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Vol. 13, No. 1

Madison, Wisconsin

January, 1964

Salute to an Old Friend

In 1907, Albert Gallistel literally blew in to the Wisconsin campus, for a February blizzard was raging as he arrived, fresh from training in art and architecture at the Chicago Art Institute. From here and from his job with the Chicago Board of Education, he had been recommended to Arthur Peabody, then the University Architect, to assist with work on a new plan for the University campus.

There were exactly 3,051 students enrolled at the time, the whole plant occupying less than 15 million cubic feet of space. All the faculty lived on or near the campus, which was a beautiful spot in a perfect natural setting as we know from old photographs; Bascom Hall in lone majesty upon the hilltop with spectacular views of lake and capitol. Even so, the problems of expansion and maintenance were as pressing then as they are now. Plumbing and paint shops were in the basement of Music Hall, the telephone and electric shop in Science Hall, and the machine and steamfitting shops in what is now Radio Hall.

Among the improvements, esthetic as well as practical which the young Gallistel approved, was the planting of shrubs and trees, for he based his philosophy upon Ruskin whom he often quoted:

"When we build, let us think we build forever. Let it be not for present delight, nor for the present use alone; let it be such work as our descendants will thank us for."

From that long ago February up to New Year's Day of 1964, when he died, Albert Gallistel has done just that, becoming as much a part of the University as the campus he helped to expand and improve.

He has often been called a walking blueprint; certainly his reminiscences would cover a large span of University of Wisconsin history, for he liked to recall less hectic days when "in the late afternoon you could see President Charles R. Van Hise taking a leisurely horseback ride down the lake drive" and those bag rushes "when the students would put a buggy on the roof of North Hall and play at other tomfoolery."

He carried a fine flavor of the past which did not prejudice him against the inevitable changes. Of modern architecture he said, practically, "Here, as nationally, we've had to adopt the functional in order to get as much as we can for our dollars . . . but the architecture of the times—of any time—is part of the educational process." And of today's young people, "They are more anxious to get an education—and they work harder."



Albert F. Gallistel, faithful friend of the Arboretum and long-time Arboretum Committee Chairman.

Gallistel's first title was draftsman, then designer, and for twenty years, Superintendent of Buildings and Grounds, a post which earned him the name "housekeeper with the biggest job in Madison." In July, 1949, he became Director of Physical Plant Planning, always serving as liaison between the University, the state engineer and state architect, and the city of Madison. Often, especially in the early days, he was on 24-hour duty, for his wife, Eleanor Munn Gallistel whom he married in 1927, recalls many a midnight when he was roused from bed by some campus emergency, the most memorable being the burning of Bascom Hall.

For many years, the Gallistels spent the summer months as supervisors of the Tent Colony living quarters for summer students which eventually became known as Camp Gallistella to honor these close friends.

With such a background of campus knowledge, it is no wonder that Albert Gallistel was a charter member of the Arboretum Committee when it was formed in 1932, and saw the creation of this unique outdoor laboratory through its most precarious period. For 20 years he served as Committee Chairman, retaining his interest as a director of the recently organized Friends of the Arboretum right up to the day of his death. He was a valuable link between those who brought about the realization of Michael Olbrich's vision and the generation of scientists and conservationists that have carried on the work.

Many honors came to Albert Gallistel in the course of his long service. In 1930 he was elected to the American Institute of Architects, and in 1934 to the State Association of Wisconsin Architects. He was a charter member of the Technical Club of Madison, of the Madison and Wisconsin Foundation, of the Madison Board of Examiners and Appeals, of the Salvation Army advisory board; was president of the Kiwanis Club and with his wife, helped found St. Paul's University Chapel. At the time of his death he had served on the board of directors of the Anchor Savings and Loan Association just 24 days short of 31 years.

Everybody knew Gallistel, not only for his professional distinctions, but because he was an easy, genial person. As someone once said, "Put a Santa Claus suit on Albert Gallistel . . . and you'll have perfect type casting, for he is as round and jolly, as wise and kind as the Saint himself."

In 1935, when the Arboretum was 500 acres of seemingly worthless land with no skilled labor to carry out the restoration plans of such men as Aldo Leopold, G. William Longenecker and Norman C. Fassett, it was Gallistel who got the ball rolling. According to his story, it happened as simply as this. One day while showing Congressman Harry Sauthoff the FERA work camp which had been erected in the middle of the area, he suggested this might prove an interesting project for the new Civilian Conservation Corps, that branch, in particular, which came under the selection of the National Park Service under the jurisdiction of the Department of the Interior. As a result, The University of Wisconsin enjoyed a million dollars worth of labor, closely supervised by specialists, and carried out by trained men using expensive heavy equipment—for nothing. Ponds were dredged, three miles of road rebuilt and completed, walls erected, trees planted, and a start made on the now famous prairie, unique of its kind all over the land.

