in the July 1990 issue of *The Boxwood Bulletin* (Vol. 30, No. 1, p. 11) with the addition of the Research Committee Report which had been presented at that meeting.

A report on the new design for the Boxwood Memorial Garden was then presented by Liz Sargent. She noted that the boxwood collection is a powerful attraction for visitors; it will occupy a central location at the Arboretum and should make a strong statement. The new plan was displayed with explanations about the main view from the Visitors Center, with an entry plaza and sign as a gathering place for guided tours. The theme of the garden will feature white-flowering trees and shrubs as co-plantings, choosing fragrant specimens wherever possible. (A fuller description of the design and a plat of the plantings appeared in *The Boxwood Bulletin* for October 1990.)

The changes which are planned for the State Arboretum will get under way with the 1991 relocation of the entrance road, to be accomplished with state highway funds earmarked for recreational locations. The Friends of the State Arboretum will sponsor the construction of an outdoor amphitheater, for which about 50% of the needed funds are already pledged. Many boxwood plants will need to be moved and this work will be done by a landscape contractor. Construction of walkways, underground lighting and water lines must also be coordinated with these moves. Financial support from the American Boxwood Society will be requested. The possible future addition of a full-time curator of the boxwood collection would be a great advantage to work with educational programs, propagation and care of the plants. A proposed time schedule would call for moving plants in the fall of 1991, if water lines are available.

The amphitheater could then be built in 1992. Vice President Dale Taylor will work on a proposal for a fund raising effort, perhaps involving large corporations which might benefit from boxwood-connected activities.

The Treasurer's Report was approved as presented. Balances were: checking account \$10,836.33; certificates of deposit totalled \$29,966.00. The full report is available on request. Committee Reports

Annual Meeting: The dates for the 1991 meeting were set for Tuesday and Wednesday, May 14 and 15.

Budget: Any committee budget requests should be submitted to Dale Taylor by February 15, 1991, in order for him to prepare next year's budget.

Boxwood Bulletin: Articles on special boxwood plantings at country houses will be forthcoming. The editor would welcome information and comments for *The Seasonal Gardener's* notes.

Buyer's Guide: Ninety-four copies of the new third edition have been sold at \$8 each.

Memorial Garden: Cdr. Larson spoke of his work with propagation of back-up plants (in case of losses when moved) and of new cultivars, which he continues to seek out and pursue. The maintenance of the existing garden has been difficult with so few manhours of work available. Herbicides were chosen over hand weeding.

Registrar: Mr. Batdorf reported that Charles Kraus, who might have been available to pursue research in plant "fingerprinting," has changed jobs. Ethel Duckey, a pathologist at the University of Maryland, is working on a disease handbook for *Buxus*. Dr. George Rogers has moved from the Missouri Botanical Garden to the Cox Arboretum in Dayton, Ohio. No work has been accomplished recently on the *Monograph for Buxus*.

Research: With the departure of William A. Gray from the Board of Directors, Joan Butler was asked to correspond with Richard Hawke at the Chicago Botanic Garden about the cultivar evaluation project there, and Richard Mahone will work with Thomas Banko on tissue culture and the boxwood field study at the Hampton Roads Agricultural Experiment Station.

Tour: Plans are under way for a garden tour in spring 1991.

New Business: Treasurer Ward noted that Dr. John A. Weidhaas is retiring from VPI&SU. A letter will be sent expressing appreciation for his many years of educational support and assistance to the American Boxwood Society. He had spoken about boxwood pests and diseases at several annual meetings.

The meeting was adjourned at 1:40 p.m.

Respectfully submitted,

Joan Butler, Secretary

Chinese Scientists Publish on *Buxaceae*

Translation Has Recently Become Available

The American Boxwood Society is pleased to present a reproduction of an important addition to the world literature on *Buxaceae*.

The document, written by Zheng Mian of Shanghai Normal University and Min Tianlu of the Kunming Plant Research Committee at the Chinese Academy of Science, was published in 1980.

In mid-1990, the President became aware that a translation had been prepared, and obtained approval to reproduce it in *The Boxwood Bulletin*. The 39-page document will be published in segments over the next several issues.

