

# Carnegie Magazine

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Powdermill Nature Reserve / The field station of Carnegie Museum of Natural History

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# Carnegie Magazine

**Cover:** Dutchmen's Britches, 'Dicentra cucullaria' (L.) Bernh. One of the early spring flowers at Powdermill Nature Reserve.

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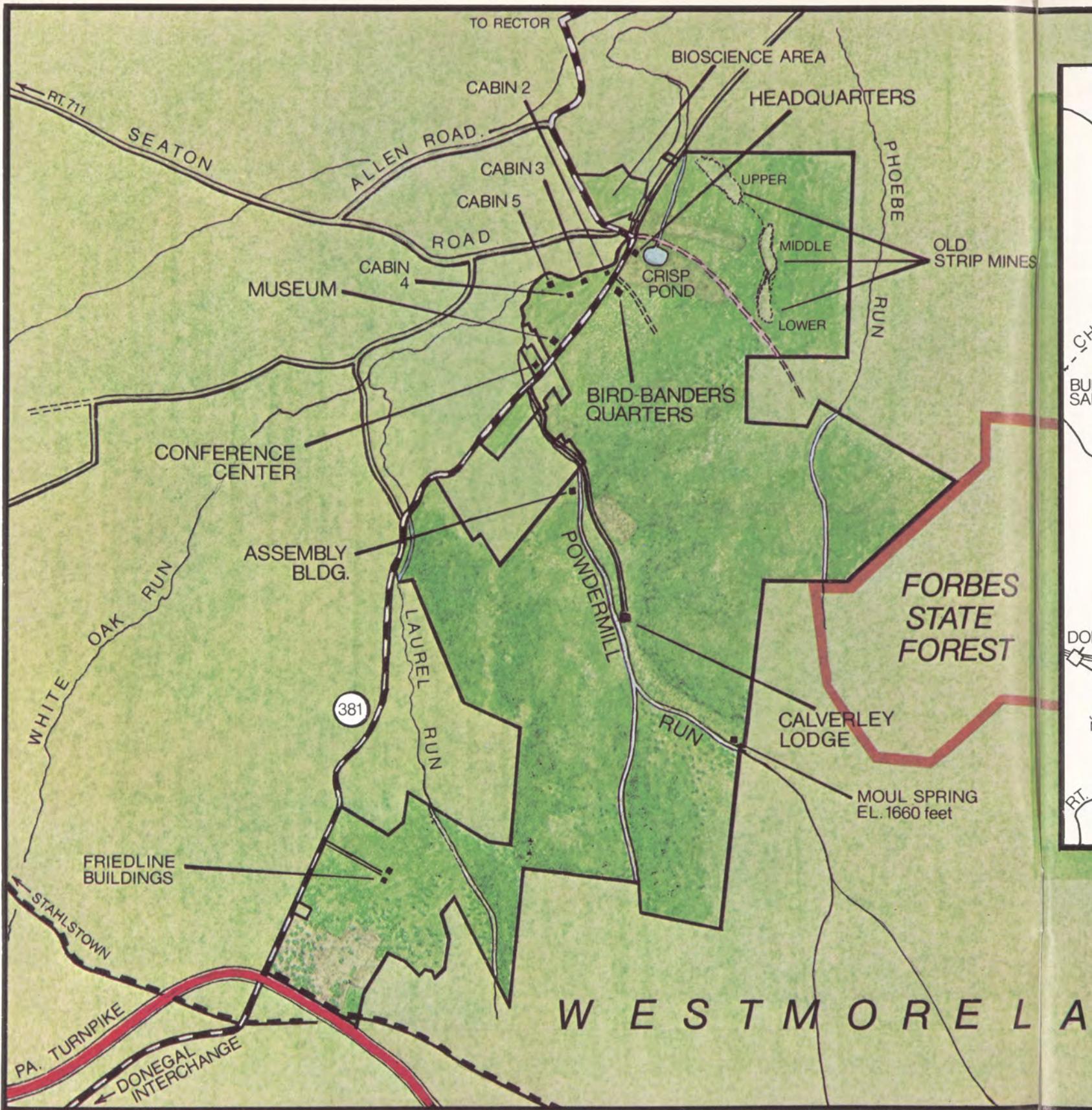
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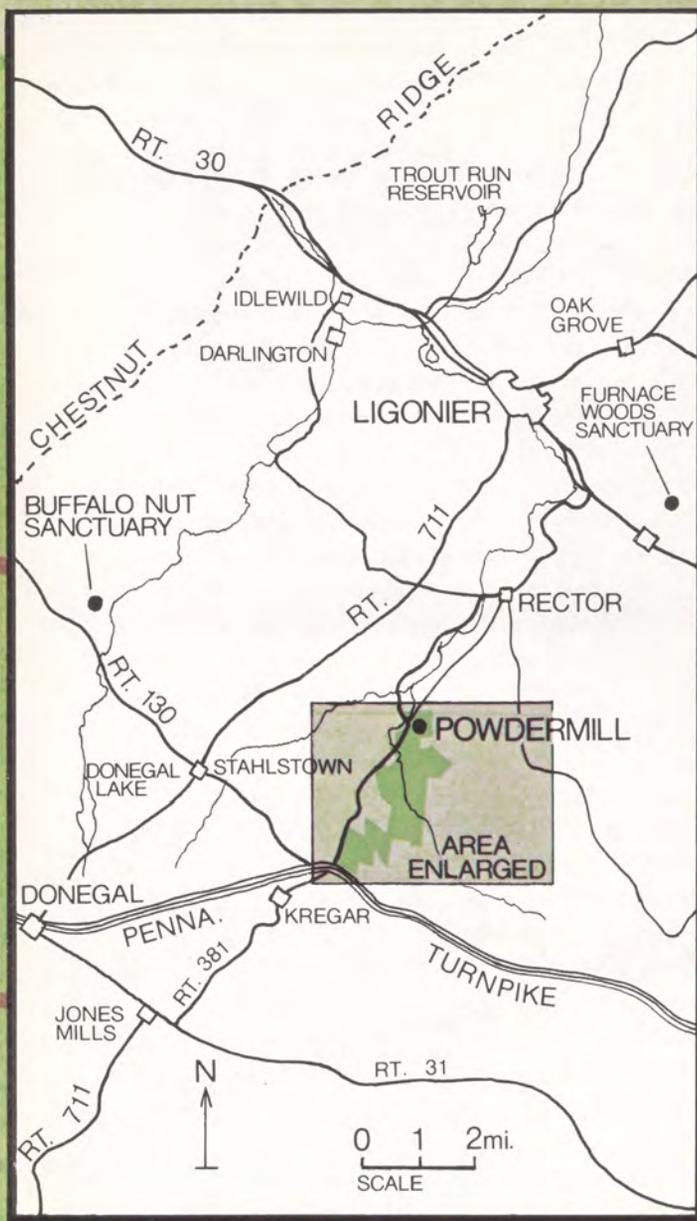
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*Powdermill Nature Reserve of Carnegie Museum of Natural History*

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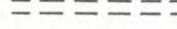
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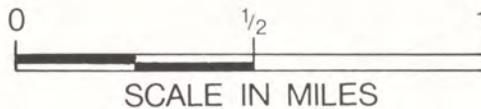
**L A N D C O.**

# POWDERMILL NATURE RESERVE



## legend

-  - INTERSTATE US.76
-  - STATE ROUTE 381
-  - STATE ROUTE 130
-  - LIGHT DUTY ROAD
-  - DIRT ROAD



## Powdermill

This issue of 'Carnegie Magazine' is devoted to one of Carnegie Museum of Natural History's programs which is now in its twenty-second year, but which is probably well known to only a very few of our friends and supporters. The program is Powdermill Nature Reserve, over 1800 acres of woodland, streams, open fields, ponds and thickets, located in the Ligonier Valley, south of Rector and north of the Pennsylvania Turnpike. The program is conservation and preservation, research and reflection.

Powdermill Nature Reserve is a place, but it is also a philosophy. It stands as a symbol of man's visions, both the scientist's and the philanthropist's. The museum's need for a natural area which could be used as a laboratory and which could be preserved for the study of natural processes was understood and eloquently outlined by Dr. M. Graham Netting. General and Mrs. Richard K. Mellon and Mr. and Mrs. Alan M. Scaife realized the potential for such a nature reserve and understood the museum's needs for such a natural area. They assured the initial land acquisition and provided for the Reserve's continued growth. It is thanks to the scientist and the philanthropist that Powdermill Nature Reserve came into being in 1956 and that it has been the focal point of so many productive programs since that time.

The articles that follow describe some of the many projects and programs that have been and are being carried out at Powdermill Nature Reserve. Dr. Netting in the June 1956 issue of 'Carnegie Museum,' when announcing the creation of Powdermill Nature Reserve, said, "The Reserve cannot draw upon the present limited funds of the museum and will be dependent upon outside gifts for buildings, operating expenses and scientific studies." Over the years, Powdermill Nature Reserve has received support from hundreds of benefactors; to all of them we express our deep appreciation. For providing support for the basic operating costs of Powdermill over the years, we thank the Richard King Mellon Foundation and the Sarah Scaife Foundation.

—Craig C. Black  
February 9, 1978



*John E. Guilday, Associate Curator of Vertebrate Fossils, Carnegie Museum of Natural History, is an internationally renowned expert on Ice Age fossils. His poetic reflections on Powdermill Nature Reserve have periodically been published in the Reserve's Educational Releases. A few excerpts are reprinted here.*

## Reflections 1

American Toad eggs



American Toad tadpoles



### *April and Powdermill*

Two hundred feet south of Avinoff Cabin is a shallow swale, spring-fed rimmed with forest muck and sphagnum. Go there some warm April afternoon when its black waters mirror the spring sky, and the woods are misted with the yellow haze of blooming spicebush.

The Wood Frogs have beat you to it. They have croaked their love to a chilly moon, and thrashed-in a new generation while you were wondering if spring would ever really come. The frogs have gone to hunt the wet woods, sexless and hungry. Mission accomplished. But their progeny are here, hundreds of them, black as the mud, swarming, wriggling with a cold energy that lasts but a few short weeks until the tadpoles sprout their legs, absorb their tails and leave the water, most of them forever.



They will meet varied fates. One will be taken by a dragonfly larva before it can leave the water. One will feel the needle teeth of a watersnake. One may be eaten by a coon, or a mink, or a chipmunk, or a crow. One will shrivel in the sun to feed the ants. One of this jewel-eyed horde of baby frogs, a lucky one, may find itself back another year in the same rain-drenched, moon-flooded, bare-branched woodland, to croak and clasp as soon as the ice has left the valley and the waters begin to warm.

Up under the eaves of Calverley Lodge a flicking wasp builds a pendant gray nest for wasps-to-be. A deer, fresh from the pinch of a barren winter forest, grazes on the new grass banks. Spring Azure butterflies, like flakes of sunlit sky, drift through the early woods, while underfoot the winter-stiffened jumping mouse stirs for the year.

So many separate ways — from the creeping green splash of liverwort on the wet spring rocks to the April-roused naturalist who braves the raw nights to see new life awaking and tramps the snow-packed slopes to catch the red maple at its springtime best — each responding in a timeless manner, each caught up in the resurgence of another northern spring, each a part of Powdermill.

—1960



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The Turk's-cap Lily,  
and a bank of Trillium.



*M. Graham Netting, Director Emeritus of Carnegie Museum of Natural History, was instrumental in setting up Powdermill Nature Reserve in 1956. While Director he was involved in all aspects of its activities, and he continues during his retirement years to write on conservation and to conduct research on turtles.*

## **Powdermill** The Gift of Time

In 1948, Wallace Richards, civic planner and one of the most imaginative and dynamic expeditors of the Pittsburgh Renaissance, became Director of Carnegie Museum, as just one of several civic responsibilities. Wally asked me to provide scientific input and supervision as Assistant Director, and one of my first assignments, as might be expected from a planner, was to recommend short-range and long-range goals for the museum. Many of the former were obvious: greatly improved salaries; rebuilding of the scientific staff; developing local archeology, long neglected; modernizing exhibits; and accelerating exploration, research, publication and education.