With all his other responsibilities, the Arboretum remained a part of the University close to Gallistel's heart. Upon his retirement from the chairmanship in 1959, it seemed appropriate that the woods formerly called Camp Woods, from their proximity to the CCC buildings, should be renamed Gallistel Woods.

Although many have regretted, in the last weeks, Albert Gallistel's unkept promise to tape-record his reminiscences of the last fifty-two years, we who knew him are fortunate that he obliged us with corrections and many an unrecorded fact for the future History of the Arboretum. Sorely though we shall miss his knowl-

edge and willing service, the confidence of his large and kindly presence, he has not built only for the present, and others will come after, to thank him, as we do now.

(Reference material: an article in the *Wisconsin State Journal*, February 26, 1950, by Hazel McGrath; two feature stories released by The University of Wisconsin News Service, February 27, 1957 and June 9, 1959, both by Vivien Hone.)

---Nancy D. Sachse

1963 Seed Exchange

In January of each year seed collected during the summer and fall is prepared and packaged for exchange with other institutions. The Arboretum Botanist, F. Glenn Goff, made numerous field trips to obtain the seed of native plants. Most of the Arboreta and Botanic Gardens throughout the world prepare a list of seeds offered for exchange each year. These seeds are not for sale—exchange is the only basis on which distribution is made.

In 1963, The University of Wisconsin Arboretum offered seed of 164 native species. Requests for seed were received from 26 different countries, with the early spring flowers (ephemerals) and some of the prairie plants being the most popular. Eight hundred and seventy-five packets of our seed were ordered by other institutions. In addition to the United States and Canada, seed was sent to Arboreta or Botanical Gardens in the following countries: Argentina, New Zealand, Japan, U.S.S.R., Algeria, Rumania, Poland, Germany, Czechoslovakia, Denmark, Sweden, Yugoslavia, Netherlands, Bulgaria, Hungary, Scotland, England, Switzerland, France, Belgium, Austria, Italy, Spain, and Portugal. The seed exchange list for 1964 will offer 123 species of native plants.

John Muir Park—An Object Lesson

This last month saw the dedication of John Muir Park, an event timed to coincide with the issuance of a postage stamp commemorating John Muir. This park has been known to generations of students as Bascom Woods. Its name was changed five years ago at the time a part of Bascom Woods was utilized for the construction of the Social Science Building. At that time there was some controversy over the utilization of this small but lovely woods as a building site, and the compromise arrived at was to permit a building on the west end of the woods in return for the permanent dedication of the remainder as an outdoor laboratory on the campus.

This little woods is located on a north-facing slope that extends from Bascom Hall, the central building on the campus, to Lake Mendota. The slope is fairly steep, and well protected from the southwest winds that prevail during the summer months. Consequently it has a good moisture supply and supports a rich vegetation. It is one of nature's history books. The oldest trees are white and black oaks, whose wide-spreading branches attest to the fact that they were started when there were no close neighbors to usurp the light; consequently they grew out rather than up. The next oldest trees are red oaks, taller and straighter than the open-grown whites and blacks. These trees are now dying of oak wilt. They have completed the second generation. Under them are basswoods and sugar maples, plus a variety of lesser species, some of which will not survive beyond the seedling stage. Others will succeed in limited numbers to add variety to the future composition of the woods.

One can see, if one understands the relationships of the species that occur here, a thousand years of vegetational history and much about the history of the Indians as well. The open-grown trees were maintained by fire. It is only since settlement by white man that a forest has existed here.

All of this, plus a diversity of plant and animal species of interest to the taxonomist and field naturalist, exists within a three-minute walk of the classrooms where biology is taught. It is no wonder that the campus biologists regard this woods as a major teaching facility, and are inclined to violence when it is suggested that the woods be converted to another use.

On the other side of the picture is the fact that the woods is seen by thousands of people every day as they walk or drive by it on their way across the campus. Many of these people are relatively unacquainted with the aspect of a forest in its natural condition and feel that the presence of downed logs and assorted shrubbery and small trees gives the place an unkempt, uncared-for appearance that is out of place in the center of a large campus. To them it is a vegetational junk yard, badly in need of a thorough cleaning. They would like to see a park with mowed grass and benches under the trees.

The present management plan for John Muir Park is an attempt to preserve the biological values and at the same time make the park as attractive as possible for the nonbiologist. The downed logs remain but there are fewer of them. Gravel paths traverse the woods. Dangerous dead wood in the tops of trees has been removed. There is no question that the park is looking a little more manicured and is losing some of its wild charm. But the important thing is that it does remain, with its full complement of species and most of its ecology intact. There is no possibility of making it look like the middle of a wilderness, but there is the possibility of making it a place where classes can study, and even more important, a place where one can go between classes on a warm spring day and discover, just as John Muir did in these same woods, some of the beauties and delights of nature.

