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ARBORETUM NEWS

Vol. 4, No. 1

Madison, Wisconsin

January 1955

Winter 1954-55

The subnormal moisture situation prevailing in the Madison area for the past two or three years was reversed in 1954 when total precipitation was 35 inches, compared with the normal of about 30 inches. This has, in general, been very favorable for the purposes of the Arboretum and as this is written, in early January, it appears that the winter snowfall will probably be greater than that of any of the winters since the heavy snow year of 1950-51, a condition which should be of benefit to our spring plantings.

Early Arboretum records to be donated

The Arboretum Committee has gratefully accepted the offer of Col. J. W. Jackson, who has been associated with the Arboretum since its inception, to turn over to the Arboretum those papers, letters and documents in his possession which bear on the early history of the area. Mr. Lord of the Wisconsin State Historical Society has undertaken to place these papers for safekeeping in the files of the Historical Society where they will continue to be available to us.

A new Arboretum at Knox College

Members of the Department of Biology of Knox College, Galesburg, Ill. visited the University of Wisconsin Arboretum in November 1954, to examine our prairies in particular, in connection with the establishment of similar areas on lands recently donated to Knox College for this purpose by Mr. Alvah Green, Galesburg attorney and landowner, who was also in the party. Accompanying Mr. Green were Prof. C. L. Furrow, chairman of the Biology Dept. and Mrs. Furrow, Prof. George Ward, botanist in the department, and Dr. Paul Shepard, Jr., instructor in biology and recent Yale graduate in Conservation.

"Green Oaks", the site of the new arboretum totals 1020 acres in eastern Knox Co. It includes about 600 acres of oak-hickory forest, most of which has been owned by Mr. Green for nearly fifty years. Two hundred acres have been strip-mined for coal and 200 are in farmland. Preliminary plans for the area include complete protection for about 420 acres of the woodland and forestry management for the remaining 180 acres. Experimental plantings, research, natural areas, and a formal arboretum are under consideration for the strip-mined land. Restoration of tall grass prairie is currently being undertaken on 20 acres of the farmland, and

may be increased to as much as 100 acres as seed becomes available. About 80 acres will remain in agricultural production, showing model practices. A score of ponds, including one lake more than a mile in length, offer a range of limnological and experimental possibilities. A field laboratory is in the planning stage. On its campus Knox College is engaged in a development and expansion program, which will be integrated with the use of Green Oaks for teaching and research purposes, and a nursery will be established at Green Oaks to provide stock for the new campus.

Establishment of Ozark pine-oak community on the Arboretum

In keeping with our policy of attempting to establish on the Arboretum as many as possible of the plant communities characteristic of the prairie-forest border region we are starting on a project to develop the so-called Ozark pine-oak association on a site in the Grady Tract. The land selected is a small valley with its surrounding slopes, quite sandy and open, with a general east-northeast exposure, and with a decided gradient from upper to lower end of the valley. It is believed that the last-named feature will permit rapid drainage away of cold air and that this, combined with shelter from the prevailing desiccating and freezing west winds, will allow the survival of plants not normally hardy in our Wisconsin winter climate.

Roy Shake, our present Arboretum Botanist, is a native of southern Illinois and it is expected that he will do much to further this project, as his Master's thesis will be based on a study of the Ozark community in southwest Illinois, and his findings will be applied in our local work. In addition, he will collect seeds of the plants needed.

The floristic composition of the Ozark border region has been studied and the principal species which we will require are already known to us. We have made a list of 22 trees, 15 shrubs, and 32 herbs. The list is in two sections, based on whether the plants in question are suited to drier or moister sites. It is, of course, of primary importance that the tree matrix be established as soon as possible. Without reference to site, the trees to be used are: *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory), *Celtis pumila* (dwarf hackberry), *Cercis canadensis* (redbud), *Chionanthus virginica* (fringe-tree, or old man's beard), *Cladrastis lutea* (yellow wood), *Cornus florida* (flowering dogwood), *Cotinus americanus* (American smoke tree), *Diospyros virginiana* (persimmon), *Juniperus virginiana* (red cedar), *Liquidambar styraciflua* (sweet gum), *Liriodendron tulipifera* (tulip poplar), *Magnolia acuminata* (cucumber tree), *Nyssa sylvatica* (black gum), *Pinus echinata* (yellow pine), *Quercus imbricaria* (laurel or shingle oak), *Q. macrocarpa* (bur oak), *Q. marilandica* (barren or black jack oak), *Q. muhlenbergii* (chestnut oak), *Q. shumardii* (Shumard red oak), *Q. stellata* (post oak), and *Ulmus alata* (winged elm). It is of interest to note that red cedar and bur oak are widespread and fairly abundant in southern Wisconsin, and that chestnut oak, black gum and redbud also occur naturally within the state, which would seem to offer good hope that their associates in the Ozark community will likewise thrive on a favorable site.

A new bird record for the Arboretum

In early November a pair of ruffed grouse were seen in the Aldo Leopold Pines by Profs. R. I. Evans and J. T. Curtis of the University Botany Department. According to Prof. McCabe these birds may have been merely on the move following an autumn rearrangement of population, but the possibility exists that the birds may find their new home to their liking and remain with us.

