Wisconsin Academy review. Volume 40, Number 2 Spring 1994

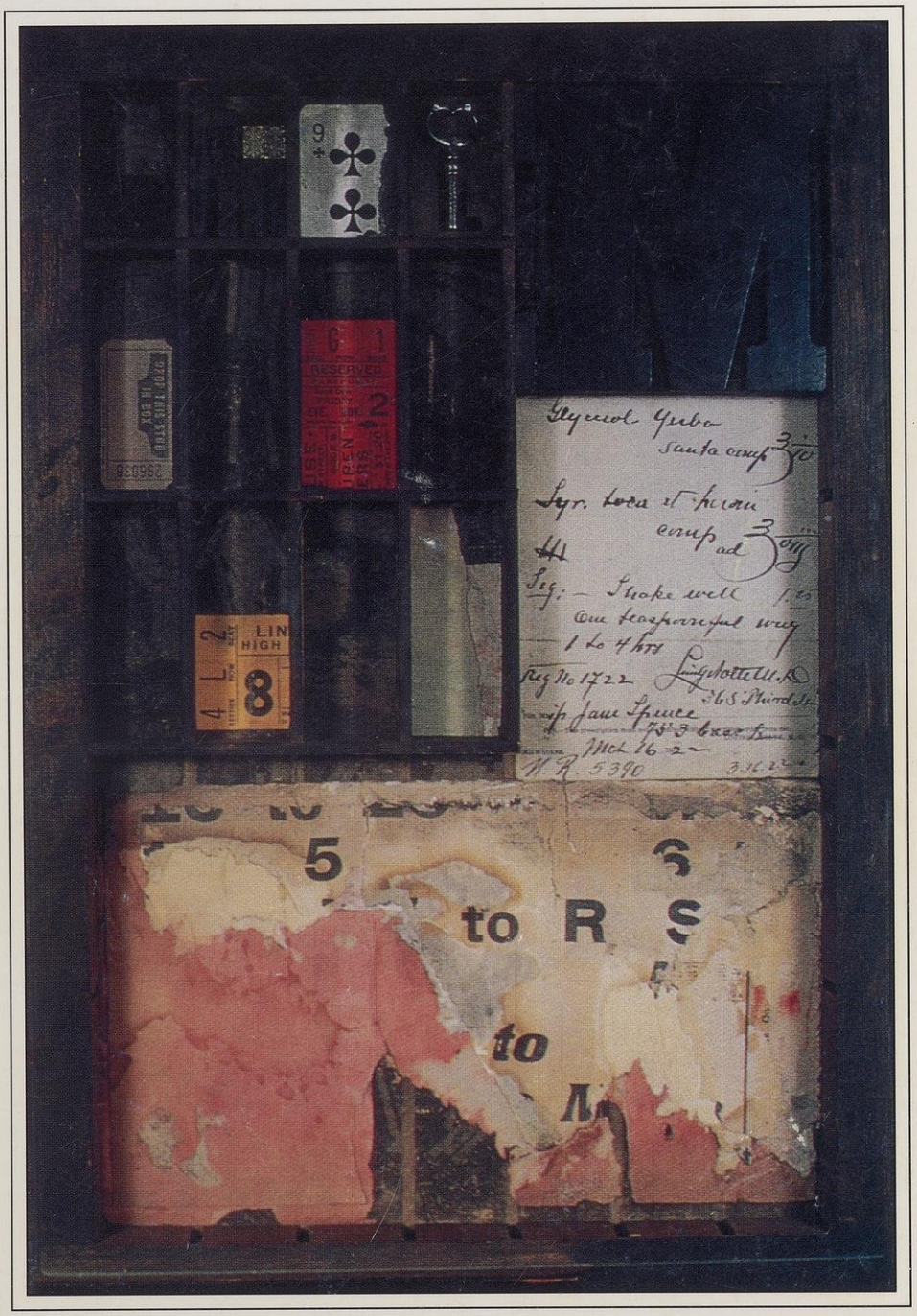
Madison, Wisconsin: Wisconsin Academy of Sciences, Arts and Letters, Spring 1994

https://digital.library.wisc.edu/1711.dl/M7VWMQPYN447R8P

LOOKING NORTHWARD
OUTSTANDING WISCONSIN EDUCATORS

Wisconsin Academy Review

A JOURNAL OF WISCONSIN CULTURE



Wisconsin Academy of Sciences, Arts and Letters

Spring 1994, Volume 40, Number 2

Wisconsin Academy Review

Spring 1994

Fragments *by Fred Berman. Intaglio, 13⅞ x 10¼ inches. 1961.*

COVER: 5 to RS *by Fred Berman. Wood assemblage, 16⅝ x 11¼ x 1⅜ inches. 1965.*

The *Wisconsin Academy Review* (ISSN 0512–1175) is published quarterly by the Wisconsin Academy of Sciences, Arts and Letters, 1922 University Avenue, Madison, WI 53705. All correspondence, orders, manuscripts, and change of address information should be sent to this address. The *Wisconsin Academy Review* is distributed to individual members as part of their annual $35 dues. It is available by subscription for $15 per year (four issues). Individual copies are available for $4 plus $1 postage in the United States, $2 postage abroad. Please order from the Wisconsin Academy and remit in U.S. currency. For information call (608) 263–1692.

Second class postage is paid at Madison.

The *Wisconsin Academy Review* is indexed by Faxon Research Services, Inc., and articles are available through Faxon XPRESS TM, Cambridge, Massachusetts.

LeRoy R. Lee, Publisher
Faith B. Miracle, Editor
Designed by University Publications
Printed by American Printing Company

Editor's Notes

Occasionally when discussing a book, an author will suggest that a character or even the plot took on a life of its own at some point during the writing. I find this happens with the *Review*. A manuscript will show up on my desk or an idea will drift in from somewhere out there in the ether, and soon a companion article or a compatible idea will attach itself to the first, then another, and sometimes even another. Thus the die is cast, the course is set, a new issue of the *Review* takes shape in a way not always planned or predicted. That is exactly what happened with this issue—a hint of two mini-themes emerged early on and developed over a period of weeks: an opportunity to look at several aspects of the North Country, and an appreciation of some outstanding Wisconsin educators.

Trillium, Shooting Stars, Bluebells, and Yellow Violets *by Jean Accola. Watercolor. Woodland wildflowers of Wisconsin.*

My annual summer forays toward Lake Superior keep me ever enthusiastic about the wonders of the North, but now and then an Academy member correctly reminds me that there is indeed life north of Highway 10 which should be represented in the *Review*. This kind of friendly nudging resulted in the opinion piece in this issue expressing concerns over land use and development in northern Wisconsin. Then along came the intriguing article on the mystery of the Paulding Lights, which have been seen for decades just north of the Wisconsin-Michigan border.

The "woodsy" theme temporarily turned into a trilogy with the opportunity to publish botanist Don Waller's testimony relating to management of our nation's forests, given before a U.S. Senate subcommittee in November 1993. The trilogy turned into a quartet of features when the U.S. Forest Service agreed to provide us with a transcript of their statement, given before the same subcommittee on the same day. In addition, Chief Jack Ward Thomas wrote us a letter outlining his six objectives as head of the Forest Service and offered some additional comments for our consideration.

This brings us to our second mini-theme: outstanding Wisconsin educators. Who among us has not been touched by an unforgettable teacher encountered somewhere along the way from grade school to university? While the four educators profiled here by colleagues, former students, and benefactors represent four distinct disciplines (architecture, wildlife ecology, music, and history), it is obvious that they all had in common an ability to deeply influence their students.

It is not often that we are able to publish fiction written by a National Book Award winner, but it's happening in this issue with the story by Academy fellow Herbert Kubly. These days, Kubly, who has had a distinguished literary career, is organizing notes and papers in preparation for a long-overdue autobiography.

Color. Beautiful color. It's an element we covet, but one which usually is beyond the limits of the *Review* budget. This year, however, through the generosity of the Norman Bassett Foundation, we will be producing four issues with a special color section in each featuring art out of Wisconsin. This issue, which is further enhanced by the generosity of an anonymous donor, focuses on the work of Fred Berman of Milwaukee. Our summer, fall, and winter issues will feature the work of John Colt, Lee Weiss, and James Frechette, respectively. On behalf of the Wisconsin Academy and the readers of the *Review* we extend our heartfelt appreciation to the Norman Bassett Foundation for making this year of color possible.

Our sincere thanks also to members of the *Review* editorial committee whose terms have ended: Patrick Farrell of Milwaukee, Bud Hudson of Waukesha, and David Graham of Ripon.

• WISCONSIN ACADEMY GALLERY SCHEDULE:
March: Randall Berndt, paintings and drawings
April: Brent Besser, paintings
May: Kay Knight, oil paintings

• WISCONSIN ACADEMY GALLERY SPECIAL EXHIBITION: The article in this issue on Frank Lloyd Wright as educator is a lead-in to a special exhibition of Japanese art on paper from Wright's collection, which up to now has been virtually unseen by the public. The exhibition is scheduled for the Wisconsin Academy Gallery during the month of June. It is being organized by gallery coordinator Sally Hutchison, and Professor Virginia Boyd, who was co-author of the fall 1993 article on Gustav Stickley, is the curator.

Faith B. Miracle

***Approaching our 125th year** . . .The Wisconsin Academy of Sciences, Arts, and Letters was chartered by the state legislature on March 16, 1870, as an incorporated society serving the people of Wisconsin by encouraging investigation and dissemination of knowledge in the sciences, arts, and humanities.*

CONTRIBUTORS

- Jean Accola is an artist working mostly in watercolor with wildflowers as a favorite subject. She lives with her family in a renovated schoolhouse in west-central Wisconsin and operates a gallery out of a historic railroad depot in Durand. For information on her watercolors call the Accola Gallery at (715) 285–5101.

- Antler's home base is Milwaukee, but he spends two months in the wilderness every year and also travels throughout America giving readings of his poetry. His work has appeared in more than 220 literary magazines and anthologies, and he has received awards from the Walt Whitman Association, the American Academy and Institute of Arts and Letters, the *New York Quarterly*, the Milwaukee Artists Foundation, the Wisconsin Arts Board, and PEN American Center.

- Eduardo Santana C. is wildlife research coordinator at the Manantlan Institute of Ecology and Conservation of Biodiversity at the University of Guadalajara, Mexico. He is presently pursuing a joint Ph.D. in the wildlife ecology and zoology departments at the University of Wisconsin–Madison. In 1993 he was elected to the board of governors of the Society for Conservation Biology and was awarded the Worldwide Fund for Nature's Prince Bernhard Scholarship in Nature Conservation.

- Sister Patricia D'Ercole is a registered Suzuki teacher trainer and a member of the board of the Suzuki Association of the Americas. She teaches at the American Suzuki Talent Education Center at the University of Wisconsin-Stevens Point.

- James O. Evrard grew up in Oconto Falls and earned his B.S. degree in biology from the University of Wisconsin–Madison. He served as a Peace Corps volunteer in Peru and returned to the university where he earned an M.S. degree in wildlife ecology. He is a wildlife research scientist for the Wisconsin Department of Natural Resources (DNR) at Grantsburg. The opinions he expresses in his piece relating to development in northern Wisconsin are his own and do not necessarily represent DNR policy or doctrine.

- The poems of C.X. Dillhunt of Madison have previously appeared in the *Wisconsin Poets' Calendar, Cream City Review*, and the *Wisconsin Academy Review*.

- E. Michael Flanagan has been director of the UWM Art Museum since 1989. He received an M.F.A. degree in studio arts from Northern Illinois University at DeKalb and was director of the university gallery there before coming to Milwaukee. He is interested in folk and outsider art and "has a passion" for collecting sea grass baskets from South Carolina.

- Yvette Viets Flaten, Eau Claire, grew up in an Air Force family and counts her years vagabonding between the United States and Europe as a unique schooling, a Grand Tour par excellence. She holds a B.A. degree in Spanish and an M.A. in history from the University of Wisconsin-Eau Claire. She writes fiction, and her poetry has been published in the *Wisconsin Poets' Calendar*.

- E. James Hillsberg is a member of the Menominee Indian tribe. His work has appeared in *The Four Directions, Imagine, The Native American Press,* and *St. Mary College Literary Magazine*. He would like to be teaching English in a tribal or inner-city setting, but he is presently serving a life sentence in Leavenworth prison in Kansas.

- Herbert Kubly was professor of English and writer-in-residence at the University of Wisconsin-Parkside in Racine from 1969 until his retirement in 1984. Author of numerous works, he has had a distinguished international writing career and won the National Book Award for nonfiction for his first published book, *American in Italy* (Simon & Schuster, 1955). His work has appeared in such magazines as *Time, Life, Holiday*, and *Esquire.* The story which appears in this issue of the *Review* is a chapter from his recently completed but not yet published novel, *Amazing Grace*. He lives on the Kubly family farm in New Glarus and spends part of the winter in Florida.

- Lisa Lombardi-Rice is an officer with the Marshfield Police Department-Ordinance Division. She has a degree in police science.

- Richard Matthews grew up in Baraboo and received a degree in journalism from the University of Wisconsin-Madison. He moved to Arkansas, where he taught English and earned an M.F.A. degree in creative writing. He is presently teaching English at the University of Houston. His work has appeared in such publications as the *Wisconsin State Journal, The Missouri Review,* and *Fiction International.*

- Charles Montooth is an architect and planner for Taliesin Associated Architects in Spring Green and a member of the governor's Commission on Taliesin. Recent works include commissions in Wisconsin, Illinois, Kentucky, Arizona, and Colorado. He graduated from the University of Chicago and was an apprentice under Frank Lloyd Wright at Taliesin from 1945 to 1952.

- William P. Rice has degrees in electronics, mathematics, and physics. He is manager of Biomedical Engineering at St. Joseph's Hospital in Marshfield and teaches electronics at Mid-State Technical College there. He is also a member of Wingad and Associates, a Cadott-based consortium of scientists and engineers addressing alternate energy and environmental concerns. He has published in areas of electromagnetic phenomena and is currently exploring statistical thermodynamics of materials and biosystems.

- Kenneth S. Sacks earned his Ph.D. from the University of California-Berkeley and has been at the University of Wisconsin Madison since 1976. He is professor of history and classics and chair of the Department of History. His pub-

Continued on page 51

The Mystery of the Paulding Lights

by James Seal, Lisa Lombardi-Rice, and William P. Rice

Almost everyone would agree that there is much truth in the saying, "People see what they want to see." In this article, we present our investigation into a regularly occurring phenomenon—the Paulding Lights of Paulding, Michigan (also known as the Dog Meadow Lights). First reported in 1966 to local police, the lights have been observed almost nightly, sometimes in the daylight, during all seasons of the year, and in all kinds of weather. They are seen from a hilltop about 4.5 miles north of Watersmeet, Michigan, along Old Military Road (also known as Robin's Pond Road) just off Highway 45.

In this article we wish to consider the limitations inherent in scientific investigation based on human observations. In doing so, we also hope to accomplish four primary objectives: 1) suggest guidelines for investigations of unexplained phenomena, especially those dependent on human observations; 2) use these guidelines to investigate and explain the origin of the Paulding Lights; 3) explain why perceptions of such events by different observers can vary widely and suggest how to make allowances for such variations while recognizing that the investigators are themselves subject to perceptual bias; and 4) illustrate the methodical nature of a scientific investigation by describing in detail the step-by-step process. But first . . .

Usually the lights appeared as a single white or red dot, but on occasion they would form multicolored globes glowing in green, red, and blue hues.

The Mystery

The Paulding Lights mystery was brought to our attention in late August 1990 while in casual conversation with a group of six friends. They mentioned that they had visited the site on two consecutive evenings while vacationing in the Watersmeet area. In both instances the lights became visible within minutes after they arrived in the early evening, appearing first near the base of a power pole in a clearing atop a nearby hill (Big Rock) and then moving up, along the power lines. Usually the lights appeared as a single white or red dot, but on occasion they would form multicolored globes glowing in green, red, and blue hues. Occasionally they took the form of pinwheels lasting for a few minutes and reappearing at irregular intervals.

Two members of the group stated they saw the lights split into two or three globes of changing color and size, rise above nearby power lines and surrounding tree tops, then fade and disappear from view. Further, they stated that the lights disappeared when loud noises were made, and the lights appeared when a flashlight or when car lights were shone into the vicinity of the clearing. Thus they concluded that the Paulding Lights were attracted to other lights.

We were given a brochure (1) which listed a number of possible explanations for the lights: the spirit of a dead mail carrier, the ghost of a railroad engineer killed in a railroad accident, and a mystical religious manifestation. The group did not offer an explanation but agreed that there was an old railroad bed next to the power lines. Because of the circumstances we did not try to question each person separately. We asked open-ended questions (for example, "What color was the light?" rather than, "Was the light red?") to obtain details of the observations. It was striking, although not surprising, that for the most part members of the group agreed on the description of the lights.

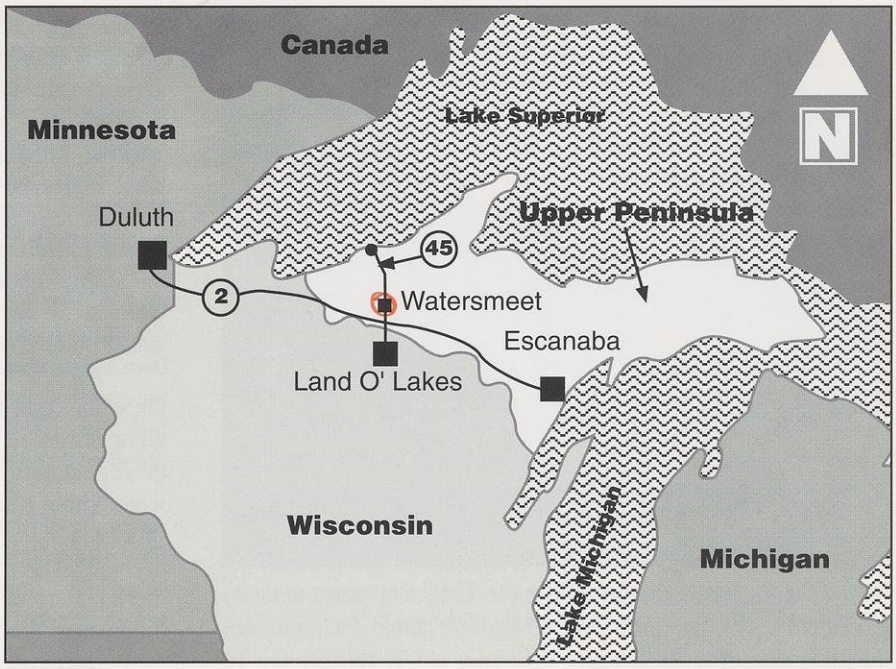
Guidelines for the Investigation

After the initial interviews, we decided to investigate the lights with the ultimate goal of determining their origin. We felt the most expeditious means of conducting the investigation was to draw up a set of guidelines. From a literature search and our interviews, we looked for common features, and from these we established a list of possible explanations. Specific criteria were used for the acceptance or rejection of a hypothesis.

First and foremost, we decided it should be a physical explanation, that is, one subject to test by scientific instrumentation. This was crucial to our investigation, as non-physical hypotheses (e.g. spirit lights or ghosts) cannot be quantified and, therefore, cannot be tested. Second, such explanations

should be consistent with all common features reported. From the possible physical explanations that remained, we drew up a list of instruments required to test each explanation.

Next we decided how the on-site interviews would be conducted. We chose not to tape record the interviews, as that might bias the results. We decided instead that at least two of the authors would be present at each interview, and that the results of the interview would be recorded immediately thereafter.



The Suspects

We prepared a list of possible explanations and categorized them according to causes. This allowed us to make a list of equipment needed to make measurements. Four broad categories of causes became apparent: man-made lights, atmospheric lights, astronomical lights, and hoaxes. Within each category many possibilities were suggested, some of which could not be supported by the findings of the literature search (2–13) and our initial interviews. For example, the possibility of hoaxes was considered minimal, since the lights had been reported nightly for over a period of nearly 25 years.

The possibilities of lightning (in particular the stable form-ball lightning which can persist for minutes to hours after its creation), space vehicle re-entries and satellites, northern lights, bioluminescence and phosphorescence (i.e., swamp gas), comets and meteor showers, and man-made lights such as airplanes and trains, also could be eliminated, because either these phenomena are too infrequent, sporadic, or seasonal, or they are not visible in most weather conditions to a degree which would account for such a consistent, nightly occurrence. Bright stars and planets, zodiacal lights and gegenschein, lunar and solar halo arcs, and airport, house, and street lights also could be eliminated because of positional (angular) information as revealed by astronomical and geographical maps.

We assigned a low probability to electrical discharge from power lines, as we felt it was rather unlikely that such a power-robbing discharge would go without repair for a quarter century. Nonetheless, due to the frequency of reports that the lights were initially seen near the proximity of the power lines, corona discharge (especially if it produced ball lightning-like effects) was left on the list.

The possibility of "earthquake lights," as well as other natural phenomena that produce light when materials are stressed, were considered, but as this region is not seismically active and as the lights were reported above the horizon, such phenomena (which are ground effects) seemed unlikely. We could not, however, eliminate temperature inversions, which are responsible for mirages and a number of other "lights" seen regularly or sporadically at other locations, even though such phenomena usually require very specific topographic and weather conditions which did not appear to be met in the Paulding area. Neither could we exclude car lights, based on the information we had accumulated.

From the explanations remaining, four categories of necessary equipment emerged: optical, electric/magnetic, positional, and temporal. We equipped ourselves with a 30-power telescope, binoculars, 35mm camera with a variety of lenses, two spectrometers (diffraction grating), an assortment of polarizers and color filters, a digital magnetometer/electrometer, relief and astronomical maps, stopwatch, and magnetic compass. A logbook was included in which to record our measurements and observations. Instruments such as the magnetometer/electrometer were calibrated against known laboratory sources, and we checked the spectroscopes against a mercury source and incandescent lamp.

Just the Facts

We arrived at the observation site at approximately 4:00 p.m. on October 13, 1990. The directions to the site which we had received from the group of early August visitors were somewhat misleading: "Go north on Highway 45 and turn west onto Old Military Road." A look at the map revealed that Old Military Road runs north-south; however, the turn-off runs southeast-northwest, as was confirmed by the compass.