John Muir Park is not a part of the Arboretum, but its history and its administrative difficulties point up the problems that thwart maintenance of a semi-natural area in the center of a portion of a large and congested University campus. There may be some lessons here for other campuses faced with similar problems, and these same lessons are very likely applicable to outlying areas of our own campus; these undoubtedly are destined to be in the center of congestion before many years have passed.

---Grant Cottam

Arboretum Foxes

Many people are quite surprised when they learn that there are foxes in the Arboretum. Foxes are assumed to be extremely wary creatures not prone to live inside a city in such close proximity to man. They are most certainly wary animals, but they are also very adaptive. The fact that there are foxes in the Arboretum reflects both their adaptive disposition and the excellent habitat provided.

Foxes are shy, secretive, and largely nocturnal animals, but much of their cautious nature is the direct result of long contact with man. As a consequence, they do not lend themselves to being easily observed. There are many clues to their presence however, and if one is observant he can see these clues. There are droppings on the trails and fire lanes that appear very much like those of a small dog, except that most of these droppings contain hair of a mouse or cottontail rabbit. Then there is the occasional shrew or mouse lying on the trail. Observe the neat round hole in the head or chest of the shrew or mouse that was

made by the canine tooth of a fox. Look for the small dog-like tracks in the sandy areas bordering the Leopold Pines. There is the occasional ball of long whitish fur left by a fox that has just finished grooming himself. If one's olfactory powers are sharp he can smell a fox at times, especially in early morning or evening hours. The odor is very much like that of a skunk. If there is a snow cover one can see the best fox sign of all, a set of small dog-like tracks with each footprint falling almost in line with the one preceding it.

What kinds of foxes are there in the Arboretum? Our studies indicate that there are both red and gray foxes in about equal numbers. These two foxes are separate and distinct species that can be distinguished from each other by their general color patterns. The red fox at a distance resembles a small collie dog. It has an overall reddish-orange appearance, a long bushy tail with a white tip, and black lower legs and feet. The gray fox has an overall grayish appearance with some reddish hair on the lower sides, lacks the white tip on the tail, and does not have conspicuous black "stockings." Both animals weigh from 9-13 pounds when fully grown, but their thick coats of fur make them appear much larger.

The gray fox is much more secretive than his red cousin and prefers thicker cover. Dense tangles of honeysuckle in the Lost City and bordering the lower Grady Tract provide ideal gray fox habitat, and indeed this is where these animals have their dens and spend most of the daylight hours. The red fox usually prefers more open terrain, but utilizes the same general areas in the Arboretum as does the gray. Its dens are usually well concealed in the dense tangles of honeysuckle, but sometimes occur in the more open woods. The many people frequenting the trails and fire lanes make it necessary for the red to utilize thick cover in order to avoid being seen. On cold days the red likes to lie on a sunny-south facing slope with his nose and feet protected from the cold by the long fluffy tail which he uses as a muff.

What do foxes in the Arboretum eat? The answer seems to be that they are opportunists and take what is most available. Students in Dr. R. A. McCabe's wildlife techniques classes have collected and analyzed fox droppings from the Arboretum trails each fall for the past twelve years. Results of these studies are most always the same. Fruits, mice, cottontail rabbits and insects comprise over 90 per cent of the food items. Yearly variations in the frequency of occurrence of food items are closely correlated with changes in availability of the items concerned. Regardless of how plentiful any alternative foods may be however, the fox always retains a few mice and rabbits on his menu.

In my study, I collected droppings each week for an entire year in order to determine seasonal feeding trends. This study showed some interesting aspects of Arboretum fox food habits and also how fortunate these foxes are in having such an abundance of food. During the raspberry and blackberry seasons these fruits made up almost 100 per cent of the fox's diet. Later in the summer when wild cherries ripened these were eaten to the exclusion of most other foods. In fact foxes seem to relish cherries for they continued to eat them long after the peak of availability of these fruits. During the winter when there was a heavy snow cover foxes had well-worn trails leading into an apple orchard just outside the southeast boundary of the Arboretum. These frozen apples sustained most of the Arboretum fox population during the winter period when other food items were difficult to obtain. In the spring meadow mice and cottontails were utilized more heavily until fruits were once again in season.