Additions to the list of Arboretum fungi

About five years ago a list of the fungi of the Arboretum appeared in the Transactions of the Wisconsin Academy of Science. Since then a supplementary list has been kept which has been very considerably expanded following the recent report of fungi gathered on the Foray (collecting trip) of the Mycological Society of America in the Arboretum in September 1953, at the time of the meetings of the American Institute of Biological Sciences held in Madison. About 120 identified items are mentioned in the December 1954 Newsletter of the Mycological Society, many of them not hitherto reported from the area. Unfortunately the list is not complete, since several of the active collectors did not submit a summary of their findings.

Mosses in the Arboretum pine plantations

This fall Prof. R. I. Evans of the Botany Department began a study of the moss populations in the various pine plantings in the Arboretum. Young plantings have a low moss population, but as the trees increase in size they shade out the grasses which are followed by a luxuriant development of mosses. At a still later time, when the pine tree canopy has closed, the dense shade and heavy needle litter cause a reduction in the amount of moss growth. Prof. Evans will study the succession in detail. He plans to begin experiments on methods of introducing other moss species to the area, especially those that are adapted to grow vertically through the needle mat.

Seed exchange for 1954

The annual Arboretum seed exchange list was issued in December and has been sent to the arboreta and botanical gardens on our mailing list. One hundred twenty-eight species in 37 plant families are offered. Of these 35 are woodland species, while the rest are plants of prairies and open places.

Graduate Degree Research in the Arboretum

Two graduate students in Plant Ecology, whose research was carried out largely or entirely on the Arboretum, received degrees of Doctor of Philosophy in Botany in June 1954. The brief accounts which follow present some of the points of general interest in this work.

Bonita J. Miller - Differential responses to cutting of six prairie grasses in Wisconsin.

The basic purpose of this study was to determine whether prairie grasses native to Wisconsin are suitable for use as hay plants and whether they can stand grazing. Actual grazing animals were not used, but the effects of grazing were simulated by the cutting practices employed. The grasses used - big bluestem (*Andropogon gerardi*), little bluestem (*Andropogon scoparius*), Indian grass (*Sorghastrum nutans*), switch grass (*Panicum virgatum*), wild rye (*Elymus canadensis*, *E. virginicus*), and side-oats grama (*Bouteloua curtipendula*). Dr. Miller found: "Only side-oats grama seemed to possess a full complement of desirable agronomic characteristics. In Wisconsin, this species alone would seem useful as a forage plant.....Proposed plans for use of the prairie grasses in Wisconsin include seeding of a mixture of all these species on areas in need of soil rehabilitation, with no cutting or grazing for varying periods of time, to be followed by management designed to lead to the establishment of a consolidated stand of side-oats grama; and direct establishment of side-oats grama on arid upland sites and slopes of high erosion hazard."

David Archbald - The effect of native legumes on the establishment of prairie grasses.

The purpose of this investigation was to determine whether some of the native legumes would have any positive effect on the establishment of several prairie grasses, including big bluestem, little bluestem, wild rye, switch grass and Indian grass. The legumes used were lead plant (*Amorpha canescens*), two tick-trefoils (*Desmodium canadense*, *D. illinoense*), brush clover (*Lespedeza capitata*), white prairie clover (*Petalostemum candidum*) and purple prairie clover (*P. purpureum*). It was found that during the third growing season the native legumes significantly increased the yield of prairie grasses. The tick-trefoils gave the best results and showed the most promise. Dr. Archbald suggests "The adaptation of the native legumes and prairie grasses to local conditions and their long-lived perennial nature must not be overlooked. The high root production of the native grasses furnishes a considerable amount of organic matter, improves soil structure, and reduces erosion, while the legumes add nitrogen. This combination of factors could conceivably provide a much-needed service as an aid in reclaiming abandoned cultivated land with a minimum of attention."

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Observatory Hill Office Building
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ARBORETUM NEWS

Vol. 4, No. 2

Madison, Wisconsin

April 1955

Fire Break in the Grady Tract

The disastrous fire of March 1954 pointed up the need for a really effective barrier to protect the pine plantings in the Grady Tract, as well as the small but fine piece of white oak woods in the west central part of the area. We hope that we have succeeded in setting up such a barrier by the establishment of a wide break starting near the northeast corner of the Grady Prairie, following the east boundary to the central ridge, and thence northwestward along the summit of the ridge to a point near the northwest corner of the tract. The main traffic lane into the area will now follow this break and most of the presently used more southerly road will be abandoned. Following the ridge as it does, the new road will provide an inspiring view to the northeast of the State Capitol and the higher buildings of downtown Madison.

The Development of Pine Forest Communities in the Arboretum

J. T. Curtis, Chairman

Arboretum Technical Committee

The Arboretum Technical Committee several years ago initiated the production of detailed development plans for the major plant communities of the Arboretum, to supplement the general master plan which exists only as a map. The first of these detailed plans was concerned with the main prairie and was completed in 1951. During 1954, a similar development plan was prepared for the pine forests in the southwest portion of the Arboretum, centering on the Aldo Leopold Memorial Pine Forest. Much of the information incorporated in the plan was collected by students in the course, Botany 166, Vegetation Management. The complete report contains 33 pages plus 13 tables and 10 maps. This article summarizes some of the more important features of the report.