The article gives American readers an unusual opportunity to read authoritative descriptions of boxwood prepared independently of the free-world scientific community. The translation was made by two British women, for whom biographical notes are presented below.

Isabel Tasker lives in Fremantle, Australia.

She does technical translations from the Chinese as a hobby, and has published papers on language texts in translation and teaching methodology. She has been on the staff at York University in the United Kingdom, and has lectured at Central London Polytechnic.

Ms. Tasker presently holds special posts at Perth University in western Australia, developing computer-aided language materials for Chinese courses for students away from the campus.

She was born and educated in Northampton, England, where she studied linguistics and the Chinese language; she returns annually and serves as a tour guide. She is an avid long distance runner, cyclist, swimmer, and "a keen ornithologist."

Robyn Carter is a native of Manchester, England, and now lives in York.

Ms. Carter studied four years at the Royal Botanic Gardens at Kew, where she was awarded travel scholarships to observe the alpine environment in the French Pyrenees, and to China, where she studied cultivation and conservation of traditional medicinal plants. In 1988, she received a diploma, with honors.

Since graduation she has had practical experience in garden design and maintenance, and has served as gardens supervisor at Harlow Carr Botanical Gardens in North Yorkshire.

She is a member of the Royal Horticultural Society, an associate member of The Institute of Horticulture, and other professional societies, and has published several articles, including one on *Buxaceae*.

FLORA

REIPUBLICAE POPULARIS SINICAE

DELECTIS FLORAE REIPUBLICAE POPULARIS SINICAE

AGENDAE ACADEMIAE SINICAE EDITA

Tomus 45 (1) I. K.

ANGIOSPERMOPHYTA

DICOTYLEDONEAE

BUXACEAE

EDITORS:

Zheng Mian
Min Tianlu

AUTHORS:

Zheng Mian (Shanghai Normal University)
Min Tianlu (Kunming Plant Research Institute, Chinese
Academy of Science)

Science Press

1980 I. K.

TRANSLATION:

Isabel Tasker and Robyn Carter

BUXINEAE

Monochlamydeae; ovules have double layered integument

BUXACEAE

Evergreen shrub, small tree or herb. Simple leaf, alternate or opposite, entire or dentate, veins pinnate or triplinerved, no stipules. Flowers small, regular, no petals; unisexual, monoecious or dioecious; inflorescence racemose or coarctate spikes, bracteate; male flower has 4 sepals, female flower has 6 sepals (*Notobuxus* 4 sepals), all biverticillate, imbricate; stamens 4, adverse to the sepals (*Notobuxus* pistils 6, of which two pairs are opposite to the inner ring of sepals), free, anthers large, bilocular, filaments somewhat flat and wide; pistils normally tricarpellate (rarely dicarpellate), ovary superior, 3 locules (rarely 2 locules), often free, persistent, stigma somewhat decurrent, each chamber of the ovary has two apposite, pendulous, anatropous ovules, ridged dorsal sutures. Fruit is loculicidal capsule, or drupe. Seeds black, shiny, endosperm fleshy, embryo straight, with flat thin or thick fat cotyledons.

This family comprises four genera* (*Buxus*, *Sarcococca*, *Pachysandra*, *Notobuxus*), and approximately 100 species, found in tropical and temperate regions. Apart from *Notobuxus* (7 species) which is found in tropical and southern Africa and Madagascar, the other three genera are all grow in China; there are about 27 known species in China, distributed in the SW, the NW, the centre, and the SE, as far as Taiwan province.

* A. Engler's Syllabus der Pflanzenfamilien II Band 1964 divides Buxaceae into 3 groups, including in total the 6 genera *Buxus*, *Sarcococca*, *Pachysandra*, *Notobuxus*, *Styloceras*, *Simmondsia*. J. Hutchinson, The Genera of Flowering Plants vol II, 1967 divides Buxaceae into 5 genera; *Styloceras*, *Simmondsia*, *Buxus*, *Sarcococca*, *Pachysandra*; another genus *Notobuxus* is entered under *Buxus*. In the revised edition by H.K. Airy Shaw of J.C. Willis, A Dictionary of the Flowering Plants and Ferns eighth edition, 1973 Buxaceae only includes the 4 genera *Buxus*, *Sarcococca*, *Pachysandra*, and *Notobuxus*; *Styloceras* being classed with Stylocerataceae, and *Simmondsia* with Simmondsiaceae. The family is probably related to Celastraceae, and modern taxonomists class it in the order Celastrales.