One of the long-range goals I suggested was the establishment of a field research station where laboratory studies could be complemented by continued monitoring of plant and animal populations, life history and behavioral research conducted, and the complexity of ecological inter-relationships investigated. (At this time only a few urban museums had such field adjuncts, but those that did – notably the American Museum of Natural History and the University of Michigan's Museum of Zoology – were engaging in fascinating ecological and environmental studies.)

General Richard K. Mellon, then Chairman of the Museum Trustees Committee, gave strong affirmation, and often financial support as well, to many of the goals recommended, but he was particularly attracted to the idea of a field station since, as a sportsman deeply concerned about preservation of wildlife, his knowledge of animals was soundly grounded on extensive observation outdoors. Since he believed the Ligonier Valley to be the finest area in western Pennsylvania, he personally instituted search for a suitable site there. During succeeding years several areas were considered and visited by inspection parties of trustees and staff before attention focused on the Powdermill drainage. Then land acquisition

took time and, unfortunately, Wally did not live to see the dream realized.

Finally, during 1956, General and Mrs. Mellon and Mr. and Mrs. Alan Magee Scaife presented to Carnegie Institute, for the use of Carnegie Museum, eleven tracts of land totalling 1,160 acres, beginning about three miles south of Rector. The area was named "Powdermill Nature Reserve, a Research Station of Carnegie Museum," and was to be supervised by the Director of the museum, the Chairman of the Trustees Committee, two staff members elected by the scientific staff, and three persons chosen by the Trustees, but not necessarily Trustees. The initial group consisted of General Mellon, the present writer, Trustees William R. Oliver and Lawrence C. Woods, Jr., Mrs. A.W. Schmidt, and Neil Richmond and Dr. LeRoy Henry, representing the staff. Each member took a keen interest in the development of the Reserve, weekend visits were frequent, and most management decisions were made on the spot.

The Reserve was zoned into three areas vastly different in size: 1. a Sanctuary, or "Natural" Area, comprising the major portion, to be a perpetual living museum, protected by man but managed by nature. It was recognized that no part of the Reserve met the definition of a true "natural area," because all of it had been lumbered at least once, but the intent was to let the least accessible, most protected second-growth forest mature unmanaged, using only old lanes or roads for access. It was understood, however, that harvesting of deer might have to be an exception to the "no hunting" restrictions since their natural predators were long gone and an overpopulation would preclude normal forest regeneration. Local residents, many avid squirrel, turkey and grouse hunters, were told that they would have first priority for deer hunting permits if they would refrain from shooting

any other wildlife. Thus, since the early years of the Reserve, deer hunting by permit, with the number being varied according to population estimates, has been the practice. Local hunters have been quite co-operative in respecting the sanctity of other creatures, even snakes, so much so that when I asked one old timer what he thought when he saw a black bear and cub along the road, he replied, "Oh, I thought she had been visiting Ruth Scott."

2. An Experimental Area, of several hundred acres or more, comprising old fields, young forest, old spoil banks, and highway frontages, to be used for all types of management or manipulative studies desired by museum researchers, and for conservation demonstration purposes.

3. A Headquarters Area, including buildings to house staff and resident investigators, and service, storage, and laboratory facilities. The main stipulation respecting this important but minimal sized segment was that the buildings and grounds be kept in neat, attractive condition.

As the Reserve developed, it became apparent that educational programs, especially for children, should be confined largely to designated areas where interference with research projects, such as bird banding, would not occur. In 1963, three tracts totalling 10.4 acres, across the road from the main property, were acquired for teaching purposes only, and the following year the first summer nature program for children was instituted on this Bioscience Area. In 1960, a seven-acre addition to the Headquarters Area had provided an old house on route 381, and a dilapidated barn. The barn was demolished as a road beautification measure, and the lower floor of the house was rehabilitated and opened in 1961 as a small museum of Ligonier Valley plants and animals, freely accessible to passing motorists on Saturdays and Sundays from April through October, and opened for school classes at other times by appointment.

The Powdermill area had a very jagged outline initially. During the years many properties were added to straighten boundaries, to extend road frontage, or to meet specific needs, such as the dependable water supply provided by a fine spring on the Hoyman tract. By the end of 1972, twenty-three additions had brought the total acreage of the Reserve to 1,808, most being due to the generosity of the original donors, or to grants from their foundations. A three-acre parcel, boasting some of the finest trees on the Reserve and now called Seminar Forest, was presented by our good neighbors, Mr. and Mrs. Frank L. Magee, in



Members of the Sweadner Entomological Society on a field trip in 1967.  
Below: Calverley Lodge, 1971.



appreciation of Mrs. Ruth Scott's educational work at Powdermill.

For the sake of ecological diversity, a matter of deep concern to environmental preservationists, two outpost sanctuaries in the Ligonier Valley have been added to the Reserve. The Furnace Woods Nature Sanctuary, a 133-acre tract on the west flank of Laurel Hill, near Laughlinton, was presented by Mrs. Cordelia S. May in 1969, and the Buffalo Nut Sanctuary, a 53-acre tract near Stahlstown, in the Four Mile Run drainage of Chestnut Ridge, affording protection to the rare Buffalo Nut shrub, was added in 1971 through the generosity of Mrs. Scott, Mrs. Townsend Treese, and other donors, in memory of J. Lewis Scott.

But land acquisition, though essential, was only the foundation. On the 34 properties consolidated into the Reserve there were initially no less than 64 structures, consisting of 28 houses and barns and 36 outbuildings and sheds. Twelve of the former and 22 of the latter were so dilapidated and such eyesores that they were promptly removed — some requiring little more than a push! All the buildings that had been used as dwellings had electricity, but only four had indoor plumbing and furnaces. During the first four years the staff members, and their families, who began studies at the Reserve, roughed it in cabins and cottages with few amenities. In 1958, Dan E. Roslund, who has been a stalwart ever since, was appointed Manager, and his residence was renovated the following year. In 1959, reservoir tanks were installed at the Hoyman spring and 3,200 feet of plastic pipe was laid three feet deep to Mr. Roslund's house. Four other buildings, named for former directors of the museum — Gerrodette Cottage, Holland House, Stewart Cabin, and Avinoff Cabin, also received this piping, thus making possible the addition of kitchen and bathroom facilities late that year, or in 1960. Although primary emphasis has been placed on renovating the old, some new structures have been added as needs dictated. The first was a garage and storage building at Headquarters in 1960, then a Service Building (shop, garage and laboratory) in the same area in 1970, and, finally, Todd Manor, a year-round residence for bird-bander Robert C. Leberman in 1974. Some renovations were almost as extensive as new construction, but thanks to the skills of local craftsmen, the original distinctive character of buildings was retained and enhanced. The rehabilitation record reads: Bioscience Center, 1968, (but tragically destroyed by fire during a severe lightning storm in 1971); Biobrook Shack, 1969; Avinoff

Cabin, 1970; Raven's Roost and Calverley Lodge, 1971; Jennings House, 1975; Headquarters and Gerrodette Cottage, 1976; Stewart Cabin and Assembly Building, 1977.

When the Reserve was young and some of us were younger, work parties of volunteers, both staff and friends, were very helpful; Gerrodette Cottage was painted on one Saturday by a staff party; stream stabilization gabions were hand-filled with 2½ tons of rock in a half day by Scouts under direction of Ralph W. Abele, now Executive Director of the Pennsylvania Fish Commission, at the cost of a watermelon feast. The number of persons who have contributed cash, furnishings, or equipment is beyond listing here, and the volunteers who have aided in bird-banding, and to a lesser extent, in other research is equally lengthy.

Originally, an important habitat — quiet water — was unrepresented on the Reserve. To rectify this lack, Crisp Pond was constructed in 1961 and rapidly added several dozen species to the bird list of the Reserve, as well as vastly improving the population of toads and frogs. As years passed ornithologists recognized a further need, namely, smaller and shallower pools that would fluctuate enough to expose areas of damp mud from time to time and attract shore birds. Coot Slough was constructed in 1972 as our first wading pool for birds and it proved so successful that four additional shallow ponds were excavated in 1974 — Plover Pool, so named because Killdeer Plover utilized it immediately, and Heron Pond, which attracted three Great Blue Heron within days, and two quite small vernal pools near Raven's Roost. To facilitate birdwatching at the pond complex, an attractive rustic viewing building, which British birdwatchers call a "hide," was constructed atop a man-made eminence in 1977, a facility provided by Elizabeth S. Abernethy, in memory of Jeannette N. Price.

The Reserve, today, as it approaches its quarter-century, is far more beautiful than when it was established, due partly to natural growth of protected vegetation and partly to the efforts of many people. Roadside plantings of evergreens and dogwood have flourished; long snake fences have been erected by Hugh Friedline and Lloyd Moore; daffodils planted to mark waterlines and elsewhere; bird food plants and ornamentals dotted around the Headquarters area, and many mowed areas allowed to revert to wildflowers. Decrepit structures have been removed, all remaining buildings upgraded, and internal service lanes improved. These accomplishments reflect the work of many people,



A tiny Saw-whet Owl, banded in 1962. Below: The short-lived Bioscience Center (1968-1971), and flowering Dogwoods in front of Holland House.



Resident Manager Dan Roslund, Assistant Manager Gilbert Lenhart, and his brother Albert Lenhart, who are equal to almost every maintenance or construction task — a tiny full-time force to care for so large an area and so many buildings. Volunteers have played a fine role also. When our first buildings were mere shells, we had no staff. Bert Lloyd served as purchasing agent for stoves, pots and pans, cots and bedding, and hundreds of other essentials, then graduated to problem solving and the invention of a series of scientific aids, from a continuous light trap for moths to bird banding gadgets of many kinds. No staff member tallied so many hours as a volunteer or helped in so many fashions — labor, butterfly collecting, photography, and bird banding. In addition, hundreds of visitors and dozens of staff regulars feasted at the Avinoff staff table (moved to Avinoff Cabin from the Institute Cafeteria) where Mary Lou Lloyd fed all comers, and hospitality was as gracious as the food was delectable. The Henrys, Guildays, Clenchs, Nettings and Neil Richmond were involved in research and development from the start or shortly thereafter.

The Reserve has recorded great annual changes in weather conditions and bird life, with some correlations; it has served as a refugium for many plants and animals now becoming

increasingly rare in our region as their habitats are destroyed; it has acquainted many hundreds of children and adults with their natural environment; it has introduced countless foreign visitors to the glories of the great eastern hardwood forest. Powdermill Run was found to be one of the very few unpolluted streams available for base line studies of aquatic life and our relatively pure air may be picked as a monitoring area for air pollution recording. Powdermill has already fulfilled, and will continue in increasing fashion to fulfill, its primary function of serving as an environmental study area for long-term research, bearing on the survival of plants, animals and man.

I once titled an early progress report on Powdermill "Toward Undiscovered Ends," derived from Hilaire Belloc's lines,

"From quiet homes and first beginnings  
Out to the undiscovered ends . . . ."

which appeared appropriate on two counts, first, because we could not forecast either the variety or magnitude of Powdermill's contributions to science and education, and, secondly, because the natural beauty brought poetry to mind.

Now, in retrospect, I can recall many discoveries made at Powdermill, many insights into biological processes gained, and many interesting publications, culminating thus far in Leberman's "The Birds of the Ligonier Valley." But this is only the beginning; in the forest the centuries shade the viewer, and centuries loom ahead, and we know not how the forest animals will change or all that scientists will discover. No writer has epitomized the value of Powdermill so well as museum scientist John Guilday, in an early article:

"A tree that germinated long before the good General Forbes pushed his Highlanders west to found the wilderness post at Ligonier is a living unit in a forest of today. Likewise, today's new growth, now girding itself for its first winter, may live on through the 2300's . . . . The forest grows. The forest also changes, in delicate response to climate, to geophysical happenings, to the wheel of time itself . . . . One of the axioms of science is that it knows no bounds of space or of time. The torch passes from hand to hand but stays ignited. The forest at Powdermill will likewise be passed on to future generations of scientists who may catch a glimpse of the effects of years, of centuries, upon a land held for the study of the slow, inevitable cycles that march and counter-march across its face. This is the unparalleled offering of the Reserve — the gift of time."