The pine forest communities involved lie in the southwest portion of the Arboretum, along both sides of the Beltline highway. They cover an area of 63 acres, lying almost entirely within the drainage basin of Lake Wingra. The land is gently rolling, with a maximum elevation of 1000 feet above sea level at the western edge and a low point of just less than 900 feet at the northeast corner. The subsoils are of glacial origin and form part of a recessional moraine of the Cary stage of the Wisconsin glaciation. The surface soils are of the Miami

catena, varying from Celina soils in poorly drained areas, through Miami soils on the slopes to excessively well-drained Bellefontaine and Wyocena soils at the hill crests. The latter two soils are quite sandy while the former are of heavier texture and are loessial in origin.

The land in the pine area was acquired at three different times by the University. The oldest portion was a part of the original Arboretum and was purchased in 1933, the second portion was obtained in 1940, and the most recent portion was added in 1952. Planting began in the old part in 1933, in the second part in 1943 and is just beginning now in the newest part. Communities in various stages of development are therefore present; these will provide a graded scale of forest ages for various biological investigations for a considerable number of years.

A total of 52,800 trees have been planted since 1933. Of these, there were 24,956 Red Pines, 19,157 White Pines, 7,753 White Spruces, 567 Balsam Fir, 200 Trembling Aspens, 195 White Birches, 110 Red Maples and 50 Jack Pines. The average rate was 960 trees per acre, but the several portions deviated considerably from this average, with the oldest plantings having 1700 trees per acre, while later plantings, still incomplete, vary from 307 to 1240 per acre. The trees have all been planted in a random spacing, rather than in the depressingly regular pattern so prevalent in commercial forest plantations. The combination of high density and random spacing has resulted in the early expression of dominance, with a small number of trees growing much better than the majority, as is the case in naturally reproduced forests. These dominants were over 35 feet tall and 10" in diameter in 1954, at an age of 23 years.

Both White Pine and Red Pine showed better than 75% survival in all plantings, but Balsam Fir had only 44% and White Spruce only 9% survival. The hardwoods were much more successful, except for Red Maple which was heavily (98% to 100%) browsed by rabbits annually.

Preliminary plantings of herbs were begun in the oldest portion of the forest in 1949 and have continued to date. A total of 46,000 individuals of 31 species have been planted so far, with a relatively poor survival in many cases. The best results have been attained with *Clintonia borealis*, *Cornus canadensis*, *Cypripedium acaule*, *Dryopteris phegopteris*, *Epigaea repens*, *Gaultheria procumbens*, and *Mitchella repens*. As light, moisture and soil conditions change with the development of the trees, better success with the herbs may be expected.

During the first twenty years, the surface soil under the oldest pines changed in acidity from pH 7.2 to pH 4.7. In the same period, the light decreased to 2.3% of that in the open, the soil moisture averaged 10% less than that in adjacent open areas, the soil temperature decreased 7° - 10°F, the air temperature decreased 6° - 8°, and the relative humidity at noon increased from 49% to 61%.

In these pine forests, as in the other ecological community developments as the Arboretum, the aim is to maintain, restore, or establish entire biotic communities of the types found naturally in the prairie-forest border region of mid-America. These communities are to be as complete as possible with respect to the plant and animal species normally found and are to be as natural as possible with regard to number and spacings of individuals. To this end, basic figures on species compositions and density have been compiled from studies of many natural stands. In the case of the pine forests, average figures have been obtained for three phases of the pine community as it exists in Wisconsin: the Jack Pine - Red Pine type, the Red Pine - White Pine type, and the White Pine - Red Pine type. These are to be established on Wyocena, Bellefontaine and Miami soils, respectively. Expected numbers per acre for all trees and for the most important trees and shrubs are shown in the table. These figures are adjusted in final planting plans by factors which take into account expected mortality or probable spread. In general, seven times as many trees are planted as are expected to be present in the mature stand, while only one tenth of the final number of herbs are planted. These adjustments are based on the reasoning that we cannot