Fossils of the leaves and fruit of the genus *Buxus* have been found in France in the sedimentary layer of the 3rd Meiocene epoch.

Plants of this family are largely used for ornamental purposes, and some species contain alkaloids and are used medicinally. The wood of the box trunk is dense, tough and tensile, and makes a good material for the production of handicrafts.

KEY TO THE GENERA

1. Leaves opposite, entire, veins pinnate; single female flower on the apex of the inflorescence; fruits are loculicidal capsules 1. *Buxus* L.
1. Leaves alternate, the majority triplinerved; female flowers attached to the lower part of the inflorescence; fruits somewhat fleshy.
 2. Leaves entire; persistent style on the fruit extremely short, approx. 2mm in length, approx. 1/5 of the length of the fruit 2. *Sarcococca* Lindl.
 2. Upper half of the leaf nearly always dentate; persistent style on the fruit long and extending to corniform, length 8 - 15mm, about the same length as the fruit 3. *Pachysandra* Michx.

Buxus L.

L. (Syst. Nat. 9. 1735; Gen. Pl. 284. 1737); Sp. Pl. ed. 1: 983. 1753; Baill. Monogr. Bux. 58. 1859; Müll.-Arg. in DC. Prodr. 16 (1): 13. 1869; Benth. et Hook. f. Gen. Pl. 3: 266. 1880; Hatusima in Journ. Dept. Agr. Kyusyu Univ. 6 (6): 262. 1942; Hutch. Gen. Flow. Pl. 2: 108. 1967.

Evergreen SHRUB or small tree; BRANCHLETS quadrangular. LEAVES opposite, coriaceous or thinly coriaceous, entire, pinnate, often lucid, petioles somewhat short. Flowers unisexual, monoecious; INFLORESCENCE axillary or apicillary, racemose, spiked or coarctate capitate, many bracts, one female flower, at the apex of the inflorescence, male flowers many, attached to the lower part of the inflorescence or at the 4 sides; flowers small; MALE FLOWERS: sepals 4, divided into inner and outer rows, stamens 4, opposite to the sepals, 1 rudimentary pistil; FEMALE FLOWERS: sepals 6, ovary trilocular, styles 3, stigma commonly decurrent. Fruits are CAPSULES,

spherical or ovoid, commonly glabrous, sparse hairs, when ripe splits into 3 sections along the locular ridge, persistent styles corniform, on the two corners of each section there is half a style, exocarp and endocarp abjoint; seeds oblong, having three sides, mesocarp black, lucid, endosperm fleshy, cotyledon oblong.

This genus has something over 70 species. They are distributed in Asia, Europe, tropical Africa, Cuba and Madagascar. About 17 species and several subspecies and varieties are known in China, they grow from Tibet in the west to Taiwan in the east, and from Hainan Island in the south to southern Gansu in the northwest, but their major distribution is in west and southwest China.

