From the Vice President ....................................................Frances Jones

In August, the Mills River was at one-sixth of its normal flow and the French Broad River reached its lowest levels since 1895 when record-keeping began. (Asheville residents were able to walk across sections of the French Broad for the first time in their lives.) Many cattle farmers, unable to grow enough hay, sold off their animals. Apple growers said their rain-stunted apples were small and less profitable.

In February 2009, the southern mountains of western North Carolina remain locked in drought. Groundwater levels are two to five feet below normal. Western NC is today almost as dry as Reno, Nevada and our low soil moisture equals that found in Texas. Hartwell Carson, the French Broad River keeper, has said that if the mountain areas don’t get more rainstorms, the French Broad and other rivers will again drop to low levels.

Why are we in this predicament?

I attended a program at the Henderson County Library in which Mike Brewer of the National Oceanic & Atmospheric Administration posited that our drought was caused by an unexplained high pressure system sitting over North Carolina and Tennessee that has been there for the past two years. An article on the internet titled, La Nina, not Climate Change, Responsible for Southeast Drought stated that during periods of La Nina, the equatorial Pacific Ocean cools. This affects air currents that in turn impact the jet stream. Douglas Lecomte, of the National Weather Service explains “The downstream effect, like throwing a rock in the stream and seeing ripples, is that high pressure builds up over the southeastern United States, which deflects storms into the north. It’s not so good for the south.”

Columbia University’s Lamont-Doherty Earth Observatory’s opinion is that North Carolina’s drought is a naturally occurring cyclical phenomenon. The Earth Observatory’s conclusions are that the “post-2005 drought” in the southeast is no more severe than earlier droughts; dry conditions are only weakly linked to La Nina; tree rings show droughts in the southeast of equal severity in the past; the twentieth century appears to have been unusually wet by the standard of the last one thousand years; models vary in their projections of future hydroclimate change; and finally there is no clear signal of anthropogenic climate change in this drought, but, climate change may increase stress on regional water resources.

I guess this adds up to: we don’t know why we are experiencing this drought or how long it will last. We can perhaps take comfort in the idea that it is a naturally occurring phenomenon. It would be interesting to study written records of how trees, wildflowers, and North Carolinians fared during pervious severe droughts.
Member News

New Member. Jim Hane is a retired landscape architect. He and his wife moved to this area five years ago from Michigan. They live in Cummings Cove. Jim worked for the Dept. of Natural Resources in Lansing. He is a volunteer at the N.C. Arboretum as a guide in the cultivated garden and at the desk in the Baker Center.

ANNUAL DUES. January 1, 2009 was the date for all membership renewals. This is the final request for renewals. Please fill in all the information on the green form and return it with your check so we can verify our membership records.

Winter Meetings. These meetings will automatically be cancelled if the Henderson County Schools are closed. Check the weather reports or telephone the Henderson County Office at 697-4733.

Book Sale. It is the first day of March and big fluffy snowflakes are filling the sky, a perfect time to sort through the books on my shelves. Before moving to Oregon, Ann Matthes donated several boxes of books from her collection. As you think spring cleaning and sort through your books, put aside any related to botany, gardening or natural science and donate them for the WCBC book sale that will be held at the Annual Meeting in July. Contact Bonnie Arbuckle (696-22077) or Jeanne Smith (885-2530) with donations.

Any change of address, e-mail or telephone number, please inform Alan Graham, 544 Tip Top Road, Brevard, N.C. 28712. 828-884-3947 <adgraham@citcom.net

FINANCIAL STATEMENT FOR 2008
WESTERN CAROLINA BOTANICAL CLUB

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Submitted by Alan Graham, Treasurer, Western Carolina Botany Club
"Documenting Life" Photo Exhibit

March 2 - 31, 2009 - Asheville

The All Taxa Biodiversity Inventory (ATBI) in the Great Smoky Mountains National Park is getting ready for its ninth field season this year as scientists, students, and volunteers attempt to inventory every species of living organisms. So far they have uncovered 890 species that are new to science and 6,302 species new to the Park. "Documenting Life" is an exhibit that will be on display at The Compleat Naturalist throughout the month of March featuring high-resolution scans of insects and plants from the ATBI project.