MASTER PLAN - LEOPOLD PINE FOREST

SHOWING

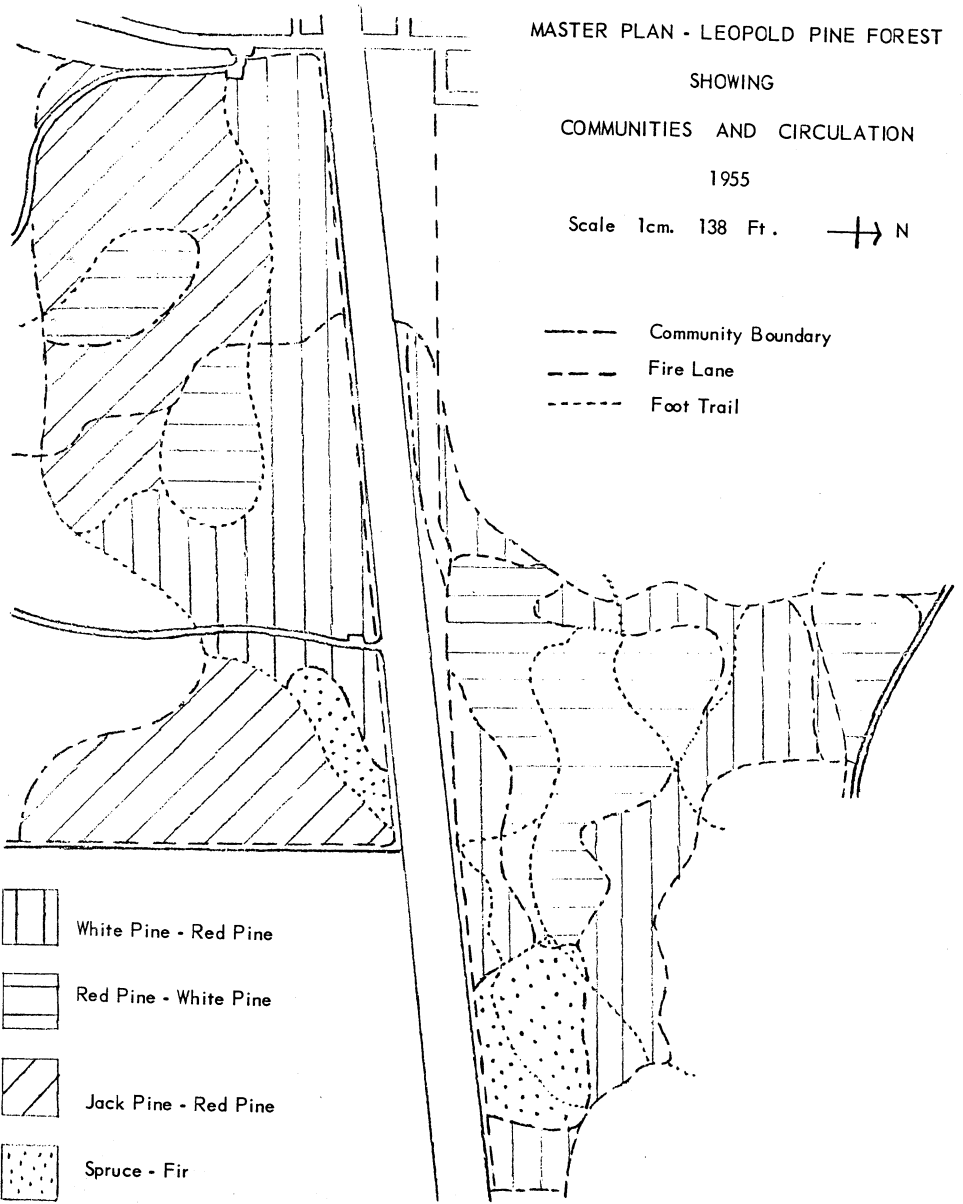
COMMUNITIES AND CIRCULATION





1955

Scale 1cm. 138 Ft.



-  Community Boundary
-  Fire Lane
-  Foot Trail



-  White Pine - Red Pine
-  Red Pine - White Pine
-  Jack Pine - Red Pine
-  Spruce - Fir