KEY TO THE SPECIES

1. When the female flower is receptive to pollen, the style is much longer than the ovary (the length of the style to that of the ovary is at a ratio of 2:1 or 3:1); male flower pedicellate; height of rudimentary pistil less than half the length of the sepal,*
 2. Inflorescence large, 1 - 1.5 cm. long, 7 - 10 mm wide; bracts many, dense imbricate; style narrow and long, curved, length 4 times that of the ovary 1. *B. henryi* Mayr
 2. Inflorescence rather small, usually less than 1 cm. long; rachis elongated after flowering, arrangement of bracts rather sparse.
 3. When dry, the leaf shows many raised lines in between the lateral veins and more or less parallel to them, both surfaces of the upper leaves appear densely pinnately rugose, and the lateral veins on the contrary are not obvious; branches, branchlets, petioles and midrib all densely covered in even fine short soft hairs; leaves oblong lanceolate or oblong, 5 - 7 cm long; persistent style on the fruit approx. 7 mm. 2. *B. pubiramea* Merr et Chun
 3. Lateral veins on the leaf surface and branching veins distinctly dense, when dry the raised markings between the lateral veins mentioned above are not present.
 4. Leaf broad-ovate or elliptical, base commonly rounded (great variation in the size of the leaves); style flat and wide, base extremely wide 3. *B. latistyla* Gagnep.
 4. Leaf elliptical-lanceolate, narrow lanceolate or oblanceolate, base cuneate.
 5. At least some of the leaves are large and broad elliptical-lanceolate, 8.5 - 12 cm, long, 3 - 3.8 cm. wide; branchlets glabrous 4. *B. hainanensis* Merr.
 5. Leaves mainly lanceolate or oblanceolate, no longer than 7 cm., no wider than 2 cm.

* Note: No firm information on the flowers of *B. pubiramea* and *B. hainanensis*.

6. Leaves oblong-lanceolate or narrow-lanceolate, 3 - 7 cm. long, 1 - 2 cm. wide; tip of the style comparatively narrow and long, revolute; branchlets pubescent, or almost glabrous 5. *B. myrica* Lévl.
6. Leaves oblanceolate or narrow obovate, 2 - 3.5 cm. long, 7 - 10 mm. wide; tip of the style comparatively short and wide, not revolute; branchlets pubescent 6. *B. austro-yunnanensis* Hatusima
1. When the female flower is receptive to pollen, the style is as the same length as or very slightly longer than the ovary, or else shorter than the ovary.
7. Height of the rudimentary pistils does not exceed $\frac{1}{2}$ the length of the sepals (only *B. linearifolia* has rudimentary pistils whose height can reach $\frac{2}{3}$ of the length of the sepals, leaves linear).
8. Leaves frequently large, longest 7 - 8 cm., leaf shapes oblong- or elliptical-lanceolate, shiny, lateral veins distinct on both sides; branchlets glabrous, or almost glabrous; male flower shortly pedicellate; when receptive to pollen, the style is longer than the ovary; capsules glossy, persistent style erect, length can reach 5 mm. (Certain plants in this species have leaves of only about 4 cm. long, lanceolate, but their other characteristics are not the same as 8 below.) 7. *B. megistophylla* Lévl.
8. Leaves comparatively small or narrow.
9. Leaves ovate, elliptical or oblong, 3 - 6 cm. long, 1.5 - 2.5 cm. wide; branchlets hairy.
10. Both sides of the leaf covered in fine downy hairs, later becoming almost glabrous; lateral veins not obvious; male flower sessile; when receptive to pollen, the style and the ovary are of equal length; capsule glabrous 8. *B. mollicula* W.W. Smith
10. Leaf glabrous, lateral veins clearly visible on the leaf surface; male flower pedicellate. When receptive to pollen, the style is somewhat shorter than the ovary; capsule covered in minute fine felt-like hairs. 9. *B. hebecarpa* Hatusima
9. Leaves when narrow are spatulate, lanceolate- or spatulate-linear or linear, when small and short they are obovate, elliptical or oblong, all less than 3 cm. long (rarely, reaching 4 cm.), less than 1 cm. wide; branchlets piliferous or glabrous.
11. Leaf surface commonly has no lateral veins, rugose when dried; leaf shape elliptical or oblong 10. *B. rugulosa* Hatusima
11. Leaf surface has clearly visible lateral veins, not rugose when dried; leaf shapes vary.
12. Branchlets densely pubescent; leaves commonly narrow obovate, oblong or elliptical-oblong, 1 - 2 cm. long, 4 - 8 mm. wide 11. *B. stenophylla* Hance
12. Branchlets glabrous, or slightly pubescent; leaves narrow-oblong, narrow oblanceolate, spatulate or linear.
13. Young fruit covered in minute fine stiff down, later becoming glabrous or almost glabrous; male flower sessile; leaves narrow-oblong, oblanceolate, or almost linear, 1.5 - 2 (- 3) cm. long, 2.5 - 4 (- 8) mm. wide; or else obovate-spatulate or spatulate, 8 - 12 mm. long, 3 - 4 mm. wide; on the leaf surface, midrib and lateral veins form an angle of approx. 45° 12. *B. cephalantha* Lévl. et Vant.
13. Young fruit glabrous; male flower pedicellate; on the leaf surface, lateral veins form angle of 30 - 35° with the midrib
14. Leaf spatulate, rarely narrow-oblong, base cuneate, 2 - 3.5 (- 4) cm. long, 5 - 8 (- 9) mm. wide; length of rudimentary pistil approx. half that of sepal