A sign erected by the U.S. Forest Service marks the observation "sight." With a picture of Casper the Friendly Ghost it describes where to look for the lights and cites local lore as "explanations" for them—the light of a signal lantern of a railroad brakeman who supposedly had died along the tracks

View of Big Rock from the observation site. The lights appear at the top of the hill. Big Rock is just to the right of the road.

nearly 70 years previously. We made initial measurements of magnetic/electric fields and ground currents to determine a baseline for future readings.

We interviewed two college students who mentioned that this was their fifth visit to the site and that on each visit they had seen the lights. They claimed to have camped at the site the previous night and had seen the lights move about halfway up the power pole nearest them, then separate into three "globs" that moved off in different directions. One of the men stated that one glob looked like the figure of a man, and when they tried to sneak up on it, it disappeared when they were about 50 feet away, apparently "because of the noise of their approach." They also said they had videotaped the lights, but the battery in the camera was dead and the tape could not be replayed.

We left the site at about 5:20 p.m. to visit other points of interest. A nearby motel owner claimed no direct knowledge of the lights but had heard some reports. A restaurant employee also claimed no knowledge of the lights. We returned to the site at approximately 7:15 p.m. and immediately observed the lights.

Viewing conditions were initially good, with a white-orange sky glow to the north of the site extending approximately 30 degrees above the horizon and originating from the town of Paulding. The light was immediately visible as a small but intense (more intense than the planet Venus) white dot near the base of the last visible power pole on Big Rock. Initial measurements were repeated during the event, and no anomalous readings were recorded. The light dimmed and disappeared within a minute.

Subsequently lights appeared and disappeared at irregular intervals. They began as a point of intense white light, sometimes surrounded with scintillating rays, multicolored in red, blue, and green hues. We timed the duration and found it to be an average of 1½ minutes. We soon observed a second variety of dimmer red lights originating at the same position and of approximately the same average duration.

Using the telescope, the single white dot was resolved into two horizontal dots, and we noted that the separation distance increased slightly during the visible period; the single red dot was resolved into two horizontal spots, and the separation distance decreased slightly during the visible period. By using the stopwatch we determined that the average duration of the white light was 1 minute, 24 seconds and that of the red light was 1 minute, 40 seconds.

After 9:45 p.m. it began to rain. The average duration of the white light increased to 1 minute, 42 seconds (no red lights were observed during the rain). After the rain subsided, the average duration decreased to 1 minute, 26 seconds. All times were within 8 seconds of their respective averages, except for a set of red lights with a duration of 3 minutes (not included in the average). Upon successive sightings, we found the variation in the intensity of the lights during this observation to be within these same limits.

Spectroscopic observations which were made at the same time as telescopic observations revealed that the white lights were of a broad band nature, such as produced by an incandescent lamp. The occasional appearance of black bands moving rapidly with respect to the spectrum was unanticipated, as they were not consistent with either an incandescent source or a gas discharge source. The red lights were too dim to produce a noticeable spectrum.

Two of us walked north, toward the lights, along Old Military Road (which descends an estimated 20 meters below the line-of-sight) while the other remained at the site. Those of us walking noted that the lights disappeared from view after descending approximately four meters, while they were visible at all times to the observer at the site. Again, magnetic and electric field measurements revealed no anomalous readings.

Reviewing all of the data we had gathered, we began our preliminary assessment of the lights. We thought it unlikely that the lights were connected with electric/magnetic phenomena that might arise from corona discharge from power lines or earthquake lights, as non-anomalous electric/magnetic readings had been recorded. Further, the fact that the lights were visible in a variety of weather conditions (our own observations had gone from initially clear to rain and fog) strongly suggested against such weather-related phenomenon as temperature inversion. The optical observations, timing measurements (in particular the variation in the intensity of the lights), the persistence of such events during changing weather conditions, and the disappearance of the lights as the observers walked north along Old Military Road continued to suggest an effect caused by moving incandescent lights seen at a great distance. We as yet had not located the source of the lights or determined their cause.

During the course of our observations we had been interviewing numerous visitors to the site. One, a local resident,

claimed to have been visiting the site almost weekly for the past 15 years and to have viewed the lights from Big Rock and "had chased the lights at least 20 miles north along Highway 45 on a number of occasions." Another person from the area produced a map and indicated that Highway 45 passed over a hill some 12 miles north of the site along the line-of-sight. He mentioned that it had been suggested in the past that automobile lights were responsible, but he disagreed with the explanation because "car lights couldn't be focused that far." Another person who lived in the area also suggested car lights but claimed that an "Air Force investigation had been inconclusive, and surely the Air Force would have identified cars." Another person claimed that the National Geographic Society also had undertaken an investigation with similar results. Other visitors suggested that the lights were house or street lights, or even possibly a hoax. Many visitors simply had "no opinion."

Later inquiries to the K.I. Sawyer Air Force Base, Glen, Michigan (14) and to the Historical Research Center, Maxwell Air Force Base in Alabama (15) indicated that the air force had never conducted an investigation related to the lights. We did not receive a reply to our inquiry to the National Geographic Society until April 1991 (16), at which time they wrote that they had not investigated the lights but had received several other inquiries. They also supplied an article by Pease (7), which we had not seen previously.

From all available data and observations, we concluded it was highly probable that the Paulding Lights were actually automobile lights originating at a point somewhere north of Paulding. Therefore, we decided to leave the observation site at 10:30 that evening and proceed north on Old Military Road in order to locate the origin of the lights.

We drove until we reached the junction at Highway 45, then drove through the town of Paulding, following Highway 45 toward Bruce Crossing. Along the way we noted landmarks (such as distinct groupings of trees) and recorded the drive times (at 55 miles per hour) along various stretches of the roadway. We noted a straight section of highway near Erickson Lake sloping over a rise toward the north. Drive time along this section of roadway (1.3 miles in length) was 1 minute, 25 seconds, which correlated with the light interval times we had observed back at the observation site. We also noted that power lines of the type seen at the observation site ran parallel to the west side of the road bed. We judged this to be the most likely source of the car lights.

We returned to the observation site and repeated our measurements with no change in the results. The number of sightings also decreased during the early morning hours, as did the traffic along Highway 45.

View from the top of Big Rock, looking toward source region (approximately seven miles away).

Narrowing the List of Suspects

On the morning of October 14, 1990, we reviewed our data and observations. The data (with the occasional exception of the moving black bands through the spectrum) supported the theory of car lights. If we consider what is in common with all accounts from the interviews we took and our literature search, we find no contradictions with the automobile lights hypothesis.

We next examined the spectrometers in order to determine the origin of the black bands seen on the previous night. We found that by moving the spectrometer horizontally across a dark picket fence (next to our lodgings) we could produce a similar effect. We concluded that the black bands could have arisen when the spectrometers were moved relative to a background of trees producing a Moire-like band system. This effect arises when two ruled patterns are moved past one another at a fixed angle.

At approximately 10:30 a.m. we returned to the observation site. The sky was overcast and it had rained earlier. Almost immediately a white light appeared at the base of the last power pole on Big Rock. The telescope revealed that the light was in fact caused by the headlights of a car traveling south on Highway 45 at the suspected source site. The power lines, the distinct grouping of trees, and even the center line of the highway were clearly visible. Observation of a number of vehicles supported previous average drive times. We then drove to the suspected source site and reconfirmed drive times and landmarks for various sections. Telescopic observations at the source site confirmed that Big Rock and the observation site were visible from the Erickson Lake section of roadway and, further, that the power lines ran along the line-of-sight.

We next returned to the Big Rock area to investigate the allegation by some interviewees and the literature that the power lines followed an old railroad right-of-way. The terrain along the power lines was rather steep and rocky, sloping northward. We could find no evidence of a railroad bed in the vicinity. Our literature search did reveal that the region was rich in timber and railroad history, and that a Chicago-Northwestern train route existed between Watersmeet and Paulding until 1939.

We decided to consider why the Paulding Lights had not been reported before 1966. A sampling of the power pole ID tags between Big Rock and the observation site revealed dates no earlier than 1955. If indeed no right-of-way existed before that date, the line-of-sight between Erickson Lake and the observation site would have been obstructed, and no sightings would have been possible. Also, it should be noted that the first sightings of the lights were reported in 1966, only a few months after a wave of UFO sightings near Dexter and Hilldale, Michigan, produced a nationwide sensation.

After returning to Watersmeet, we spoke to one area merchant, who upon being assured that we did, in fact, know the origin of the lights, stated that the lights were locally believed to be car lights and sightings were common even in the late 1950s.

Finally, we reviewed topographical maps which showed that the observation site, the top of Big Rock, and the source site lay in a straight line. Later calculations that included compensation for the earth's curvature indicated that the projected source location was in error by less than 10 meters out of a distance of 11,585 meters. Calculations also revealed that the source lights should not be directly visible along Old Military Road from elevations less than about 3 meters below the observation site, well in agreement with the approximately 4 meters observed.

Map of the Paulding-Watersmeet vicinity north of Land O'Lakes.

The Perpetrator—A Profile

Our interviews revealed several important factors about the perception of "reality." First, they revealed that what was common to all accounts did not contradict factual data; however, what the individuals uniquely perceived was often greatly different from substantiated reality. These differences can be traced to at least four factors: 1) faulty observations and failure to appreciate the limitations of the senses, 2) imperfect knowledge of the physical world, 3) faulty reasoning (chiefly a priori and non sequitur), and 4) unsuspected bias introduced by the brain in the processing and interpretation of unfamiliar sensory information.

With the exception of the last of these factors, we can quantify and evaluate their effects on a person's perception of an event. (The last factor must be filtered out by cross comparison of accounts and finally by consistency with possible theories.) An understanding of how the brain processes sensory information could also go a long way toward eliminating the bias from observations. (It is not our purpose to go into any depth about how the brain processes familiar or unfamiliar sensory information, but we feel our work may have shed more light on the subject.)

Illustrations of the first difficulty abound in our study. For example, among the different observers the duration and distance to the lights varied considerably from values established by the study. Many observers reported considerable variation in the intensity of the lights, over and above their true intensity. Further, the inability of all observers to recognize the regular variation in intensity of the lights during each sighting was remarkably evident.

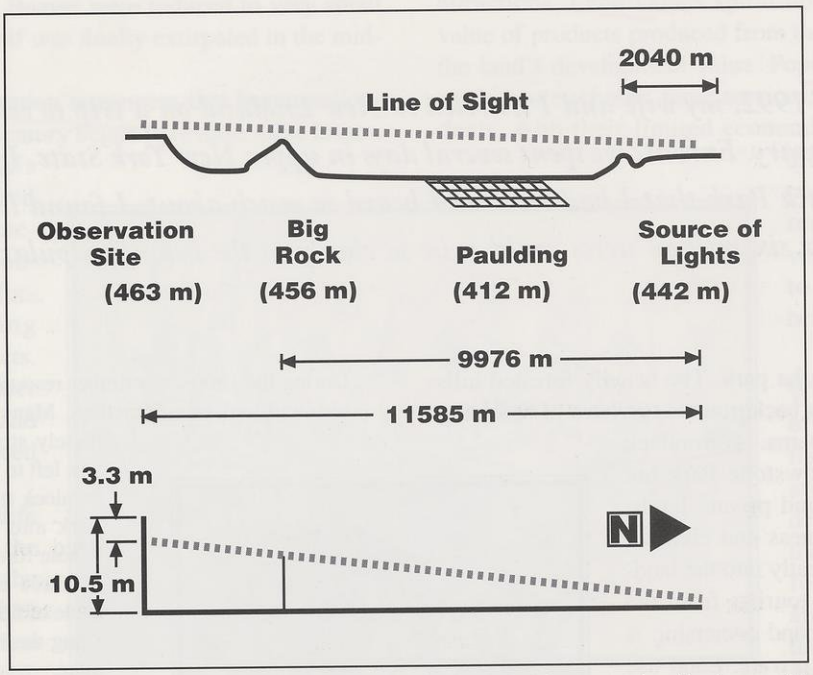
We also documented examples of the second difficulty. Observers reported that lights could not be seen over a 12-mile distance, or that lights could not remain focused over that distance. Such statements reveal the need for an understanding of basic physics. The fact that, indeed, one can see small objects at great distances is readily apparent when one realizes that in 1957 millions of people around the world observed the Russian Sputnik, an object .58 meters in diameter, which never approached the earth closer than 939 kilometers and which was seen by reflected sunlight.

The third difficulty also manifested itself in a number of ways. For example, the conviction that the lights changed color, such as from red to white, indicates an assumption that the red and white lights originated from the same source. The belief that the "lights disappeared when approached" or "were scared off by noise" indicates an assumption that the lights were responding to the motion or sound of the observers and not that the observers had moved below the line-of-sight. The U.S. Forest Service sign or local railroad lore may be responsible for preconceived associations such as "the lights seemed as bright as a locomotive's headlight and illuminated the inside of our car," or "the red light swings like a pendulum below the white light."

The fourth difficulty, that of how the brain interprets the information that it processes from the senses, is far more difficult to assess. For example, the shape of a circular hoop is normally elliptical on the retina of the eye, and yet the brain perceives it as round regardless of the orientation of the hoop. The size and motion of an object is often dictated by visual cues. For example, a full moon appears to have a larger angular size when on the horizon than when at the zenith. A stationary object, when viewed by a person in a dark room, can appear to wander as much as 30 degrees from its true position (autokinetic effect).

When viewed in this light, the perception of events involves an iterative process of measuring, testing, and correlating sensory information with previous experience, under the limitations we have described. But without a reasonably unbiased set of guidelines, measurement and testing could still lead to unreasonable conclusions.

In many ways the processing of information by the brain is analogous to the working of an electronic system with feedback loops. With no guidelines for accepting or rejecting information, the indiscriminate weighting or phasing of the output (the correlation of past experience, sensory perception, and measurements) to the input either exaggerates and distorts to the point where the system becomes unstable and absurd results are generated, or the feedback is destructive and no output results, i.e., "no opinion."



Topographical sketch of the area showing the line-of-sight correction for the earth's curvature.

The Verdict

We have identified the source of the Paulding Lights. They result from vehicle lights seen at a distance of 6 miles, originating from a section of Highway 45 near Johnson and Erickson lakes. Street lights in the town of Paulding, enhanced by atmospheric conditions such as mist, contribute to the effect. Perhaps more significantly, our study gave us an opportunity to investigate how experience and sensory cues play a major role in shaping the explanation of an event or situation.

In order to properly collect, process, and interpret information we feel it is necessary to use guidelines—whether, we might add, one is a tourist curiously investigating a local "mystery" or a scientist analyzing an unidentified phenomenon. In either instance, it behooves us all to remember the illusive Cheshire cat, whose outline, except for its smile, is obscured by the branches of the tree until the brain refocuses and the outline of the beast is revealed. ❧

We thank the citizens of the Land O' Lakes, Wisconsin, and Watersmeet-Paulding, Michigan, areas for making our site visit most pleasant and interesting and note that they were in no way attempting to promote any intentional fraud. They were quite willing to acknowledge the true nature of the lights, once they were certain that we had experienced the satisfaction of solving the mystery for ourselves.

Specifically, we acknowledge Dr. Elizabeth Kyes for her many helpful discussions and Dr. James McCluskey for supplying geographical information.

Photos by Lisa Lombardi-Rice.

References

1. Watersmeet Chamber of Commerce, Inc. *All Season's Watersmeet Business Directory,* no date.

2. R.L. Dodge. "Michigan Ghost Towns," *Upper Peninsula,* Vol. 3, 1973.

3. Dixie Franklin. "New Light Shed on Odd Light," *The Milwaukee Journal,* August 6, 1978.

4. Elizabeth Hayhow. "Historian Traces Road's Route," *The Daily Mining Gazette,* March 10, 1982.

5. Elmer Lenz. "Have You Seen the Lights?" *The Milwaukee Badge,* no date.

6. Graydon M. Meints. *Along the Tracks: A Directory of Named Places on Michigan Railroads,* no date.

7. Harry S. Pease. "A Different Northern Light," *The Milwaukee Journal,* November 30, 1980.

8. Walter Romig. *Michigan Place Names,* 1986.

9. Beth Scott and Michael Norman. *Haunted Wisconsin.* Madison: Stanton and Lee Publishers, 1982.

10. Unreferenced. "Dog Meadow Mystery Lights," *Action* magazine, no date.

11. Unreferenced. "New Military Hill Highway Gives Bruce Crossing Added Significance," *The Daily Mining Gazette,* December 5, 1959.

12. Unreferenced. "Trackside Grave Memories," *The Daily Mining Gazette,* no date.

13. Unreferenced. "Watersmeet is Remembered as a Railtown," *The Daily Mining Gazette,* August 22, 1970.

14. Historian. K. I. Sawyer Air Force Base. Glen, Michigan.

15. Historical Research Center. Maxwell Air Force Base, Alabama.

16. National Geographic Society. Letter to third author, April 1, 1991.

Thoughts on the Future of Northern Wisconsin

by James O. Evrard

In the summer of 1992, my wife and I traveled to New England on a trip to celebrate our twenty-fifth wedding anniversary. Enroute we spent several days in upper New York State. I particularly wanted to see the Adirondack Park that I had read and heard so much about. I found it hard to believe that a wilderness park of over six million acres could exist so closely to the heavily-populated eastern coast of the United States.

I was impressed with the park. The heavily forested hills and mountains were striking backgrounds to views of sparkling blue lakes and rushing streams. Adirondack Park was not another Yellowstone Park but rather a mosaic of public and private lands, forests and villages, wilderness and civilization. The small villages fit neatly into the landscape despite crowding by tourists from the nearby metropolitan areas. Land ownership is equally divided, public and private. Land use of some of the private land is controlled by tough zoning laws. This is a place where humans are attempting to coexist with wilderness.

In 1993 we spent a week's vacation at a resort on the Turtle-Flambeau Flowage in northern Wisconsin. To reach the flowage we traveled through a good part of Wisconsin's northwoods. Besides relaxing and fishing, we spent parts of two days visiting and shopping in surrounding small towns and villages.

Recently I thought about the similarities and differences between northern Wisconsin and New York's Adirondack Park. I recalled an article by John Collins, Ernie LaPrairie, and Richard Stewart titled "To the Founders: Thank You For Giving Us Adirondack Park" which appeared in the Spring 1992 issue of *Adirondack Voices*, a publication of the Residents' Committee to Protect the Adirondacks. Here are some excerpts:

> The Residents' Committee to Protect the Adirondacks would like to thank you for your work a century ago which led to the establishment of Adirondack Park. Those of us who have lived here for generations have come to recognize the greatness of your vision.

Yellow Lady's-slipper, Columbine, Wild Geranium, and Greek Valerian, *wildflowers found throughout Wisconsin.*

During the 1800s, our timber resources were being depleted by unsound lumbering practices. Many mountainsides were completely stripped and the barren land was left to the forces of erosion. Giant hemlock trees were cut only for their bark and the tree was left to rot. Whole forests were cut and burned to produce charcoal. The inevitable cycle of flood and drought was threatening the river systems of New York State.

Our wildlife was being eradicated by market hunters who supplied meat to fancy restaurants and trophies to the "sports" from the cities. Beaver and fisher were nearly extirpated from the Park because their pelts were of great value. The moose was hunted until none remained in the Park and the wolf and the panther were destroyed by bounty hunters.Through your foresight and tremendous efforts, Adirondack park was created. . . . Through conservation legislation, the flora and fauna within the Park began to regenerate and the scars that were created by greed began to disappear.

For its first 75 years, the Park changed slowly. Lumbering remained the primary occupation for the residents while farming was slowly replaced by tourism. Now our Park faces a new threat. . . . Many of the scenic views are being spoiled by uncontrolled growth and development. Shoreline development is threatening our water quality. Local people, who know how to live on limited incomes but cannot match the resources of the outsiders, can no longer afford their own land. Our quiet easy way of life is disappearing. . . .

The article could have been written about northern Wisconsin with few differences. Wisconsin underwent similar forest destruction late in the 1800s, including extensive wild fires.

Farmers followed the loggers north. Wildlife was eradicated by early residents living at subsistence levels, sharing the blame with market hunters. Northern Wisconsin also lost the moose, panther, and fisher. Beaver were reduced to very small numbers, and the timber wolf was finally extirpated in the mid-19OOs.

However, the conservation movement that began nationally around the turn of the century began to reverse these losses. While land in New York's Adirondack Park was acquired largely for watershed protection, land in northern Wisconsin was later acquired for forest protection, including production of forest products. Wildlife was protected under regulated hunting, fishing, and trapping regulations enforced by state agents.

Prairie Smoke, *found especially on low-grass prairie.*

The forests and wildlife slowly recovered. During the last half of this century, the timber wolf and fisher returned to Wisconsin. A few moose and cougar reappeared, and beaver became abundant. Logging continued in a reduced manner, and farming gave way to tourism centered on the many lakes in the North. Downstate Wisconsinites and tourists from neighboring states came to the North for their low-keyed vacations, staying for a week or two each summer at small, family-owned resorts and camps. The vacationers came to fish, swim, and relax by the shores of peaceful northern lakes.

Now northern Wisconsin, like the Adirondack Park, is threatened by rampant development. Increasing numbers of urban "outsiders" flock north to buy lakeshore and wild land for recreational, second-home development. Family resorts are broken up and sold as second homes or converted to condominiums and other higher-valued developments. Lakes are ringed with one, two, and more rows of summer homes. Wild shoreline is becoming an increasingly scarce commodity. Summer homes are converted to year-around homes, and their owners retire to live permanently in the northwoods. New utility corridors are cut through the landscape to service the new developments. Water quality deteriorates, and lakes turn from clear blue to green in the summer.

Some people are no longer content with enjoying a quiet, peaceful vacation but must find "something to do," such as frequenting amusement parks, water slides, and shopping malls. The call of loons can no longer be heard over the roar of high-powered boats and jet skis. The whine of all-terrain vehicles and motorcycles is heard on rural roads and trails. During the winter, these machines are replaced with the noise of another machine, the snowmobile.

Small villages lose their northwoods flavor with the homogenizing development of chain stores and fast-food restaurants. Gaudy signs line the roadsides advertising local attractions. Land values spiral upward to a point where the value of products produced from the land cannot compete with the land's development value. Population growth means more roads, more schools, more services, and more taxes. Local residents, with their limited economic resources, are forced to divide and sell their land to the outsiders because of the heavy real estate tax burden. The very values that attract people to northern Wisconsin are being destroyed.

❦

While much of the wilderness of northern Wisconsin is gone forever, there are still sizeable areas largely untouched by development. These lands are the national, state, and county forests, parks, and wildlife areas. By contrast, nearly all the public land in the Adirondack Park is owned by the state of New York and is managed as wilderness, to remain by statute "forever wild."