—M. Graham Netting

A family of Racoons, 1966.



## Powdermill Reflections 2



A misty morning at  
Heron Pond.

### *Powdermill September*

Standing in the field above Crisp Pond, engulfed by the drone pipes of the orthopteran chorus that sings of the season as do the goldenrods, the dying heads of joe-pye-weed, or the frosting of asters by the wood's edge, it is hard not to fall into a fleeting moment of contemplation now and then. All the world about you is trilling through the cornucopia of autumn, only to die in the first heavy frosts and lose itself beneath the hiss of early winter snows.

Joe-pye-weed,  
at Crisp Pond.



Here is a teeming, vibrant scene of what may as well be an infinity of living creatures. I count, on one goldenrod alone, ten soldier beetles, two wasps, one bee and a crab spider. But look across the field. It sky-rockets with saffron waves of goldenrod, a sea broken only by the stripmine road and a six-foot ironweed tipped with purple. How many individual lives must be buzzing and droning and fiddling in this field, multiplied by the hazing hills beyond all comprehension? All are preoccupied in individual little worlds, yet fused into what we annually call autumn. Year after year this complicated edifice is rebuilt to turn heavy gold and sumac red as the season runs out in honeyed drops, too soon stilled.

Nectria canker on  
a Black Walnut.



Pasture Thistle.



But things do change and nothing is ever quite the same again. This field may be a blackberry patch next year, a hawthorn tangle in ten years, an oak forest in a hundred. But this ecological progression is merely superimposed on what we know (yet do not know) is the ever recurrent season.

The grasshopper climbs the goldenrod to catch the first rays of a sunrise that creeps farther south each morning until one morning it clings frost-stiffened amid a crystal world. The grasshopper thaws and falls from all time into all time.

And the naturalist turns back into his everyday world again wondering just how one goes about pondering the imponderable.  
—John E. Guilday, 1966



Common Milkweed pods.

*Duane A. Schlitter, Associate Curator of Mammals, Carnegie Museum of Natural History, discusses scientific research at Powdermill. Scientists from seven sections of the museum and their numerous research associates have been active at the Reserve since its beginning.*

## Powdermill Research

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Research activities at Powdermill Nature Reserve began immediately after its acquisition by Carnegie Museum of Natural History. Initial activities centered on an inventory of the kinds of plants and animals found on the Reserve, since this knowledge is vital in planning other types of research there. Although the Reserve was originally obtained as a place to do ecological and behavioral research, projects there have also dealt with the taxonomy of the plants and animals, since most of the museum's scientific staff are specialists in this area of research. Taxonomy deals with determining how many kinds of organisms there are, telling them apart, and finding out how they are related to one another.

A brief survey of research activities and results spans such topics as determining a new method of disposing of mine acid wastes; discovery of rare plants; studies of species of lilies; documentation of changes over many years in the kinds of trees to be found in a forest; recording which stink bugs are eating what plants; activities periods of butterflies and aspects of territorialism in butterflies; new species of insects related to Canadian ones; aspects of the natural history of turtles; studies of migration and life history of birds; and how to tell white-footed mice apart. Some projects result from chance observations, others are short-term in nature, while others such as the bird-banding study, forest composition study, and the life history study of wood turtles, are long-term in scope.

Results of scientific research at the Reserve are published for layman and scientist alike. Powdermill Nature Reserve Research Reports (now numbering 37), present the results of research in a prose understandable to and appreciated by the layman. These reports are distributed to just over 400 newspapers and individuals, most of whom are interested in local and

regional activities; but also to a few from across the country. Always very popular, early numbers are now out-of-print.

Results are also published in scientific journals, after critical review by colleagues who verify the scientific value of the contribution. Even a partial list of journals is impressive: *Annals of Carnegie Museum, Ecology, Bird Banding, North American Bird Bander, Condor, Wilson Bulletin, Herpetologica, Journal of the New York Entomological Society, Proceedings of the Pennsylvania Academy of Science, Journal of the Lepidopterists' Society*. In addition, reports too numerous to mention have been published that were based wholly or in part on data from Powdermill.

The following is a brief review of scientific activities at Powdermill Nature Reserve since its acquisition. The review is presented on a sectional basis; some projects have only been discussed, but for others the results have been published.

#### *Section of Environmental Studies*

Neil D. Richmond, Curator of Environmental Studies, has been instrumental in a number of faunal inventories on the Reserve. In addition to beginning the surveys of reptiles and amphibians when he was curator of that Section, Richmond has helped survey the liverworts and a number of insect groups, including the solitary bees, scorpion flies, deer flies, and a wasp-parasite moth. As part of the environmental studies, Richmond helped map the Reserve to a scale of 1 inch equals 660 feet, the same scale as the Department of Agriculture aerial maps — thus overlay maps are possible for pinpoint accuracy of any spot on the Reserve.

The problem of mine acid disposal led to a current research project at Powdermill. Located on the Friedline property, one of the recent acquisitions to the Reserve, is an inactive



Water drainage from an abandoned slope mine contains acid which may be removed by the "living filter" technique — a method being studied at Powdermill.



Why do salamanders climb  
vegetation at night? There  
is still no satisfactory explanation.

coal mine. Mine acid drains from the mouth of this abandoned mine at the rate of 5 gallons per minute. This is not an overwhelming amount, yet sufficient to be of concern. This concern led Lyle Sherwin, of the Loyalhanna Watershed Association, and Richmond to design a scientific experiment to test a possible better method of disposal of this mine acid waste. Because of the remote location of this slope mine, and numerous others like it in western Pennsylvania, a method of disposal was needed that avoided the usual mechanical treatment methods which require almost daily maintenance and constant electrical power. Their new method uses the "living filter" concept developed at Penn State University 15 to 20 years ago. This procedure was originally intended for sewage treatment but is now being tested at the Reserve for mine acid disposal.

The mine water is initially run into a holding pond. Periodically one-half of this pond is drained into one of three filtration ponds. Percolation tests revealed that 2 to 6 inches of water an hour could soak into the soil, so a lysimeter has been installed below the filtration ponds to sample the components of the ground water for traces of mine acid. For the minimum data necessary, the experiment is designed for a period of two years.

#### **Section of Plants**

Personnel of the Section of Plants have pursued an active program of scientific research at the Reserve. As was the case with most of the other sections of the museum, an inventory was the first requirement. Consequently, LeRoy K. Henry, now Curator Emeritus of Plants, initiated a plant survey in May 1956 and, with some help, continued the work through 1972. Among those who helped were: M. Graham Netting,

Jane Netting, Neil D. Richmond, Robert Leberman, Ruth Scott, Daniel Roslund and Dorothy L. Pearth.

Since the Reserve is a large tract of land, encompassing a variety of habitats, many kinds of plants have been encountered. At the end of 1977, the total plant count was 967. This number includes 447 herbs (17 of which are cultivated species), 90 shrubs (36 cultivated), 65 trees (13 cultivated), 40 ferns and fern-allies, 229 fungi, 52 mosses, 25 liverworts, 18 lichens and a single species of alga.

The most recent summation of the ferns and flowering plants at the Reserve is Dorothy L. Pearth's "Ferns and flowering plants of Westmoreland County, Pennsylvania" (Powdermill Nature Reserve Research Report No. 34). This report is annotated for the Reserve, as well as for three other sanctuaries in Westmoreland County. There is at least one drawing — whether of a fruit, a flower, a leaf or a whole plant — for each of the 504 genera in the report. In all, Mrs. Pearth has illustrated 511 kinds of plants.

Although the list of plants known on the Reserve is large, it is almost certainly incomplete. While the count on the more easily discernable plants — trees, shrubs and ferns — is probably approaching a limit, the list of herbs, fungi, lichens, liverworts and mosses should grow.

Current research on plants at the Reserve is being done by Fred H. Utech, Associate Curator of Plants. Utech is using the Reserve as a field laboratory for his studies of the species of lilies. Similar and closely related kinds of lilies occur in the eastern United States, western United States and eastern Asia. These lilies are descendants of the Arcto-Tertiary flora that covered the northern hemisphere about 30 million years ago. As part of his studies of these lilies, Utech keeps

Indian Pipes  
on Salamander Trail.





Two young White-footed Mice  
in a fence post at the  
Powdermill Museum.

collections of living lilies. Coldframes have been constructed at the Reserve so that living specimens of the species being studied can be grown. The Reserve is an ecological area equivalent to the other areas in which these lilies normally occur. Also, many of the lilies that occur in the eastern United States can be found on the Reserve and close, undisturbed observation can be maintained there.

With the plant survey of the Reserve nearly completed, more attention is being given to research of an ecological nature. Utech has also been involved in ecological sampling of the vegetation of various habitats of the Reserve. Students of botany from neighboring universities are being taught to measure forest composition. The composition studies are centered around monitoring the proportions, frequencies of occurrence, and densities of the species of trees. Study plots are being fixed to monitor the long range changes. Plans are being formulated to establish a total grid system over the entire Reserve. Because of such activities, we will be able to document the changes through time of the composition of the forest.

Forest composition studies at the Reserve were first undertaken by Kimball Erdman of Slippery Rock State College, Pennsylvania. Erdman inventoried three study plots — each four meters wide and several hundred meters long. The plots are situated by Calverley Lodge, adjacent to Raven's

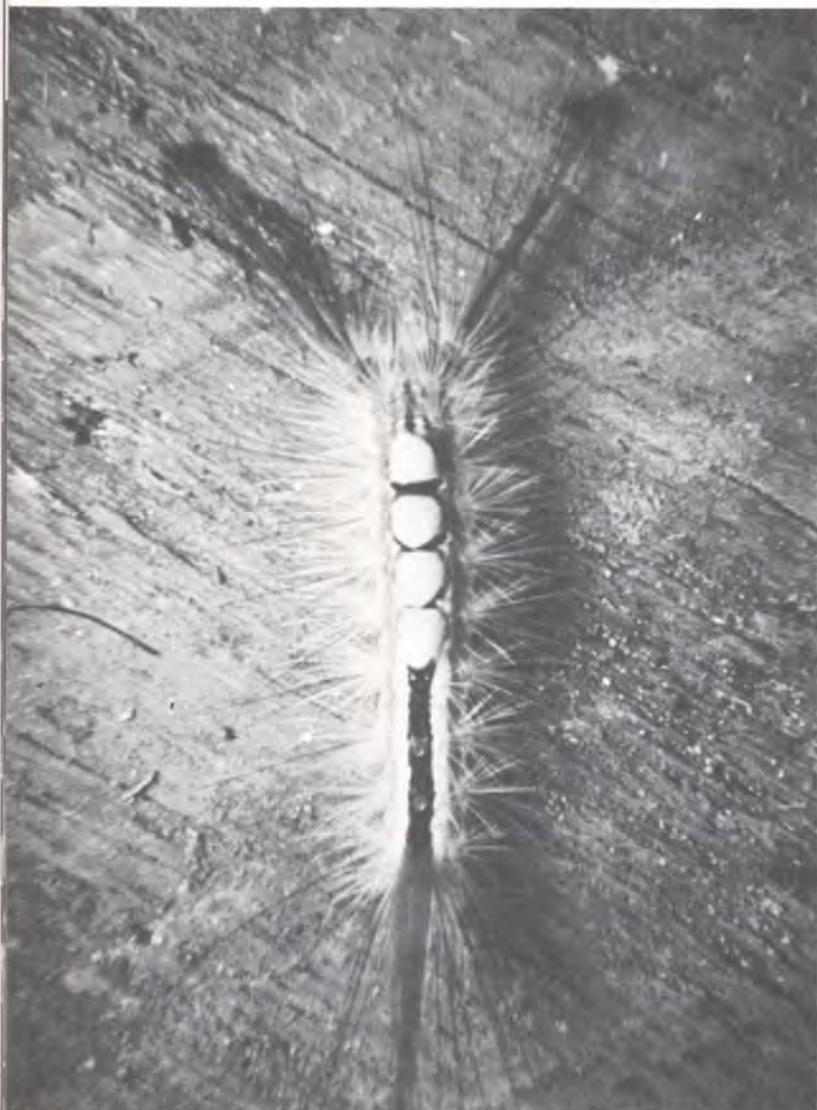
Roost, and between Crisp Pond and the swamp on the Reserve's boundary. These inventories were to serve as base line data for a description and inventory of the forest at the Reserve. The kinds of trees and the size of individuals allows the scientists to describe the forest community. As time passes, the kinds of trees and their individual size changes and the composition of the forest changes; an accurate record of these changes can be maintained over time.