-13. *B. harlandii* Hance
 14. Leaf linear, attenuate at both ends, rarely linear-lanceolate, 1.5 - 2.5 cm. long, 3 - 5 mm. wide; length of rudimentary pistil approx 2/3 that of sepal
14. *B. linearifolia* M. Cheng
 7. Rudimentary pistil of equal or greater length than sepal (rarely 2/3 length of sepal, but then leaves definitely not linear),
 15. Midrib and lateral veins clearly prominent on both leaf surfaces; leaf spatular to obovate, 2 - 4 cm. long, 8 - 18 mm. wide
15. *B. bodinieri* Lévl
 15. Leaf without lateral veins on either surface, or with lateral veins only on upper surface; leaf shapes various.
 16. Leaf without lateral veins or rugosity on either surface; male flower shortly pedicellate; leaf shape oblanceolate or narrow-obovate, 1 - 1.6 cm. long, 4 - 6 mm. wide16. *B. ichangensis* Hatusima
 16. Lateral veins on leaf surface (some varieties have only rugosity on leaf surface, and show no lateral veins); male flower sessile; leaf commonly broadly elliptical to long elliptical, 1.5 - 3.5 mm. long, 0.8 - 2 cm. wide (shape and size of leaf varies greatly among the ssp. and vars.)
17. *B. sinica* (Rehd. et Wils.) Cheng

1. *Buxus henryi* Figure 5: 1-4

Mayr, Fremd. Waldb. u. Parkb. 451. 1906: Dummer in Gard. Chron. ser. 3 (52): 423, f. 182. 1912, descr. ampl.; Rehd. et Wils. in Sarg. Pl. Wils. 2: 168. 1914; Hatusima in Journ. Dept. Agr. Kyusyu Univ. 6 (6): 296, f. 11. 1942.

SHRUB, height about 3 metres; BRANCHES terete; BRANCHLETS quadrangular (the outer edges of two opposite sides may extend to some extent to form longitudinal ridges), glabrous, rarely 1 -2 nodes at the top of the branchlets are slightly covered in minute fine hairs on the internal sides, internodal length 1.5 - 3 cm. LEAVES thinly-coriaceous, lanceolate, oblong-lanceolate or ovate-lanceolate, 4 -7cm long, 1.5 - 2.5(-3.5) cm. wide, apex obtuse or slightly acute, base cuneate or acute, margin curves downwards, midrib prominent on both surfaces of the leaf, lateral veins not clearly visible, or upper leaf surface lateral veins clearly visible; petiole 1 -2 mm. long. INFLORESCENCE axillary, 1 - 1.5 cm. long, 7 - 10 mm. wide, flowers dense, basal bracts ovate, 3 - 4 mm. long, taupe colour, upper bracts obovate-oblong, approx. 6mm. long; MALE FLOWERS: about 8, pedicels 2 - 4 mm. long, glabrous, sepals oblong or obovate-oblong, 4.5 - 5mm. long, scarious, glabrous, stamens including anthers approx. 11mm. long,

rudimentary pistil has fine thin terete stalk, tip slightly enlarged, height approx 1 - 1.5 mm.; FEMALE FLOWER: outer bracts oblong, approx 6mm long, inner bracts ovate, approx. 3mm long, all scarious, glabrous, ovary 2 - 2.5 mm. long, style narrow and long, flat, 6 - 8 mm. long, apex curved outwards, stigma linear-obcordate, decurrent to close to the base of the style, nearly covering the whole of the inner side of the style. CAPSULES almost spherical, 6mm. long* (*FN In this family, 'length of fruit' refers to the length of the fruit itself, and does not include the length of the persistent styles. This usage will be followed below.) persistent styles erect at base, top extends outwards and downwards becoming arcuate, carpopodium 3 mm. long, many residual bracts. Flowering period April, fruiting period July.