Added to these public lands in northern Wisconsin are industrial forests and other private forest land protected by provision of reduced real estate taxes. Other protection from development is provided by governmental regulation through zoning, water, and wetland use laws.

The public and publicly-protected lands provide the fragile fabric that holds the northern Wisconsin landscape together. It is these limited lands and waters that provide products for the forest industries, wildlife, and northwoods atmosphere that support the tourism industry. Without this environment, northern Wisconsin would soon be a suburban slum.

What will be the future of the North? What can be done to halt or even reverse the destruction of our northern wild landscape for the benefit of both its wild and human residents? I recognize that people have been, are, and will be part of the northwoods. As the number of people increases, so will development. It is inevitable. *What is needed is sustainable economic development that does not harm the environment.*

I believe we should re-examine our resource management efforts in light of new developments in conservation thinking, including biodiversity and landscape-scale management of ecosystems. We cannot afford to continue our present system where every institution that has an impact on natural resources

manages the resources under its control in a narrow, myopic manner without regard for other resources or resource users. This leads to conflicts among resource users and overall environmental degradation.

We do not have to create new institutions or additional layers of government to halt the overdevelopment of northern Wisconsin. What we have to do is broaden and strengthen existing programs using existing institutions.

One strategy for better resource management and protection would be less reliance on real estate taxes to fund local government spending, especially for public education. Lower taxes on undeveloped land would allow landowners to manage their properties in more environmentally-friendly ways. Perhaps shifting real estate taxes from undeveloped to developed property and improvements would help.

The real estate tax problem is recognized by many, but few alternatives have been offered that are presently politically acceptable. Funding public education from sources other than the real estate tax would be a great step forward in efforts to protect our northern landscape.

If the real estate tax structure is not changed, new programs to reduce taxes on private land will be needed in addition to the present managed forest law. In order to enroll property in this program, 80 percent of the land must be managed for forest products. Alternatives are needed for landowners who need real estate tax relief but do not wish to manage their land for forest products.

Endangered Wildflowers of Wisconsin *(detail), includes white lady's slipper, wild petunia, the Carolina anemone, and the ram's-head lady's slipper, a northern woodland orchid on the federal endangered species list.*

Another strategy would be increased public land acquisition. As mentioned earlier, public land ownership and publicly subsidized and regulated management of private lands and waters have preserved the northern Wisconsin landscape to this point in time. However, the present rate of land development far outpaces that of public land acquisition and protection. This is particularly true for wild lakeshore. In the past, acquisition of lakeshore by public agencies has been avoided due to high costs, both economically and politically. However, wild lakeshore is more vulnerable to the destructive forces of development than other types of landscape in northern Wisconsin today.

Additional funding is needed to increase land acquisition at all levels of government: federal, state, and local. Partnerships with the Nature Conservancy, industrial forests, and other private groups and individuals should also be encouraged.

Public land acquisition priorities could include completion of existing projects, creation of projects in new and unique areas, and acquisition of corridors and buffers between and around existing cores of public land. The recent acquisition of the Chippewa and Turtle-Flambeau flowages by the Wisconsin Department of Natural Resources is a good example of government taking timely advantage of the sale of truly unique real estate. Similar potential acquisitions include the Gile and Willow flowages.

A third strategy would be strong and effective land use zoning. Zoning laws vary among municipalities and can be changed at whim by rezoning or obtaining zoning variances. The citizens who control the zoning process are often the same people who have something to gain economically from easing zoning restrictions. Zoning committees should be more representative of all citizens. Federal and state land use restrictions are usually difficult to change compared to local government regulations. This can be either beneficial or detrimental, depending upon the issues.

Better land-use planning would be a first step in identifying land for protection either by acquisition or by zoning or use regulations. To increase public acceptance of land use planning, more direct and representative citizen participation in advisory boards, committees, and governmental operations is needed. The average citizen should share with governmental agencies the responsibility of planning for the future.

Areas could be designated as preservation zones, resource management zones, and sustainable economic development zones. Regulations could be drafted to define, direct, and control the use of these zones. For example, if development was not allowed in preservation or even resource management zones, fewer tax dollars would be needed to service these zones. There would be no need for school buses and mail carriers to drive miles into the wild lands to provide service for a handful of people. The real estate taxes of landowners in these restricted zones should be reduced accordingly. We should be able to create an environment capable of supporting populations of both wild creatures and humans.

❦

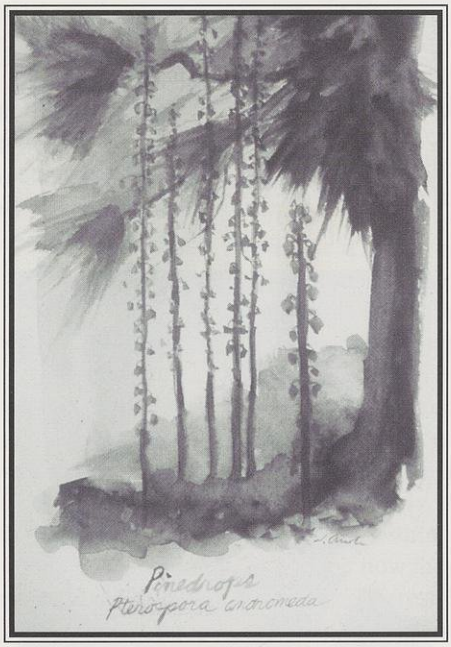
Implementing this proposal would not be without problems. There are people who, motivated by ignorance, fear, or greed, would cry out that the proposal is a conspiracy to steal their land or prevent them from using their land as they wish. However, property rights do not give landowners the right to degrade or

damage the environment at large through misuse of their property. These property rights advocates are common not only to Wisconsin but also to upstate New York.

In the same issue of the *Adirondack Voices* I referred to earlier, there is another article titled "Myths and Reality: The Truth About 10 Misconceptions in the Adirondack Debate." I adapted the following Adirondack Park myths and realities to fit situations in northern Wisconsin:

• Myth: *We don't want or need any more public land.* **Reality: *Many communities want more public land ownership because it benefits their character and economy.*** Public land is the fabric that holds the northwoods together. It supports the forest products and tourism industries. Local governments receive direct income from public land while public land requires few government services and tax dollars to provide those services.

• Myth: *Open space protection is elitist and is for the rich.* **Reality: *Public land is for everyone.*** Public land is available for many recreational and economic uses by all citizens. Use of private land by the public is severely restricted. Land for second-home development is sold many times at prices northern Wisconsin residents can't afford.



Pinedrops, *a plant of coniferous forests that probably has been extirpated from the northern forests of Wisconsin.*

• Myth: *All northern Wisconsin residents think the same and are against additional resource protection.* **Reality: *Northern Wisconsinites do not think just one way but think as individuals, and many support preservation.*** There are many northern Wisconsin residents who fiercely protect the natural resources of the region against local and outside monetary interests. We all want clean air and water and an abundant natural heritage to pass on to future citizens.

• Myth: *Government agencies lock up land so people can't use it.* **Reality: *Private property locks up land against public use and allows only the more affluent to enjoy it.*** One of the first things people, especially from urban areas, do when they buy rural property is to post it against trespass, ending public use of the property.

• Myth: *Private landowners have always protected their land and don't need any land-use regulations.* **Reality: *Without the public and publicly-protected lands, northern Wisconsin would not be the wonderful, wild landscape it is today.*** One only has to look at the environmental abuse that has and is taking place on some privately-owned land to realize how some private landowners fail to protect their land.

• Myth: *There is no development crisis in northern Wisconsin.* **Reality: *A person only has to visit the region to realize there is a development crisis today in many northern Wisconsin cities.*** As you approach some of the more popular tourist destinations in northern Wisconsin, you are assaulted visually with gaudy and even trashy billboards and signs touting local attractions. These communities are increasingly ringed with chain stores and fast-food restaurants that look the same from Florida to Oregon. In some instances, lakeside summer homes are crowded closer together than permanent homes in most cities.

• Myth: *Governmental agencies do not pay taxes on the land they own.* **Reality: *The state of Wisconsin does pay taxes on the land it owns while the federal government shares revenues derived from its land.*** In addition, county-owned land provides direct income to the counties, offsetting the need for real estate taxes. There are no permanent human residents living on the public lands, so the need for schools, roads, and other services (and tax dollars) from local government is low.

• Myth: *Public land drives business out of northern Wisconsin.* **Reality: *Isolation, distances from markets, and a tendency for skilled workers to move to urban areas are the forces discouraging new and present business.*** The northern Wisconsin economy of forest products and tourism is based upon its natural resources—it will never be an industrial mecca.

• Myth: *Widespread development represents the best interests of northern Wisconsin residents.* **Reality: *Intensive development in northern Wisconsin tends to drive land prices up, changing the traditional northwoods way of life.*** Profits from development tend to be short-term, and development tends to alter the way of life that has made the region attractive to most residents and visitors.

❦

I hope future generations and their decendents will be able to enjoy the beauty of a wild Wisconsin lakeshore or landscape. I hope they will hear the wail of a loon or the howl of a wolf without the noisy interference of man-made machines. I hope they will thrill to the sight of a bear or moose track in a sandy trail unmarred by vehicle tires. If we are to preserve this Wisconsin northwoods heritage for future generations, we must act now—tomorrow, it may be too late.❧

Watercolors by Jean Accola.

U.S. Forest Service
Forestry

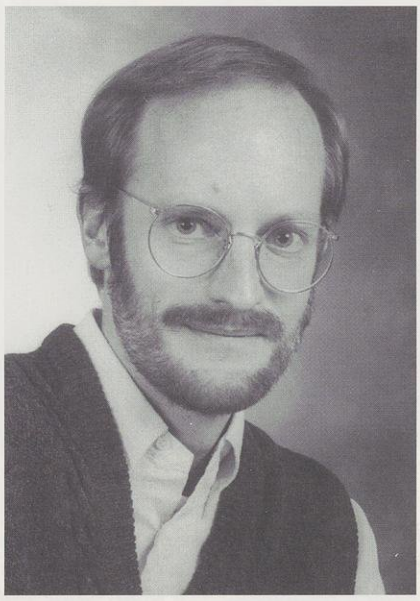
Testimony Before the Subcommittee on Agricultural Research, Conservation, Forestry, & General Legislation

Committee on Agriculture, United States Senate. November 9, 1993.

by Donald M. Waller

Personal Background

Thank you for the invitation to address you today on issues pertaining to ecosystem management, a topic vital to the biological health of our national forests. I speak to you today as an independent scientist. I have no vested interest in seeing our public forests achieve any particular level of commodity production or particular recreational or aesthetic goals. I speak rather as a trained ecologist interested in how forest management affects plant and animal life, or what we now term biological diversity. I will therefore attempt to speak for this important but unrepresented constituency of yours.



Donald M. Waller

My involvement in national forest management began eight years ago when several colleagues and I took time from our academic schedules to read Draft Long-term Management Plans prepared by the U.S. Forest Service for Wisconsin's national forests. We were shocked by the marginal treatment biodiversity issues received and especially by the serious misunderstanding of ecological science these plans reflected. At the time, we reasoned that these biologically ill-informed plans reflected oversight, gaps in qualified staff, or perhaps the commodity orientation of most planners. We therefore began an earnest effort to fill the conspicuous vacuum in the plans by providing information on contemporary conservation biology. We assumed that the forest supervisors would appreciate our input and acknowledge its relevance in the Final Forest Plans and Environmental Impact Statements. One forest (after external verification of the legitimacy of our proposals) did attempt to incorporate improved conservation science into their plan even while staff on the other forest remained adamantly opposed. Later, however, progressive elements introduced into the Chequamegon National Forest Plan by the supervisor were mysteriously removed at the last minute in 1986 by the regional forester, behind closed doors and without any scientific or economic review. Again, we were shocked and disappointed that an agency entrusted to conserve so many of our country's lands could be so arbitrary and capricious with regard to the implications of sound conservation science.

These cases were appealed to the Chief who took over three years to decide them. Again we were disappointed, again we attempted to negotiate, and again we were forced to pursue legal action to get any fair hearing for modern conservation science. I do not wish to dwell on these failures and disappointments. Instead, I will share the lessons these experiences taught us. These lessons then lead me to make several specific recommendations that I feel could greatly improve the agency's ability to steward our federal forests more efficiently and effectively.

The first lesson our own experiences taught us is that the U.S. Forest Service cannot be trusted. Promises made by well-informed and well-intentioned officers on one level are routinely over-ruled at higher levels in the organization, particularly when they affect commodity outputs. Furthermore, such policy decisions are usually made in direct response to lobbying by commercial interests instead of any scientific or economic analysis. This timber orientation is so deeply entrenched within the Forest Service that senior agency personnel routinely and openly encourage higher timber outputs even when these contradict "below cost" criteria set by the Administration and threaten natural values.

A second lesson we learned is that Forest Service leaders feel entitled to openly flaunt their responsibilities under the National Environmental Protection Act of 1970 (NEPA) and the National Forest Management Act of 1976 (NFMA) to fully and honestly divulge the environmental impacts of the forestry practices they pursue. In passing these laws, Congress intended to hold federal forest managers accountable for the ecological and environmental effects of their practices. NFMA remains the only federal law with any explicit provision to protect native biodiversity, yet Forest Service leaders continue to interpret this diversity provision in a self-serving manner far removed from the consensus of contemporary conservation biologists. Thus,

we encounter the present situation where a major federal agency attempts to escape the public accountability and scrutiny our environmental laws are intended to ensure and the courts are forced to decide major issues of forest policy.

A third lesson we learned is that, while wrapping itself in the progressive rhetoric of new perspectives and ecosystem management, the agency has quietly persisted in continuing to pursue policies that consistently favor high timber outputs over most other natural and recreational values. This is not true in every forest, or in every district, but it is pervasive enough across regions and the national forest system as a whole to belie the rhetoric and reveal an agency still primarily wedded to manage our public forests for timber production. Furthermore, the agency has even used progressive rhetoric to cloak its logging orientation as when substantial areas of mostly healthy forest are logged as "sanitary cuts" under the auspices of maintaining "ecosystem health."

Economic Issues

By any measure, the U.S. Forest Service is a massive enterprise. It manages almost one-third of all forest lands in the country, distributed among 156 national forests covering 193 million acres. This is more land than that managed by the Fish and Wildlife Service, the National Park Service, the Army Corps of Engineers, and the Bureau of Reclamation combined. With a budget of over $3 billion for 1990, 39,000 employees, and this extensive land base, it would rank among the largest corporations were it independent. We as a nation should expect such an agency to be administered with efficient dedication to the goals laid down by Congress. Unfortunately, this is not the case.

The Act of May 23, 1908, established that counties would receive 25 percent of all gross timber sale receipts from timber sales within their boundaries. This act has erected powerful economic incentives for local governments to push for increased timber harvesting in the national forests ($235.7 million in 1985 and $497.6 million in 1986). Many communities have become economically dependent on these payments and a strong supply of low-cost timber, blocking legitimate efforts to apply sound ideas from conservation biology to ecosystem management.

The Knutson-Vandenberg Act (K-V) of 1930 allowed the Forest Service to begin retaining that fraction of its timber sale receipts that it believes are necessary for reforestation. The 1976 National Forest Management Act extended this allowance to include thinnings and wildlife management activities associated with timber sales. Expenditures of K-V funds expanded more than 50 percent between 1975 and 1980 and augmented the Forest Service budget by $186.1 million in 1985. Because it is natural for an institution to seek to augment its discretionary budget, this act has provided a strong internal incentive to increase timber harvests. In addition, it has favored the increased use of clear cuts since these demand the highest costs of reforestation.

A third law passed in 1964 established the right of the Forest Service to grant "purchaser credits" to build roads, a necessary, but expensive, part of the infrastructure needed to support timber harvests. Under this act, the Forest Service lets timber purchasers deduct the cost of the roads they build from the amounts they pay for the trees to the Forest Service. In 1985, the Forest Service obtained $192.3 million worth of roads in this way in addition to the $234.8 million directly appropriated by Congress for this purpose.

Leadership and Personnel Issues

Since its inception, the U.S. Forest Service has sought to fulfill two distinct, and, at times, conflicting goals: to conserve and protect the national forests and their natural resources, and to provide a stable and sustainable supply of commodities from those forests. Through time, the former has progressively lost out to the latter for many reasons, including the incentives just mentioned. In response, the Forest Service has encountered a rising crescendo of protest from both the informed public and, more recently, from its internal ranks. While controversy is not new, current storms of protest extend into the daily papers, prime time television, and even the pages of *Sports Illustrated*. Not surprisingly, these conflicts have also precipitated an identity crisis within the agency regarding what should be their goals and how they should be pursued.

The Forest Service employs many excellent scientists, both in its independent research section and in individual forests. Unfortunately, their opinions are only rarely solicited during key phases of forest planning. Furthermore, even when they are consulted, their opinions are often dismissed or even disallowed. I recently heard a scientist in the Northwest complain that a decision to base management decisions regarding salmonid fisheries in the Tongass National Forest on the best current information then coming from research elsewhere in the Pacific Northwest was summarily over-ruled in the Washington, D.C., office in direct response to political pressure. Scientists were told that research done outside of Alaska was irrelevant to the Tongass. In other cases, scientists' opinions are solicited, then ignored. In some cases scientists have even been told to rewrite their opinions to better match agency policy or in response to political pressure. Such occurrences violate basic norms of scientific conduct and endanger our ability to make informed public decisions regarding our valuable national resources.

Dissatisfaction within the agency runs so deep that an Association of Forest Service Employees for Environmental Ethics was established in 1989. The very existence and popularity of such an organization bears testimony to the atmosphere of intimidation and discord that exists within the agency. Loyal employees are forced to choose between pleasing their superiors and protecting the resources many feel they were hired to conserve. In November 1989, all the forest supervisors from the Western Region signed a pointed letter to the Chief complain-

QUESTIONS FOR PROFESSOR DONALD M. WALLER FROM SENATOR LARRY E. CRAIG OF IDAHO

CRAIG: I don't think there is any question that the plentiful aspen and birch stands of the Lake States regenerated from wildfire even before modern man's intervention. Since we cannot use large scale fire due to the air pollution impacts, wouldn't timber harvesting be an efficient alternative to manage ecosystems in the Lakes States forests?

WALLER: Timber harvesting does favor early successional species like aspen and paper birch and so has served to greatly increase the abundance of these tree species, even in the absence of fire. It is less clear that this represents sustainable forestry. Recent research suggests that repeated intensive harvesting of aspen results in increasingly destructive infections by the Armillaria root rot fungus that eventually kill the trees (Stanosz 1987). The question also implicitly assumes that perpetuating abundant populations of these pervasive and weedy species should be a primary goal for forest management. Most forest ecologists would disagree. Aspen has already expanded drastically in abundance in northern Wisconsin and Minnesota, increasing from less than 3 percent of the landscape of the Chequamegon National Forest before European settlement to more than 28 percent today (Chequamegon National Forest Long-Range Management Plan 1986). Aspen dominates private industrial lands and northern Minnesota to an even greater degree where it has displaced other vegetation types that were once much commoner, in particular old-growth hemlock-hardwood stands which have declined from about 60 percent of northern Wisconsin to less than 1 percent.

Thus, the question should not be between fire and logging as a means to perpetuate aspen, an already vastly over-abundant forest type, but whether the public interest is really being served by preventing the successional recovery of these forests to some semblance of their original stature and regional diversity. Here, the national forests have a particular responsibility, in that private industrial forestland owners are not likely to modify their management to provide for other important forest types and ages. Timber harvesting is not likely to promote the recovery or development of the forest types most in need of conservation in the region.

CRAIG: I understand the endangered grey wolf population is recovering in Minnesota and Wisconsin because aspen regenerated by clear-cuts has provided the food base for its prey. Isn't it appropriate for man to intervene to maintain this ecosystem in the proper balance?

WALLER: You have been misinformed on the recovery of grey wolf populations in Minnesota and Wisconsin. Many scientific studies indicate that wolf recovery depends on minimizing open road density, as many wolves die from accidents with vehicles or by being shot by hunters with motorized access (Thiel 1985). While some wishful thinkers among the timber industry like to suggest that wolves may be limited by deer densities, David Mech, perhaps the region's foremost deer biologist, has asserted plainly that there is no evidence to support the idea that wolf populations are limited by their access to deer prey. Indeed, this would be difficult to conceive in Wisconsin where the state's approximately thirty-five wolves face a population of about 1.1 million deer. While one could argue that this situation is far from balanced, promoting clear-cuts and yet more aspen significantly worsens the situation rather than benefitting the wolf or regional diversity because, 1) timber harvest activities require a high road density that threatens wolves, and 2) more aspen boosts deer populations in a landscape already suffering the ill effects of too many deer.

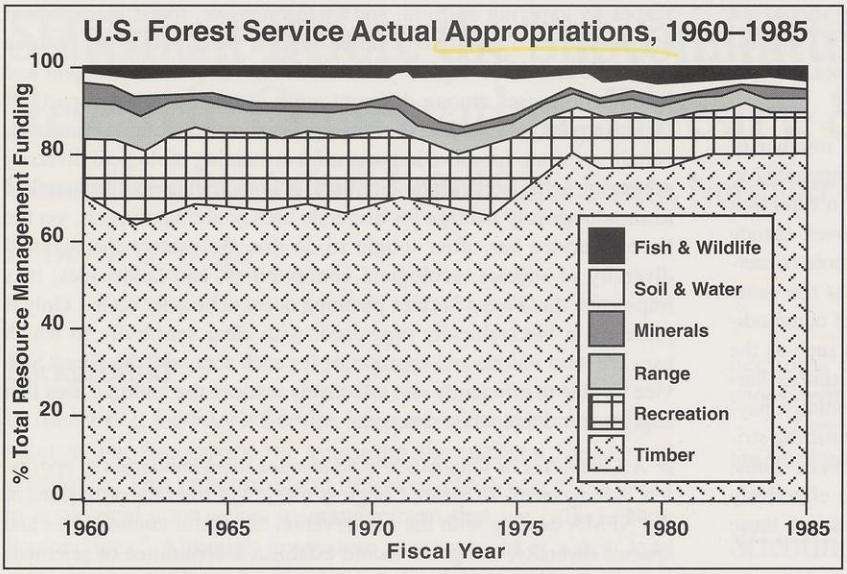
Our current plague of deer represents a substantial public nuisance for many reasons, including, 1) more than 32,000 drivers hit deer last year in Wisconsin, causing millions of dollars in property damage, loss of wildlife, and human injuries and deaths; 2) abundant deer contribute to high densities of deer ticks that are spreading an epidemic of Lyme disease in many parts of Wisconsin and the eastern United States.; 3) high deer densities preclude the presence of other ungulate species such as moose, caribou, and elk because they harbor a reservoir of a parasitic brain worm that is lethal to these species; 4) foraging by hungry deer directly eliminates populations of orchids, other wild flowers, and many tree seedlings. Deer densities now are estimated to be two to ten times higher than they were before European settlement, representing a system far out of balance and a browsing threat to the regeneration of several key forest tree species like eastern hemlock and northern white cedar (Alverson et al. 1988).

ing that "the current emphasis of National Forest programs does not reflect the land stewardship values embodied in our forest plans. Congressional emphasis and our traditional methods and practices continue to focus on commodity resources." Regional Forester John Mumma also resisted pressure from the Washington office to maintain excessive and non-sustainable levels of timber harvest. As you know, Mumma was forced to accept early retirement shortly thereafter. By this past August, nine of these thirteen supervisors had been transferred, reassigned, or took retirement.