What about the home life of foxes? In midwinter they become interested in finding mates and homemaking. Older animals usually keep their home territories, thereby forcing the young adults to seek homes elsewhere. There is confusion among the experts as to whether foxes mate for life. I do not care to confuse the

issue further at this time except to say that pairs remain together until the young are grown. Females of the red species select previously used fox dens, appropriate dens of woodchucks or other burrowing animals, or if necessary, dig their own dens. Usually more than one den is readied for the prospective family, the extras being held in reserve. Gray fox females use burrows too, but frequently are found in hollow logs or brush piles.

Young foxes are born in March or April. An average litter contains from 5-6 balls of lively grayish fur that remain inside the den for about one month. During this period the male does most of the hunting and brings food back to the mother and young. At approximately two months of age the young begin to accompany their parents on short hunting expeditions. Like the young of most animals, young foxes are adventurous and frequently go on hunting forays of their own.

On several occasions I have watched a family of young red foxes playing on the trails near the Teal Pond. On one occasion I sat on the trail a few yards away and watched three young in mock combat with one another. A sharp warning "yip" from the female, whom I had not seen, ended the fracas and sent the young scurrying into the honeysuckle bushes nearby.

As frost begins to tinge the maple leaves with gold, family ties grow weaker and the wanderlust possesses the young foxes. They leave their familiar home surroundings to face the rigors of life on their own. Those that survive the difficult winter months find mates and the cycle begins once more.

---Ernest D. Ables

Arboretum Personnel

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Vol. 13, No. 2-3

Madison, Wisconsin

April-July, 1964

Management of the West Marsh

This spring we attempted, for the first time, to use fire as a management tool on areas other than the prairie. We have known for some time that certain areas are changing because of lack of management. Among these are the two large marsh areas on the east and west ends of Lake Wingra. The East Marsh is being permitted to change because we want to study the extent of the changes that will occur, and their effect on the wildlife populations. But we want to keep the West Marsh, and there is no question that it is rapidly growing up to shrubs and willow trees. This is an area of low ground extending from Monroe Street on the north almost to Wingra Woods on the south with a total area of about 90 acres. It is of special interest because it contains a fen. The fen is a rare community in Wisconsin—an alkaline marsh fed by underground springs. This particular combination of environmental characters is not often found; consequently fens are rare. Our fen is only two acres in size but it contains some interesting plants.

Like most marsh communities, fens have to be managed. Prior to the coming of white man, fire was probably the management tool. After the white man came, he mowed the marshes, using the hay for insulating his ice houses, where blocks of lake ice were stored, or for cattle feed. Both of these uses have long since vanished from Wingra marshes. The result of lack of management is a great increase in the amount of shrubs. Within 25 years after cessation of some kind of control, the community is no longer a marsh, but is a shrub community called shrub carr by the ecologists. Thereafter there is a gradual change to lowland forest communities and the marsh species completely disappear.

We do not want to lose our fen, or the rest of the marsh for that matter, so we manage. Prior to this year we have confined our management to the fen itself, and our management practice has been mowing every three years. This is more difficult than it would seem, since the fen is very wet and the mechanical equipment we use is not quite as good as a team of horses in such terrain. Our solution has been to wait until the marsh is frozen and there is no snow. But this year Professor D. Archbald suggested that we try fire rather than mowing. Essentially we are going back to the Indian techniques rather than those used by the white man. This idea seemed very practicable, and after an examination of the marsh, we decided to burn the entire area. The most serious danger is that of starting a fire in the underlying peat. Consequently we did not

want to wait until spring really warmed the area, and burned the first possible day after a good rain. The fire was remarkably easy to manage. We had our usual trepidations, especially since the area had not been burned for a long time and the quantity of dead plant remains serving as fuel was considerable. It turned into a controlled wildfire, since the wind changed directions shortly after we started and what we had intended to be a fire break on the south end of the marsh turned into the advancing front of the fire moving to the north. The area is very safe, except on the south side, where it would be possible for a fire to move into Wingra Woods. Golf courses, ponds, and roads make up most of the remaining boundary.

Some of the ground was too overgrown with shrubs or trees to support a fire, but we estimate that perhaps two-thirds of the area did burn. We expect that the effect will be to kill the tops of the shrubs. They will grow back just as they always have, but repeated fires or mowing will serve to maintain the marsh.

Two interesting sidelights: A supplementary reason for burning this marsh was the fact that it was the site of about six fires last summer, all set by small boys, and all requiring considerable effort and expenditure from the Arboretum and the fire departments to extinguish. This year such fires will be impossible, since there is nothing to burn. The other sidelight is that Professor Archbald's jacket was consumed in the flames. The loss of a jacket is apparently a prerequisite for the continued employment of an Arboretum manager. The last man to hold this post, Mr. J. R. Jacobson, lost his jacket the second year he was here, while burning the Grady Tract.