#### *Section of Insects and Spiders*

Section personnel have the longest history of research in the area of the Ligonier Valley which, in 1956, became the Powdermill Nature Reserve. Long before this area came into ownership of the museum, an inventory of the insects and spiders occurring there had been started. The first annual report of the museum, published in 1898, listed two noteworthy collections given to the museum. Mr. and Mrs. Herbert H. Smith and M.A. Wertheimer of Pittsburgh collected various zoological specimens in western Pennsylvania and West Virginia. Three hundred and fifty specimens of spiders and myriapods collected in Westmoreland county were donated on July 28, 1897. On the same date, these same people gave a collection of 11,500 specimens of insects collected at the same place. The insect collection was rich in flies and in parasitic wasps. Both of these collections were made at a place that is now included in the Reserve. These early collections have been invaluable in giving the basic data necessary for studying the change in the insect fauna of the Reserve with the change in habitats that has occurred there since the beginning of this century.

The inventory of the kinds of insects and spiders occurring on the Reserve continued more in earnest after 1956. In addition to the personnel of the Section, other museum personnel and non-museum persons aided in this inventory. Chiefly involved, but by no means the only persons, were A.C. Lloyd and Neil D. Richmond.

Beatrice R. Vogel of Yale University studied the spiders of the Reserve during 1965 and 1966. During two weeks of inventory in mid-1965, Vogel collected over 1000 specimens of mature spiders, representing 150 species, from the Reserve. Her report, together with scattered others, brought the number of kinds of spiders known to occur in the state to between 200 and 250. However, judging from the spiders known from adjacent states, Vogel estimated that there



The larva of the Tussock Moth.

should eventually be more than 500 kinds of spiders known to occur in Pennsylvania.

Although James L. Swauger, Senior Scientist in Anthropology, is better known for his contributions in the field of archaeology, his university training was in biology with an emphasis on entomology. Swauger has maintained an interest in insects, particularly stink bugs, as a hobby. In this spirit, Swauger has carried on an inventory of stink bugs on the Reserve.

Probably the most intense non-resident scientific research done on the Reserve has been carried out by Harry K. Clench, Associate Curator of Insects. An internationally recognized specialist on butterflies, Clench early realized the potential of the Reserve for his research. He began his research on the butterflies of Powdermill on May 3, 1956, within a few days of the acquisition of the property by the museum. The day was made even more memorable by the capture of a specimen of *Erora laeta* Edwards, one of the rarest butterflies in North America and the first known Pennsylvania record of the species.

Study of the Reserve's butterflies has always had to take second place to other duties, but since that first visit over 800 field hours have been logged by Clench in some 15 years of active collecting and observation at the Reserve. Clench deliberately kept the goals of the field study of butterflies simple: What species are present? How common are they? At what times of the year do they fly? What habitats do they occupy? This intensive and prolonged study of the butterflies of a limited area has produced a considerable amount of valuable information, most of it unduplicated elsewhere.

Average flight periods of nearly all the Reserve species of butterflies have been learned to an accuracy of a few days. This, combined with information on behavior and habitat choice, made it possible for Clench to show that a number of species of hesperine skippers have minimized potentially strong competition by adapting to flight periods that do not overlap in time. A byproduct of this study was the devising of a logarithmic scale of abundance — not unlike that for stellar magnitudes — to estimate and record numbers of different species. This new method is more precise and descriptive than the various verbal terms often used, yet is simple enough to use in routine daily observations.

The behavioral studies made by Clench also showed that butterflies thermoregulate (regulate their body temperatures) and that certain moths at times "pump" an unbelievably large amount of water through themselves. This latter activity



A recently emerged Monarch Butterfly in August. In about one month it will begin its southward migration, probably to Florida.

still has not been explained.

Even lighter moments at the Reserve have sometimes been productive. At a staff picnic on July 8, 1961, a larva was found that turned out to be of *Panthiades m=album* Boisduval & LeConte, a hairstreak that is extremely rare in this area, the northern edge of the range of the species. This discovery enabled Clench to publish some details of its life history, larval and pupal morphology, and even of pupal sound production, something rarely noted.

A detailed study was made by Clench on the little-explored subject of territorialism in butterflies, the particular species used being *Lycaena phlaeas*. The data have been gathered and publication of the results are pending. The Reserve has proven especially useful for research on butterflies since insecticides and other drastic human disturbances, and the threat of major alteration in land use, have been absent. Such conditions have permitted Clench to pursue long-term studies in population fluctuations, habitat usage, seasonal occurrence: aspects of butterfly natural history that have remained poorly studied because they require the long-term availability of a sizeable area not subject to outside change.

24 Unique features of the Reserve have attracted various non-museum researchers. Jan Sykora of the Department of Environmental Health at the University of Pittsburgh is involved in research on aquatic insects and other invertebrates. The Reserve contains a number of aquatic habitats — deep and shallow ponds, fast flowing mountain streams, slow-moving streams, and a large spring with an adjacent spring-brook. The large spring, Moul Spring, about ten feet in diameter, maintains a temperature of 50° F, with a degree or two of variation, throughout the year.

Because of these features, Sykora has utilized the Reserve as a field laboratory for his research on caddis flies, insects of the order Tricoptera. It was once thought that changes in the development of these insects were keyed to changes in the temperature of the water. But the research at Moul Spring, a natural constant water source, and the adjacent spring-brook indicate that the cyclical emergence of adult caddis flies is not dependent on constant temperature of the water but probably on light or some other factor.

John S. Weaver, Jr., a student of Sykora's from the University of Pittsburgh, completed his doctoral dissertation on a quantitative sampling study of the aquatic invertebrates of Moul Spring. Such studies are critical for obtaining base line

data, and methods for collecting such data, for comparisons with other areas in Pennsylvania and other adjacent states. Moul Spring is one of the few unpolluted springs of its size in this entire region, so research of this nature is critical because the results of the studies to obtain base line data will not be affected by any pollutants.

As a by-product of his studies, Sykora has discovered a number of new, undescribed species of caddis flies. Some of the discoveries of new species result from the fact that relic invertebrates of the Ice Ages have been left behind by the receding glaciers to continue to live in the cold water spring. Thus some of the species of the invertebrates occurring in Moul Spring and the adjacent spring-brook have as their nearest relatives species found only in the far north of Canada.

#### **Section of Invertebrates**

Scientific research on invertebrates other than insects and spiders has centered around the work of Juan J. Parodiz, Curator of Invertebrates in the museum. This research has focused upon inventories of the kinds, their numbers and local distribution of land snails in the Reserve. The results have been a part of a greater effort of the same nature for Westmoreland County together with Allegheny and other counties in western Pennsylvania. Fortunately, this research was begun in the early fifties so much of the necessary survey was completed by the time our current concern about environmental inventory and change came about. Data from this inventory are now being widely used to document rapid changes in the environment. Additional species are still being found as the project continues and a definitive scientific report is planned for the future.

#### **Section of Amphibians and Reptiles**

Research on Amphibians and Reptiles began immediately after the Reserve was acquired. Neil D. Richmond, then Curator, began inventories of the species present, their relative numbers, preferred habitats, and observations upon various aspects of their natural history. This research has been continued by C.J. McCoy, current Curator of Amphibians and Reptiles.

The inventory of species of amphibians and reptiles occurring on the Reserve is about completed. To date, 15 species of salamanders and 7 frogs and toads have been found there. Of the reptiles, 4 turtles, one lizard and 12 snakes are known from the Reserve. This rather high total reflects the great diversity of habitats on the Reserve.

A Red Salamander,  
one of the most brilliantly  
colored local salamanders,  
an inhabitant of cold springs.



In addition to his studies of Reptiles and Amphibians, McCoy has been involved in fish management in Crisp Pond. Crisp Pond is a man-made, 1.4 acre impoundment built in 1961. Initially stocked with large-mouthed bass and golden shiners, the pond has been a center of population studies, analysis of growth, and age classification of the large-mouthed bass population. Prey species populations have also been monitored. During the period 1972 to 1974, an annual seine-sampling study was carried out by McCoy in such a way that the results were comparable for each year for all the fish species present in the pond. As a result of this study, blue gills were introduced as a prey species because not enough proper-sized prey were available for the bass.

Sometimes significant new information can be recorded when one's attention is focused on other matters. While monitoring the changes occurring in Crisp Pond the year following its completion in late 1961, Richmond observed that green frogs were transforming in the pond in August and September of 1962. This may not sound exciting except that it was thought that green frog tadpoles overwintered (lived through a winter before maturing). But since Crisp Pond did not fill with water until November and December of 1961 and the water was from surface runoff, it was impossible for the 1962 tadpoles to have overwintered.

Another of the long-range scientific research projects at the Reserve involves a study of turtles by M. Graham Netting, Director Emeritus of the museum. Beginning in 1956, when the Reserve was first acquired, turtles have been marked by engraving numbers on the shell. Although the project centers around wood turtles, one of the most common turtles on the Reserve, some box, painted, and snapping turtles have

also been marked.

To date, over 125 wood turtles have been marked. Each capture and recovery has been checked for sex, age, growth, weight, and location on the Reserve. Turtles can be aged by counting the concentric rings on the scutes or large plates on their belly. Unfortunately, at about 20 years of age these rings begin to wear smooth from the turtle's rubbing its belly on the ground as it travels, so if the individual is an adult with worn scutes when first captured, its exact age cannot be determined.

As is often the case in projects of this nature, relevant results accumulate slowly, only after many years of study. After over 20 years of marking turtles, significant evidence indicates that adult female wood turtles remain in the same small area except for their annual movement to find a suitable site for egg laying. Adult males, on the other hand, wander over greater distances and do not remain in a single area for any length of time. Juvenile wood turtles of both sexes wander even more than adults. Interestingly, the maximum recorded age for a captive wood turtle is 12 years, 6 months, and 1 day. This maximum age has already been surpassed by wild individuals at the Reserve.

This study of the life-history of wood turtles is one of few studies of this nature anywhere. Such studies can only be undertaken at places such as the Reserve because nearly two decades are required before significant results begin to accumulate. Those familiar with the slow movement of turtles will appreciate that the accumulation of data from a study of their life history comes at an even slower pace. Some years the new ground vegetation on the Reserve grows so rapidly and is so lush that there are few if any captures of turtles. On the other hand, some individuals have been recaptured six or more times — a large number of recoveries for a turtle.

A current scientific research project from the Section involves Steven R. Williams of the Penn State University, New Kensington Campus. This project consists of a long-term comparative study of strategies of reproduction in various salamanders. The reserve has 15 kinds of salamanders so it offers an ideal setting for research of this nature. The project is getting under way now and is scheduled for a minimum of five years.

Finally, the Reserve has served as a source for specimens of specific species of amphibians and reptiles needed for various





The underside of a Wood Turtle reveals an identification number. The Wood Turtle population at Powdermill has been under study for two decades.

Yellow-breasted Chat.  
The unusual  
migration pattern  
of this species is  
under study.



research projects being done in the museum. At various times, a readily-available source has been needed for both live and dead individuals of a number of species.

#### **Section of Birds**

Primary emphasis on scientific research on birds at the Reserve has been the bird-banding project covered as a detailed example of scientific research in a separate article in this magazine. In addition, Kenneth C. Parkes and Mary H. Clench of the Section have made a strong effort to encourage graduate and undergraduate students from universities and colleges to use the Reserve for studies of life histories of birds.

Mary McKittrick, an undergraduate student at Smith College, spent one summer at Powdermill studying the vocal behavior of the Arcadian Flycatcher. Cecelia Moore, a graduate student at Cornell University, came to the Reserve to do research for her masters degree. She spent one summer at Powdermill doing a comparative study of different methods used in censusing. Her experiences as a student working at the Reserve should be published in 'Carnegie Magazine' at a future date.