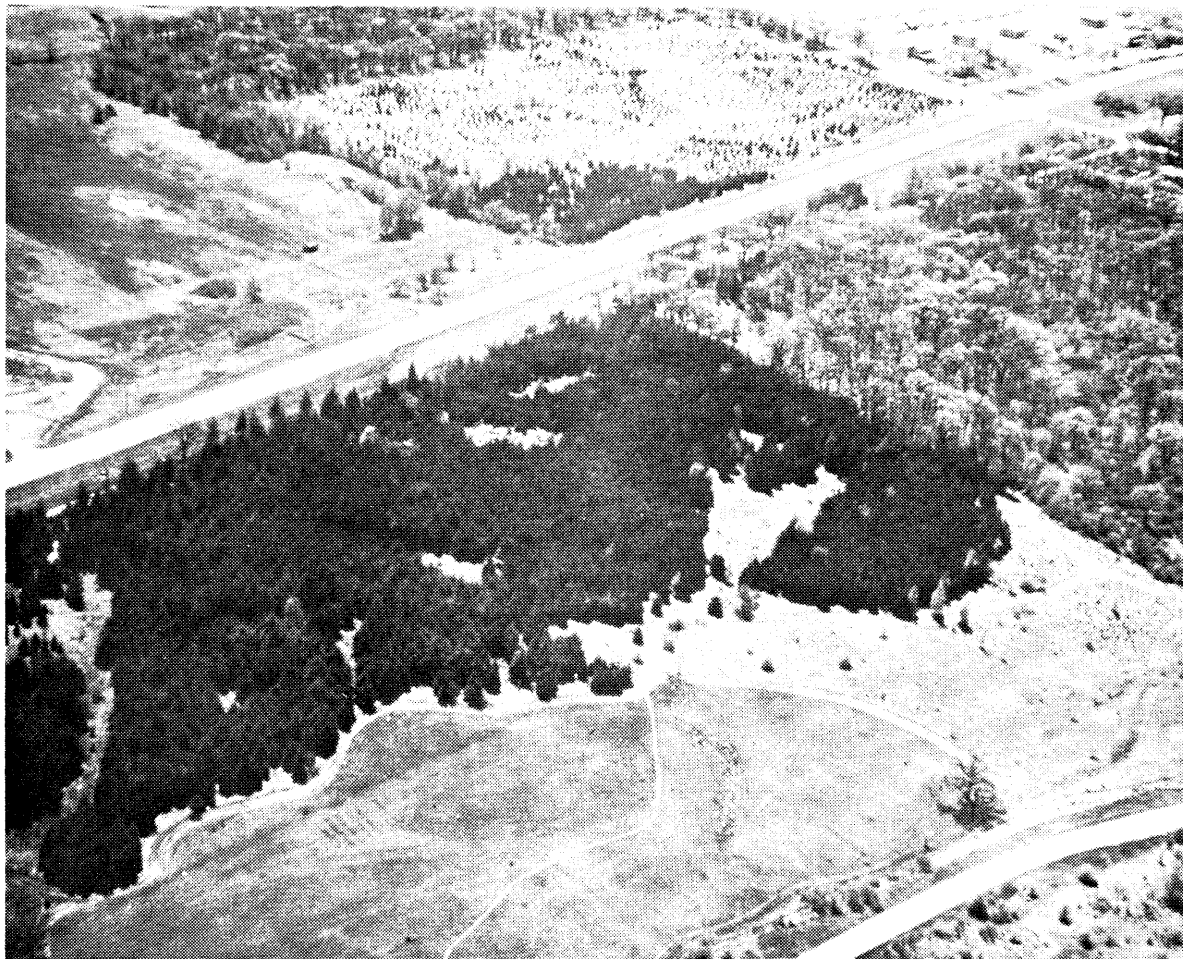


PHOTO OF LEOPOLD PINE FOREST

afford to wait for natural regeneration of the trees, but that the herbs will have sufficient time for reproduction during the period while the trees are maturing.

Experiments are now underway to learn the best methods whereby the bryophyte and lichen members of the community may be established. It is hoped that a full complement of cryptogams will eventually be incorporated. Similar attempts will be made in the future to introduce the invertebrates and small mammals typical of the pine forests.

Species and expected densities per acre for three pine forest types

Species	Jack Pine- Red Pine	Red Pine- White Pine	White Pine- Red Pine
Trees			
Jack Pine	200		
Red Pine	30	22	2
White Pine	18	100	34
Balsam Fir	0	36	120
Trembling Aspen	1	4	12
White Birch	1	40	14
Red Maple	3	9	4
Hill's Oak	24	22	14
Red Oak	0	0	0
		15	4
Herbs and shrubs			
Anemone quinquefolia	1400		
Aster macrophyllus	1400	930	160
Cornus canadensis	600	4600	2500
Corylus cornuta	680	500	400
Diervilla lonicera	1000	760	1200
Fragaria virginiana	560	600	1500
Gaultheria procumbens	3700	240	800
Maianthemum canadensis	6900	2800	1800
Oryzopsis asperifolia	680	3800	6700
Polygala paucifolia	800	1200	1200
Pteridium aquilinum	3600	800	1000
Trientalis borealis	1780	40	4100
Vaccinium angustifolium	5600	360	1400
Vaccinium myrtilloides	1780	2100	400
Viburnum acerifolium	1900	440	240
Waldsteinia fragarioides	3800	200	80
		3600	930

Interesting Plants in the Arboretum. 1. The Snow Trillium

The Snow Trillium (*Trillium nivale*) is a rare plant of extreme southern and eastern Wisconsin which has been established in the Camp Woods at several places along the main path. It is the first woods wild flower to bloom in the spring, with its flowers commonly appearing in the snows of late March storms. A dwarf plant, the largest specimens are rarely more than 5 inches tall. Our oldest colony was planted in 1944 and now numbers 21 flowering plants, with many immature seedlings. The species ranges from western Pennsylvania to Minnesota south to Kentucky and Missouri. It appears to reach greatest concentrations in Iowa and in the isolated groves of Illinois and Indiana. The white petals are about one inch long and are arranged in the familiar trillium triangle.

The Snow Trillium deserves to be more widely planted in lightly shaded gardens, where it makes an excellent companion for Snowdrops, *Chionodoxa*, *Crocus* and other spring bulbs. Bulbs should be purchased and planted in late summer, as the very early blooming season makes spring planting rather hazardous.

--- J. T. Curtis

Prairie Burn in 1955

The eastern third of the larger Arboretum prairie was burned over in late April as a part of our continuing program of controlled prairie fires. The purpose is the keeping down of woody shrubs and trees and the improved flowering of prairie species following the burning off of the heavy grass mulch which accumulates over the years. The prairies of pre-settlement Wisconsin were maintained by the vast fires which regularly swept the area, but when the land was broken and subdivided for agricultural purposes the fires largely ceased and all except the most arid sites tended to become covered with brush and trees. Although the Wisconsin prairie were thus, in a sense, artificial they were, nevertheless, a regular and established feature of the pre-settlement landscape and are considered to be worthy of restoration and preservation in the Arboretum.

In this most recent burn further motion pictures were taken for the Arboretum movie which we hope to have ready for presentation this year. An unusual feature of the proceedings was the presence of a helicopter which hovered overhead bearing members of the University Meteorology Department recording variations in light reflection from the burned and unburned areas.

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ARBORETUM NEWS

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July 1955

Summer 1955

The season, up to the time of this writing in the second week of July, has in-general been favorable for the growth and development of our plant communities. The precipitation, although not notably high, has been fairly well spaced, and we have been able to carry out our scheduled planting program without difficulty or delay.

Correction

The scale of the Master Plan Map of the Leopold Pine Forest in the April issue was wrongly given. The 1 cm. = 138 ft. scale was the original before reduction. The proper scale of the map as printed should be 1 cm. = 181 ft. Please make the correction on your copy.