The exhibit has been created to showcase the diversity that exists within the park. All of the pieces are beautifully framed, and may be purchased, with 100% of the proceeds benefiting Discover Life in America, the non-profit organization that coordinates the ATBI, documenting the biodiversity of the Southern Appalachians.

To learn more visit www.dlia.org

The Compleat Naturalist, Ltd., 2 Brook Street, Historic Biltmore Village
Asheville, NC, 28803

2008 Rare Plant List for North Carolina

The "2008 Natural Heritage Program List of the Rare Plant Species of North Carolina" has been completed as is now available for downloading from the NHP website:
ww.ncnhp.org/Pages/publications.html<http://www.ncnhp.org/Pages/publicawtions.html>

Because of the state budget shortfall, we will not be able to provide bound copies any time soon. If we do get some copies printed in the future, I'll send out an announcement. In the meantime, you can print the list from our web site or download a .pdf file.

-Misty Buchanan, Botanist, NC Natural Heritage Program
The flowers of our native Maples provide us with an interesting subject for study in the spring.

Later in the season we will have no difficulty distinguishing between Red Maple (Acer rubrum) and Silver Maple (A. saccharinum) on the basis of their foliage, but the blossoms emerge very early so this is of no help. They grow in small clusters, each made up of either staminate or pistillate flowers. The two species are superficially similar but have one difference which is diagnostic: Each individual flower of Red Maple has five petals, while those of Silver Maple have none.

In two others—Striped Maple (A. pensylvanicum) and Mountain Maple (A. spicatum)—the situation is reversed. The flowers open later, but although the leaves are then in evidence they are confusingly similar, differing mainly in that the margins are finely toothed in the first species and coarsely serrate in the second. The flowers, however, present no problem. Both are greenish yellow, but those of Striped Maple are $\frac{1}{4}$" long, bell-like, in pendulous racemes, while those of Mountain Maple are half as long with very narrow petals, and are much more numerous, in slender erect panicles.

Sugar Maple (A. saccharum) has leaves that resemble Red and Silver Maple but have only a few large teeth. Its flowers have pale yellow sepals but no petals, and hang from long, threadlike petioles.
EPIPHYTES

Epiphytes are plants that grow above the ground and live attached to other plants. They use the host plant only as a foundation and support. They derive no sustenance from it because they can manufacture their own food by photosynthesis, and so are self-sustaining. By growing on trees as many orchids do, they are better able to reach the light. Over half of the 20,000 species of orchids are epiphytes.

Epiphytes are not to be confused with parasites. Parasitic plants also live on and even inside the tissue of their host but they cannot synthesize organic substances from carbon dioxide and water because, unlike most epiphytes, they have no chlorophyll. To survive, parasites must steal their food from the living tissues of their host. Many parasitic plants are responsible for diseases of crop plants such as the rusts on cereal plants, the brown rot of peaches and anthracnose of beans. Parasites are harmful, epiphytes are harmless.

In northeastern North America, no flowering plants are found to be epiphytes. Occasionally small poplars are found on sugar maples or spruces. These are often referred to as ephemeral epiphytes. Such plants had their seeds disseminated by chance in suitable niches such as knotholes or soil-filled forks of trees. They do not usually complete their entire life cycle in this environment as epiphytes do. Of the many members of the Orchid family which are epiphytic, only a few are seen in the southeast except in Florida. There is one epiphytic orchid found in South Carolina. This is Epidendrum magnoliae the Green-fly orchid, which was identified for us by Bonnie Arbuckle on a botany club trip to the S. C. Francis Biedler Audubon Forest in 2001. It was found growing on a cypress tree and was in bloom.

Although epiphytes are not accustomed to droughts as are other flora because they don’t have access to the ground, they do have some mechanisms to survive dry spells. These include the ability to take in carbon dioxide at night, and photo-fixing it during the day to reduce water loss by transpiration. Epiphytic orchids have “pseudobulbs” that store water, bromeliads have tanks of water in the rosette formed by their leaves and philodendrons send long trailing roots down below the canopy which allow them to collect water and nutrients. These plants typically have thick, waxy leaves to minimize water loss.