If the Forest Service is to effectively apply ecosystem management, it will need to erect a leadership and command structure that demands respect from its employees, the scientific community, and the public. Because science and management will continue to co-evolve as we gain deeper insights into ecosystems, these leaders will need flexibility and imagination as well as trust. It is the role of Congress to make our public priorities and overall commitments clear and demand leadership that reflects these priorities.

Ecosystem Management

Ecosystem management holds out the prospect of improving the stewardship of our vast federal lands by incorporating modern conservation science and integrating management decisions more thoroughly across our landscapes. In contrast, the Forest Service has persisted far too long in managing the national forests piecemeal, propagating similar patterns of timber harvest over



Reprinted by permission of Greenwood Publishing Group, Inc., Westport, Conn., from The Impact of the Federal Budget Process on National Forest Planning *by V.A. Sample. Copyright © 1990 by Greenwood Publishing Group.*

broad areas instead of recognizing distinctive values and acknowledging the conflicts that sometimes exist between alternative uses. Planning generally centers on individual forests, districts, and even opportunity areas rather than the broader landscapes and biogeographical regions that should properly be their focus. This has had the effect of promoting extensive timber harvests, even in lands ill-suited to them or poor in their economic return. At the same time, threats to biotic communities are dealt with on a species-by-species basis, ensuring an ever-growing list of threatened and endangered species. As ecosystem management develops, it must attempt to resolve these conflicts by recognizing the clear advantages to be gained by aggregating similar uses together onto lands best suited for these purposes. Conversely, the conflicts that clearly exist between conflicting dominant uses must be recognized so that they can be effectively segregated. Furthermore, such decision must occur at the broad scales necessary to sustain the ecological processes upon which our forests depend.

Sadly, "ecosystem management" as practiced thus far by the Forest Service has amounted to little more than another public relations initiative aimed at deflecting public scrutiny and criticism. Small-scale pilot projects are held up as exemplars of ecosystem management, then reversed or negated by decisions made later or for other, usually much larger, areas. In separate, unrelated incidents, I was twice told of episodes where senior personnel from the Washington office sought to reassure audiences that ecosystem management would be limited primarily to demonstration projects and specifically would not affect timber targets or the bulk of on-the-ground management. Such "business-as-usual" pronouncements belie the public stance of the Forest Service and evidences the deep duplicity that has marked its leadership. In response, the public has become increasingly critical and cynical.

Recommendations

Clearly, many impediments exist to slow or block reform within the Forest Service. Biased leadership, an unbalanced perspective among Forest Service officers, and internal and external incentives favoring timber harvest activities have all conspired to defeat the intent of Congress to redirect Forest Service priorities. Especially the uppermost levels of the Forest Service bureaucracy appear unwilling or unable to enforce legislated mandates to protect non-commodity values.

Do these failures imply that we should dismember the Forest Service, turning lands important for conservation over to another steward such as the Department of Interior? There are those who believe the agency cannot be re-formed and advocate this drastic "New Zealand solution" to avoid obvious conflicts in land use. Alternatively, this agency might join the other federal agencies in embracing not just the rhetoric but the imperatives of ecosystem management.

As the agency has attempted to supply a growing set of competing demands, it has foundered in its ability to provide even marginally efficient economic outputs and basic environmental protection. It has attempted to meet its concurrent obligations via simultaneous multiple use, a concept that has failed to attain either economic efficiency or sustain ecological functions and species diversity. Congress and the agency should now recognize and accept the substantial economic and ecological advantages to be gained by segregating and guiding competing uses among distinct land areas. This process will demand careful economic and ecological analyses. The scientific community stands ready to assist in these efforts. As a start, I urge Congress to address the following set of conspicuous issues:

▶ *The agency continues to resist Congressional direction regarding its basic mission and goals.* Despite the Multiple Use Sustained Yield Act of 1960 (MUSY), NEPA, and NFMA, the agency continues to cut extraordinarily high volumes of timber at low or no return to the U.S. Treasury while failing to protect the basic non-commodity natural resource values entrusted to it. As an agency, it remains stubbornly entrenched in outmoded paradigms of intensive forestry and, in 1993, is still uncommitted to the protection of biodiversity and other natural values. It has thus repeatedly fallen to the courts to decide basic matters of policy that Congress plainly prescribed years ago.

▶ *Failed leadership has created a culture of fear and uncertainty.* The failure to heed Congress reflects a leadership committed far more to extracting commodities than to protecting the resources entrusted to it. Leaders of the Forest Service continue to refuse to adjust agency priorities to concur with what the public expects and what Congress has laid down as the law of the land. At the same time, they place extraordinary and often contradictory demands on their subordinates. District and forest personnel often work in an oppressive atmosphere of uncertainty with shifting sets of expectations and obligations. They deserve leaders they can respect with a clear and scientifically-informed vision of the

job to be done and how to do it. While all decision making should not be centralized, conscientious officers attempting to enforce Congressional mandates to protect environmental values should not work in fear of being over-ruled, demoted, or transferred.

▶ *Contradictory incentives skew management goals.* A number of laws, institutional habits, and budgetary incentives have interacted to shape Forest Service policy. The current ambivalence in direction stems from the contradictory internal and external incentives agency personnel face. On the one hand, they are expected to promote conservation and the sustainable harvest of forest resources. At the same time, they face strong pressures to maintain high outputs of commodities at low cost. Well-intentioned but now outmoded acts such as the Knutson-Vandenberg Act tie internal budgets directly to timber harvests in a way that subverts management of the forests. Similarly, payments to counties in lieu of taxes are also tied to logging, ensuring strident local political pressure to sustain high harvest levels. Thus, Congress shares responsibility for the agency's failure to effectively protect environmental goals and must move quickly to remove these perverse incentives.

▶ *Too many budgetary incentives exist within the Forest Service to harvest timber.* With incentives like those discussed above, it is not surprising that forest personnel often work to maximize their own budgets rather than returns to the U.S. Treasury or ecosystem sustainability. Through the retention of K-V funds and the construction of purchaser credit roads, one out of every three national forests managed to retain more than 75 percent of their timber receipts in 1985. Congress has fueled this bias by consistently approving Forest Service budgets heavily weighted toward timber-harvest activities (Figure 1). Such actions directly contradict the goals of other legislation Congress has passed specifically to curb the excesses brought about by intensive timber management.

▶ *Line-item appropriations contribute to environmental damage.* In setting budgets for the Forest Service, Congress continues to fund activities related to intensive forestry such as road building at far higher levels than those related to conservation (Figure 1). We cannot expect the Forest Service, even under new leadership, to achieve effective reform in the presence of these perverse incentives. After setting clear goals via legislation and a reliable and consistent set of standards for reaching them, Congress should step back and resist the temptation to micro-manage by setting line-item appropriations. In addition, individual members of Congress must resist the temptation to influence policy in individual forests within their districts. Having set policy via collective legislation, Congress should limit its intervention to ensuring that those policies are being carried out.

▶ *Conservation science is ignored.* Despite pressures from the conservation biology community, the Forest Service has tarried in applying conservation science to improve the sustainability of its silvicultural practices. Rather than substantially modify its management to better protect biological diversity and other environmental values, the agency has preferred to promote public relations initiatives. The agency should move immediately to inject contemporary conservation science into policy and integrate this science more thoroughly into routine local forest management.

▶ *Planning must occur at appropriate scales.* Forest Service planning continues to emphasize the simultaneous pursuit of many competing goals. Such management has the effect of homogenizing forested landscapes by applying uniform, and often intensive, forest management practices to each forest and district. It is far preferable, from both an economic and an ecological point of view, to sequester divergent and incompatible uses among different areas. Some forests and parts of forests are far better suited to timber production than others. Similarly, certain areas are far more important for sustaining biological diversity or serving other non-commodity uses. It is inefficient and impractical to simultaneously manage for disparate uses on the same lands, yet the Forest Service has often sought to do this. To protect the regional diversity of species, ecological communities, and landscapes, it is imperative that Forest Service planning occur at broader scales. Only if planning is hierarchically organized, with clear sensitivity to which uses are most unique and appropriate for each area, will the Forest Service be able to efficiently and effectively achieve the multiple uses that Congress and the public demand.

▶ *A Committee of scientists should oversee implementation of ecosystem management.* To assure Congress that it will meet the provisions of the NFMA dealing with the conservation of natural communities and species diversity, Congress should establish a committee of scientists to periodically review and oversee the implementation of ecosystem management. Such a committee would simply and cheaply ensure the credibility of these programs while fostering creative solutions to pressing natural resource questions. It would also provide strong incentives to more directly involve scientists and specialists within the agency in the teams making planning and management decisions.

Conclusion

Congress is faced with making many important decisions regarding human economic and social affairs that demand serious attention and careful deliberation. I am here to remind you that you also face critical decisions regarding life-and-death conditions for many other species that share our nation. You have the opportunity here to better sustain both the economic and ecological values of our public forests, but only if you insist that ecosystem management extend to more than localized demonstration projects. In the long run, it will be far more efficient and practical to protect our natural resources and biological diversity wholesale via ecosystem management than retail, one species at a time, through the Endangered Species Act. Please give these issues the same considerations you grant other pressing human concerns.❧

References Cited:

W.S. Alverson, D.M. Waller, and S.L. Solheim. "Forests too deer: Edge effects in northern Wisconsin." *Conservation Biology,* 2(4): 348–358. 1988.

G.R. Stanosz, G.R. and R.F. Patton. "Armillaria root rot in aspen stands after repeated short rotations." *Canadian Journal of Forest Research,* 17:1001–1005. 1987.

R.P. Thiel. "Relationship between road densities and wolf habitat suitability in Wisconsin." *American Midland Naturalist,* 11: 404–407. 1985.

ecosystem management
Forest Service

Statement Before the Subcommittee on Agricultural Research, Conservation, Forestry, & General Legislation

Committee on Agriculture, United States Senate. November 9, 1993.

by David G. Unger

Background

In June 1992, the Forest Service announced ecosystem management as the framework for managing the national forests and grasslands. This announcement followed a two-year experiment in ecological approaches to management that we called "New Perspectives." Although ecosystem management is a new land management philosophy, the Forest Service is well positioned to develop ecological approaches building upon nearly 100 years of land management experience and a broad array of expertise including Forest Service Research scientists and field-level resource professionals. This effort is supported by the direction provided by the Organic Act, the Multiple Use-Sustained Yield Act, the National Forest Management Act, and the forestry provisions of the 1990 Farm Bill.

Ecosystem Management

Ecosystem management is a holistic approach to natural resource management, moving beyond a compartmentalized approach focusing on the individual parts of the forest. It's an approach that steps back from the forest stand and focuses on the forest landscape and its position in the larger environment in order to integrate the human, biological, and physical dimensions of natural resource management. To carry out ecosystem management, the attention of land managers must be directed to understanding the structure, function, and variability of ecosystems and developing appropriate site specific management activities. Because of its complexity, ecosystem management requires an accelerated scientific effort and the efficient incorporation of science into on-the-ground projects. It also depends on grass-roots participation in decision-making and partnerships to achieve shared goals.

Ecosystem management means considering the whole fabric of our natural resources as we make decisions; understanding and preserving the vital connections between land, water, wildlife, vegetation, and human beings; and assuring that we provide the values, uses, products, and services desired by the public in a sustainable manner. Comprehensiveness, connections, change, and sustainability are the watchwords of ecosystem management.

I would now like to take a few minutes to discuss how we are implementing ecosystem management.

Ecosystem management includes a commitment to working with even more partners than we've had in the past.

Scientific Foundation

The scientific basis for ecosystem management is provided by Forest Service Research and cooperating scientists from other institutions. Forest Service Research is focusing its resources on developing and providing scientific and technical knowledge to improve the productivity, health, and diversity of forests and grasslands. An enhanced scientific underpinning is fundamental to taking an ecosystem approach to managing our natural resources on a sustainable basis.

Our Forest Service Research strategy concentrates on:

▶ First, *understanding ecosystems* where the focus is on understanding the makeup and function of forest and grassland ecosystems. This research will provide the basis for addressing the health and productivity of natural and managed systems, and help us understand how these ecosystems are affected by natural and human disturbances. Two key components of this effort will be to examine ecological trends, including major disturbance factors to estimate past and future conditions, and to monitor results of management activities to ensure predicted conditions are achieved.

▶ Second, we are working toward *understanding people and natural resource relationships* where emphasis is being given to learning more about how people perceive and value the protection, management, and use of our natural resources. This component reflects our recognition that people's needs, uses, and attitudes affect all forest and range resources. Our research will focus on understanding the interaction between humans and ecosystems—including people's needs and demands for resources, and how people value and perceive these ecosystems.

▶ Third, *understanding and expanding resource options* has the goal of determining and developing stewardship practices and

LETTER TO THE EDITOR

Washington, D.C.
January 25, 1994

I am answering your letter requesting a response to Professor Don Waller's testimony about management of the nation's forests. Attached is a copy of the testimony of Dave Unger, Associate Chief of the Forest Service, presented at the same hearing. If you truly wish to provide the Forest Service's point of view in your journal, I suggest that you give Mr. Unger's testimony an equal amount of space.

When I took the helm as Chief of the Forest Service last month, I sent out six messages to all employees and the leadership team. We will:

- obey the law
- tell the truth
- implement ecosystem management
- develop new knowledge, synthesize research, and apply it to management of natural resources
- build a Forest Service organization for the 21st century
- trust and make full use of our hard-working, expert workforce

I am a scientist by training and profession. I welcome differing views but I do not expect everyone to agree with my decisions, scientifically, economically, or politically. My experience with spotted owl research and the President's Forest Plan for the Pacific Northwest has taught me that agreement by everyone is an admirable but seldom achievable goal in ecosystem management. The Forest Service has and will continue to include Professor Waller's viewpoints and scientific contributions in its deliberative process.

Jack Ward Thomas
Chief
U.S. Forest Service

utilization systems that protect and enhance long-term resource productivity and biological diversity. Special attention will be given to interaction s among resources in response to a variety of activities aimed at achieving management goals. We will apply this research to improve our on-the-ground management.

Cooperation

Ecosystem management includes a commitment to working with even more partners than we've had in the past.

Because ecosystems cross boundaries, many federal, state, and county agencies; tribal governments; private landowners; community leaders; and corporate foresters are interested in ecosystem management. We recognize the sensitivity of private property rights and the questions about how ecosystem management can be implemented across property boundaries. Cooperation is the key to success.

In our state and private forestry work, our objective is to provide technical and financial assistance to federal and state land managers and to non-industrial private landowners. Through this effort, we can help land managers and landowners meet their objectives for their land by encouraging the use of sound ecological approaches. In addition, the Forest Service helps rural communities develop local natural resource-based economies that support sustainable ecosystems. All programs are voluntary and carried out in accordance with federal, state,

and local laws; actual decisions on resource management are left to the landowner.

Implementation

Now I would like to take a few minutes to describe some of the changes that are underway to implement ecosystem management in Forest Service activities.

First, we have adopted an ecological unit framework to provide a scientific basis for ecosystem management. The framework is a classification and mapping system for stratifying areas into ecological units that have common biological and environmental factors. These factors include climate, physiography, water, soils, air, and natural communities. We have been working closely with other federal agencies as we developed this framework.

Second, we have completed some major regional ecosystem assessments, are beginning some others, and are setting out parameters for others. An example was our full participation in the inter-agency Forest Ecosystem Management Assessment Team (FEMAT) report for the Pacific Northwest and northern California spotted owl forests. We prepared the Eastside Forest Ecosystem Health Assessment for eastern Oregon and Washington. Also being completed by the Forest Service and Bureau of Land Management is a strategy for protecting the habitat of Pacific salmon and steelhead (PACFISH), for Oregon, Washington, California, Alaska, and Idaho. Another just beginning is for the Sierra Nevada in California.

These and other assessments provide the basic information to be used in our land management planning process.

Third, we are following ecosystem management in many on-the-ground projects. These include the White River Ecosystem Initiative in Vermont, the Hurricane Hugo Restoration in South Carolina, the Cicero Fire Recovery/French Creek Fisheries Project in South Dakota, the Blackbark Beetle Thinning in Oregon, and the Butte Valley National Grassland project in California.

Collaborative Efforts

A wide variety of partnerships involving managers, universities, other agencies, and the public-at-large are important elements of these efforts. We have strengthened our working relationships within the Department of Agriculture, especially with the Soil Conservation Service, and with the Environmental Protection Agency and agencies of the Department of the Interior and Department of Commerce. We are actively exchanging ideas on how to better coordinate policies among agencies and how to standardize information across administrative boundaries.

Future Needs

While we have taken some significant steps toward an ecosystem management approach for the Forest Service, there is still much work ahead.

We are looking at several areas where we may need to change our current policies to implement fully ecosystem management. There may be areas where changes in our existing statutory framework would be desirable. We do know that we will need to change our regulations to streamline our land management planning process and to base it upon ecosystem management principles. We expect to propose these regulatory changes in early 1994.

We are still experimenting with operational applications of ecosystem management, and these first projects continue to demonstrate needs for additional information and analysis, as well as point out ways to do a more effective and efficient job.

We do not see a "final" system for ecosystem management in the future. This is an evolutionary process, and new information will constantly result in changes. We believe that a key element of ecosystem management is a consistent monitoring effort, an evaluation of management outcomes and, where necessary, adapting our management to incorporate new information from the monitoring, the scientific community, and the public.

Summary

Although built upon a long history of natural resource management, ecosystem management is still in its infancy. That is why we are purposely moving cautiously and adapting our on-the-ground management as we learn.

The ultimate success of ecosystem management—management that recognizes that people are an integral part of the ecosystem and their needs must be blended with environmental concerns—depends on how we focus our scientific inquiry and apply science to management. To accomplish this, we are taking a new look at our information needs, focusing our scientific analysis to address these needs, and aggressively putting our science into practice. We are taking a holistic, landscape-oriented perspective in conducting research; making greater use of interdisciplinary approaches in our research and planning; expanding partnerships to define, conduct, and use our scientific results; developing new methods for monitoring ecosystem health and productivity; and adapting our management to incorporate new information.❧

David G. Unger is associate chief of the U.S. Forest Service and was acting chief at the time of this hearing.

The Wine Was Black

by Herbert Kubly

Nic Kyle lay in his hospital bed listening drowsily for the familiar clack of the intern's wooden shoes echoing in the hall. A writer whose entire life had been haunted by his fear of blindness, Nic now had to contend with the reality of detached retinas in both blindfolded eyes.

In the somnolence of the long, useless day stretching before him, he slipped into a dream in which the tapping he heard was the guiding cane of Enzo Melotti leading himself and Nic down a ghetto street in a Mediterranean city late at night. In the dark Nic could feel the quiet rustlings of invisible creatures against his body. Enzo gripped Nic's arm and led him into an unlit room where they were greeted with loud, ribald laughter.

With inexplicable perception Nic sensed that the shadowed space was filled with a rowdy company of dwarfs and men with hunched backs, palsied women and quivering children, faceless boys and girls with three breasts. A fur-faced padrone stepped forward to greet them and, guiding them to a table, asked with a hollow voice, "*Bianco o rosso*?" White or red wine?

"*Vino nero,*" Enzo replied, and the padrone roared out for everyone to hear, "*Vino nero! I Signori birra vino nero!*"

Realizing that Nic did not understand why the invisible company rocked with laughter, Enzo explained the joke. "For us who are blind, all wine is black."

Only then did Nic realize that, in this assembly, all were blind, and he himself also was blind.

"No!" he cried out. "No! No, it's not so. Please turn on the light so I can see!"

Nic felt a cool dampness cross his forehead. He reached up and found a moist cloth covering his brow, and he touched a small hand.

"Nora," he said, thinking it was his wife.

"No, it's me, your nurse, Maria Teresa." Nic let go of her hand. "I heard you calling. You were having another bad dream. Do you feel better now?"

"Yes, thank you."

"I'm supposed to give you a pill."

He swallowed it and, after she left, lay back on the bed, trying to remember.

Enzo Melotti. It was a name that until now he had locked away and forgotten, like a letter in a trunk. From the sealed labyrinths of memory, the shape of a man emerged.

❦

It was during his year in Florence. While playing tennis with a tall English woman and reaching for a high stroke, he had painfully slipped a disc in his back and temporarily paralyzed his left leg. A Swiss orthopedist fitted him with a therapeutic corset and arranged for a masseur to treat him at his pensione. The masseur, the doctor carefully remarked, was blind. "Blind masseurs are best," he said. "Their hands are sensitive and strong."

The next morning there was a soft rapping on Nic's hotel room door.

"*Entra per favore*," he called out, and the door slowly opened. A cane entered tentatively, exploring space like an insect's antenna. A pale, slender man followed and stood inside the door, waiting.

"*Sono qui*," Nic said. "I am over here."

Guided by Nic's voice the man moved toward the bed, extending in his hand a card which Nic accepted and read. "*Enzo Melotti. Massaggiatore sportivi, curativi, qenerali.*"

"Is it right to speak English?" asked the man.

"Yes, of course." Nic was glad not to have to struggle with his elementary Italian. "Dr. Brunn has ordered me to remain in bed," he said.

"Naturally. May I remove, please, my coat?" the masseur politely asked.

He took an envelope from his pocket and laid the jacket over a chair. Without the jacket he appeared spare yet strong. Large dark lenses covered his upper face, but not enough to hide the deep fissures reaching out from under them like purple spiders' legs. Except for these his features were molded as precisely as the face on a Roman relief. His dark hair was curled, and Nic guess his age to be about forty.