Tree Swallow-Bluebird Nesting Studies in the Arboretum

R. S. Ellarson, Dept. of Forestry and Wildlife Management

The Tree Swallow and Eastern Bluebird nesting study was initiated as a formal project on the Arboretum in the Spring of 1949. It developed as an out-growth of a House Wren nesting study which had been conducted from 1943 through 1948 by R. A. McCabe of the Department of Wildlife Management. During the six-year course of the Wren study, 84 Bluebird and 13 Tree Swallow nests had been recorded in nesting boxes which had been erected and intended for Wrens. Therefore, in 1949, upon the termination of the Wren study, it was decided to continue to erect nesting boxes, but to manipulate the box locations in such a way as to attempt to increase the breeding population of both Bluebirds and Tree Swallows.

The manipulation consisted in moving the nesting boxes from areas of relatively dense shrub and tree cover, favored by Wrens, out into areas lacking brush cover, and with no trees, or only a park-like scattering of trees, the latter sites being more suitable to the nesting of Bluebirds and Tree Swallows.

The Bluebirds have shown little or no response to these shifts in nest-box locations. Numbers of Bluebird nests have varied between 7 and 16 in the years 1949-1954. This year (1955) we have had so far a total of 6 Bluebird nests, but more are expected, as the nesting season often extends to mid-August.

Tree Swallows, on the other hand, have shown a remarkable response to the new nesting sites provided. As previously mentioned, in the six-year period prior to 1949, only 13 Tree Swallow nesting attempts had been recorded. However, from 1949 through 1955, there has been an almost continuous increase in the number of swallow nests. In 1949, 13 nests were found; 1950-18; 1951-11; 1951-15; 1953-20; 1954-43; and in 1955 a total of 54 nesting attempts were made for a grand total of 174 nesting attempts made by Tree Swallows since the study in 1949.

The purpose of this study has been to study the nesting phenology and nesting success of these two species of birds as well as attempting to increase the breeding population by manipulating and increasing nesting sites.

Prior to 1955, approximately 65 to 70 nest boxes were erected annually. This year, however, the number has been increased to 116. The boxes are erected on existing fencelines or on steel fence posts set along fire lanes in the prairie areas of the Arboretum.

The nest boxes are checked every two or three days throughout the nesting season and all information on nest building, egg laying, incubation, hatching, and fledging of young is recorded. All nestling Tree Swallows are banded before fledging.

In 1954 a trapping and banding program was instituted in an endeavor to determine the number of Tree Swallows returning each year to breed, and to determine the contribution nestling swallows reared on the area make to the adult breeding population. In 1954 forty adult swallows were trapped. Seven of these were found to have been banded as nestlings in previous years. So far in 1955, thirty adult swallows have been trapped; 15 were banded returns and 15 are new unbanded birds. The oldest banded bird found to date was an adult female trapped this year which had been banded as a nestling in 1951.

The first week of June 1955 was an unfortunate week for the Arboretum Tree Swallows. The continuous cold rainy weather of this week caused a severe shortage of flying insects upon which the swallows depend for food. As a consequence, of the 9 nests containing young at the start of this period, 6 nests of young were entirely lost, 2 nests lost 2 and 5 young respectively, and only one nest had all young surviving. Eggs being incubated at the same time were undamaged.

From the time of their arrival, usually sometime in the first week in April, until their departure from the study area in mid-July, the Tree Swallows are a prominent and delightful part of the Arboretum avifauna. They can usually be seen perched on the fence wires bordering the Arboretum drive along the prairie and horticultural areas. The trusting nature of these beautiful swallows as they perch on the wires close by their nest boxes allows many Arboretum visitors to make the acquaintance of one of our lesser known songbirds.

Interesting Plants in the Arboretum. 2. Rattlesnake Master

The Rattlesnake Master (*Eryngium yuccifolium*) is an interesting summer-blooming plant of the moist prairies. It is a member of the carrot family, as may

be told by its characteristic odor when crushed, but it differs greatly in appearance from most members of this family. The leaves are long, narrow and sword-like, with a few stiff hairs on the margin, very reminiscent of yucca leaves. They are about two feet long and are produced in a basal rosette. In midsummer, a flower spike arises from the center of this rosette, bearing white flowers in tight, almost spherical heads, each head on the end of a diverging branch. The plant is found in open places from Texas to Florida, north to Minnesota, Ohio and New Jersey, reaching optimum development in the Mid-western prairies.

Very large colonies of this species, each with many thousands of plants, may be seen in the main prairie of the Arboretum. It is also well established in the Grady prairie. The peak of the blooming season lasts from the middle of July to the middle of August. The flowers have a sharp pungent fragrance which is very noticeable on bright, humid, windy days.

The individual flower cluster is rather stiff in appearance when viewed alone, but becomes very effective when mixed with such spike flowers as Gayfeather (*Liatris sp.*) or other, more colorful summer blooms in an informal bouquet. The plant is easily grown in the perennial garden. It requires full sun in this region and is most floriferous in loam soils of medium or low fertility.

---J. T. Curtis

Spruce Disease

Many of our largest and finest white spruce trees are seriously infected by a fungus (*Rhizosphaera kalkhoffii*) which causes premature needle casting, and in serious cases produces almost complete defoliation and subsequent death of the trees. A spruce tree normally holds its needles for well over a decade, and it is this retention which gives to healthy trees their handsome, dense, compact appearance. Experts in forest pathology were consulted and recommended a program of spraying which was carried out in June. The effects, if any, of this are still to be determined. So far as we have been able to learn this disease to date has been reported only on trees planted for ornament or in plantations such as ours, indicating perhaps that an unnatural environment may be a predisposing factor in infection. A study is now under way in the Botany Department of the University of Wisconsin in which an attempt is being made to follow the course of the fungus in the host tissue, primarily with a view to determining whether a surface spray program offers any real hope of control, and, if not, whether there may be any feasible alternative.