In addition to his duties as bird-bander at Powdermill, Robert Leberman is involved in a number of other research projects on birds. One of these is a long-term project on the life-history of the Kentucky Warbler. This secretive little bird of the wood-warbler group has not been studied in detail by anyone. Although mostly of southern distribution, Kentucky Warblers are moving northward. Leberman has found that the abundance of this bird at the Reserve is directly related to the extensive tracts of unbroken bottom-land forest. Kentucky Warblers need the thick growths of understory vegetation found in this type of forest. Leberman has further found that the number of warblers depends on the number of deer in any area. As the deer herds increase, they use more and more of the understory as food. But at the Reserve the understory consists primarily of Spicebush, a shrub that is not used as food by deer.

During any given year, Leberman has found Kentucky Warblers difficult to observe. For every 100 Kentucky Warblers heard, he is able to locate only about two, even after extensive searching. For this reason alone, this must be a long-term bird study with plenty of time set aside for searching. Though difficult to see, Kentucky Warblers are a common summer resident on the Reserve.

#### **Section of Mammals**

Initial scientific efforts of the Section involved the usual inventory of the species of mammals occurring on the Reserve.

This inventory is continuing although the list of species occurring on the Reserve is nearly complete. In addition, data are being gathered on relative population densities and cycles and on the optimum local habitat for each species. Such information will allow a system of monitoring of each species as the Reserve changes through ecological succession. In addition, if an ecologist from another institution should wish to study some aspect of the ecology of a particular species, section personnel will be able to judge whether such a study would be feasible at the Reserve.

Data from inventories sometimes come in strange ways. An example involves the occurrence of the pine vole on the Reserve. This small, often harmful, rodent is known from a single specimen from the Reserve. An adult male was collected in 1961 by A.C. Lloyd and Robert Leberman from the lower shelf of a mist net while they were checking the net for birds before stopping their netting for the night. Although we have no data to substantiate how the vole came to be found in a mist net, we strongly suspect it had been captured by an owl of some sort. The owl in turn had flown into the net and, while extricating itself from the net had dropped the vole. Extensive trapping as part of the inventory of shrews and rodents has failed to produce any other specimens of this locally distributed vole.

In 1975, the Reserve served as the primary field laboratory for a study of the white-footed mice of the northeastern United States by J. Hoyt Bowers of Texas and Duane A. Schlitter of the Section. In some parts of this region, the different kinds of these mice are difficult to distinguish. A new approach to this problem was undertaken whereby the relationships of the chromosomes of the different kinds of mice was studied. Field studies are completed but Bowers is continuing cross-breeding studies in the laboratory in Texas.

It should be apparent by now that research activities at Powdermill are numerous and diverse. Because of the lack of human interference and freedom from land development, many scientists are willing to begin long-term projects there. The pristine nature of the Reserve is ideal for studies designed to obtain a basis for comparison to other areas. For scientists, Powdermill offers peace of mind because work, once started, can continue indefinitely without outside interference. Who knows, the most exciting discovery in Powdermill's history could happen tomorrow.

—*Duane A. Schlitter*



Cardinal Flower.  
Summer blooming,  
in moister sites.



## Powdermill Reflections 3

### *Time and Powdermill*

Along Powdermill Run above Calverley Lodge, a yellow birch stands, not on the ground, but rather jauntily on a tripod of roots. It straddles the rotten trace of the fallen log that gave it nurture as a seedling. In a few more years the last punky remnants will be scattered and the tree will be straddling nothing at all. Even now it looks a little ridiculous.

Behind Stewart Cabin, an abandoned stream channel meanders its sunken way through the woods, on its way to nowhere. Its muddy bottom, choked with grasses, jewelweed and elderberry bushes, catches the rain water into little mosquito pools, that are the pathetic remnants of a former glory.

Between Gerrodette Cottage and Holland House, a great white oak, veteran of many hundreds of mountain winters and swinging summers, leans out gracefully over a stream that is no longer there. As if in chagrin at this highhanded treatment, its trunk has grown upright through the years, forcing the tree into a massive bow. But the original streamward tilt still remains, ingrained in its old oak bones.



An American Toad  
sings a love song

Time has had its way at Powdermill Nature Reserve. The years fall one by one to be caught up again in the sprouting beechnut, or the tulip tree sapling that is just beginning to shoot its ramrod massiveness up through the forest canopy. A tree that germinated long before the good General Forbes pushed his Highlanders west to found the wilderness post at Ligonier is a living unit in a forest of today. Likewise, today's new growth, now girding itself for its first winter, may live on through the 2300's. At the Reserve, the name plates on the tree trunks have been ripped out by the simple addition of a season's growth to their swelling girth.

The forest grows. The forest also changes, in delicate response to climate, to geophysical happenings, to the wheel of time itself.

But the steady progression is out of cycle with the short span of a man, and we see it all at once like the heavens on a winter's night, composed of stars that are united only by the fact that we gather in one split second the light of stars that may have taken centuries to reach our eyes.

One of the axioms of science is that it knows no bounds of space or of time. The torch passes from hand to hand, but stays ignited. The forest at Powdermill will likewise be passed on to future generations of scientists who may catch a glimpse of the effects of years, of centuries, upon a land held for the study of the slow, inevitable cycles that march and countermarch across its face.

This is the unparalleled offering of the Reserve — the gift of time.

—John E. Guilday, 1958

*Robert Leberman, Naturalist at Powdermill, has 17 years experience with bird-banding research and other ornithological projects in the Ligonier Valley. Originally from Meadville, he has been keenly interested in birds for his entire life.*

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A Black and  
White Warbler.

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## Powdermill Bird-banding

With each change of season in southwestern Pennsylvania, and especially with the arrival of spring and fall, a great diversity of small migratory songbirds appears in, departs from, or passes over our area. Brightly colored warblers of more than a score of species may literally swarm through the treetops on a late May morning, then be gone the next. August brings bewildering flights of dully-hued, look-alike flycatchers, followed a month later by hordes of what, at least to the untrained eye, seem like hopelessly similar-looking brown and yellow autumn-plumaged warblers. October gives rise to wave after wave of thrushes and darkly streaked sparrows. These flights can, at once, be both the delight and despair of the new bird watcher, and they can hardly fail to attract the attention of even the somewhat casual amateur naturalist. Yet with all of this everyday familiarity, much remains to be learned about the details of these migratory patterns, and of course of the complex life histories of still other birds (the permanent residents) which may inhabit one small area throughout their lives.

Following the acquisition of Powdermill in 1956 by Carnegie Museum of Natural History, the establishment of a bird-banding station at the new Reserve was a natural stage of development. Here, at the western edge of the Appalachian Mountains, was available a large and protected tract of land providing a wide variety of habitats, ideally suited to the study of birds — an outdoor laboratory.

The first brief banding attempt at the then-new Reserve

dates back to September 1959 when Lindsay Mattison, a student from Antioch College, operated a few wire traps in the Headquarters area part-time. Over an eight-day period he managed to band 34 birds. Such a project was practical.

Then, arriving at Powdermill in mid-June of 1961, at the invitation of M. Graham Netting, I established a second pilot project using a few Japanese mist nets through the remainder of that summer and fall. That was the beginning of our current program. More than 1500 birds were banded in that trial season, demonstrating even further the potential of the Reserve as a banding site. Probably no one at the time could have foreseen the extent of what was to develop, and that the Powdermill station would eventually become one of the most prominent in North America.

For the next dozen years I was engaged to band at Powdermill from early March through mid-November, and finally in January 1975, when adequate winter housing became available, I began the banding on a 12-month schedule. Over the first few seasons the project was carried out under the guidance of the Museum's Curator of Birds, Kenneth C. Parkes. When Associate Curator Mary Heimerdinger Clench joined the Museum staff in 1963, she assumed responsibility for providing direction to the rapidly growing program. Through most of these years my work has been most ably supplemented by the voluntary efforts of A.C. (Bert) Lloyd and several others.

Catching the birds is the bander's first problem; to this end a considerable variety of ingenious snares and wire traps have been developed — many of them for very specialized purposes. As mentioned above, however, at Powdermill we have primarily concentrated on the use of mist nets, which are similar in texture to a lady's hair net. Each net, approximately 7 feet high and 40 feet long, is suspended on five guide strings (trammel lines) and stretched between two poles. Set up against a dark background, along a hedgerow, or through a thicket, the nets are nearly invisible. When a low flying bird hits the soft netting, its velocity creates a small pocket which gently holds the bird until it can be removed by the operator a short time later.

After being removed from the nets our birds are carried, usually in paper bags, to a centrally located laboratory in the Reserve's Headquarters area, for the actual banding and processing. Once the species has been determined, a small serially numbered aluminum band (*ring* is the term preferred

Documentation for  
a recently banded  
Gray Catbird.



by the British who were early developers of many of the techniques) is placed on the bird's leg with the aid of specially designed pliers. In addition to the identifying number, an inscription on the band advises any subsequent finder to contact the U.S. Fish and Wildlife Service in Washington, D.C. — the agency that acts as the central clearing-house for all banding activities throughout the United States and Canada.

Additional information taken at the time of banding includes a record of the age and sex of the bird, a wing measurement to the nearest half millimeter, and the bird's weight. To weigh a bird, it is simply put upside down into a transparent plastic cone which inhibits its movements, and then weighed on a sensitive balance (already adjusted to allow for the weight of the cone) to the nearest one-tenth of a gram. This method, just developed at Powdermill in recent years, proved to be a considerable improvement over our earlier procedure in which the squirming, often enraged, bird was placed in a man's silk sock, weighed sock and all, then the weight of the sock subtracted from the total.

Much of the excitement of bird banding, understandably, derives from the ever-present possibility of one of *your* birds being recovered in some unexpected area far from the point of release. Our most distant recovery to date is of a Swainson's Thrush banded at Powdermill in September 1966, while the bird was on its southward migration — probably from the spruce forest of Canada. Three or four winters later (because of the nature of the recovery, we can't be sure which) the thrush was shot by an Indian of the Achnal tribe in the jungles of northern Peru, with a *blowgun*! Another record of special interest is that of a Blue-gray Gnatcatcher banded at Powdermill, where it may have been nesting, on May 9, 1969. On November 1, 1970 it was killed by a boy with a slingshot in Llano Grande, Jalisco, Mexico. This was the first recovery of a gnatcatcher south of the United States, and one of the very few recoveries of the tiny species anywhere. Even more significantly, it was the first record of the eastern race of the species for western Mexico, where wintering gnatcatchers had always been presumed to belong to the western subspecies.

Not all of our most interesting recoveries have resulted from purely human activities. One early May morning in 1968, Tibby, a pet cat, appeared on her owner's porch in Lee, Massachusetts, bearing a Lincoln's Sparrow in her mouth. Circumstances indicate that the sparrow had probably left



Bob Leberman makes his rounds of the mist nets.

A Broad-winged Hawk, Band No. 585-41817, April 15, 1967.



Powdermill the night before, and completed the 350 mile flight from southwestern Pennsylvania to Massachusetts in a single hop. This is one of very few cases in which the length of a single night's migration has ever been documented for such a small bird. More recently we have also obtained a record of a Red-eyed Vireo that left Powdermill one September evening in 1974 and was found the next morning, after it had hit a television tower near Raleigh, North Carolina, some 350 miles to the south.

To date a total of 160 different species of birds has been banded at Powdermill. The most recent addition to the list was a female Wood Duck that blundered into one of our nets on May 15, 1977. Approximately 300 birds of 49 species have been recovered elsewhere. The actual banding of the birds and the hope of their eventual recovery, however, is just a small part of what the Reserve's program is all about. The chance of a distant recovery of any one individual bird is, indeed, rather remote: well under one in a thousand for a small kinglet or wren; and only about two-tenths of one percent on the average. For the feeder-frequenting Evening Grosbeak our recovery rate is about three percent, while the rate for the much hunted American Woodcock (the only game bird commonly trapped at Powdermill) is about eight percent. Generally, the larger the bird, the better the chances of recovery away from the station.