Mistletoe species are hemi-parasitic, bearing green leaves that do some photosynthesis, and using the host mainly for water and mineral nutrients. Mistletoe species grow on a wide range of host trees and can commonly reduce the growth of the tree, or even kill it with heavy infestation.
An epiphytic orchid made famous by a book 
"The Orchid Thief: A True Story of Beauty and Obsession"
is the ghost orchid, *Polyradicion lindenii*. It is a native of 
southwest Florida and Cuba. In southern Florida it
is found on host trees in Fakahatchee, Big Cypress
and Corkscrew Swamps. "It is most sought after
because of its beauty and because it is impossible
to cultivate. The flower is a papery white and blooms
once a year. The plant has no foliage --only roots
which serve as both roots and leaves. Its lip is
especially pronounced and each corner tapers in
a long, flutty tail. Because the plant has no foliage
and its roots are almost invisible against the tree
bark, the flower looks magically suspended in
midair-like a ghost"*

Spanish moss, *Tillandsia usneoides*, is not a moss but a member of the
bromeliad family, an epiphyte or air plant that has developed a unique way to make its
food. These plants have evolved the capacity to process their food from minerals
dissolved in water that runs off across leaves and branches of the trees to which they
are anchored. Spanish Moss is a flowering plant that reproduces by seeds. In spring
the plant has a single yellow-green, fragrant flower on the end of a moss strand. The
plant provides protection for insects and is a favorite roosting place for special
species of bats. Many think Spanish Moss is a parasite, but instead it is an indicator
of the health of the tree on which it is found.

Resurrection Fern, *Polypodium polypodioides*, is an epiphyte common in the
southeast and found from Florida to New York and west to Texas. It lives on the
branches of large trees such as cypress and live oaks. It gets its name because it can
survive long periods of drought by curling up and appearing dead. When just a little
water is present, the fern will uncurl and reopen, appearing to resurrect. The club has
seen this fern on a tall tree at the end of the woodland trail coming down from the
main building at Jackson Park. Another site is along the wooded Coon Branch Trail at
the Bad Creek Power Station. Here we get good looks at the fern since it is often seen
growing on fallen tree trunks.

*This quotation is taken from a book review which appeared in the Spring issue of Shortia 2002.
The book review was written by Botany Club member, Jeanne Smith. She and her husband,
Dick, saw the ghost orchid after a muddy search at Fakahatchee Swamp.*
Linnaeus and his Apostle, Pehr Kalm

Carl Linnaeus was one of the founders of modern botany. It was Linnaeus's systematic mind that brought order to the rapidly accumulating knowledge of strange plants that resulted from the expansion of European trade to many different parts of the world. His system, based on the sexuality of plants, was a giant leap forward that was crucial in the development of natural science. In Species plantarum in 1753, he simplified the naming principle by using only two-word Latin names, as in Homo sapiens - the binomial system upon which all biological naming is based to this day.

Linnaeus was a popular teacher at the University of Uppsala, Sweden. He called the students whom he especially valued his "apostles," and he selected from them nineteen men whom he sent abroad on voyages of discovery. Pehr Kalm was sent to the British and French colonies of North America. His goal was to describe the natural products of that part of the world and to find and introduce to Sweden such useful plants as might be expected to thrive in the harsh climate of Scandinavia. It was still believed that climate throughout the world was the same at equal levels of latitude, so that it would be easy to adapt plants found in the corresponding latitude of the French and English colonies of North America for cultivation in Sweden.

Kalm was born in Sweden in 1716 but returned as a five-year-old boy to his family home in Finland, then part of the Swedish kingdom. Kalm was educated at Åbo Akademi in Turku (Åbo) Finland. There he was introduced to Baron Sten Carl Bielke, a friend of Linnaeus and, along with him, a founder of the Swedish Royal Academy of Sciences. In 1740, Bielke invited Kalm to work as supervisor of his estate, Lövsta, in Funbo parish about seven miles from Uppsala, while he also attended lectures at the University. During this time, the two patrons, Linnaeus and Bielke, prepared their young apostle for a journey of discovery to North America.