The masseur poured some talcum from the envelope and rubbed it over the calf of Nic's leg. "For friction," he explained. With vigor he attacked the muscle, pinching it with strong fingers and beating it with his palms until Nic cringed. "Is good sign, the pain," said Enzo. Nic wondered at the dexterity of the fingers kneading his flesh like shuttles.

The morning was hot, and when Enzo had him roll on his back, Nic saw how pale was his face, how glistening with sweat. He stopped to dry himself with a towel, wiping carefully around the black lenses to avoid removing them.

"If you will excuse me I will have a small rest," he said. Reaching behind him he found the chair on which his jacket lay and sat on it.

"Are you a tourist?" he asked Nic.

"I am here to write. I am also a student at the Academe."

"You study the art?" Enzo quickly asked.

"Yes, art history," Nic replied.

"So did I study the art." Leaning forward in his chair, Enzo seemed suddenly invigorated. "To be a painter was my dream," he said. To Nic, this disclosure was too unsettling too contemplate.

"Have you seen Del Sarto's *Last Supper* in the San Salvi Church or the beautiful angels of Fra Angelico?" asked Enzo. "When you are able to walk I will take you there and we will see them together."

See them? Was the man forgetting that he was blind?

"Together we shall see them and many more," said Enzo excitedly.

Nic himself was caught up in Enzo's euphoria and wondered how he might raise the question he needed to have answered.

"How did you become blind?" he finally asked, breaking the silence.

"In the war, in a mine explosion," Enzo replied. "There were six of us and five died. I was seventeen years old." He sighed. "I was too young. There are so many paintings I did not see, so many I do not in my mind possess."

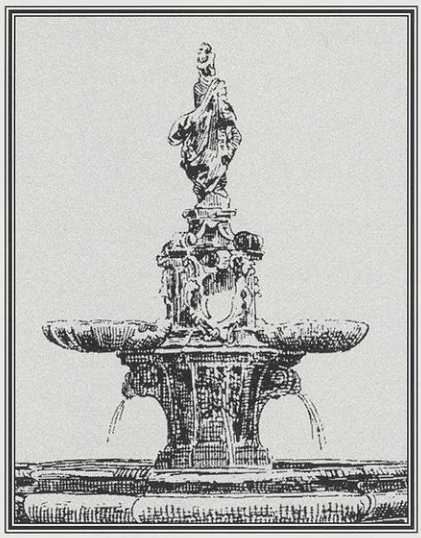
With a sleeve of his shirt Enzo wiped away glistening drops which appeared to flow from the empty sockets. Nic wondered whether they were tears or perspiration.

"It is finished," Enzo cried out. "For twenty-seven years it has been finished. I shall never see the paintings."

The desolation rising from him was almost too painful to endure. Needing to bring it to an end, Nic asked, "How did you learn English?"

"From English and American patients," Enzo replied. "From each I learn a little more. I thank you if you will talk to me. It is time to continue," he said, resuming his attack on Nic's back.

A month later, after Nic's injured back was sufficiently healed for him to walk, Enzo Melotti conducted him on a walking tour of Florence to "see" the favorite paintings in various churches. They started at Santa Maria Novella, and Enzo led him into the celebrated Spanish Chapel where paintings by Bonaiuto were crowded with saints and noble personages, each of whom Enzo identified. Pointing his cane at some black-and-white dogs fiercely guarding a flock of white sheep from lurking wolves, Enzo explained that the sheep were actually Christians being guarded by "*Doemeni cani*, watchdoqs of God" from heretical wolves.



They sat for an hour in the convent courtyard listening to the rippling of a fountain and the trilling of birds.

"If you look closely," he said, "you will observe that the sheep are not happy to be protected." It was true. Some of the sheep appeared to be gazing longingly at the wolves as if they yearned to join them.

On another day Enzo led him across the Arno to the Church of the Carmine "to see," he said, the great fifteenth-century frescoes of Tommaso Masaccio in the Brancacci chapel. Although the paintings were poorly lit and difficult to see, Enzo pointed his cane at a panel on a high wall entitled *Expulsion from Paradise*. Adam and Eve were depicted with contorted faces. Eve, whose hands covered her eyes, was weeping. Adam's head was thrown back, his mouth open. Nic seemed almost to hear the agonized cry.

In a large painting entitled *Payment of the Tribute*, a strong and virile Jesus with a tense expression was surrounded by a company of men whose faces and expressions were highly individualized.

"Here you see the birth of *umanismo*, the beginning of psychology in art," Enzo said. "Once you have seen these faces, you will never forget them."

As they returned across the Arno he said, "Masaccio painted men. Now I will show you Fra Angelico who painted angels and saints."

In San Marco Convent all the figures wore haloes or diadems which glittered like jewels. "Everything is beautiful, everything serene," said Enzo. "Here are the hopes of mankind but no reality. I prefer the *naturalismo* reality of Masaccio."

They sat for an hour in the convent courtyard listening to the rippling of a fountain and the trilling of birds.

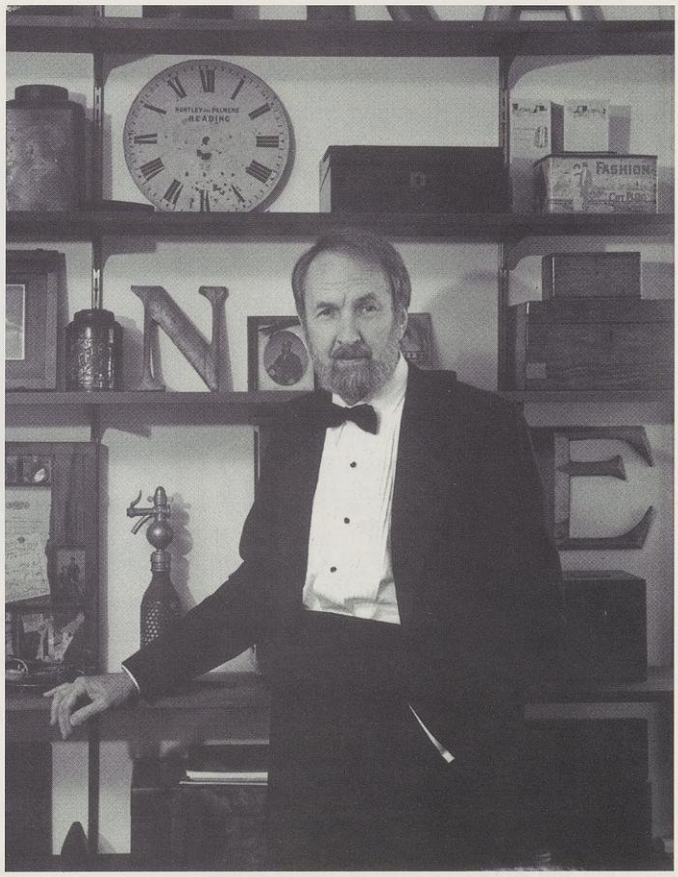
Enzo turned the conversation to his blindness. "I have heard that in America there are famous doctors who do extraordinary operations to make the blind see.

Continued on page 29

The Art of Fred Berman: From Chess Board to Canvas

by E. Michael Flanagan

This spring the University of Wisconsin-Milwaukee Art Museum will mark its tenth year of operation by featuring a retrospective of the works of Fred Berman. It is a fitting tribute, inasmuch as Berman has had a long-standing affiliation with the university and, prior to that, with the Layton School of Art in Milwaukee. His work has been exhibited in significant regional, national, and international shows for nearly fifty years and is included in important private and public collections. The UWM Art Museum exhibition is mounted in recognition of Berman's retirement after thirty-three years of distinguished teaching at the university and features works in five media from his activity which spans five decades.



Alan Magayne-Roshak

Fred Berman.

Fred Berman was born in Milwaukee in 1926, and with the exception of stints abroad in England in the mid 1960s, time spent in graduate school in Madison, and extensive travel, he has lived and worked in Milwaukee. In his youth he enjoyed playing chess, and when he was in his teens he gave some serious thought to devoting his life to the game. But the pull of a career in art was too strong, and he relinquished the strategies of the chess board for those of the canvas. (On occasion he can, however, be seen in the Student Union playing "speed chess," a timed, accelerated version of the game.)

As a young man, Berman's art work was informed and influenced by the style and subject matter of a time when still lifes, landscapes, and urban scenes dominated the painter's world. The Midwest—certainly the region including Chicago and Milwaukee—was not as hospitable to the advent of expressionism and, eventually, abstract expressionism as was the New York art world. The School of the Art Institute of Chicago, for example, remained committed to the depiction of representational, figurative images, and artists who received their training in Milwaukee and Madison art schools were largely influenced by the German academic heritage exemplified by Robert von Neumann, Gustave Moeller, and Joseph Friebert. Von Neumann's heroic depictions of working people (farmers, loggers, fishermen), Moeller's dark landscapes, and Friebert's somber scenes typified the background from which Berman as an artist evolved.

Within three years of beginning his training as an artist he was accepted into the prestigious *Chicago and Vicinity Exhibition* at the Art Institute of Chicago and the *First Biennial of Paintings and Prints* at the Walker Art Center in Minneapolis. His work continued to be exhibited in nationally-prominent museum competitions, and his painting titled *The Storm* (1949) won the Joseph Eisendrath Prize at the 1950 *Chicago and Vicinity Exhibition.* In retrospect, this series of successes in competitive exhibitions is quite remarkable, considering his youth and his limited experience in the art world. These early successes

Continued on page 26

Studio Window. *Oil on canvas, 60 x 35 inches. 1979–92.*

Continued from page 24

set the stage for a career that has existed outside of the traditional setting of commercial galleries.

During the 1950s Berman's art underwent a transformation from the dark collage paintings he was investigating to paintings of urban scenes. One of these paintings, titled *White City No. 2*, was invited to the Venice Biennale of 1956 and another, titled *Razed House IV*, was selected for the 26th Corcoran Biennial of 1959 in Washington, D.C.

The decade of the 1960s was marked by continued success; his work was included in major exhibitions in the United States, South America, and Europe. In 1964, when his work was exhibited at the Milwaukee Art Center, Director Tracy Atkinson noted in the exhibition catalog, "It is a marked growth in the emphasis upon this transformation from the world of reality into the world of art that underlies Berman's recent work. In subject he has shifted from the man-made world of the city, with its varied but limited visual raw material, to the broader, richer world of landscape." The decade also was a time of research and personal growth for Berman, culminating with a one-year exchange program where he taught at the University of Reading, England, and traveled in Europe.

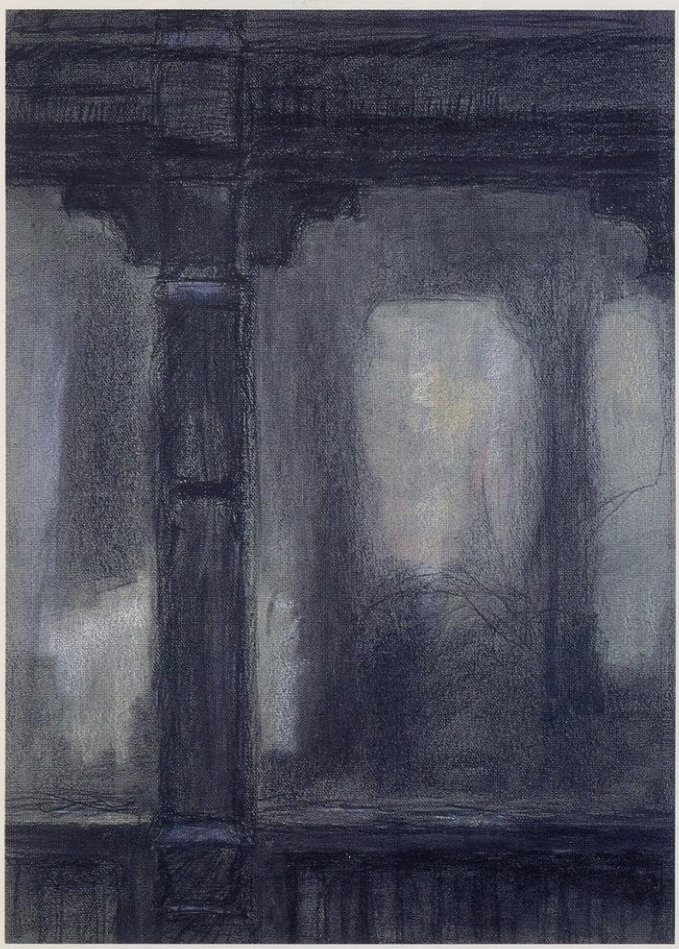
Through the years, Berman has continued his investigation into the atmospheric landscapes and subtle still lifes. He has combined that investigation with an interest in photography which harkens back to his earlier assemblage work. His photographs have received critical acclaim and were featured in a series of exhibitions across the country as well as in England.

Berman's intensity is evident in all that he does, whether he is facing a canvas, focusing a camera, contemplating a chess move, or serving a tennis ball. By combining this intensity with talent and a commitment to his profession, he has carved out his own distinctive niche in the world of art.

The retrospective of Fred Berman's works can be seen April 9–May 29, 1994, at the UWM Art Museum. Call (414) 229–6243 for information.

Reference

Tracy Atkinson. *Paintings and Prints by Fred Berman*, exhibition catalog. Milwaukee Art Center, February 13-March 15, 1964.



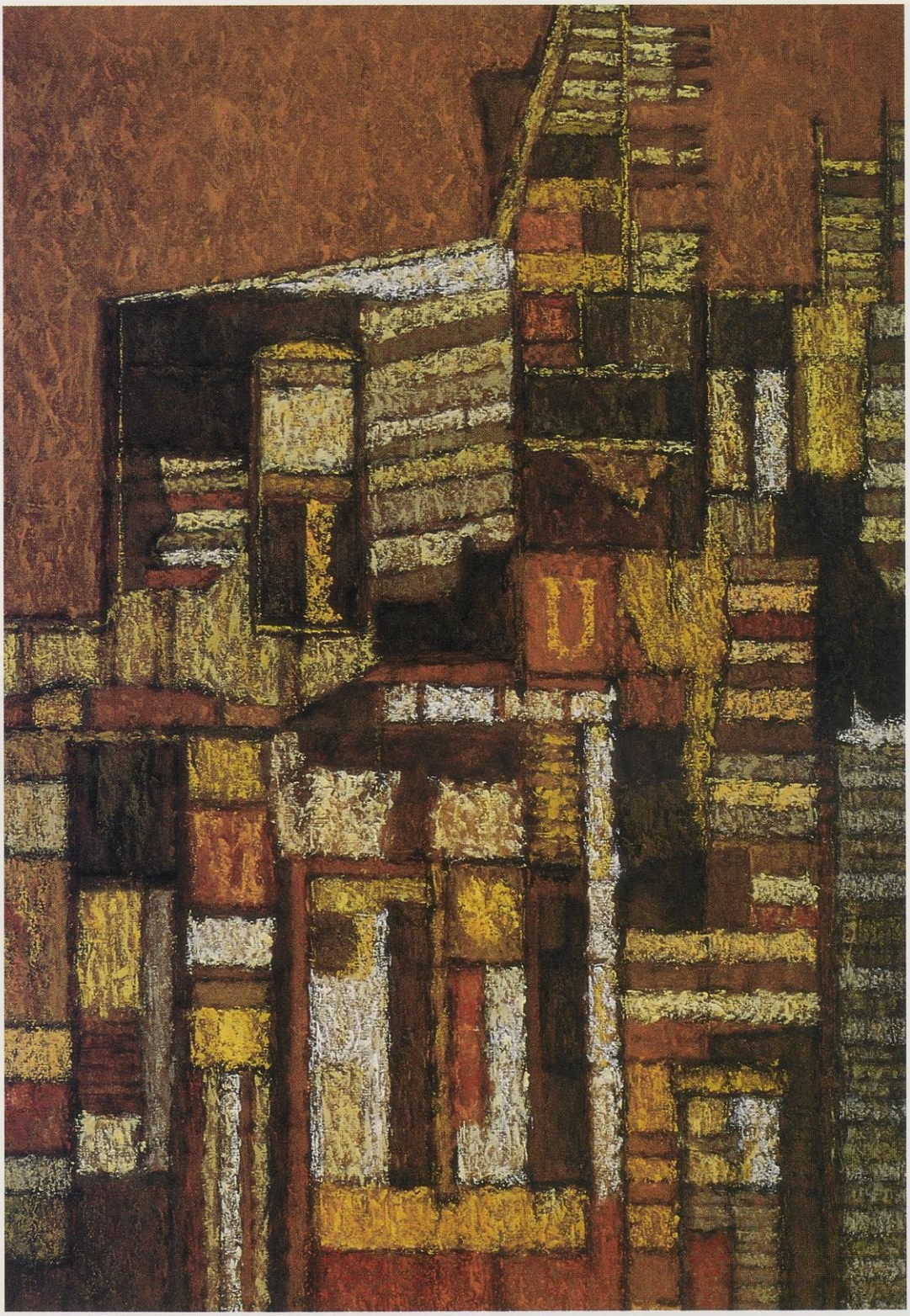
OPPOSITE PAGE, TOP: Aldwych Theatre. *Charcoal, pastel, and collage, 24 x 19 inches. 1989.*

OPPOSITE PAGE, BOTTOM: Her Majesty's Theatre. *Charcoal, pastel, and collage, 12 ½ x 19 inches. 1989.*

TOP: Plaster Studio. *Photograph, 16 x 20 inches. 1980.*

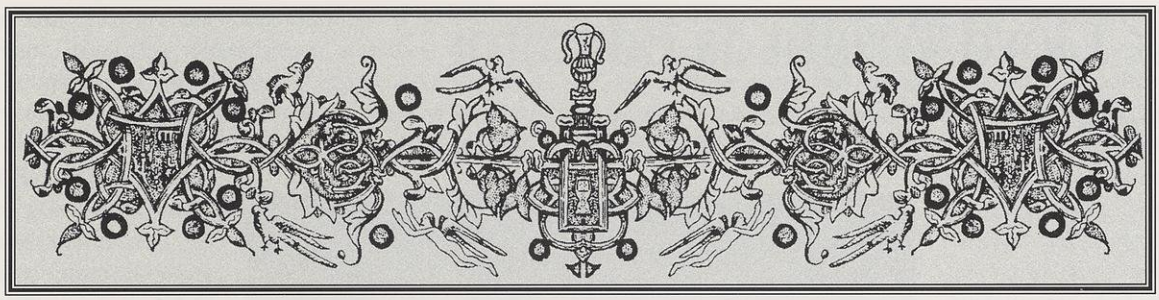
LEFT: Greenhouse Window I. *Charcoal and pastel, 28 ⅛ x 21 inches. 1969.*

ABOVE: Melon Slice. *Oil on canvas, 8 x 10 inches. 1991.*



Razed House V. *Oil on panel, 48 x 34 inches. 1958. Collection Wriston Art Center, Lawrence University, Appleton. Gift of Mr. and Mrs. Bernard Hankin.*

This special color section was made possible through the generosity of the Norman Bassett Foundation.



Continued from page 23

Nic wondered what to say.

"Is it true that American doctors take eyes from dead men who no longer need them and give them to the blind? Do you know such a doctor?"

"I don't know any personally," Nic replied.

"Here in Angelico's garden of hope there is hope even for me. I have a dream to go one day to America and have such an operation."

Nic considered describing a cornea transplant but had neither the courage for truth nor the heart to offer more false hope.

"Such doctors must ask for much money," Enzo went on. "Far more than I could earn."

No longer able to remain silent, Nic said, "If a doctor had the skill to restore your sight, ways might be found to provide the money."

The gratuitous remark seemed to buoy Enzo's spirit and to fill him with joy. "Is a beautiful country, America," he said. "Do you think if such a doctor exists he would give me new eyes?"

Looking into the hollows beneath the masseur's sunglasses, one filled by an ill-fitting artificial eye, the other scarred by a crude surgical effort to disguise an emptiness, Nic regretted having irresponsibly spoken words of encouragement.

"I don't know," he said.

Perceiving the evasion, Enzo's mood darkened. "There are no such doctors," he said angrily. "I shall never return to light. Is that not true?" He seemed to be pleading for a contradiction. "Do I not speak truth?"

"I cannot say," Nic replied, realizing that in his own inability to speak truth he spoke mendaciously instead. "Only a doctor himself could say." He thought he felt a tapping on his shoulder, and he guiltily remembered a boyhood phantom friend who never told a lie.

"If you hear that such a doctor exists, would you speak to him for me?"

"Of course."

"You are my friend?" Enzo asked.

"Yes. I am your friend."

"To know you are my friend gives me great happiness."

Nic told Enzo that he was leaving for Siena the next day.

"Ah, Siena! Many painters in Siena. Simone Martini, Ambrogio Lorenzetti . . . Of course I have not seen them. Will you return to Florence?"

"I will return."

"Then together we will see more paintings."

"I hope so."

"You will always be my friend."

As they said goodbye, Enzo asked the time. It was a quarter to five. "You see, I never know the time," he said. "When I reach the Arno I will already have forgotten."

When Nic returned from Siena ten days later, crossing Trinity Bridge he saw the familiar, slender figure approaching from the opposite side. As they drew closer, Enzo, sensing a presence, waved his cane.

"Excuse me. What time is it, please?"

"*No conosce, mi dispiace*," Nic replied, lowering his voice. "I don't know, I'm sorry." He hurried on across the bridge.

Nic did not stay long in Florence, and he never saw Enzo again. For a quarter of a century the shade of Enzo Melotti had remained the disturbing companion of his conscience and sometimes entered his dreams. Whenever he looked at paintings in museums and churches, he felt Enzo's explicating presence.

❦

The day after Nic's disturbing dream, he waited eagerly in his hospital bed for the intern's morning call.

"May I ask you a question?" Nic began.

"Of course," the doctor replied.

"Is it within the province of medical science to transplant a dead man's eyes for one whose eyes were destroyed in war?"

"What are you thinking about? Surely you're not . . ."

"No, no, of course not."

The doctor paused in deep thought. "I have never heard of such an instance," he said.

"Thank you," Nic replied.