But a great deal more can be learned during the time we have the bird in the hand, and from the return of our own banded birds to the Reserve from one year to the next. The study of longevity in wild bird populations is one example of the kind of information available only through banding. After 17 years of continuous field work, we are now beginning to acquire some knowledge of the life expectancy for a number of species, and a few of our Powdermill birds are even known to hold the age record for their kind. A male Red-winged Blackbird holds our local age record. First netted as a one-year-old in April 1962, he was last recaptured at the Reserve in May 1973 when 12 years old. A Tufted Titmouse at 10½ years of age has been trapped a total of 29 times, and appears to be none the worse for the experience: as indignant as ever, and perhaps a bit wiser. Other "old-timers" in the Powdermill files include a ten-year-old Red-eyed Vireo and a Cardinal; a Downy Woodpecker and a Black-capped Chickadee that approach nine; and eight-year-old Gray Catbirds and Indigo Buntings.

Mist nets are manufactured in several mesh sizes. One of Mary Clench's and my first scientific papers, resulting from research at Powdermill in 1965, described a controlled experiment on the comparative efficiency of two different sizes (30 and 36 mm) of mesh, enabling banders to better pre-select the correct net needed to capture a specific species or group of birds. We are still getting requests for reprints of that paper.

We have also pioneered at Powdermill in the study of differential migration; that is, the difference in timing between the flights of males and females, and between adult and immature birds during the same season. In most birds the males usually arrive several days before the first females are recorded. In spring, for example, male Ruby-crowned Kinglets are the first to appear at the Reserve, and their migration normally is well under way before most of the females appear. But, conversely, in the fall the female kinglets are usually first to appear. A similar pattern was found in Rusty Blackbirds. In still other species, the timing of migration is essentially the same for both sexes in either season.

The timing of fall migration may also vary between age groups of birds. In many species the adults and immatures migrate through Powdermill simultaneously. This is a common pattern, typical of such birds as the Gray Catbird, Swainson's Thrush, Tennessee Warbler, and Rufous-sided Towhee. In some others, the migrations of the adults show a marked tendency to peak before those of the young of the year. We found this pattern in the Red-eyed Vireo, Northern Waterthrush, Dark-eyed Junco, and Lincoln's Sparrows. Both the vireo and the waterthrush average an adult peak ten days before that of the young. In yet other birds, the flight of adults was discovered to peak *following* that of the immatures — often by about ten days. Some birds in this last group include Nashville, Magnolia, and Chestnut-sided warblers, as well as Field, Swamp, and Song sparrows.

Considerable attention, too, has been given the age ratios of the various species migrating through Powdermill each fall. The ratio of adult to immature birds detected each year will, naturally, vary somewhat depending on the success of the nesting season immediately preceding it, and will probably, to a lesser extent, be influenced by weather patterns. We found that during a typical autumn invasion as few as ten percent of the Black-capped Chickadees passing through the Ligonier Valley may be adults; and an average of only

A Wilson's Warbler  
in a mist net.



13.8 percent of all the Gray Catbirds normally captured at the Reserve prove to be mature birds. Our lowest adult-to-immature ratio, however, was detected in the northern-nesting Yellow-bellied Flycatcher; only 4.8 percent of the birds captured in the average season were mature. Perhaps most of the older Yellow-bellied normally migrate south by another route. Age ratios for the Tennessee Warbler (another bird of the Canadian spruce forest seen in southwestern Pennsylvania only in migration) varied from 20 percent adults in 1967, following an apparently poor nesting season, to only three percent in 1970 after a highly productive breeding summer. More nearly even age structures were found in the Wilson's Warbler and in White-throated and Fox sparrows. Adult American Goldfinches and Dark-eyed Juncos commonly outnumber young by small margins. In all, quite a variety of patterns are documented.

Studies of bird weights based on the Powdermill files have been diverse, and many of the requests we receive from outside researchers are for such data. One of my earliest papers in this area documented the changes recorded over the annual life-cycle of a resident species, the Tufted Titmouse. Recently Regina King, an undergraduate student at the University of Pittsburgh, published a paper on the daily weight changes in migrant Yellow-rumped Warblers at the Reserve; and with Miriam A. Stern, I studied the effects that the added (short-term) stress of handling can have on the weights of some individual birds during migration. Later this year, Carnegie Museum of Natural History will release a statistical analysis that Mary Clench and I compiled of almost 100,000 bird weights from Powdermill. This information is broken down into species, month, age, and sex groups, and will be the most comprehensive such study of the weights of small birds ever published.

The opportunity to examine thousands of living birds in the hand each year at Powdermill has also made possible some very basic research toward new and more reliable methods of age and sex determination in the many species we handle. Recapturing known individual birds from one season to the next allows the taking of notes on any subtle changes in plumage, eye, mouth, or bill color that might prove useful in differentiating between age or sex groups; and patterns of molt or feather wear are often helpful.

An area of related study now receiving considerable attention at Powdermill concerns the length of time required for a

bird's skull to pneumatize — or "ossify". In a newly hatched bird, the skull consists of a single very thin layer of bone or cartilage. Gradually, a second layer of bone develops beneath this surface layer, with a network of air pockets and supporting columns or struts between. By moistening the transparent skin on top of the bird's head (crown) and parting the feathers, the structure of the developing skull can be observed. From the degree of completion in the pneumatization process we can then often judge the age of the bird — especially in the fall and early winter. Some birds, like gnatcatchers and kinglets, may complete the process within 90 days of hatching. Other species may take many months; a year or more; while the skulls of still others (shorebirds, cuckoos, hummingbirds, and some nuthatches) may never fully pneumatize. Understanding the process in each species enables us to develop time tables to aid other banders and researchers in their work.

To acquaint other banders with our methods of age and sex determination in birds, Dr. Clench and I have given several workshops at annual meetings of the Eastern Bird Banding Association, and have published still more of our material in various journals or in our own annual Powdermill Research Reports. We have also cooperated closely with the Bird Banding Laboratory in Washington, D.C., contributing much information in this specialized field for inclusion in their new *North American Bird Banding Manual*. Other information from the Powdermill program, like arrival and departure dates for migrants, helped form the backbone of a recently published book, *The Birds of the Ligonier Valley*, documenting the status of 254 species known to occur there.

This has been just a brief outline of what's happening at the Powdermill banding station. The potential for research using the Reserve's already considerable data bank has just begun to be tapped. In 1977 we began the computerization of the current Powdermill data and, through a generous grant from the Loyalhanna Foundation, now hope to have the entire backlog of information into the system within a two-year period. Completion of this project will not only greatly facilitate our own access to the data, but that of outside researchers as well. Birds are proving to be valuable indicators of environmental quality. And now with increasing interest in ecology, the store of base-line information from Powdermill — Carnegie's "outdoor laboratory" — will continue to increase in value each year.

—Robert C. Leberman

*Thea Teich, Coordinator, Leonard S. Mudge Environmental Education Program, is responsible for planning environmental education programs for the Section of Education, Carnegie Museum of Natural History.*

## Powdermill

### Educational Programs

Examining life in the streams.



#### *Summer Nature Program*

Almost fourteen years ago, in 1964, M. Graham Netting, then director of Carnegie Museum of Natural History, and a retired couple from O'Hara Township, north of Pittsburgh, started what was to become a permanent fixture in the Ligonier Valley, the Powdermill Summer Nature Program. J. Lewis and Ruth Scott, he, a retired cartographer, and she, an architect and artist, started very slowly getting to know the children in the neighborhood of the Reserve. Soon the word spread that there were nature walks in the mornings at Powdermill, and everyone brought their friends.

The program was soon structured to include different nature study activities and class sizes. Despite the Scotts' stamina and ability (they had been dedicated Audubon campers), they soon needed assistance, and a number of people, ranging from local residents with interests in flora and fauna, to students on their way to teaching degrees at area colleges, helped keep the children in the program interested, involved, and motivated. Some of those children were so motivated that they eventually took degrees themselves in biological subjects and teaching.

The children who participated in the Program from 1968 through 1970 were fortunate to have a brand new, especially designed building for their headquarters, the Bioscience Center. Designed by Ruth Scott, the building served as rainy-day shelter and special-project work space until the middle of 1971, when it was struck by lightning and burned to the ground. The program went on that year, however, with help from the nearby Penn State Experimental Field Station and friendly donations. The Powdermill Children's Program has since used the Biobrook Shack, a small cabin tucked in the woods.

During the first years of the program, adult classes entitled "Design with Nature" were also provided, as well as training sessions for counselors at the nearby Girl Scout camp, Camp



What is the strange  
growth on an elm leaf?  
A botanist can give  
the answer.

Henry Kaufmann. In 1969, Ligonier hosted the Pennsylvania Mayors' Conference, and the children of these officials spent a morning on Powdermill's nature trails.

Late in 1970, J. Lewis Scott died, and during the following year, Ruth Scott transferred her activities from the Children's Program to the development of Seminar Forest, a small meeting center at Powdermill. She saw, however, one of her favorite wishes come true: the leadership of the Program was taken on by a local resident. Definitely, the Powdermill Children's Program was a community enterprise and not simply a gift from an outside source.

Two area teachers, John Murphy and Barbara Mannion, ran the Program from 1971 through 1976. They were usually assisted by a third teacher; the teacher who filled this last position in 1975 and 1976, Walter Gasdek, took over the Program in 1977.

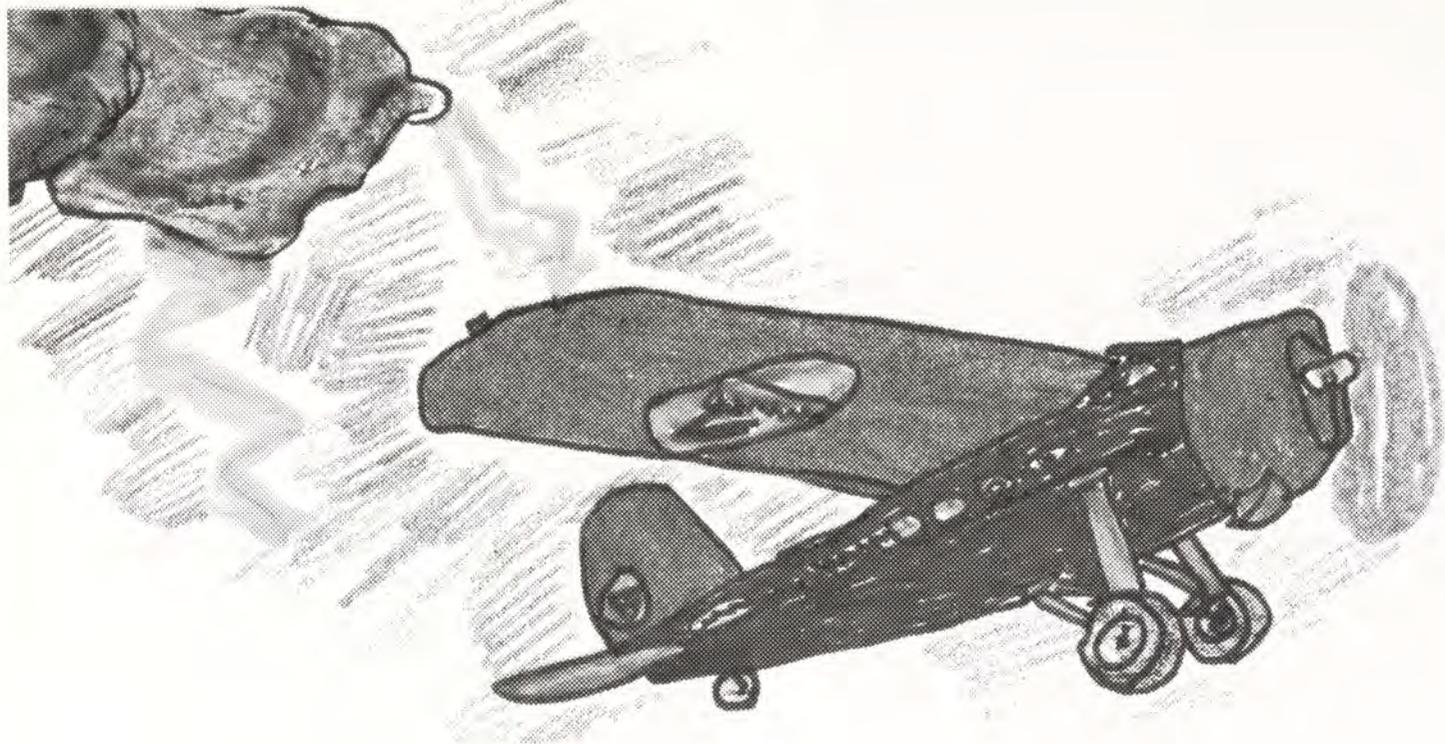
Murphy usually handled the nature study activities, and Mannion the nature crafts. In 1971, they both had to deal with the last minute, almost emergency preparations, for the

Program, since the Bioscience Center had burned down less than two weeks before the usual starting day. In the Annual Report of the Carnegie Museum of Natural History of that year was the following:

"This tragedy demonstrated how many friends the Reserve has made, particularly through the good efforts of its summer staff. Donations of books, or cash with which to purchase replacement volumes for the library, came in goodly number and from points as far distant as the Denver Public Library. Other friends contributed folding chairs, card tables, small aquaria, and other classroom supplies."