Kalm left Sweden, accompanied by one assistant, Lars Jungström, in the fall of 1747 for London, where he would be able to board a ship bound for Philadelphia. It took almost a year to get to America. Hostilities between European powers made travel across the Atlantic dangerous, and ships left infrequently. Fortunately, Kalm used his time in England well, studying plants at the Apothecaries' Garden, and making valuable acquaintances with several of the members of the Royal Academy of London who were knowledgeable about plants, agriculture, and America.

Kalm arrived in Philadelphia on September 15, 1748. He soon was befriended by Benjamin Franklin, John Bartram, one of America's first field botanists, and Cadwallader Colden, Surveyor-General of New York. Kalm was amazingly fortunate in the timing of his journey to Canada. Hostilities between England and France had taken place along his 225-mile route the previous year and would soon resume in what Americans called the French and Indian War. Kalm traveled north from Philadelphia through New York City, up the Hudson River past Albany and through what was then a dangerous no-man's land between the British colonies and French Canada.
Kalm was treated as a royal guest by the French government, in exchange for the help that had been given by the Swedish crown some years before to a French scientific party that traveled to Lapland as part of an attempt to define the shape of the earth. Kalm journeyed up the St. Lawrence from Montreal to Quebec with a party led by the royal physician and naturalist, Dr. Jean François Gaultier, who organized the trip to places of interest and helped him to find specimens. In appreciation, Kalm asked Linnaeus to name the genus Gaultheria (wintergreen) in honor of his host. Kalm spent the winters of 1749 and 1750 in Sweden, then called Raccoon, across the river from Philadelphia in the area that had once been New Sweden, the ill-fated colony of Sweden on both sides of the Delaware River. In March of 1750, Kalm married the widow of the Rev. Johan Sandin, who had been the pastor of the Swedish Lutheran Church in Raccoon.

The following summer Kalm traveled north again to Niagara Falls, via the Hudson to Albany, and then west along the Mohawk Trail to the Iroquois capital, Onondaga, and then to Fort Oswego on Lake Ontario; from there he was taken by canoe to Fort Niagara. Although the purpose of his trip was to obtain plants and seeds, Kalm was greatly impressed by the size and majesty of Niagara Falls and wrote a description of what he had seen to Benjamin Franklin, who published it in his Pennsylvania Gazette on September 20, 1750. It was also reprinted in the Gentleman’s Magazine 37 in London. Kalm’s was the first scientifically accurate description of the falls.

Kalm left America reluctantly in 1751; there was still so much to explore and more plants to discover. He returned to Sweden via England accompanied not only by Jungström but by many cases of seeds, specimen plants, two opossums, and a new wife and stepdaughter. In August of that year, Kalm returned to Finland to become Professor of Economics and Natural History at Åbo Akademi in Turku, where he remained for the rest of his life.

Unfortunately, few of the American plants that Kalm brought back to Scandinavia survived, and none were of economic benefit. Despite the failure to accomplish the task that Linnaeus had assigned him, Kalm’s travels were of value. He took careful notes along the way, not only about plants and animals, but also how people in the American colonies lived, what they ate, how they built their homes and public buildings, how they worshipped, and how they were governed. Fortunately, Kalm was a very thorough and methodical person and a good observer, and his journal and the resulting volumes that he culled from it have been a treasure trove of information for scholars of colonial America. His journal was an important source book about Canada for a later environmentalist, Henry David Thoreau. Linnaeus named several plants for Kalm, the most important being Mountain laurel, Kalmia latifolia.

Paula Ivaska Robbins, a member of WCBC, is the author of The Travels of Peter Kalm, Finnish-Swedish Naturalist, Through Colonial North America, 1748-1751 (Purple Mountain Press, 2007).
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c/o Anne Ullinski
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FIRST CLASS

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Editor: Anne Ullinski
Editorial Assistant: Jean Lenhart
Member News: Ruth Anne Gibson

Please submit contributions for the next issue by May 15, 2009

The purpose of the Club is to study the plants of the Southern Appalachian Mountains and the Southeast through field trips and indoor meetings. Membership is open to all. Individual/family memberships are $15. New members joining from the period July 1-December 31, pay $8. All memberships are renewable on January first of each year. Send dues to: Alan Graham, 544 Tip Top Road, Brevard, N.C. 28812