After that, Nic was aware of a new ghostly presence in his hospital room. He knew his burden of guilt for nurturing Enzo Melotti's false hope would haunt him forever.❧

Frank Lloyd Wright as Educator

by Charles Montooth

Imagine a man with interests, talents, and accomplishments so disparate as to attract generations of scholars and critics in equally diverse fields. Such a man was Frank Lloyd Wright. An architect, of course. That was how he made his mark. But he also was a graphic artist of renown whose abstract designs are collectors' items. He was one of the foremost authorities on Japanese prints as well as a collector and expert on screens from the Edo period. He also wrote extensively of his own work, of his ideas on urban planning, economics, democracy, and general improvements for living in twentieth-century America. He wrote about all of these subjects and spoke about them in public lectures and on television to nationwide audiences.

Frank Lloyd Wright was an educator in the broad sense of the term. He also served as exemplar for the apprentices who came to work with him during his long creative life. With the help of his wife, Olgivanna, he formalized his apprentice training work as the Taliesin Fellowship, now in its sixty-second year. He recognized and acknowledged the fact that he could not *create* talent. Instead he offered a unique experience to those who were willing to come and work, and, in working, learn. His instruction was direct, as when he showed us how to sweep without raising dust. Or when in designing a cabaret, he explained the importance of small tables closely spaced. Better for conviviality, he explained. Tidbits of wisdom for those lucky enough to be around at the opportune moment. And he had practical ideas on every conceivable subject of daily life. He scorned the professor-to-student lecture means of teaching, yet he did talk to his charges. When he talked, he spoke from experience. He was eminently believable.

His means of assessment of performance was simple and direct. It stemmed from the philosophy inlaid on the balcony parapet of the studio at Hillside: "What a man does That he has." What was done in the field, on the farm, in the studio, in the kitchen, with flowers, or what was presented twice a year as design projects of imagination was that by which the learners would be judged.

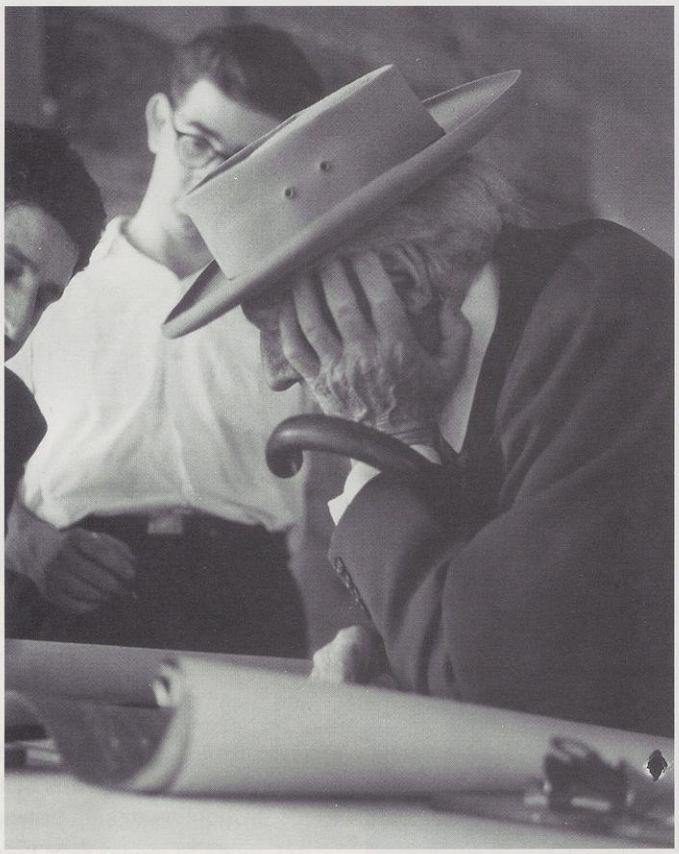
HB -4414H

Frank Lloyd Wright with the Taliesin Fellowship, circa 1930s. Hedrich-Blessing photo, courtesy Chicago Historical Society.

Many learners were not close enough to be critiqued except, perhaps, in passing. Nonetheless, architects the world over would be apt pupils, for what noted architects of the twentieth century failed to learn something from him? What architects were not in some way indebted to this pioneer prairie preacher of form? Wright saw and admired good work, often that of unsung practitioners. He could phrase a comment (when asked) in such a way as not to offend. He could play the diplomat, especially if delicate sensitivities were involved. But he could also be offensive. He could criticize the overly self-assured just as he could support and encourage the talented but insecure. If nothing else, he was truthful, blunt, and direct.

To me, as one of his students, he personified integrity. It came through in his work and in his life. He was a man of considerable complexity, but one who lived and worked by principles he professed early in his career.

One of the principles involved fame. He initially set out to work for neither fashion nor fame, but fame eventually came, no doubt because of the integrity of his work. It also probably was helped along by the easily perceived eccentricities of his lifestyle: his dress, his automobiles, his marriages. This lifestyle, in turn, was true to his strongly individualistic nature.



Frank Lloyd Wright at work, 1952. Copyright Pedro Guerrero, 1985.

❦

As is historically often the case with teacher and learners, those who worked closely with Wright became adept at recreating his message but lacked the creativity or design independence to bring forth a new one. Indeed, in architecture, seldom if ever have fresh new concepts arrived on the scene completely developed (as was the case with Shaw's twenty-fifth-century youth who burst forth fully formed from an egg). Rather, such new paths tend to evolve over time. Even the gothic era, with great cathedrals rising over France within a century, did not arrive as one expression. Tradition and the nature of the art form conspire against the single genius changing the shape of things overnight.

But if ever an architect came close to doing it, Frank Lloyd Wright was the one. In his case, in the unprecedented climate of innovation in art, music, drama, and literature, as his work began to be known, his apprentices began to carry coals from the Oak Park Studio throughout the Midwest and even abroad. His first period of creativity was summed up by the dramatic, photogenic Robie House. It took two decades for his work to develop to his satisfaction and to critical acclaim. The evolutionary or organic nature of it, however, made it unlikely that a "style" would emerge and completely dominate building nationwide. Nonetheless, the logic and simplicity of Wright's work appealed to a broad range of perceptive patrons who doubtless were influenced by the trends in art and music as well as by the technological magic and industrial advances of the time. Wright seized upon these advances and introduced innovations of his own.

Throughout the Midwest and beyond, buildings began to appear with clean lines and organized fenestration. Buildings of brick or stucco trimmed with broad horizontal bands of contrasting stone or wood were to be seen, sometimes in unlikely, out-of-the way places. Some of the buildings were well-proportioned and handsome. The tradition of talented, aspiring architects working with Frank Lloyd Wright, then going out on their own, is one that continued throughout his life. They came as apprentices and progressed as their natures intended or permitted.

Although we did not use the terms, it was clear that we were *apprentices* to a *master*. But initiative was not stifled. Indeed, it was appreciated and encouraged. Wright often said he wanted us to be the kind of citizens who, encountering an obstacle such as a fallen branch on a road, would immediately take action to remove it.

Wright was quick to take an idea which had merit and transform it into something of his own. But Wright was Wright, and, to my knowledge, no one else of his stature has emerged. In the work of his son Lloyd, William Wesley Peters, Aaron Green, Fay Jones, John Lautner, John Howe, and in the fantastic creations of the Bruce Goff-Bart Prince-Art Dyson school, the influence is apparent along with much original thought. Such work is more than admirable—it is successful.

❦

Members of the Taliesin Fellowship at the drafting tables in the Hillside drafting room, Spring Green, 1960. Charles Montooth is standing second from the left. Photo OBMA FLWFA, courtesy the Frank Lloyd Wright Foundation, Taliesin West, Scottsdale, Arizona.

In music, an art form Wright often compared to architecture, we have analogies which resonate more clearly with my experience than with other fields of endeavor where the mastery of craft is handed from one to another. However, the gap between ultimate genius and followers does not appear as great as it does in architecture. Mozart followed Haydn and paid his respects with the quartets named for his mentor. Schubert followed Beethoven at some distance, if not in time. There was influence, but also creative difference.

The most relevant analogy of master and pupils may be Wright's contemporaries: Schoenberg, Webern, and Berg. The music of the pupils was different and original, although built upon the same harmonic principles as those of the teacher. Berg's music was brazenly romantic, lush, colorful. Webern's was masterly crafted, completely original, dynamic yet lyrical, rich in sound yet sparse in harmonic texture. It too began as romantic. But Schoenberg was not quite the unique figure in music that Wright was in architecture. And it remains to be seen if those who have built and continue to build upon Wright's organic principles attain the recognition of Schoenberg's disciples.

It does not matter much to society. Good buildings are needed. If the work proves popular, practical, and poetical, it will be appreciated. The view appears now widespread that a design must respond to a client's needs rather than to some stylistic tradition, that it should consider the context in which it is destined to reside, and that it may defy fashion to bring building more closely to the architecture of which Wright spoke and wrote. Architects invariably speak of an "idea" behind each of their creations.

What Frank Lloyd Wright did for his colleagues, his fellow architects in general, and his immediate followers in particular was to make the practitioner significant, in fact the key figure on the building scene. He did this by his commanding presence on the professional scene in spite of adversities and long periods without commissions. He also made the architect an artist. In avoiding work for fashion, he made architecture fashionable. He made the architect one of the major professionals in society. He did this by being himself, by setting an example, by holding to high principles.

❦

Frank Lloyd Wright was a most unusual man, the kind of man he himself most admired: a natural. He claimed to be arrogant, yet he was astute enough to recognize the wisdom of his beloved wife, Olgivanna. He understood that his confrontational nature had to be harnessed so that he could be effective in his work. The firm hand and mind of Olgivanna, his partner, attempted to thrust forward his innate charm while curbing his combative instincts.

Education was an important element in Wright's life. The intellectual philosophy of the Hillside School at Spring Green was part of his family heritage. While in Japan, one of Wright's important commissions was the design of the Jiyu Gakuen Girls' School in Tokyo (1921), also known as the School of the Free Spirit. It is one of three Wright buildings standing in Japan today and is still used as a progressive academy for girls.

I was one of the apprentices who arrived at Taliesin toward the end of Wright's career. I knew him as a teacher, and I now have had occasion to reflect on our roles as learners. Wright was a source of inspiration for legions who followed him, and his influence continues to inspire today.❧

Dr. Hickey's Advice: A Former Student Remembers

by Eduardo Santana C.

I was born in Havana, Cuba. At the age of four my family moved to Puerto Rico, where I grew up. My sensitivity to nature came from my mother and father, although neither was educated in the natural sciences.

My mother was raised in the Cuban countryside, in a dirt-floor house surrounded by chickens, hogs, and horses. She often would tell me beautiful and exciting stories of life in the country. My father was a building contractor and would take my friends and me tromping through the woods whenever he had to check the location for a new road or bridge. My parents taught me few facts about the natural world, but they did teach me to love it.

At the age of seventeen, in 1974, I moved to Madison to attend college. I had graduated from a small high school of about 350 students, and most of what I knew about wildlife ecology at the time I had learned from television shows like "Wild Kingdom" and "The Wonderful World of Disney."

The University of Wisconsin seemed like a huge monster to me. During the first semester, I had a bad experience with a professor who, when I asked him a question after class, told me that I did not belong in college. He simply did not understand the needs of a young, inexperienced foreigner. I decided to search for other career alternatives.

One day, I consulted my advisor, a medical student. He suggested that I talk with Professor Joe Hickey whose wildlife ecology course he had taken as an elective. He said he had enjoyed it very much, had met his wife in the course, and Hickey had attended his wedding. My advisor was black, so at least I figured Hickey wasn't racist, an important consideration inasmuch as I had had some ugly experiences in Madison.

Joe Hickey and I got along well right away, and he agreed to be my advisor when I transferred to wildlife ecology. He also gave me some advice: "Don't worry about what one professor told you. Stay after class and pester your professors with good questions. Make sure that you understand everything." A few weeks later I was officially an undergraduate student in the Department of Wildlife Ecology. At that time I didn't even know who Aldo Leopold was.

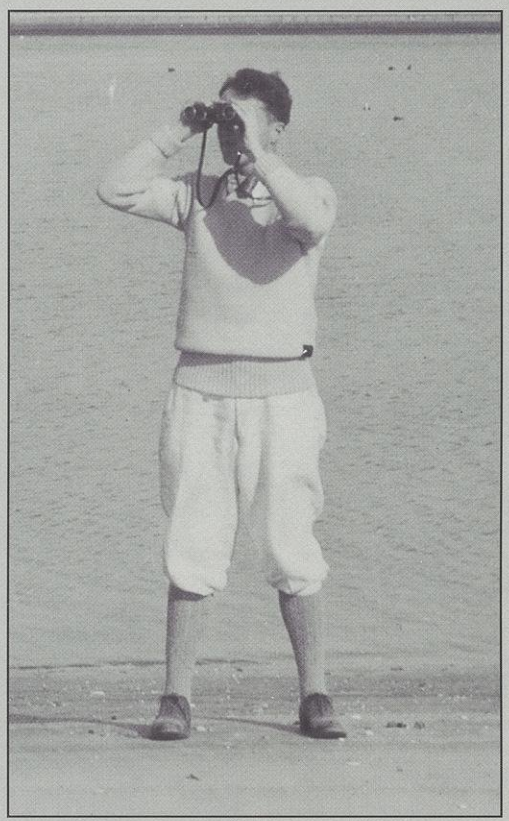
Joseph Hickey in the field.

❦

The following semester I took Hickey's wildlife ecology course. He always started the class with recordings of bird songs that he often imitated by whistling while tilting his head sideways back and forth. He also explained the context in which the birds sang. Often he would have mammal and bird skins on a table so students could get some hands-on experience, and he used many color slides during lectures. His course was sometimes criticized for not being technical enough, yet I now see

Joe Hickey and The Bronx Boys

by Roger Tory Peterson



Joe Hickey in 1929, age 22.

I first met Joe Hickey nearly seventy years ago, and he became one of my dearest friends. I would not have written my field guides had it not been for Joe and the Bronx Boys. How these nine teenage boys of various ethnic and social origins, living in various parts of the Bronx, found each other, heaven knows. They organized themselves as the Bronx County Bird Club, and Joe Hickey became the permanent secretary. The official membership stayed at nine for years, but they had started a revolution. I was the first outlander—the first non-Bronx member.

Those days I spent around New York with the members of the Bronx County Bird Club were wonderful. From them I learned the tricks of the trade, and being trained as an artist, I was able to pull things together and give them visual form. This led to my first field guide to the birds.

Joe was birding on his own when he was twelve and, lacking glasses, he used to climb a tall maple tree to see warblers close up. He was thirteen years, ten months old—he remembered the big day exactly—when some kind gentleman he had met near the Bronx Zoo gave him an old pair of opera glasses. That started him on the road to sophisticated bird-watching. Like so many gifted people whom I have known, his spirit soared highest on the wings of birds.

The generation that Joe and the Bronx County Bird Club represented became the focal point of the birding movement. The Linnaean Society was their base and source of influence. In 1943 Joe Hickey's *Guide to Bird Watching* was published, and he became a tremendously influential conservationist, especially when he moved to Wisconsin to work with Aldo Leopold and then to succeed him, culminating in his work on DDT, peregrines, and other raptors. Hundreds of Joe's students have moved into and built up the structures of modern conservation and environmental studies.

Joe knew the meaning of conservation: the value of birds, animals, forests, waters, and soil; the joy and well-being to be found in their study and contemplation. He felt it was a sacred responsibility to pass these things on to the future.

Roger Tory Peterson is author of the Peterson field guides to birds.

his objectives. In addition to providing the basics of wildlife ecology to majors, he had designed his course to serve as a motivational experience for non-majors, helping to raise concern about environmental issues and promoting activism in nature conservation. (We have come full circle and now see the need for that type of course in college curricula.)

Every day, following his early advice, I stayed after class to ask him questions. Some of my questions might have been interesting, but most, I now realize, revealed my complete ignorance of wildlife and nature in general. Despite this, Hickey never discouraged me from continuing in the wildlife field. However, he did seem a little distressed one day when I solemnly asked him, "Dr. Hickey, what is a thistle?" and he replied, "Of all the city boys I know, you're the cityboyest." Not the best compliment for a student who wanted to live out in the wilderness and study wolves and eagles.

That semester came and went. I received an A in his class and earned A's in most of my other classes as well. However, at the age of nineteen, new experiences touched my life and the lives of friends close to me: strange cultures, strange religions, racism, love, sex, rape, homosexuality, drugs, alcoholism, imperialism, and armed struggle for liberation. All of a sudden, studying wildlife did not seem to be all that relevant. There were too many problems to solve in the world and not enough time. Worst of all, I understood little about the world, which I felt I had to change. I was learning new things and experiencing new feelings so fast that I couldn't process everything. I needed time to think.

So, I began thinking—and as sometimes happens with students who spend time thinking, I began flunking most of my classes. I finally decided to go and chat with Dr. Hickey. For about twenty minutes I

paced back and forth in his office, giving him a long dissertation about social injustice and human suffering and how I needed to do something about it. I told him I didn't care that I was flunking most of my courses.

I was sure my presentation was going to ignite a complex and stimulating discussion of the biologist's role in abolishing social injustice—discussions similar to those I had been having with friends at the Memorial Union, the 602 Club, and the Cardinal Bar. But all Hickey said was, "I think you're burned out. You've been working too hard." He didn't talk about politics or sociology. He said he would play his role *in loco parentis* and was pragmatic about the whole situation.

Again, he offered some advice: "If you don't care about school then drop out. No sense to waste your time. Maybe you will have wasted your money, but let's make sure those F's stay off your record by dropping out early. Second, let's get you a job in a wildlife refuge where you can get some experience and can decide if wildlife ecology is the field for you." So he made one phone call and immediately got me a position as a technician with the U.S. Fish and Wildlife Service.

❦

I was assigned to the Chatauqua National Wildlife Refuge in Illinois, part of the Mark Twain National Wildlife Refuge. When Hickey learned where I was going, he told me that he had a friend who worked near that refuge. "Do you know who Frank Bellrose is?" Hickey asked. "Nope," I answered. He rolled his eyes (again!) and took me into the library and showed me a whole collection of scientific articles on waterfowl written by Bellrose. I did not know it, but Hickey then called Bellrose and asked him to take care of me.

Bellrose was the first person with whom I went bird-watching for shorebirds, and he set me up to work with biologists at the Illinois Natural History Survey. The summer experience had its ups and downs, but it served to get my thoughts and feelings in focus again. I learned what it was that I wanted to get out of college, and, more vaguely, out of life.

I returned to Madison feeling I owed my life to Joe Hickey, and I told him so. I also told him I didn't know how I could ever pay him back for all the help he had given me. He answered by giving me still more advice: "Some day you will be in a position similar to mine. And when you get to that point, you will have the opportunity to help others. And every time you help another person, you will be paying me back for the help I gave you." That was one of the most important lessons of my life, one that I have never forgotten, and one that I have taught all my students in Mexico.

Although I owe much to various mentors and friends in my career, I might never have become a biologist had Joe Hickey not had the sensitivity to understand me and help keep me on track during those early years. I eventually graduated "with distinction" and went on to work for the U.S. Forest Service on the conservation of the critically-endangered Puerto Rican parrot.

When I returned to school for a master's degree, Hickey, although retired, was there to share his wisdom. He gave me advice like, "Always discuss your research project. You will think of things while you're talking that you will not think in silence. Ask fellow students and colleagues for their opinions and criticism." He steered me through the university bureaucracy and politics and wrote important letters of recommendation.

The last formal bit of advice Dr. Hickey gave me was in 1985. I had just received my master's degree and was leaving for west-central Mexico to help create a biosphere reserve in a remote mountain range. Other professor friends gave me practical advice about meeting the new challenges I was going to face in my first professional job. Not Hickey. He told me, "First, find the right woman and get married. Women have been very important in my life. Second, get your union card—in our business, this means get your Ph.D."

❦

Some say Dr. Hickey's greatest contribution was his work on DDT and the conservation of the peregrine falcon. Others say it was his novel use of bird band return data to conduct life-table analyses. Still others say it was his leadership in conservation organizations like the Audubon Society and the Nature Conservancy. I, however, feel that his greatest contributions came in his role as a teacher and advisor. At the beginning of each semester you could easily identify Dr. Hickey's office. It was the one with a crowd of undergraduate students waiting in line to talk with him.

In unquantifiable ways, he helped many young students and biologists at crucial times in their academic and professional careers. If only a fraction of those he helped are now following his advice of helping others, then his goodwill is spreading widely, making this a much better world.❧

These excerpts were taken from readings given on September 5, 1993, at a memorial service in Madison for Professor Joseph Hickey (1907–1993), who was a long-time member of the Wisconsin Academy.

"Joe Hickey's greatest striving was to be a good teacher. It was also his greatest success professionally. He worked with exceptional zeal and dedication in preparing his classroom presentations . . . The students responded with enthusiasm."

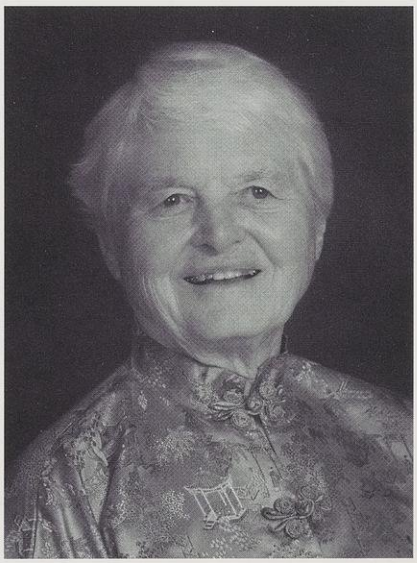
Robert A. McCabe,
emeritus professor of wildlife ecology,
University of Wisconsin–Madison.

Margery Aber and the American Suzuki Institute

by Patricia D'Ercole

It was August 1967. After a thirty-year career of conducting high school orchestras and teaching string instruments to students in the Detroit public schools, Margery Aber joined the music department at the University of Wisconsin-Stevens Point as a teacher of violin. The journey from Detroit to Stevens Point had been a particularly long one, because she had traveled via Japan. Aber was one of approximately forty people that August who were part of a tour sponsored by the American String Teachers Association. The tour offered them an opportunity to observe and investigate the phenomenal success of Shinichi Suzuki and his method of teaching violin.

Margery Aber had had her first introduction to the Suzuki method three years earlier when she attended the Detroit performance of a tour group from Japan. There were approximately ten violin students, ages five through twelve, whose stunning solo and group performances of the standard violin literature amazed the audience of American music teachers. At that time in the United States, interest in the study of string instruments was so low there was some concern as to whether there would even be a future for symphony orchestras in America! Naturally, American string teachers were interested in knowing the secret to Suzuki's success.