---Grant Cottam

An Entomology Research Project in the Arboretum—Larch Casebearer

Larch trees, better known as tamarack to many people, are attacked by the larch casebearer, a serious pest. This small moth causes damage to host trees by mining in the needles during the immature stages of its life cycle. This mining results in needle loss, and is particularly noticeable in the spring of the year when new growth occurs. Continued defoliation over a period of several years may cause considerable mortality of the trees. The larch casebearer was first observed in North America around 1886, and has since spread throughout much of the normal range of the larch tree.

One successful control measure has been the establishment of *Agathis pumila* (Ratz.), introduced from Europe, which is a beneficial wasp-like parasite of the larch casebearer. Introduction of *A. pumila* into Wisconsin was made by importing this insect parasite from Michigan and Canada and releasing it in the Thunder Lake area. The establishment of *A. pumila* throughout Wisconsin has been an important factor in control of the larch casebearer. Also of importance in the control of this serious threat to tamaracks are insect predators which feed on the eggs of the pest and insectivorous birds which consume great quantities of casebearers in their normal diet.

To determine the complex of factors involved in larch casebearer control an investigation was begun in the Arboretum in 1961. It consisted of experiments involving caged and uncaged trees. Known numbers of casebearer larvae were placed on all trees. The first series of trees was left uncaged, available to all parasites and predators; the second series of trees was caged with hardware cloth of $\frac{1}{2}$ inch mesh to exclude the birds but to allow ready access to the insect parasites and predators; the third series of trees was covered with fine plastic screen (32 x 32 meshes per square inch) to exclude both birds and insects.

Concurrently with the field studies, laboratory experiments are underway to establish the feeding patterns of the insectivorous birds that feed on the casebearer. Trapped birds are placed in a large screen-sided cage complete with foliage, casebearers, and a one-way mirror. The one-way mirror allows a "Candid Camera" type of observation with little or no interference to the normal pattern of bird feeding.

Preliminary results show that the largest numbers of casebearers were found in the fine-screened cages. Slightly fewer were in the coarse-screened cages, and very few remained on the uncaged trees. Thus it appears that insectivorous birds were the most important predators of the casebearer. The study is not yet sufficiently complete to assess the importance of insect parasites and predators in keeping larch casebearer in low numbers throughout Wisconsin, but it appears that a combination of bird and insect predators and insect parasites will achieve the best control.

---Norman F. Sloan
Harry C. Coppel

Soil Study in the Arboretum

G. A. Nielsen and Professor F. D. Hole of The University of Wisconsin Soils Department have published Arboretum Journal Paper No. 53 entitled, "A Study of the Natural Processes of Incorporation of Organic Matter into Soil in the University of Wisconsin Arboretum" in the Transactions of the Wisconsin Academy of Sciences, Arts & Letters, Vol. 52, pp. 213-227, 1964. This is essentially an interesting and well-illustrated progress report on soil studies made on long-term plots under natural vegetation. The soils in question were all originally of a forest type, some never plowed and still under forest, while others are land which was cleared and plowed for crops over a period of about 90 years. Prairie vegetation was established on the plowed land after it was taken over by the Arboretum. The plots, which were set up in both prairie and forest, were subjected to a variety of treatments calculated to provide information as to organic matter incorporation in the soils in question. The authors determined that storage of organic matter is largely above ground at the forest sites studied and largely underground at the prairie sites. The accumulation of above-ground parts of prairie plants as a mulch on the soil not only suppresses the vigorous growth of the prairie vegetation, but may be of little benefit as a source of soil organic matter—this would appear to provide further vindication for our practice of periodic burning of our prairies. Over a period of about 90 years, under agricultural management, the soil studied lost about 20 tons of organic matter per acre or 26 per cent of the total organic matter within the undisturbed forest soil. Within a period of 19 years under planted prairie vegetation, the same soil regained about 12 tons of organic matter per acre or 60 per cent of that lost under agricultural management.

The Milwaukee Arboretum

In the October issue of the *News*, it was noted that a drive was under way to acquire an area of about 200 acres in Ozaukee County as the nucleus for an arboretum for The University of Wisconsin-Milwaukee campus. It is a pleasure to report that the drive, conducted by the Nature Conservancy, was successful beyond all expectations and the entire property under option was purchased. The Milwaukee campus now has a functioning Arboretum Committee and is proceeding to establish plans for the use and management of the area.