Found in western Hubei, western and eastern Sichuan, and Guizhou; grows on wooded slopes, altitude 1300 - 2000 m. Type specimen collected from the vicinity of Yichang in Hubei Province.

2. *Buxus pubiramea* Figure 5: 5 -6

Merr. et Chun in Sunyats. 5: 104, 1940; Hainan Journal of Plants 2: 339, 1956.

SHRUB, height approx 3m; BRANCHES terete; BRANCHLETS quadrangular, diameter 1 - 2 mm. Branches, branchlets, petioles and midrib all densely covered in even fine short soft hairs. LEAVES thickly coriaceous, oblong lanceolate, rarely oblong or obovate, widest at or above the middle, 5 - 7 cm. long, 1.5 - 2 (-2.5) cm. wide, apex attenuate, rounded or obtuse, often with small indentation, base narrow and pointed, margin chondroid, bending slightly downwards, on the leaf surface the midrib stands out, the lateral veins are sparse, distance between each vein is 1.5 - 2.5mm, forming an angle with the midrib of 30 - 35°, when dry the leaf shows many raised lines in between the lateral veins and more or less parallel to them, externally both surfaces of the upper leaves appear rugose, and the lateral veins on the contrary are not obvious; PETIOLE flat, 1 - 5mm. long. INFLORESCENCE axillary or apicillary, flowers unseen. CAPSULES oblong, 9mm. long,

persistent style approx. 7mm. long, stigma decurrent, barely reaches 1/4 down the style, persistent sepal at the base of the fruit approx 1.5 mm. long, carpodium 5 - 8 mm. long, pubescent, above are many ovate acuminate bracts approx. 1 mm. long. Fruiting period June to July.

Found in Guangdong (Baoting in Hainan Island); grows on wooded slopes, altitude 650m. Type specimen collected from aforementioned site.

3. *Buxus latistyla* Figure 5: 7 - 12

Gagnep. in Bull. Soc. Bot. Fr. 68: 482. 1921; in Lecte. Fl. Gen. Indo-Chine 5: 661, f. 77, 10, 78, 1 - 4. 1927; Hatusime in Journ. Dept. Agr. Kyusyu Univ. 6 (6): 288. 1942; Yunnan Journal of Plants 1: 142, figure 35, 1 - 3. 1977.

SHRUB, height 1 - 4 m; BRANCHES terete, ribbed longitudinally; BRANCHLETS quadrangular or roundish, with longitudinal grooves on each of two sides, almost hairless, or slightly puberulous. LEAVES coriaceous or chartaceous, with both large and small sizes. LARGE LEAVES: ovate or oblong-ovate, 5 - 7 cm. long, 2 - 3.5 cm. wide, rarely rhomboid-ovate or lanceolate, apex acuminate or acute, obtuse or with a small point protruding, base round or very obtuse, rarely acute, margin curves downwards, midrib prominent on both sides of the leaf, lateral veins mostly opposite, between them there are frequently dense veinlets, or the veinlets may not be obvious, on the back of the leaf the lateral veins and veinlets may range from being slightly clear to unclear, very frequently the midrib on the leaf surface and the petiole are covered in minute fine hairs; PETIOLE wide, 1 - 3 mm. long; SMALL LEAVES: broadly-ovate or elliptical, 2 - 4 cm. long, 1 - 1.5 (-2) cm. wide, apex acute, base round, rarely acute, lateral veins and veinlets on the leaf surface not as numerous or as obvious as those on the large leaf; these two types of leaf commonly grow on different plants, but are sometimes also found on the same plant. INFLORESCENCE axillary and apicillary, 8 - 10 mm. long, 5 - 6 mm. wide; bracts ovate, acute, 2 - 2.5 mm. long, covered in minute fine hairs on the back; MALE FLOWER: pedicel 1 mm. long, outer sepals ovate, approx. 2.5 mm. long, acute, minute fine hairs on the back, inner sepals comparatively long and wide, glabrous, length of