Margery Aber, 1992.

During the August 1967 tour, the American teachers were enthusiastically received in Japan, and Suzuki, a man of small stature but magnanimous character, was an inspiration to all who observed him. His method was simple: Teach music in the same way that children learn their native tongue. In other words, enrich the environment with music, start early, have parents serve as beginning teachers at home, move in small steps with much encouragement, make repetition fun so that mastery of the skill is acquired, and delay note-reading.

When Aber took her position at the university, she was eager to try these ideas, but how? Fortunately, the University of Wisconsin-Stevens Point School of Education had an elementary laboratory school at the time. Once they found out that she had studied this innovative method of teaching music, she was assigned to teach in the lab school for one hour each day.

She started the first year with twenty-one eager violin students and their parents. Eventually the lab school was phased out, but the University of Wisconsin-Stevens Point College of Fine Arts decided to keep the Suzuki program as a community outreach program. Thus the American Suzuki Talent Education Center (ASTEC) was founded in Stevens Point.

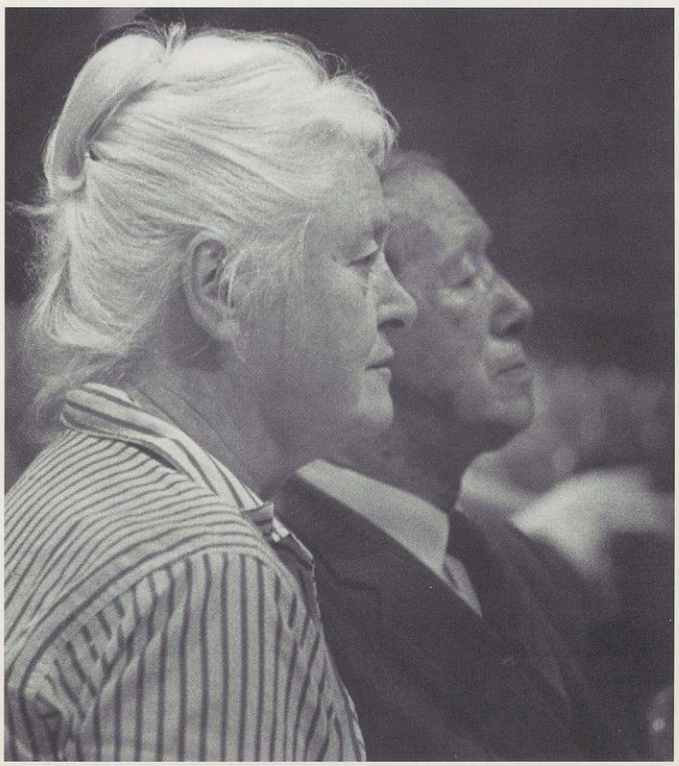
The more Margery Aber taught, the more she realized the importance of the learning environment. To enrich it she was eager to begin a week-long summer institute for all Suzuki students in this country, patterned after Suzuki's program in Japan. Not only would this be a place for students to be inspired by each other and by the finest teachers available, but teachers and parents could share their ideas and enhance their understanding of Suzuki's philosophy and pedagogy. Thus in 1971 the first American Suzuki Institute (ASI) was held on the campus of the University of Wisconsin-Stevens Point with twenty-one teachers and 350 violin and cello students.

In subsequent years the offering of the institute grew to also include both children's lessons and teacher training in piano, viola, flute, and harp, as well as a two-week chamber music program. Highly reputable American, Japanese, and European teachers were on the faculty, and Suzuki himself visited for two weeks in 1976 and again in 1984.

The institute grew in size as well. In its years of existence, the American Suzuki Institute has served a total of 33,224 stu-

Margery Aber and young student.

dents and trainees coming from all fifty states and nineteen foreign countries. This figure does not include the estimated 50,000 parents and relatives who, accompanying their children, also have come under its influence. The ASI is still the largest of the sixty-plus institutes held each summer in the United States, all of them using the Stevens Point program as a prototype.



Margery Aber and Shinichi Suzuki.

Because Stevens Point became the gathering place for leading Suzuki teachers in the movement, it was logical that they would discuss their needs and aspirations for the future. Thus the ASI holds another distinction: In 1973 it became the birthplace of the Suzuki Association of the Americas, the professional organization of Suzuki teachers in the Western Hemisphere.

❦

As a clinician, Margery Aber has traveled worldwide. She has introduced the Suzuki method to Germany and Estonia. She has taught both children and teacher-trainees in the United States, Canada, Japan, China, Belgium, Finland, Australia, and New Zealand.

But while Aber's renown as the founder and, until her retirement in 1984, as director of ASTEC and ASI is nationally and internationally recognized, her violin teaching to students of all ages, before and after her introduction to Suzuki, should not go unnoticed. This is her second important contribution to the world of music.

Dating back to her tenure in Detroit, Aber's orchestras were consistently outstanding. Many of the students she trained continued their study with members of the Detroit Symphony Orchestra, and seven of them eventually became symphony members themselves. In Stevens Point, her pre-collegiate violin students have won scholarships to such prestigious music schools as Julliard, Boston Conservatory, and Oberlin. Her students have participated in international tours and have performed as soloists with the Milwaukee, Madison, Green Bay, Fox Valley, and Central Wisconsin symphonies.

Now in her fifty-seventh year of teaching, Aber's vision, enthusiasm, and zest for life appear not to have dimmed. (Though she has been officially retired for approximately ten years, she still teaches fifteen students, ages five to adult.) She gave a recital in February and is contracted to teach at three institutes this summer. Four years ago she thought the American Suzuki Talent Education Center should sponsor a biennial research symposium; today she and her committee are planning the third such event.

While Many of Aber's students have majored in music and are now teaching and performing, her real goal has not necessarily been to produce professionals, but rather to give each student an excellent education in music. However, she does not believe in limits for herself or anyone else. Perhaps that is why she understands children so well. To children all things seem possible, and their imaginations know no bounds. Both Shinichi Suzuki and Margery Aber have based their professional lives as teachers on this philosophy.❧

Photos by Arthur Montzka, courtesy American Suzuki Journal.

The Karen Fredrikka Falk Johnson Story: One Teacher's Legacy

by Kenneth S. Sacks

In March 1991 the Department of History at the University of Wisconsin–Madison received several small gifts in memory of Karen Fredrikka Falk Johnson. Many of the donors lived in Wisconsin, but others sent contributions from California, Hawaii, New Mexico, North Carolina, Texas, and Washington. Professor Charles Cohen, associate chair of the history department and the person in charge of the department's endowments, called the University of Wisconsin Foundation to ask about Karen Johnson. The foundation had on record that she was a graduate of this university (B.A. degree in 1919, M.A. in history in 1941). Holding the title of assistant professor of education, she had taught at Wisconsin High School, run by the university, from 1946 until 1964. She was then emeritus until her death on December 8, 1990.

With just that little to go on but inspired by the outpouring of affection for Karen Johnson, Cohen established a fund to honor the memory of this faculty member who students felt had been such an outstanding teacher. The first Karen Fredrikka Falk Johnson Prize was awarded to an exceptionally talented assistant professor, and the money earned from the fund went toward buying him a book.

A year later, however, the department received a substantial donation to the Karen Johnson Fund from Victor S. Falk III of Florida. (Falk is, of course, Karen's original family name.) By inquiring again at the foundation, we learned that Victor Falk III was forty-seven years old, born nearly half a century after Karen Johnson. I began to wonder: What was their relationship? Both had attended the University of Wisconsin. Is the Falk family local? There is a Falk school in Madison. Was there a connection? I knew Karen Johnson's graduation and employment dates, but that told me little about someone who clearly had inspired much love and admiration.

Because she had taught at the University of Wisconsin, her past was easily recoverable. Local information was available, and Lola Pierstorff, professor emeritus from Johnson's department, sent me a copy of the memorial resolution read at a faculty senate meeting after her death. There were nineteen donors of gifts in her name, and I wrote to each for personal recollections about Johnson. As a result of the research, I spent an informative and enjoyable evening with her nephew and niece, Dr. and Mrs. Victor S. Falk, Jr., who, I discovered, live in Stoughton!

The reason for the outpouring of affection for Karen Johnson became more and more apparent as we spoke to and heard from acquaintances and former students.

I learned that Karen Fredrikka Falk (Johnson) was born in Stoughton on October 28, 1897, on land once owned by Daniel Webster. Her grandparents had emigrated from Norway to Wisconsin in the middle of the nineteenth century. I learned much about her family history, including the fact that at one time one of her relatives lived in Madison in the house next door to that which I now own!

Although opportunities for educational advancement for women were clearly limited, Johnson achieved great distinction professionally and in her community. The details supplied by friends and relatives reveal the qualities of a remarkable person.

Johnson graduated from Stoughton High School in 1915. She attended the University of Chicago on a scholarship (surviving letters reveal how hard she studied) and transferred to the University of Wisconsin–Madison for her sophomore year. During the time between receiving her two degrees, she taught in high schools around the state: Rice Lake, Westby, Mondovi, Marinette, South Milwaukee, and Sheboygan. As a social studies instructor, she was especially fond of geography and Wisconsin history. The hallmark of her teaching philosophy was her commitment to making instructional material meaningful to students. The resolution of the University of Wisconsin faculty senate confirms her innovative methods:

She wrote and edited curriculum materials that combined elements of the history, geography, art, literature, agriculture, music, and geology of Wisconsin. These materials were widely used by teachers in Wisconsin and by the student teachers when they went out to teach and were distributed statewide for many years by the Wisconsin Department of Public Instruction.

In 1941, when Johnson earned her master's degree in history, she worked with the chair of the department, Professor John D. Hicks, who was one of the most distinguished faculty on the University of Wisconsin campus. Her thesis was titled, "War Propaganda in Wisconsin, 1917–1918." A condensed version, "Public Opinion in Wisconsin during World War I," appeared in the *Wisconsin Magazine of History* (volume 25, pp. 389–407, 1942). There Johnson explored Wisconsin's dichotomous reaction to the war: The state was among the leaders in recruiting soldiers and in per capita investment in war bonds, yet it also was home to many of the most famous defenders of isolationism (for example, Robert M. La Follette, Sr., and Victor L. Berger).

Johnson's writing is clear and evocative, the judgments sound and based on carefully-compiled statistics. When she discusses two sides of a delicate situation which included outright harassment of citizens reluctant to buy Liberty Bonds, she draws clear conclusions without imposing a moral judgment. Her admiration for the University of Wisconsin, however, is evident when she attributes to its faculty the state's rich tradition of free expression that helped spawn the different reactions to the war:

> Wisconsin's most important contribution to the nation has been hard-wrought political and educational experimentation. Carl Schurz, fresh from the German revolution of 1848, was one of [Wisconsin's] earliest leaders and a trustee of her university. John Bascom, the moral philosopher, when president of the university, trained a whole generation of fearless political athletes, Robert M. La Follette, Sr., among them. Professor Ely kindled the light of independent thought in hundreds of young minds; and later there were President Van Hise, Professor Commons, and other sturdy thinkers.

Karen Fredrikka Falk Johnson during the 1920s when she was a teacher at Wisconsin High School in Madison. Photo courtesy Victor Falk, Jr.

I consider her to have been one of the most profound educational influences in my life.

Professor Sherwyn M. Woods, director of the Department of Psychiatry at the University of Southern California's School of Medicine, was one of Johnson's students at Wisconsin High School located on Henry Mall on campus (the building was razed in 1993). The professor writes:

> I first met Karen Falk Johnson as a seventh or eighth grade student at Wisconsin High School at Madison. Her social studies course was the high point of my year, not because I was so enamored of the subject, but because I was captured by her vibrancy and love of learning. She had the capacity to make virtually any topic come alive to the point of making one want to know far more than was required by the course. . . . We saw each other from time to time all the way through my medical school career, and after I moved to California we still maintained contact. . . . I consider her to have been one of the most profound educational influences in my life.

The reason for the outpouring of affection for Karen Johnson became more and more apparent as we spoke to and heard from acquaintances and former students. The Falks of Stoughton relate that Johnson tried to meet a new person every day, and that right up until her death, at age 93, she was independent and socially active. She was involved in the foreign student exchange program in Dane County, began the first children's education magazine in the state, and was a pioneer in preparing educational programs for television. There is still much more to learn about her and her family (which can be traced back to 1689 and includes the noted historian Stephen Ambrose).

Certainly, the education she received was exceptional for a woman of her time, and she obviously took advantage of the opportunities presented to her. She has left a legacy as a distinguished Wisconsin educator. And in the University of Wisconsin–Madison's history department, her life and contributions to learning now will be honored annually through the Karen Fredrikka Falk Johnson Teaching Award.❧

Perspectives on Mr. Getzinger

by Richard Matthews

"Mr. G's out!" a child shouts, and a half dozen others stop schreeching at a silent cat, drop from trees, dash through a sprinkler's rainbow, and tear across the tree-shadowed street, slowing only as they reach the blacktopped Getzinger driveway. Their excitement seems to grow out of the wake of his calm, and he seems to grow calmer as they close in. There is so much to do, their mad sprint seems to say, but Mr. G does what he does slowly, as if each move matters.

A small, sad smile raises the corners of his mouth as he hears the children's stampede cease, and the street they all share becomes quiet. Birds can be heard calling from the trees. Still Mr. Getzinger doesn't exactly acknowledge the children. He only draws on his pipe, tendering an intimate whistle. Then into the grass he drops one of the two silver shafts he is carrying, takes the other in both hands and sights down it at the ground.

Is he a father figure? An abandoned retiree? An untethered intellectual?

It might be implied by the meticulous grooming of his lawn, the absurd spotlessness of his garaged car, and his every unharried action that he has no children of his own. And it might be told that the gathered children's own parents are terse midwesterners whose faces turn hard and real, cracking with the roads in the long winters and softening only by degrees with each spring thaw. Is the unfinished Mr. Getzinger so different? Most of the children apparently think so, though the dullest of them might only guess his age (about fifty) and note the thin gray hair combed sideways and the way the glass circles of his always turned-away eyes glint at certain angles in their plastic and metal frames.

Even now, as the children have joined him on his lawn, Mr.Getzinger doesn't look directly at any of them. Do they speak to him? Apparently, because he bows his head when one of them steps tentatively forward. Then he seems to nod, however slightly, but it is hard to discern whether his head is manipulated only by nerves when he drops it into that severe angle. Perhaps this is what intrigues the children, this seemingly reverential posture.

Mr. Getzinger doesn't seem to judge the children. His attention, if his careful movements and monk-like countenance are any indication, is turned inward. Or is he only self-absorbed and oddly distracted at the same time, plagued like most of the country by television and the gap between the *promise* of an easy life and the *actual* day-to-day? Maybe he understands more than most. Maybe he doesn't judge the children because he is a genuine humanitarian. But maybe he just doesn't care, is simply too tired or too preoccupied by what he has come outside to do.

They see the ball climb over an unpaved road beyond the field and then gradually level out and fall beyond a line of ancient oaks which guard the school and its trimmed fields.

He reaches down into the bottomless pockets of his trousers, and some of the children start at the hopeful jingle of coins as he pulls out a dozen small white balls, dropping them in the thick grass on his little rectangle of lawn. (At least part of this audience, it appears, has arrived only for the reward that sometimes follows the ritual.)

Now the children stand back importantly in a half-circle as the still-smoldering pipe is dropped in the grass. Then, after

a practice swing at an imaginary ball, their Mr. G, with another swing, this one followed by a little "click," sends a real, dimpled ball into the feathered Easter blue sky over a long green house across the street. Hushed ejaculations, variations on oohs and aahs, crescendo and echo the arching shot as it flies out of sight beyond the house toward an empty lot the children use for football games. The metal shaft in Mr. Getzinger's delicate hands glints like a magic wand, and in the wake of the children's concerted gasp his held smile escapes this time, like a magician's dove, with a protesting flap of wings followed by a demure tucking and a dignified readjusting of an original, remembered stance.

Minutes later, after all the balls have flown and disappeared in the same manner over the same house, Mr. Getzinger takes a little wooden tee from the breast pocket of his seersucker shirt and scrapes the black dirt from the grooves in his club face. Then he starts across the road, the children following in the cool shadows between houses, until he reaches the vacant field. There they overtake him.

"We'll get 'em for you," one of the little followers boldly and peremptorily suggests, and Mr. Getzinger only stifles his sad smile again (or perhaps it is sad because he stifles it). The children accept this as an important sign, a call to action, and stoop and scramble to corral the neatly scattered balls.

Mr. Getzinger then drops one of the two shafts he has carried with him, and he again takes up a hitting position. Once more the children move back, the largest of them directing their circle so that it opens this time toward a shining field behind the local high school across the way, a much farther distance. The children wait in suspense. They are quiet enough to hear the wind in the grass, and they hold very still; they can see that Mr. Getzinger now stands in the shadows they cast.

The shaft glides slowly back again and then whips forward, slightly faster this time. The children hear the ball whistle low over an adjacent field of weeds (in the middle of which lies a fort they have been building of cardboard and grass). They see the ball climb over an unpaved road beyond the field and then gradually level out and fall beyond a line of ancient oaks which guard the school and its trimmed fields. Meanwhile, the shaft in Mr.Getzinger's hands comes to rest across the back of his shoulders as he watches with the children. Some of them must move quickly to one side to see the tail end of the ball's flight. Then, after a moment to let the oohs and aahs die down again, he hits another ball to the same field, and then another, and by the time each lands, it looks, in the thick waves of summer, like a flung stone tumbling into a silver sea.

When Mr. Getzinger has again finished hitting his whole bevy of balls, he repeats the club-cleaning ritual and then starts toward that shining expanse, the children following, now skipping and flashing to the incessant jangle of coins in his pocket.

Does he care one way or the other that they follow, eddying about him in the tall grass like the fickle summer wind? Has he come outside to be alone, to practice some private balance that the children's presence seems to threaten? The questions linger as he and the children fuse into glinting shadows beyond the trees in the wavering distance.❧

Poetry Boom in Milwaukee

There's a Poetry Boom in Milwaukee!
More people joining the Poetry Force because
unlimited employment opportunities abound!
The estimated number of poets here
was 86 in 1986,
Well above a low of 3 in 1846.
If the present rate of increase continues,
2000 Milwaukee poets by the year 2000!
Upheavals in new poem possibilities
have created a need for
myriads of bards.
Experts predict high demand for poets
could lead to a poet power shortage,
especially for erotic poem poets.
Soon politicians will be wooing
endorsements from the Poets' Union
more than AFL-CIO.
At this rate it won't be long before
rather than the State of Wisconsin
gives General Motors
9 million in taxpayer money
to open a new truck plant
and create 900 new jobs,
The State gives 9 million
so 900 more poets can be free
to work on 900 new books of poems.

Antler

How to Hold a Book

long

as a new almanac
complaining spring, turning
each season on time

open

with horses
praying the Angelus, ringing
in the noon-hot field

now

at winter's edge, wind
angling the painter's knife
still moving

again

and again this kitchen
table holding
its hand-picked bouquet

C. X. Dillhunt

C-in-C

Complacent, on his desk top plateau,
the commander of troops
(FORTUNE 500, OR BIG BLUE)
forgets himself, orders his
private secretary
to fetch fresh water,
brew coffee for the general
staff meeting.

At the water hole they gather.
Swift-winged words,
soft-mouthed words like birds
fly to the four winds.
Soon.
the drums of disenchantment
rumble low like far thunder.

But Custer,
distracted in his conference call,
ignores the hum
of distaff warfare and forgets
that Sioux women use fleshing knives
as well as any man.

Yvette Viets Flaten

Flames of Passion, In Sorrow's Fashion

That I would not thirst for the brush of your lips
Upon my naked and deserted soul
Or hope in the caress of your finger tips,
Could they heal the fever of my heart's goal?
And should I fall into the burning dark
Would, yet soft, the kiss of your tears save me?
Concert my death in the song of a lark,
Chrysalid wing on a summer day! I see
The flame of eternity's eventide—
In the flash of God, belief and blood guilt.
Of fear and loss was the horse I did ride
So it is only just that the scales must tilt.
Though if not your love, then outer darkness
Must I hold alone for the chance at regress.

E. James Hillsberg

Adult Swim

As we swim
from tile side
to tile side, pumping our
arms and legs in joyless
rhythms, I want to
jump in the way and
splash a wild dance
disrupting the
grim procession, make everyone
crack their taut lips to a grin
and laugh at the bubbles
tickling bare skin.

Lap after lap I fantasize
that suddenly
"Esther Williams" smiles
ripple across our faces as
the buoyed ropes break
and the pool leaps into a
shimmer of fountains and lights,
all of us romping in glorious
lopsided circles, delighted
as dolphins.

Charyl K. Zehfus

Birth

There are too many seeds
to break through the soil;
too many larvae
to spin their fine wings;
too many fledglings
to fit in the nest.
Yet nature continues
to swivel, dropping
another myriad.
It looks like bounty,
but rather is miss,
miss and sometimes
hit. A messy
business, this
endless birth,
each living thing
spewed into carnal
form, an
individual
groping for its
infinitesimal
chance.

Charyl K. Zehfus

DREAMS AND SECRETS: New Work by Milwaukee Writers. Milwaukee: Woodland Pattern Book Center, 1993. 92 pages. $7.95.

by Allen J. Post

A slender compilation of poems and short-short stories, *Dreams and Secrets* is an appetizer buffet of more than thirty Milwaukee writers. The primary goal of editors Jane Brunette Kremsreiter and Judith Woodburn is "an opportunity for emerging writers to reach a wider audience, and established writers—whose work may be appreciated nationally—to reach readers at home."

Dreams and Secrets is the product of a Woodland Pattern Book Center workshop, wherein participants were introduced "to the process of editing a literary anthology." The book's title defines its thematic boundaries without limiting "subjects, styles, and approaches."

Woodland Pattern is noteworthy as "Wisconsin's resource for contemporary literature and the cognate arts." The center, located at 720 East Locust Street in Milwaukee, presents a host of public events each year, with "ongoing exhibitions and workshops . . . in writing and the book arts." For more information one may phone (414) 263–5001.

The works included in this anthology are as diverse as the denizens of Wisconsin's largest city. Structurally, free verse dominates the selections, with brief fiction and poetic narrative rounding out the composite. A thematic thread loosely binds the variety of style and tone.

In "Picking Up After," Steven Kapelke tells an unsettling tale of a man's voyeurism into his ex-wife's home and life. Obsessing on a failed relationship, his emotional imbalance parallels his physical anguish as he refuses to let go of the past and his pain.