Swamp White Oak Planting

In the fall of 1952 a very fine specimen of swamp white oak (*Quercus bicolor*) in Madison's Tenney Park produced a heavy crop of good acorns, many of which were collected from the lawn on which they dropped, and were stratified over winter in the Arboretum. These were grown protected in our fenced nursery through the seasons of 1953 and 1954. In early summer 1955 the trees were dug bare-rooted, suitably pruned back, and set out in the low, often moist southwest part of the Grady Tract oak plantings in accordance with the Arboretum Master Plan. They withstood the transplanting very well and so far are thriving. They will be protected from rodent attack for several years by wire netting.

Seeding-in of White Rein Orchis

This beautiful orchid (*Habenaria leucophaea*) has been studied over a period of years in the Grady Prairie and was discussed at some length in Arboretum Journal Paper No. 25, which dealt with population changes in native orchids. Further observations have been made in 1955 which throw light on the habits of this short-lived perennial. In 1949, 1950, and 1951 a large specimen bloomed at an isolated spot in the west part of the Grady Prairie. It disappeared after the 1951 season and has evidently died out. In 1954 two or three blooming plants turned up in the general area, and it seems possible they were seedlings from the large plant, but in 1955 twenty-two blooming plants were counted in close proximity to the stake marking the position of the earlier isolated plant!

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October 1955

Heat Wave and Drought

The summer and early fall of 1955 were notable, in the Madison area, chiefly for the prevailing high temperatures and almost complete lack of precipitation. On these counts the season was surely one of the most severe in the history of local weather recording, and certainly the most so in the history of the Arboretum, not excluding the summer of 1936 when, to be sure, the all-time temperature high of 107 was reached, but which overall was decidedly less stringent. In the season just past, between July 1st and September 11th, there were 40 days when the temperature reached 90 or more, frequently 95 or over, including several days when 100 or slightly more was registered. From the middle of June until the first week in October there was only one fairly heavy rain, in the latter part of July, when approximately 1½ inches was recorded. Since this rain was preceded and followed by extended and excessively hot and dry periods it was not particularly effective in relieving the moisture deficit. In the first week of August a ½ inch rain fell at the Truax Field weather station, but missed the Arboretum. During the entire month of September there was only 8/10 inch of rain at Madison, and this was in a series of five or six small showers which did little more than lay the dust. As the summer progressed the fire hazard in the Arboretum became increasingly serious, and the climax was reached on Friday, September 9th. The day started with a cool, relatively moist east breeze, a cloudy sky, and the hope of showers. By mid-morning, however, the wind direction had shifted to the southwest, with a large increase in velocity, the temperature had risen sharply, and the relative humidity had correspondingly decreased. By one o'clock the temperature had reached 97, the relative humidity had declined to 17% - phenomenally low for this part of the country - and the wind was blowing in a gale of between 30 and 35 miles an hour, with frequent gusts up to 45 miles. The writer was in the Arboretum at the time and has never before experienced such a feeling of foreboding and peril, so far as fire danger is concerned. Superintendent Jacobson put two men in cars to patrolling the boundaries of the area and concentrated the rest of the work crew in the headquarters nursery, where they would be at once available for fire-fighting duty. All

Arboretum fire-fighting equipment was at the ready and the Town of Madison Fire Dept. was alerted. Although by evening the temperature had naturally dropped somewhat, the high wind persisted until late at night and a number of grass and marsh fires broke out in the general vicinity of the Arboretum, but by great good luck none on the area itself. At the time this is written, in the first week of October, there has just occurred a helpful 3/4 inch rain, but we are still more than six inches behind normal. It is feared that this great moisture deficit, which resulted in a most disappointing showing of our herbaceous prairie species during late summer and early fall, may have a much more serious and lasting effect on our woody plantings, especially the conifers. If we are lucky enough to have an early and lasting snow cover during the coming winter, the situation may be materially improved, but otherwise the outlook is ominous indeed.

Arboretum Journal Paper

A paper entitled "Effects of Clipping, Burning and Competition on Establishment and Survival of Some Native Grasses in Wisconsin" by W. C. Robocker and Bonita J. Miller has been designated as Arboretum Journal Paper No. 28. It appeared in the Journal of Range Management 8: 117-120. 1955

A Rapid Response

Professor J. T. Curtis has recently received a request from the Indonesian National Botanic Gardens (the former Buitenzorg Gardens) in Java for seeds of *Eryngium yuccifolium*, the native Wisconsin prairie species which was described by Prof. Curtis as No. 2 of his current series entitled "Interesting Plants in the Arboretum" and which appeared in the July 1955 issue of the Arboretum News. This issue was not sent out to the mailing list until about the first of August and all copies went by ordinary mail only.

Interesting Plants in the Arboretum

3. Andrew's Bottle Gentian

The Bottle Gentian (*Gentiana andrewsii*) is one of the few blue-flowered plants of the prairie and one of the latest to bloom. It usually begins flowering in the first part of September, but many individuals prolong the season well into October. Unlike most species of its genus, the Bottle Gentian flowers never open. The corolla forms a continuous tube with the blue petals united by intervening white membranes which protrude past the petal tips. These membranes are frilled at their outer edges and the frills interlock with one another, thus preventing the corolla from opening. Only an insect with the strength of the bumble bee can force open the seal and thus gain entrance to the interior of the flower.