stamen including anther 4 - 5 mm, anther and upper half of the filament hairy, rudimentary pistil discoid quadrangular, wider than it is high, approx 1 mm. wide; FEMALE FLOWER: all the pistils 4 - 5 mm. long, ovary 1.2 - 1.5 mm. long, style flat and wide, 2.8 - 3.5 mm. long, apex attenuate, width at base up to 1.6 mm., stigma oblong, lower part narrow, decurrent to the middle of the style. CAPSULES spherical, up to 8.5 mm. long when ripe, smooth and shiny, persistent style approx 4 mm. long, persistent sepal at the base of the fruit triangular-ovate, 2 mm. long, carpopodium 5 - 7 mm. long, with many ovate, acute, hairy bracts above. Flowering period March to April, fruiting period May to July.

Found in Guangxi (the region of Tiane, Hechi, Lingyun and Fengshan), and Yunnan (Funing): grows on slopes, beside streams, under forest cover. Distributed through Vietnam and Laos.

4. *Buxus hainanensis* Figure 5: 13 - 14

Merr. in Lingn. Sci. Journ. 14: 25, f. 8. 1935; Hatusima in Journ. Dept. Agr. Kyusyu Univ. 6 (6): 285. 1942, p. p. excl. descr. fl. et fig 6; Hainan Journal of Plants 2: 338. 1965.

SHRUB, height 1 - 2 m.; BRANCHES terete or with blunt ridges; BRANCHLETS roundish, one longitudinal groove on each of two sides, diameter approx. 1 mm., internodal length 2 - 6 cm, glabrous, or with sparse fine hairs just visible through a powerful magnifying lens in the longitudinal grooves. LEAVES thinly coriaceous or chartaceous, elliptical-oblong or oblong-lanceolate, leaves on old lower branches comparatively small, 5.5 - 7 cm. long, 1.8 - 2.3 cm. wide, leaves on new upper branches large, 8.5 - 12 cm. long, 3 - 3.8 cm. wide, both types of leaf apex attenuate, obtuse or with a small point slightly protruding, base cuneate, margin curves downwards, both sides glabrous, nitidous, midrib prominent on both sides of the leaf, veins on the large leaves especially clear, lateral veins 18 - 20 pairs, intercostal distance 2 - 4 mm., space between lateral veins covered in veinlets; PETIOLE approx. 1 mm. long. FLOWERS unseen. CAPSULE develops in the leaf axil and the shoot tip, spherical, unripe fruit and persistent



FIGURE 5

1-4, *Buxus henryi* Mayr: 1, Flowering branch; 2, Male flower; 3, Pistil; 4, Fruit, 5-6, *Buxus pubiranea* Merr, et Chun: 5, Leaf surface (upper surface); 6, One segment of the capsule, 7-12, *Buxus latistyla* Gagnep.: 7, Branch carrying large leaves; 8, Small leaf; 9, Inflorescence; 10, Male flower; 11, Pistil; 12, Fruit, 13-14 *Buxus hainanensis* Merr.: 13, Large leaf carried on upper branches; 14, Smaller leaf carried on lower branches, (Drawing: He Dongquan)

style each 5 mm. long, style oblique, stigma narrowly obcordate, decurrent to 1/4 - 1/2 of the style, persistent sepals at the base of the fruit triangular-ovate, 2 - 2.5mm. long, glabrous, carpodium approx. 4 mm., with many lanceolate, sharp-pointed, almost glabrous bracts above. Fruiting period September to December.

Found in Guangdong (Ya County in Hainan Island); grows by streams or under moist wooded cover. Type specimen collected from Huangjin Mountain, Ya County, Hainan Island.

The author of the text above based the description on the Isotype (Liu Xinqi 554. 1932) in the volumes kept by the Academy of Sciences South China Plant Research Institute, and on Merrill's original notes.

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