New Arboretum Trail Guides: Arboretum Autumn Trail - 61 Woody Plants

Included with this issue of the *News* is a pamphlet containing reproductions of the leaves of 61 woody plants that may be encountered along one of our most popular trails, the Curtis Prairie-Noe Woods-Leopold Pines circuit. This trail starts at the Prairie Parking Lot, goes past the Jackson Oak, through the woods, and finally back across the prairie. We have pondered for two years what to call this tour and the name Autumn Trail is a compromise. The Curtis Prairie is most beautiful in midsummer, Noe Woods in early summer, and Leopold Pines probably by comparison is nicest in winter. All are lovely in the fall, and the name Autumn Trail slights none of the communities. This little project was almost completely the work of Arboretum Botanist F. Glenn Goff. Glenn is an artist at making leafprints, a process where the leaf itself is used to make an impression. The amount of detail that can be reproduced in this way is indeed remarkable, and Glenn makes the best leafprints we have ever seen. Unfortunately, it would take a very expensive printing process to reproduce these leafprints, and we have had to be content with tracings of them in this Autumn Trail pamphlet.

Gallistel Woods Trail

By the time this issue of the *News* reaches you the revised Gallistel Woods Trail Guide will have been published. Conceived as a memorial to the late Albert F. Gallistel, the guide is a product of the *Friends of the Arboretum* and is a complete revision of the initial trail guide to Gallistel Woods published last year. It is on sale through the Arboretum Office, 329 Birge Hall, Madison, Wisconsin 53706, for one dollar.

Unfortunately, printing of the guide was unavoidably delayed. Gallistel Woods is a show place for wild flowers during late April and most of May. Since the Arboretum produces spectacular mosquitos as well as spectacular flowers in the densely wooded areas, the trail will not be completely labeled until early next spring. Numbered markers have been erected, however, to correspond to the Nature Note numbers in the guide. Any hardy soul who wishes to brave the the summer crop of A-1 mosquitos may do so—at his own risk!

A Report on the Friends of the Arboretum

The annual spring picnic of the *Friends of the Arboretum* was held May 28th at 5:00 p.m. in the Headquarters Area of the Arboretum. A large and enthusiastic crowd enjoyed the catered chicken supper served out-of-doors in near perfect spring weather.

At a short business meeting held immediately following the picnic supper, Mr. Nash Williams was elected to fill the vacancy on the Board of Directors left by the death of Mr. Albert F. Gallistel.

Tours were taken through the Grady Tract, a lesser-known area of the Arboretum. Members of the University staff conducted the tours, starting at the oak opening hilltop and descending out onto the Grady Prairie. It was a beautiful time of day; the prairie was most attractive at sunset.

IN MEMORIAM

Contributions in memory of Albert F. Gallistel, Carlton J. McCaffrey, Angus B. McVicar, Dr. John P. Spooner, and Frank J. White have been received recently by the University of Wisconsin Foundation for the *Friends of the Arboretum*.

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Vol. 13, No. 4

Madison, Wisconsin

October, 1964

In Memoriam—Charles Bunn

The University of Wisconsin Arboretum has lost a loyal friend in the passing of Professor Charles Bunn, who died November 5, 1964, in Washington, D. C., at the age of 71. Professor Bunn had suffered from anemia for some years, which necessitated frequent blood transfusions. Despite his ill health, he remained active in his special fields of interest. He became a lecturer in law at the University of Virginia following his retirement from the law faculty of The University of Wisconsin in June, 1961.

Professor Bunn was a member of the Arboretum Technical Committee for many years. His love for the Arboretum was deeply rooted, as was his enjoyment of all of the out-of-doors. His was a familiar figure walking the Arboretum trails during all seasons. As a young man, Bunn was an avid and accomplished canoeist, frequenting the wilderness areas of the Rocky Mountains. In later years, one of his favorite haunts was the Baraboo Hills, through which he hiked with close friends. He knew a great deal about the out-of-doors and would stop to point out a small plant or make an observation on the wonders of nature for the benefit of his companions. He was the possessor of a keen intellect and was known for his lucid style with the English language. He had the rare ability of being able to cut down through the chaff to the kernel of whatever problem was up for discussion. These talents he brought to the Arboretum Committee he served so loyally, plus his ability as a skilled counselor.

“Bob” Bunn, as he was known by his closest friends—a nickname carried over from his childhood, was a man deeply concerned with the preservation of just such areas as the Arboretum and felt that any project concerned with preserving natural areas should be widely supported. At the beginning of World War II, at a time when Arboretum funds were low, Professor Bunn established the Bunn Fund—\$10,000 given for the support of general research in the Arboretum, but particularly for use in wildlife management projects. The Fund kept many research projects going, paying for materials and salaries that without it would have been abandoned.

It is with deep regret, but with fond memories, that we extend our sympathies to the family of “Bob” Bunn.