The last several years of the Program have seen an increasing emphasis on environmental education, which encompasses nature study, but also provides a focus for other subjects. The environmental education program developed by the National Park Service, called "Environmental Strands," has been utilized extensively. Field trips to nearby sites have also been added and the children visit the Penn State Experimental Station, a state park, and Bear Run Nature Reserve, among others. However, the more "traditional" activities of stream ecology, visiting the bird bander, meeting Ruth Scott at Seminar Forest, and a watermelon party on the Program's last meeting of the summer, continue.

In 1976, the Powdermill Children's Program became part of the Leonard S. Mudge Environmental Education Program of the museum's Section of Education. Walter Gasdek and Ann Mailey ran the Program that summer with the help of two teenagers who had been attending the Program for about ten years. Funding problems and inflation have made the Program more expensive to run in the last few years, but all attempts will be made to continue this community based, museum sponsored Children's Nature Program at Powdermill.



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### *The Powdermill Museum*

On Route 381 stands a green house and a small sign that denotes the building as connected to the Carnegie Museum of Natural History, in Pittsburgh. Upon entering, the visitor sees six to ten cases that exhibit plant and animal life in the Ligonier Valley. Some of the cases contain dioramas; some contain collections of specimens or models of animals and plants accompanied by their common and Latin names.

The Powdermill Museum was one of the first educational activities of the Reserve and the 1962 Annual Report of Carnegie Museum notes the installation of exhibit cases and labels. The building is open only on weekends from April through October and many a motorist, hiker, or bicyclist has stopped to check on a plant or bird he spotted earlier.

In the middle of 1977, the interior of the building was repainted and Tom Herman, an intern in the museum's Section of Exhibits, refurbished the exhibits and replaced some of the models. The museum is still a landmark in the area, visited by the Powdermill Children's Program, people passing through, and residents as well.

### *Meetings and Events*

Powdermill Nature Reserve has been utilized as a site for meetings and programs, a place where scientists and educators 41 could get away from telephones and offices and get down to the business of exchanging information and reporting on the progress of research with their peers.

Perhaps the best and simplest method of describing these gatherings is to list some of them: First Conference on Eastern Archeology, September 1959; Board of Governors, The Nature Conservancy, June 1961; Conference on Archeology of the Ohio Valley, September 1961, now an annual traveling meeting called Ohio Valley Archeological Conference (OVAC); Ligonier Chamber of Commerce, August 1962; Conference on Archeology of Early Man in Eastern North America, September 1963; Field trip of Directors of Systematics Collections, April 1963; Training Program for Camp Henry Kaufmann counselors, 1967; Petroglyph and Pictograph Conference, May 1975; Meeting of Council on Standards of Association of Systematics Collections, July 1976; Museum Data Bank Committee Conference, April 1977; Interpreters' Forum, September 1977; International Colloquium on Ecology and Taxonomy of African Small Mammals, September 1977; and Conference on Upper Ohio Valley Archeology, October, 1977.

In 1971 a small cabin that had been called Ravens' Roost by its original owners, was remodeled into a unique small conference center. This work was done under the direction of Ruth Scott.

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The next year, Mr. and Mrs. Frank Magee presented the surrounding area, called Seminar Forest, to Powdermill, in appreciation of Mrs. Scott's work in environmental education. Then in 1977, the Assembly Building (capacity 40-50) was renovated. These events have made it very evident to museum staff that Powdermill has great potential as a center for professional meetings and conferences.

#### *Education News Releases*

In an attempt to spotlight "everyday" occurrences at the Reserve, the Powdermill Educational Releases were started. Usually written by curatorial staff, these releases concerned everything from reports of new migrants being banded to stories like "April and Powdermill" by John E. Guilday, Associate Curator of Vertebrate Fossils.

The releases were written in layman's language with little scientific terminology. They mirrored the museum staff's fascination with the things that were being studied and attempted to inspire the same interest in the reader.

Many of the releases are more scientific than poetic. Former Curator of Mammals, the late J. Kenneth Doutt, suggested that Sherlock Holmes would have been a good mammalogist, because mammalogists must do a lot of detective work. Doutt then discussed mammal tracking in the snow.

There are a total of ninety-four releases, issued irregularly since 1957. The mailing list was always rather limited, consisting of just over four hundred newspapers and individuals, mostly local and regional. Some of the releases are now out of date and most out of print. But some are timeless and can be read with delight today.

#### *Field Trips*

A number of natural history organizations have used the Reserve for field trips. The Botanical Society of Western Pennsylvania regularly comes to search out rare and endangered, as well as relatively common, plants. The Sweadner Entomological Society and the Audubon Society of Western Pennsylvania have also been regular visitors. Several of the members of these and other organizations have often volunteered their time and knowledge to help museum staff with research projects at Powdermill. This help is especially necessary during fall bird migration when the number of birds banded in one day may climb toward 500.

Robert Leberman, Bird-Bander at Powdermill, has occasionally demonstrated bird-banding to small groups of adults. Since Powdermill is a research station and birds are easily disturbed, visitation by outside groups has been held to a minimum.

#### *The Lookout*

The newest educational facility at Powdermill was dedicated just last May. Donated by Elizabeth S. Abernethy, the Lookout, a blind for bird observation, is a memorial to her friend and bird-watching companion of many years, Jeannette N. Price, who died in 1973.

When Miss Price developed arthritis in middle age, she had to give up her professional golfing career. She became interested in bird watching and instilled the same interest in her friend, Miss Abernethy. Together they traveled throughout the country, looking for new birds for their life-lists. Then they found in their own backyards Powdermill Nature Reserve, and the bird-banding activities there.



The Lookout was constructed from plans provided by the Royal Society for the Protection of Birds (Great Britain). It is a duplicate of a successful blind in Minsmere, England, well known to Kenneth Parkes and Mary Clench of the museum's Section of Birds.

In addition to her support for the Lookout, Miss Abernethy provided funding for the publication of "The Birds of the Ligonier Valley," and has continued her interest in furthering the birding activities at Powdermill.

#### *Final Comment*

Powdermill Nature Reserve is a research facility, but its educational activities are numerous and perhaps more noticeable to the general public. Education and research have complemented each other at Powdermill, and served to acquaint the public with the scientific interests and needs of natural historians at the museum, as well as the scientists in the field.

—Thea Teich

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*Associate Curator of Mammals Duane A. Schlitter hosted one of the scientific meetings held at Powdermill Nature Reserve, an International Colloquium on the taxonomy and ecology of African Small Mammals.*

## Powdermill Scientific Meetings



Formal presentations on rodents are followed by coffee-break discussions. At right two scientists compare ideas on the Lesser Jerboa of the Sahara.



From September 19 to 22, 1977, the Section of Mammals hosted at Powdermill Nature Reserve an International Colloquium on the Ecology and Taxonomy of African Small Mammals. This represented yet another in the continuing series of group meetings held at the Reserve.

This colloquium was the first attempt to bring together international specialists involved in research on the ecology and taxonomy of African small mammals. Although the small mammals of Africa are not as obvious to an observer as are the large species (lions, elephants, or antelope) these small mammals are every bit as important. There are many more species, and more individuals of given species of small mammals, than there are large ones. Of the nearly 4200 kinds of mammals found throughout the world, almost three-fourths of them are shrews, bats, and rodents. 45

The small mammals are particularly important to the developing nations of Africa and other countries of the world because of their relationships to diseases, agriculture, and other economic factors. Small mammals serve as the primary reservoirs for the causal organisms — the bacteria, rickettsia, and viruses of many diseases — and small mammals serve as the hosts for the organisms that transmit diseases. Some of the diseases involved are plague, spotted fever, typhus, Lhasa fever, Congo fever, kalahazar, and sleeping sickness.

Many countries of Africa, especially those located in the savannah or grasslands, have serious problems with rodents which consume large amounts of the foodstuffs intended for humans. Amounts and duration of rainfall in these countries are variable. Rodent reproductive and population cycles are dependent on the availability of food, which is related to rainfall, and the rodents experience extremely high peaks in population numbers when the rains follow the droughts. At such times the people are attempting to grow cereal



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grains and can ill afford to lose any of these to the rodents. A better understanding of the biology of the rodents will enable the people to develop programs for their control. Other foodstuffs, such as palm nuts (which produce oil for cooking), rice, cassava, corn (or maize, as it is known over much of Africa), sorghum, groundnuts (peanuts to Americans), are eaten by rats and various squirrels and monkeys. Many kinds of fruit are either eaten entirely or are at least sufficiently spoiled by bats, monkeys, rodents and carnivores as to be unfit for human consumption. In order to better understand the biology of these mammals, scientists meet and focus their attention on how to study the most important problems.

In preparation for the colloquium, initial discussions were held with many of the specialists in Europe and Africa, commencing with trips there in 1973 and continuing intermittently until 1975. Everyone consulted was eager and enthusiastic about the idea of organizing a colloquium. The meeting would draw together ecologists as well as taxonomists, but would exclude specialists in studies of large mammals since those people were already holding their own meetings. All of those consulted felt that the group must be kept small, but that it should be representative of the persons, institutions and countries involved in this area of research.

Numerous meetings were held with museum staff and plans were formulated. A list of potential participants was drawn up and circulated to five of the older, more experienced African mammal specialists, together with details of the proposed colloquium. These five were asked about their feelings on holding a colloquium either at Powdermill Nature Reserve or in Pittsburgh. All replied that they would rather stay in the facilities at the Reserve.