The relationships of Andrew's Bottle Gentian are not clear. It closely resembles the Eastern Bottle Gentian (*Gentiana clausa*) but is much larger and more floriferous. Well developed plants in the moist prairies of Wisconsin frequently exceed three feet in height and have 10 to 25 stems, each with 30 to 45 flowers. The flowers are arranged in a compact head at the tip of the stem and in encircling groups in the next lower two or three leaf axils. The Red-Stemmed Bottle Gentian (*Gentiana rubricaulis*) is probably not closely related to Andrew's Bottle Gentian, although it, too, has flowers which do not open. Its main dif-

ferentiating characteristic is the placement of the flowers in a cup-like enclosure of the top-most leaves.

Andrews' Bottle Gentian is present in a colony of more than 2000 plants in the original wet prairie of the Arboretum and has also been very successfully established on the Grady prairie, where it is spreading rapidly from self-sown seeds. In southern Wisconsin it grows in full sun in moist sedge meadows and in wet prairies. In both habitats it is frequently surrounded with the rather vigorous growth of grasses and sedges. As a result, its stems tend to be lax, and the plant tends to sprawl in a garden, unless it is staked and tied. Under garden conditions, it does well in any good loam soil and definitely does not require peaty soil or excessive moisture. In fact, its proportions are improved under the drier garden environment. The Bottle Gentian is a very long lived perennial and will continue to grow and thrive in any suitable location with no transplantation and little care other than staking. Thus it makes one of our better wild flowers for garden use.-

- - J. T. Curtis

Nesting Bird Studies on Educational TV.

The Department of Agricultural Journalism at the University of Wisconsin is currently preparing, under the supervision of R. S. Ellarson of the Dept. of Forestry & Wildlife Management, a film illustrating Ellarson's tree swallow-bluebird nesting studies now in progress on the Arboretum (see article on these studies in the July 1955 issue of Arboretum News). The movie, expected to be completed by next November 15th, will show nesting habits, bird banding, and methods of attracting the species concerned. The film will run for 12½ minutes and the photography was done by Fritz Albert and Kirby Brumfield. While intended primarily for use on Educational TV, the picture will also probably be shown separately to 4-H Clubs and other interested groups.

Extensions of the Arboretum Foot-Trail System

It is the aim of the Arboretum Committee to provide, by means of a comprehensive system of foot-trails, as complete access as possible to that part of the Arboretum open to the public. The plan is to so locate these trails that the person who follows them may circulate through greater or lesser portions of the area, as suits his inclination, and at the same time finish his hike conveniently near the point at which he started, without retracing his steps for any considerable distance. The most recent trail to be established originates at an open gate in the fence opposite the Wingra Woods parking area and thence runs eastward and south-eastward through the Camp Woods to the point where it crosses the stream bed through which the Teal Pond drains to Lake Wingra. From this point the trail winds in a large loop through a wooded area and then runs southward through an alternating series of attractive low meadows and wooded spots to the large jack pine plantation, one end of which it traverses, until it finally comes out on the road which runs northward past the Teal Pond and the Camp Woods. This trail is now completed to the Teal Pond drainage and it is hoped that the rest of it can be finished this fall. As a water conserving measure it is planned to dam the stream bed at the point where the trail crosses it and use the dam as our bridge. Maps are now being drawn under the supervision of Prof. Longenecker, Arboretum Director, which will show the entire foot-trail system, including the portion

currently completed and that projected. These will be available for distribution to interested persons and organizations.

General Use of the Arboretum

The use of the Arboretum by non-research groups of both the University and the general public is increasing yearly and it is our hope that this trend will continue. The following listings, while not complete, show in a general way the use of the area by organized groups from 1) the University of Wisconsin and 2) the general public in 1955: 1) Elementary botany, 366 students; Principles of Plant Ecology, 10; Ecological Methods, 10; Plant Conservation, 10; Advanced Plant Ecology, 10; Dendrology, 12; Advanced Mycology, 10; Field Ornithology, 36; Field Zoology, 18; Ecology (zoological), 53; Wildlife Ecology, 30; Wildlife Management Techniques, 10; Landscape Architecture, 75. 2) exact numbers are not available for the following groups from the general public, but most averaged about 20-25, and in a few cases more. These are only the groups which requested and received guided tours. (Many more groups, especially of school children in buses, toured the Arboretum on their own, but at present we have no way of checking – Portage Garden Club, Northland Garden Club of Westby, Kiel Garden Club, Evergreen Garden Club of Oconomowoc, Garden groups from Lake Geneva and Racine, Spring Green 3rd and 4th grade public school students, and Boy Scout troops from the Madison area. In addition to these organized groups the Arboretum of course receives heavy use by individuals and family groups, particularly on spring and fall week-ends. The Monroe street area and the Wingra Springs are especially popular with the public.

Arboretum Personnel

- Chairman of the Arboretum Committee A. F. Gallistel
- Executive Director G. W. Longenecker
- Research Coordinator J. T. Curtis
- Superintendent J. R. Jacobson
- Botanist R. E. Shake
- Editor, Arboretum News H. C. Greene

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