The Arboretum Movie

Our movie had its premier in the Wisconsin Union Theater on September 30, before an overflow crowd that must have totaled about 1300 people, including those who were turned away. The movie has received critical acclaim from many people. It appears to be an artistic success and a success in the fields of outdoor education and conservation as well. It has already been shown on both coasts and will receive national listings as a conservation film next year. We have five copies available for loan, and they may be reserved by writing the Arboretum Office, 329 Birge Hall, The University of Wisconsin. There is no charge for the film except that the user must pay return postage, and must pay postage both ways if the film is to be shipped airmail. The film is 16 millimeter sound and lasts 32 minutes.

Many people had a hand in making it a success. Most important was Prof. Walter Meives of the Photo Lab who produced and directed it. Dave Archbald was the coordinator and contributed many ideas as well as a lot of time. Film footage for the bird sequences was donated by Reverend H. L. Orians and Prof. Robert McCabe. Finally, money was contributed by the University, the City of Madison, Dane County, and the Friends of the Arboretum.

The purpose of the film is to tell the public what the Arboretum is and how it operates. Incidentally, it tells a lot of natural history.

Arboretum Botanist

The post of Arboretum Botanist is not really an Arboretum position at all. Rather, it is budgeted in the Botany Department, and the Arboretum Botanist is always a graduate student who is listed as a teaching assistant and whose duties are primarily concerned with providing technical assistance to the Botany Department in its relations with the Arboretum. He collects seeds for the Arboretum seed exchange list, makes transplants and collects plants in connection with botany research projects on the Arboretum, conducts tours of student groups, and prepares materials for instructional use. Since the interests of the Arboretum and the Botany Department overlap, much of what the Arboretum Botanist does is of value to the Arboretum as well as to the Botany Department. He is usually a candidate for the Ph.D. degree, and he does the research for his thesis on the Arboretum as part of his job.

We have had an interesting group of persons holding this position and the position of Arboretum Biologist that preceded it. Professor Robert A. McCabe, longtime member of the Arboretum Committee and Chairman of the Wildlife Management Department, was once Arboretum Biologist. He initiated a series of research projects at that time, and still maintains an active interest in them. If you want to know how many trilliums there are in Gallistel Woods, he can tell you. He planted them and has counted them periodically ever since. Among other

projects initiated by Professor McCabe at that time are the woodcock project, which still continues, and a project on the introduction of pasque flowers on the Grady Tract. The pasque flowers are still there, but it is only recently that they have increased in numbers.

The present Managing Director of the Arboretum, Professor David Archbald, was Arboretum Botanist from 1951 to 1955. He worked on the effect of native and introduced legumes on the establishment of prairie grasses for his thesis, and was very active in the establishment of the Curtis Prairie. His broad knowledge of the Arboretum gained at that time is invaluable to us now.

From 1962 to June of this year our Botanist was F. Glenn Goff. Glenn continued the tradition of devotion to duty and remarkable achievement. He came here from Central Michigan University, where he was the student of a son of a prominent Wisconsin conservationist, Wakelin McNeel. Glenn was valedictorian of his class at Central Michigan and was co-author with Wakelin McNeel, Jr., of a laboratory manual for a course in conservation.

As with many previous Arboretum Botanists, we were very fortunate to get a man with diverse new interests, and Glenn has proven to be very valuable indeed. The work most people see is the publications he has a part in. He designed and wrote much of the text of the original Gallistel Woods trail guide, and did the Autumn Trail pamphlet distributed last spring. He was very active in conducting tours and spent much more time on his Arboretum duties than we had any right to expect. Unfortunately, we can't pay overtime, and Glenn has a wife and four children, so he was slowly starving to death on a graduate student's salary. We made a concerted attempt to have him appointed Arboretum Naturalist, but were unable to find the money. He made plans to leave school, applied for permanent teaching positions, but finally got himself a National Science Foundation Fellowship that pays an allowance for each dependent. This means that we are deprived of his assistance, but he has been able to continue his work toward the doctor's degree. He is still around, and has been unable to completely exclude the Arboretum from his activities.

The new Arboretum Botanist is Paul Zedler. Paul got his undergraduate training at The University of Wisconsin at Milwaukee, where he didn't get interested in botany until too late to avoid graduating as an English major. In spite of this severe handicap, he seems to be doing very well. His first published work is a picture key to Wisconsin trees, developed as a teaching aid for elementary botany students. Paul and Glenn Goff are co-authors of this publication which is one of the most useful aids to tree identification I have ever seen. We welcome Paul. He has some mighty big shoes to fill, but at the moment it looks like he has pretty big feet.