Formal invitations were mailed one year before the proposed date of the colloquium so that all the invited participants would have ample time to acquire permission to attend, and also find any additional funds needed for travel. Although Carnegie Museum of Natural History was providing sleeping facilities and meals during the colloquium, each participant had to find his own travel funds, and many were anxious to visit other museums and field stations. This additional expense was cited by some African participants as one reason for having such a meeting in Europe as opposed to the United

(continued on page 50)

**BALUCHI SADDLEBAG**

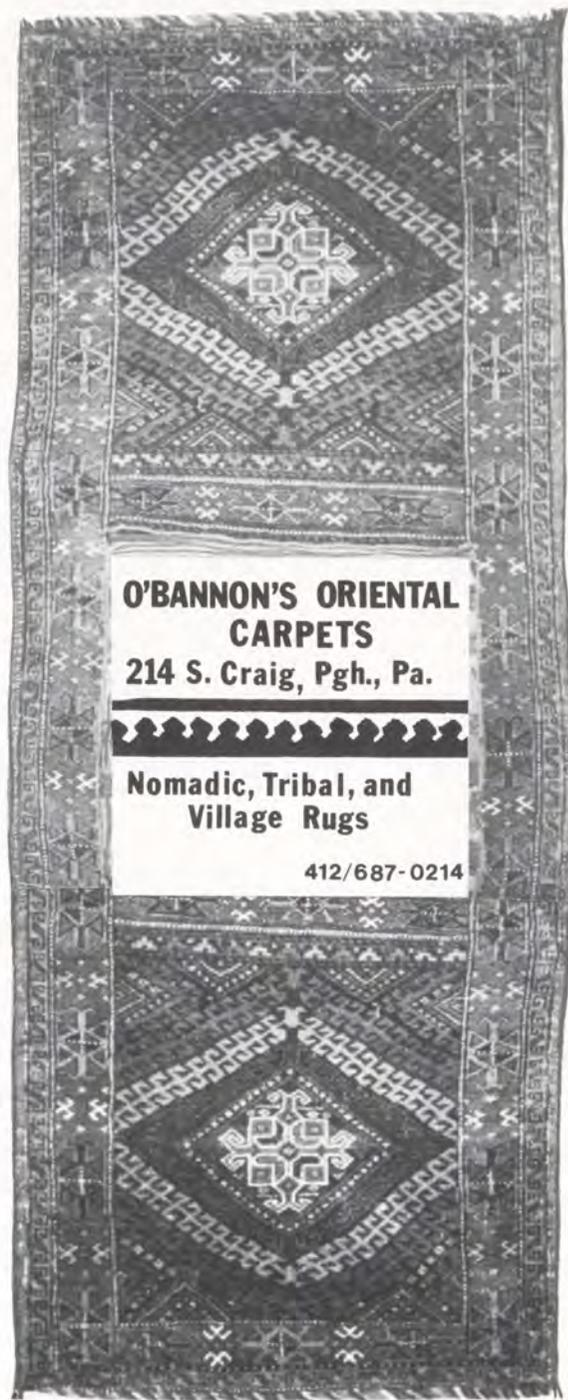


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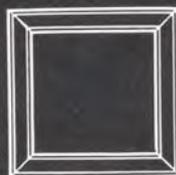
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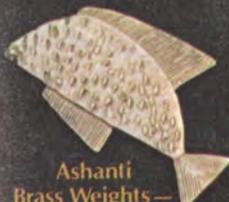
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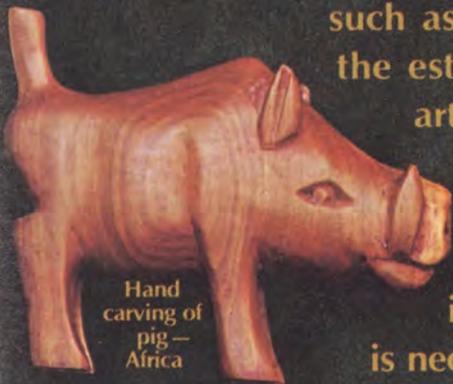
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## Out-of-Doors Days



### *Looking forward to Spring and Summer with CMNH*

Out-of-Doors Days, a workshop and field trip series now in its third year, will begin the 1978 season with "Visitors with Wings," a program on migrating birds and waterfowl.

50

The Workshop will be held on Thursday, May 4, at 7:30 pm, in Information and Orientation Hall. The Field Trip will be held on Saturday, May 6, and will take participants to gamelands and reserves north of Pittsburgh. The bus leaves the Institute at 8:30 pm.

Chuck Bier, an experienced Audubon guide and a naturalist at the Audubon Society of Western Pennsylvania's Beechwood Farms Nature Reserve, will lead the group.

Costs for the Workshop and Field Trip: \$5 for Adult Institute members (\$6 for non-members); \$3 for members under 16 years (\$4 for non-members under 16). Registration is necessary.

Participants should be over 6 years of age, and children must be accompanied by an adult. For more information, call 622-3283.

Out-of-Doors Days is sponsored by the Leonard S. Mudge Environmental Education Program of the museum's Section of Education, and by the Western Pennsylvania Conservancy. More information about Out-of-Doors Days programs will appear in future issues of *Carnegie Magazine*.

(continued from p. 47)

States. After consulting with numerous private and federal agencies, a proposal was submitted to the National Science Foundation for one-half the round-trip airfare to the United States for nine of the participants from Africa. This proposal was accepted and funded.

By September, 39 participants were expected to attend. Countries represented were: Britain, France, Belgium, The Netherlands, West Germany, Switzerland, Spain, Egypt, Sudan, Kenya, Uganda, Nigeria, Ghana, Senegal, South Africa, South West Africa, Canada, United States, and Saudi Arabia. Plans called for formal presentations of research reports in the morning, round-table discussions in the afternoon, and informal gatherings, exhibitions of equipment and methodology, and films or slide show presentations in the evenings. Arrangements were made for the participants to sleep dormitory-style in the staff cabins, but because the response was greater than had been anticipated, additional space was required. Fortunately, Mr. and Mrs. William H. Rea and Dr. and Mrs. M. Graham Netting offered to have some of the participants stay at their homes.

The participants arrived in Pittsburgh and were taken to Powdermill. By Sunday evening, everyone was ready. Honorary Chairman Karl F. Koopman, of the American Museum of Natural History, New York, and Craig C. Black, Director of Carnegie Museum of Natural History, opened the colloquium. The agenda for Monday called for formal and informal discussions on some of the general problems that should be covered, and, specifically, on shrews. Tuesday was devoted entirely to bats, and the ecology and taxonomy of rodents were covered on Wednesday. Small monkeys, hyraxes, small carnivores, and major reviews of distribution of African mammals were discussed on Thursday. Heated discussions were held each day, continuing often during coffee breaks, lunches, and dinners. With 19 countries represented, there were many different opinions held and voiced. During the evenings, motion and slide pictures taken by some of the participants during their research in Africa were shown; equipment such as bat detectors was exhibited and examined with great attention.

Raven's Roost, the conference center, was used as the main meeting building. Meals, primarily prepared by the wives of the museum Curators, with much assistance by the other women and men of the Section, were served at Raven's Roost. The formal and informal discussions were held at the Assembly Building. (more)



## The Great Pittsburgh Fire

For several weeks, there had been no rain. Buildings were tinder dry. And April 10, 1845 was a windy day.

So the stage was set for catastrophe when a washerwoman left a fire unattended in a yard next to a wood icehouse at what is now the corner of Stanwix Street and the Boulevard of the Allies.

Sparks ignited the icehouse, triggering Pittsburgh's Great Fire, and before the day would end, flames would destroy 20 blocks of buildings covering 56 acres.

About 1,000 buildings would be leveled, among them many warehouses, a half-dozen hotels including the new Monongahela House, three churches, Western University and numerous other important structures. One-third of the city was destroyed and 12,000 persons were homeless.

Fanned by the brisk wind, the flames gained momentum, leaping from icehouse and then crossing streets. The Smithfield Street Bridge, a wood structure, quickly caught fire.

Firemen fought valiantly to confine the fire, but they lacked sufficient water. Virtually everything between Fourth Avenue and the Monongahela River and east to the 10th Street Bridge was wiped out. Included was Pipetown, a flourishing suburb above the present Ross Street.

The fire began at noon and by 7 p.m. it began to dwindle—there was nothing more in its path to consume.

The nation responded to the plight of the homeless with contributions from many states.

With typical Pittsburgh spirit, reconstruction of the ravaged area soon began with new and better buildings replacing those that were lost in the fire.

An important event in the  
history of a great American city.





Some conference members at Raven's Roost: (left to right) C.G. Coetzee, South West Africa; T.J. McIntyre, Washington, D.C.; L.A. Lester, Los Angeles; E. Van Der Straeten, Belgium; D. Christian, Michigan; J.A.J. Meester, South Africa; S. McLaren, CMNH.

From this colloquium, all the participants learned about the results of their colleagues' research. More importantly, results were gained from the informal, afternoon discussions. A small mammal newsletter was set up, to be published by colleagues in Antwerp, Belgium. This newsletter will allow specialists on African small mammals to keep in contact. There will be less duplication of research effort and thus less wastage of the limited money available for research. More cooperation between countries and individuals on research projects will result; numerous such plans were even discussed at that time. A proposed computerized mapping project of the geographic distribution of all African and Asian desert mammals was discussed. Plans for a large book on African mammals, suitable for use by non-mammalogists as well as specialists, were presented. Discussions were held concerning the permits required by various countries of those persons conducting small mammal research. Fortunately, individuals of many African countries were present and thus able to give details of why their countries have such requirements. Also discussed were the problems of endangered species of African mammals. In all, four days were not nearly enough; much to the dismay of some of the participants who initially thought the schedule was too long.

The Reserve was a perfect place for such a meeting. Many of the participants, especially those from Africa, had never had a chance to spend a few days in our American forests. Most were awed by so many trees and bushes. The presence of the inquisitive chipmunks, numerous mice and shrews, and many kinds of birds at such close range thrilled the participants. The bird-banding station was a popular free-time gathering place. On one evening, 16 participants were conveyed to the cranberry bog on Laurel Ridge above Lynn Run State Park and were impressed with their first view of a bog. Five deer, in two groups, offered close inspection along the highway.

All the participants of the colloquium were persons who participate in field research in Africa. All have spent much time in cities in many parts of the world. To a person, all were pleased with the colloquium and the results obtained, but even more so because we selected the Reserve as the colloquium site rather than the city of Pittsburgh. The museum, the Institute, Pittsburgh, and western Pennsylvania made 39 new international friends.

—Duane A. Schlitter



## A Day at Powdermill

*a new event for Institute members*

Carnegie Institute's Membership Office has never before sponsored a trip to Powdermill Nature Reserve. Join us for this first-time journey to Carnegie Museum of Natural History's research station in the Ligonier Valley. Your day will include familiarization with bird banding and other research projects now underway. There will also be nature walks led by museum staff to observe the plants, animals and stream life native to Powdermill.

**When:** Saturday June 10 or Sunday, June 11 — you can choose either day. (In case of rain the dates will be changed to June 17 and 18.)

**Departure:** Chartered bus will take members at 9:30 am from Carnegie Institute; return is by 5:30 pm.

**Price:** \$12 per person. Reservations are restricted to members of Carnegie Institute over 18 years of age.

**Lunch:** The Institute will provide beverages and dessert, but members should pack their own lunches.

**Clothing:** This is a "field" experience, so dress accordingly and be prepared to walk in all kinds of terrain.

**Tickets:** Limited space is available, so reservations should be made promptly. Send a check for \$12.00 per person, made out to Carnegie Institute, to: Powdermill Trip, Membership Office, Carnegie Institute, 4400 Forbes Avenue, Pittsburgh, Pa., 15213. For information call 622-3314. Indicate which day you prefer — June 10 or June 11.

### *Nomadic Weavings / Art Lecture Series*



## Nomadic Rugs

The Women's Committee of the Museum of Art, Carnegie Institute, will present two lectures on Nomadic weavings of the Middle East as the final part of this year's Art Lecture Series. Talks will be on Thursday mornings at 10:30 am in the Museum of Art Theater, on April 6 and 13. Anthony N. Landreau, Curator of Education in the Museum of Art, will lecture first on the Nomadic Rugs and Textiles from Turkey, and second on Nomadic Rugs and Textiles from Persia and Afghanistan. Mr. Landreau, formerly Director of the Textile Museum in Washington, will also identify Middle Eastern carpets brought to the second session. Carpets must be small enough to be hand carried.

Tickets may be ordered from Miss Virginia Trimble, 552 N. Neville Street, Apartment 74, Pittsburgh, Pa. 15213 (telephone 681-5617). Please enclose a self-addressed, stamped envelope and a check or money order for the correct amount, payable to the Women's Committee, Carnegie Institute. Tickets for both lectures are available for \$7.00 (members \$6.30). Tickets for single lectures, if available, will be sold at the door for \$4.00 each (members \$3.60). All proceeds are used to benefit the Museum of Art, Carnegie Institute.



### A Wealth of Treasures Awaits You at Kaufmann's Oriental Rug Gallery

Enter a world of mystery and mystique. Of timeless tradition and ageless artistry. A bazaar of exotic color. A Myriad of designs. Textures that entice and capture the subtle beauty that is the East. A place where Occident and Orient meet, and merge harmoniously.

The place is Kaufmann's . . . one of the country's foremost Oriental rug galleries. An unsurpassed collection of rugs from Iran, Pakistan, India, China and Turkey awaits you. All woven by hand, becoming more valuable with each passing year. The best of the Orient can be yours at Kaufmann's.

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