—Grant Cottam

Fish Research*—Gardner Ponds

The research ponds located on the eastern edge of the Arboretum have a bewildering amount of activity in the shallow water during June and July, for at this time of year the green sunfish (*Lepomis cyanellus*, Raf.) are spawning. In water usually no deeper than 35 mm. (14 inches) as many as thirty males, strewn along a cinder dam 25 meters (80 feet) long, will scoop out their saucer-shaped nests, and maintain constant guard over the nests while their young undergo early development. However, it is not this dense concentration of spawning sunfish that first impresses the casual observer. One is first struck by the beehive-like aggregations of the brightly colored northern redbfin shiners (*Notropis umbratilis cyanocephalus*, Copeland) located over the nests of the sunfish. In 1959, 1960 and 1961, we conducted investigations of the spawning behavior of the green sunfish, and the relationship between this species and the northern redbfin shiner.

We tagged several mature males from one of the research ponds with tags designed to permit visual identification of individual sunfish without having to recapture them. A daily record of the number and location of sunfish nests was maintained throughout the spawning period, which usually extended from late May through early August.

The first spawning period begins when a single male green sunfish constructs his nest. Other males are attracted to the area where they too build nests. In this way aggregations of nests are formed. Spawning occurs about every eight days for individual fish, and these periods appear to be synchronized for individuals within a nesting aggregation. In cases where nests do not form an aggregation, synchronization does not occur. Spawning commences on the following first or second day after nest construction. The male protects the nest for about five days and then deserts it. A few days later the spawning cycle begins again. It is probable that while the male is off his nest he proliferates a new supply of milt (male reproductive fluid).

We observed that the male green sunfish would always return to the same area to spawn from one cycle to the next, often spawning within a meter of his previous nest. To investigate the possibility that the fish used local landmarks to recognize this area, we placed pans covered with gravel at the spawning locations. These were used as spawning beds by the fish. If these nests were displaced by rotating the pans 180 degrees, the fish would not return. When the position of small sticks and stones around the pan was changed, the fish became disoriented. If the nest with all these small landmarks was displaced one to two meters, the male would continue returning to the new location, but when the nest was displaced without its landmarks the fish would oscillate between the two sites. These experiments provide evidence in support of the hypothesis that small landmarks near the nest play a major role in nest recognition by male green sunfish.

The relationship between the sunfish and the spectacular groups of brilliantly colored redbfin shiners was also investigated. Daily inventories revealed that the number of redbfin shiners over sunfish nests was closely synchronized with the spawning activity of the male sunfish and that the shiners spawn in the sunfish nests. This observation was substantiated by collecting eggs in watch glasses placed in nests, some of which were occupied by sunfish and others unoccupied. The eggs were allowed to hatch in the laboratory for positive identification. The results show that the redbfin shiner nearly always spawns over nests occupied by green sunfish and rarely over unoccupied nests.

The male green sunfish, shrouded by the mass of shiners, was seldom seen chasing or snapping at them. However, if any other species of fish entered the territory it would be chased or threatened by the sunfish. It appears that the functional relationship between these two species is commensalistic; the sunfish protects the eggs of the shiners but is neither harmed nor aided by their presence. We were interested in behavioral mechanisms involved in this relationship as to the stimuli involved in initiating the aggregation of redbfin shiners over the nests of green sunfish. Two possibilities were suspected: (1) turbulence produced by the spawning male sunfish; and, (2) genital products released by the sunfish during spawning.

A latex model of a green sunfish was used to test the first hypothesis. The model was rotated in an area where no sunfish were spawning and at a time when spawning activity was at a minimum in other areas as well. Rotation attracted significantly more male shiners than did a stationary model, but the behavior of the attracted individuals in no way resembled that of an aggregation over a spawning sunfish.

A series of experiments were undertaken to investigate the notion that the odor of genital products of spawning sunfish attracts the shiners to the nest. The small research ponds of the Arboretum, each about 56 square meters in area, and lying adjacent to the larger research ponds, were utilized in many of these experiments. In the spring of 1961, fifty northern redbfin shiners were introduced into one of these ponds, and twenty-five were introduced into each of three other ponds. The first pond (designated Pond Epsilon) contained no other species of fish, whereas the other three maintained spawning populations of sunfish. For nearly two months no spawning activity was observed in Pond Epsilon even though shiners were spawning over nests of sunfish in the other three ponds. One male green sunfish was introduced into Pond Epsilon. He promptly dug a nest, but, without females, he could not spawn. Still no shiners were observed spawning. We artificially introduced diluted milt from green sunfish over this nest, and immediately an aggregation of male shiners was established at this spot, whereupon spawning commenced. This experiment and others similar to it provided evidence that the milt, and perhaps ovarian fluid and eggs, is an important stimulus attracting northern redbfin shiners to the nests of green sunfish.

**Based on work done by J. R. Hunter and A. D. Hasler*

*—Abstracted by Edward S. Gardella
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