Carol Sklenicka relates the emotional friction of a reserve soldier returning from Desert Storm in "Who To Tell It To." A realistic portrayal, the story centers around a husband's difficulty in relating the enigma of his war experience to his wife and child.

The majority of the pieces in *Dreams and Secrets* are poems which range in style from earthy blues lyrics to surreal narratives. In "Tired Man," Carlus L. Wilmot depicts the limitations of a working man at "$4.45 an hour." "A tired man from 9 to 5," Wilmot's poem reads like a blues homage to the minimum-wage laborer. John Kruth, on the other hand, celebrates life's vividness in "Dream" as he fishes from "the edge / of a giant ornate tea cup." Kruth economically paints a surreal and humorous scene—perched beside a polar bear, bamboo pole baited in liquid "the color of cranberry juice." The bear suggests the author "'take up aerobics or sewing' / in response to me having no luck catching fish."

Susan Firer describes her mother's garters as a "red question mark" and "cherry orchards in blossom." Bob Harrison relates "A Brief History of My Panamanian Life" where " . . . all the big roads / became tiny letters." Peggy Hong questions her mate's role in her life:

> Your answer: 'To help you deal
> with reality.' I laughed
> and confessed my role in your life:
> to help you dream.

The variety of works in this small anthology offers styles and tones to satisfy the tastes of any reader. Each piece is a glimpse into an individual author's private dream or secret memory. Some glimpses are startling, others endearing; some horrific, others jubilant. One may share a dark foreboding, another a warm remembrance. Taken together, one comes away with a menagerie of thoughts and sensations.

A succinct biographical sketch accompanies each author, with listings of previous and forthcoming publications. *Dreams and Secrets* is a tasteful collection which can be enjoyed during a coffee break, while commuting, or at bedtime. As an introduction to new and experienced Milwaukee writers, it is the handshake which may lead to literary friendships.

Allen J. Post is primarily a devotee of literature. He lives in Wausau.

EDITH JACOBSON BEGINS TO FLY by Patricia Zontelli. Minneapolis: New Rivers Press, 1992. 75 pages, $6.50.

THESE KINDRED STARS by Michael Belongie. Randolph, Wis.: Star Gazer Press, 1992. 67 pages, price not listed.

LEGENDS AND OTHER VOICES: SELECTED AND NEW POEMS by Mary Shumway. La Crosse: Juniper Press, 1992. 72 pages, $12.00.

by Margaret Benbow

Patricia Zontelli is the 1990 Minnesota Voices Project winner. She lives and teaches in Menomonie and is a painter as well as a poet. On the cover of her first book is her painting of a gaunt, aproned figure floating, arms out, through a pearl-like sky, above the sea, away from a white-washed house and neat row of fruit trees. She is letting go and heading out. This is Edith Jacobson, and the most impressive section in the book deals with this woman who, in middle age, explores "how to begin again / or become more." The poem titles tell part of the story: "Edith Gets A Divorce," "Edith Gets Rid of the Furniture," "Edith Jogging Backwards," but only the poems themselves can give a sense of the sharp excitement and danger of her odyssey: " . . . zig/zag up and out of here," away from "a clipped hardened anger" and a mummy case of unloved, unloving associates. Edith has been suffering from a sort of rheumatoid arthritis of the mind and emotions. Her escape, tentative at first and then soaring, is visionary and yet as physical as the unclenching of a fist:

> I see my good shadow flying blurred but definite
> beneath me, skimming over a field so wild
>
> there is no space for death, no room
> for anything but roots and pulse of earth,
>
> the blooming, and the light—
> holding, releasing.

The Indian mystic Krishnamurti used to tell those of his students who were writers, "Be as observant as a hawk who is famished." Zontelli has a piercing, unsentimental gaze, but in this fine first book one is also aware of a compassionate heart.

Michael Belongie is a Wisconsin teacher and poet. His likable collection *These Kindred Stars* follows his first, *Fellowship with the Stars*. The poet believes that "The kindred stars, as mysterious and distant as last night's dreams, form the sanctuary for gathering as of old at first sabbaths." It would be a mistake, however, to assume that Belongie is lost in space, occupying come star-encrusted left field. His best poems are earthlings. He is fascinated by the rhythms and colors of daily life. He can be unashamedly besotted ("Wedding Vow"); and yet for anger as condensed as a bullet, read the six chilling lines of "And a time to be reaped," about exploited old age.

Although his gaze sometimes wanders (as in "Writer's Knot": "Miasma bears the footing / of uncertain steps / through the tripping vapor / of self-doubt"), Belongie is also capable of the startlingly exact image. In "Sequestered": "Midwestern snow / is plowed with armor plate / blade, scraping roads / in arching sparkler glint." In "March Thaw": "Copper-kettle moon encompassed in blue-black night, warming eye and heart in March thaw; / its color masks the mud ruts and blanched grass . . ."

In Belongie's strongest poems, his passionate engagement is with the earth, not the stars.

Habitual readers of poetry are hardy souls who in the last generation have survived successive plagues: minimalist stone soup poems, entrail-reading confessional weepies that tell more about the poet than even the most obsessed mother could wish to know; elevator poems, suitable for any age; the "workshop wienie" poem (known a few years ago as the McPoem), and various tics of the above. Against this mottled cavalcade, a collection like Mary Shumway's *Legends and Other Voices* stands forth with genuine integrity and fire. She is a mature poet in full command of her powers. The poems are so varied that with every poem the reader meets new strengths. Indian legends, and the mysteriously present past that they represent, are treated in "Little Eagle and the Plumb Bob":

> spearpoints sifted
> from the run-off, birdpoints picked with the craft
> of a lover, and the terrible prayer that grants
>
> earth all life and art . . .

Shumway has wide-open eyes and a fine ear. However, she is never merely an aesthetician. "Fragment," a memorial to Mike McNamera, echoes with the Irish rhythms of his speech, and yet it is between the lines of the narrator's plain speech that one gradually sees a depth of desolation, opening fully only in the very last line.

The strongest possible contrast comes with "Mr. Evans' Oracle: Sally Rand Vacations in the Dells," which describes the descent of the famous 1930s fan dancer on a parched little town in July and her effect on its staid citizens:

> Well, dour old Thomas, caught between
> those feathers high and low, rose and pranced
> adrift uncertain air that freshened with the lift
> of bright and tendered promises, and danced.

"Occasions" is a hilarious account of bizarre variations in visiting poets, ". . . in St. Vincent de Paul flashery the color / of pigeon feet, breasts sprung loose like / two abandoned oriole nests, and beads" as well as "the meatless; tofuists, the dry; / and those voices with a palpable grief / who whine their poems . . .We apologize to these who / pause at line's end hearing Earth move." Summing up,

> Most, while we fawn, stay
> until the liquor's gone.

"The Old Truck" is a virtuoso piece, with a complex structure and hypnotic language. The fifth stanza is a dream segment, and if you read it aloud you will taste it for a long time afterward:

> When I woke from the fall, swarms of grunions
> flashed white in my eyes, on my tongue were
> the quick feet of birds, my breath crowded
> with their growing, mouth full of their struggle,
> I choked on the opening wings, turned inside out.
> Each pressed out from me, pushing feet on my tongue
> in the thrust of birth to be freed: small purple
> birds shining in the wind, singing round my head,
> flooding the air I could breathe,
> the air I could breathe at last.

Margaret Benbow is a poet whose work has appeared in The Spoon River Quarterly, Poetry, The Kenyon Review, *and others. She has completed a full-length manuscript,* Stalking Joy.

THE GERMAN-AMERICAN RADICAL PRESS edited by Elliott Shore, Ken Fones-Wolf, and James P. Danky. Urbana: University of Illinois Press, 1992. 239 pages.

by Frank P. Zeidler

The subtitle of this collection of essays on the radical press of German-Americans is "The Shaping of a Left Political Culture, 1850–1940." "Left" as it appears in this collection of scholarly essays includes the social democrats, the socialists, the socialist-labor people, socialist gymnasts and Turners, communists, Trotskyists, anarchists, radical 48ers, freethinkers, atheists, ordinary workers, and literary romanticists. The essays themselves address specific conditions or the work of specific individuals, but each of the foregoing classifications appears somewhere in the discussions. Thus Ludwig Lore, famous editor of the *New Yorker Volkszeitung* (NYVZ), is shown in an essay by Paul Buhle to have been an early socialist, then active in the

Socialist Labor Party, then a communist but friendly to Trotsky, and then an independent radical.

Dirk Hoerder of the Labor Migration Project and Labor Newspaper Preservation Project of the University of Bremen estimates that there were about 240 German-American radical papers from the 1840s to the 1940s. In his essay he groups them into four phases of evolution: From 1844–1869 the 48ers and early socialists set the tone. From 1870 to 1902 socialist, anarchist, and union activity occupied the columns of the press. During the period of 1903–1929 the German-American radical press consolidated itself, but there was a decline in new ideas. After 1930 the press was anti-fascist and anti-war. Only a few references appear on the anti-clericalism of the press, but it was substantial.

Individual essays in the book emphasize the influence of individual editors. Richard Oestreicher's portrayal of editor Robert Reitzel of *Der Arme Teufel* (The Poor Devil) describes the almost completely forgotten Reitzel as "the most lively and imaginative, certainly the most irreverent, literary voice of nineteenth-century American Germania." *Der Arme Teufel* bridged the gaps between liberal rationalism, literary romanticism, and revolutionary proletarianism. Reitzel's activity to save the Haymarket martyrs of 1886 from execution is recounted in the essay, one of the memorable passages of this book.

In this present time when democratic socialism is being discredited by the drive to privatize all aspects of government, and when the term "socialism" has been discredited by Stalinism and the changes in the former Soviet Union, this book nevertheless presents valuable information on how the German-American press pioneered in advancing the social concepts which resulted in great political and social improvements in legislation and conditions of life in the United States. For example, Ruth Seifert in "Women's Pages in the German-American Radical Press, 1900–1914" discusses the emerging role of women and the evolution of the suffrage movement in the German-American radical press. The earlier concept that the Marxian class struggle overrode other particular interests yielded to the insistence of socialist women that suffrage was a cause to be emphasized.

The essays largely cover the press in New York, Chicago, Detroit, and St. Louis. However, references are made to the radical press in Wisconsin. In 1875 Joseph Brucker started the *Milwaukee'r Socialist* at great sacrifice. Notations are made of Victor L. Berger, Heinrich Bartel, Michael Biron, and even Valentine Blatz. Editors like Bartel and Biron, who edited nine different radical papers here, alternated between socialist and freethinker papers.

This book is recommended reading for labor and socialist historians, students of German-American society, sociologists, and persons interested in the modern development of a social system. Each essay is replete with nuggets of information which tempt the reader to follow through for further information. A fine bibliography will help anyone so inclined. The conclusion one gathers from reading this work is that much of what we currently treasure in social programs and labor relations and even in religious policy came from the editors and writers of the German-American radical press.

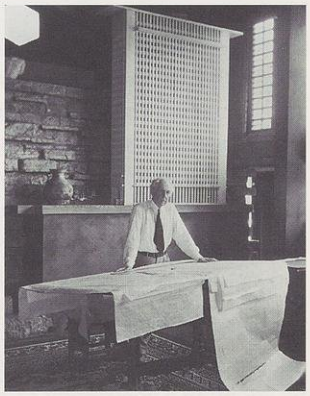
It should be noted that James P. Danky, one of the editors, is a periodicals librarian for the State Historical Society of Wisconsin and was named one of Ten Media Heroes in the United States by the Institute of Alternative Journalism in New York.

Frank P. Zeidler is a former mayor of Milwaukee and a long-time student of German-American culture.

BOOK NOTES

PICTURING WRIGHT: AN ALBUM FROM FRANK LLOYD WRIGHT'S PHOTOGRAPHER by Pedro E. Guerrero. Rohnert Park, Calif.: Pomegranate Artbooks (1–800–227–1428), 1994. Hardcover, 9 x 9 inches, 150 duotone reproductions. $29.95.

Pedro E. Guerrero was Frank Lloyd Wright's photographer for nearly two decades. He worked with Wright first as an apprentice and later as his on-call photographer based in New York, where he also specialized in photographing the work of sculptors Alexander Calder and Louise Nevelson. This collection of Wright photographs, which is accompanied by often humorous commentary, offers an intimate look at Wisconsin's famous native son.



Frank Lloyd Wright, 1947. ©1985 by Pedro E. Guerrero.

THE UNIQUE WOOD DUCK: TABLEAU OF A FIELD TRIP WITH FRANK BELLROSE AND SCOTT NIELSEN by Richard E. McCabe. Mechanicsburg, Pa.: Stackpole Books (5067 Ritter Road, zip 17055), 1993. A Wildlife Management Institute Book, 8½ x 11 inches, soft cover, 136 pages, 173 color photos. $24.98

The "captivating world of woodie" is presented here in various stages from egg to duckling to adult. The stunning color photos give full justice to the incomparable beauty of this species, which, through successful wildlife management, has made a remarkable comeback. A review copy can be seen in the Earth Science Resource Associates (ESRA) resource center at the Wisconsin Academy. Author McCabe is an officer with the Wildlife Management Institute and a member of the Academy.

Enhancing Earth Science Education

by Robert Lovely

In the spring of 1992 the Wisconsin Academy of Sciences, Arts and Letters received funds from the National Science Foundation to support a three-year teacher-enhancement project in the earth sciences. Presently beginning its third year, Earth Science Resource Associates (ESRA) will offer an intensive schedule of field and seminar activities designed to enhance the earth science knowledge and teaching skills of the twenty new Wisconsin teacher/participants selected for the 1994 program. This article describes the activities of the 1993 ESRA participants, who attended a spring conference, three summer institutes, and a fall meeting during year two of the program.

Ranging from the study of the earth's lithosphere to cosmology, from the exploration of ocean processes to paleontology, the sheer number and diversity of fields comprising the earth sciences ensures a specialty area forever inspiring to teachers fortunate enough to claim the broad subject as their own.

Yet this very diversity often proves daunting to members of the ESRA steering committee, who are limited to eighteen contact days with a select group of middle and high school teachers during the spring, summer, and fall of the year.

ESRA strategists confronted the dilemma of "too many sub-fields" last spring by adopting a conceptual shift in their program approach. Rather than attempting to cover each of the earth sciences topic by topic, they introduced an organizational framework that employed the following categories: applied science, pure science, and science pedagogy. Approximately equal emphasis was to be devoted to each of the three areas. The classification of fields into applied or pure science would be determined by whether the majority of the field was defined by economic incentives or if simply extending the boundaries of knowledge constituted a legitimate purpose for study.

This planning framework served as a means of organizing otherwise diverse earth science topics and learning theory, enabling, for example, oil exploration to be combined with geologic history and cooperative learning in Summer Session I; environmental monitoring with long-term ecological research and common misconceptions in Session II; and meteorology with climatology, paleontology, and exemplary teaching of earth science concepts in Session III.

One exercise, for example, acquainted teachers with the use of the Brunton compass to measure the strike and dip of a rock outcrop at the mouth of the Montreal River.

Over the course of the program, participants engaged in a wide variety of opportunities to enrich their knowledge of earth science education. For example, they conducted field work in five different sectors of the state, listened to specialists present the results of research in specific earth science disciplines, shared their own ideas about teaching and learning in group discussions, developed demonstrations on specific earth science concepts, completed written exercises designed to expand their knowledge of teacher resource materials, and developed specific plans for community leadership activities.

❦

ESRA's second year began for nineteen selected teachers in late April 1993 with a three-day conference in Wausau. There, participants were treated to a rigorous blend of presentations and field trips, including talks by science education specialists and geoscientists, as well as geological tours of Rib Mountain and the Eau Claire Dells.

In Wausau teachers also expanded their computer literacy by trying out state-of-the-art technology in geographic information systems (GIS)—one of the fastest new growth areas in applied earth science technology. GIS allows users to compile and manipulate layers of data over geographic regions and then display that data in the form of maps on computer screens. Environmental Systems Research Institute, a Minneapolis-based company, provided the software, equipment, and training personnel for this session.

Other highlights of the spring conference included presentations and discussions led by specialists on topics such as overcoming student misconceptions, the extinction of

dinosaurs, and the Mars Observer Mission.

Participants in ESRA spent the first week of their summer field experience examining the complex geologic history of rock strata along Lake Superior's south shore. Using Northland College in Ashland as a base of operations, the teachers spent their days exploring outcrops of the largest exposed Precambrian-age rock in the United States, including rock outcrops ranging in age from 570 million to 3.8 billion years old.

Participants in the Earth Science Resource Associates program explore a granite quarry near Rib Mountain at Wausau.

In Bayfield County the program blended a rich mixture of pure and applied science while looking at the circumstances that led to recent oil exploration in Wisconsin. As they visited the site of a test well drilled by Amoco Oil Company, associates learned that, in the 1950s, petroleum geologists had considered Wisconsin's rock strata to be too old to contain crude oil; Precambrian rock generally was thought to be devoid of fossils. But new earth science concepts and modern research began to change this thinking. The discovery of organic remains in Precambrian rock in diverse locations (including Lake Superior's north shore) led exploration geologists to re-examine the state's potential for oil and gas generation. Geoscientists recognized that, as a potential source for oil and gas, this ancient fossiliferous material differed little from younger organic-rich petroleum-bearing sources. The idea was confirmed in the 1980s, when oil was discovered in Australia in Precambrian rock as old as 1.4 billion years of age. Suddenly the notion of finding oil and gas reserves in Wisconsin no longer seemed unreasonable.

The theory of plate tectonics also played a role in generating optimism concerning the presence of indigenous hydrocarbons in Wisconsin. Interest focused in particular on the Midcontinent Rift, a scar in the earth's crust that extends nearly 900 miles across Kansas, Iowa, Minnesota, and northwestern Wisconsin. Created through the action of plate tectonics, this rift scar formed when rising magma forces split the continent in two some 1.1 billion years ago. After separating over forty miles in certain locations, the crustal movement halted when pressures finally subsided. This Precambrian-age aborted rift basin formed the basaltic basement rock on which younger sedimentary sandstones, siltstones, and shales were deposited throughout Douglas, Bayfield, and Ashland counties. Today the Midcontinent Rift has attracted the attention of oil companies because rift structures have been associated with petroleum discoveries in other parts of the world. The proximity of these sedimentary deposits to a rift structure, combined with new thinking about Precambrian fossils, led oil companies in the early 1980s to spend over $4 million dollars on oil exploration in Wisconsin.

Turning away from problems related to economic geology, the associates traveled to Amnicon Falls State Park, where they examined the Douglas Fault—a 200-mile-long fracture in the earth's crust extending through northwest Wisconsin and Minnesota. The Douglas Fault forms one of the principal fault lines associated with the Midcontinent Rift system in the Lake Superior region. Amnicon Falls is the best of only four locations in Wisconsin where the fault remains exposed at the surface, enabling a clear examination. There the Amnicon River has cut through the overlying glacial till and down into the bedrock to reveal the fracture.

The remaining field work in the Lake Superior region centered on problem-oriented geological exercises conducted at specific localities. One exercise, for example, acquainted teachers with the use of the Brunton compass to measure the strike and dip of a rock outcrop at the mouth of the Montreal River. Other stops included Copper Falls State Park, Brownstone Falls, and Red Granite Falls, all of which provided unique evidence of the age relationships of the different rock types. Associates also visited select quarries to collect gabbro and other rock samples to take back to their classrooms.

Teacher Connie Becker of West High School in Waukesha leads the way up a hill near Ashland.

In Summer Session II the program's earth science focus shifted from geology to the contamination of earth systems.

Atmospheric deposition of sulfates, nitrates, mercury, and other contaminants continues to draw Wisconsin scientists into the work of monitoring and assessing the environmental effects of these pollutants. Because the research cuts across numerous disciplinary boundaries within the earth sciences, it furnishes fertile ground on which to cultivate practical learning activities for the participants in ESRA. Attention to research on acid rain, for example, offers teachers the opportunity to interact with a diverse group of scientific investigators, ranging from agents of the Department of Natural Resources (DNR) to researchers in the university community.

For these reasons ESRA's second summer institute last year was held at Kemp Natural Resources Station on Lake Tomahawk near Minocqua. There, participants could mingle with DNR and university collaborators who work on some of the most engaging experimental research in the world associated with the problem of acid deposition. In addition to providing a seminar room right on the lake, the research station offered teachers splendid opportunities for fishing, boating, canoeing, and nature hikes during breaks from the program.

By focusing on acid-rain impacts in Wisconsin, the week-long program offered teachers a combination of hands-on field activities and a comprehensive overview of research related to acid deposition. These studies ranged from practical monitoring tasks to investigations (positioned at the pure-science end of the research continuum) addressing questions related to long-term ecological change and stability.

Teachers rounded out their stay at Kemp Station by assessing commercially-produced acid rain laboratories for in-school use. In this exercise they performed the same procedures students would use to test parameters related to assessing the impact of acid deposition, such as measuring soil and bedrock buffering capacity. The teachers then evaluated the labs and shared opinions on how well the activities were designed to accomplish learning objectives.

❦

Meetings for Summer Session III were convened on the University of Wisconsin–Madison campus. Highlights of this session included a visit to Weather Central in Madison, a trip to "The Third Planet" exhibit at the Milwaukee Public Museum, and a field trip to Devil's Lake.

As a group project in Madison, associates compiled an annotated bibliography of books, computer software, and other materials from the ESRA Resource Center located on the lower level of the Wisconsin Academy. This exercise enhanced individual knowledge of a few selected resources while providing the entire group with a catalog of reviews summarizing and appraising a wide range of materials. (Participants in ESRA 1994 will continue to expand this annotated bibliography, and copies of the latest edition will be distributed to all associates from the three-year program.)

In Madison, the teachers also made group presentations demonstrating what they thought was the best way to teach earth science concepts ranging from the speed of dinosaurs to understanding the vast expanse of geologic time.

❦

The final meeting of the ESRA class of 1993 was held in Fond du Lac over a weekend in mid-October. During this session, associates learned how the history of geology could enrich and enliven their earth science curricula. History of science can be an effective vehicle for rediscovering important principles and theories. Students often grasp scientific concepts more readily when shown how these concepts developed through time. Moreover, as compared to a catechism-style presentation of seemingly air-tight theories, the historical approach can offer a truer and more animated picture of how science really works. Students begin to view the process of scientific discovery as a more human endeavor. Finally, a history of science context offers teachers numerous opportunities to explore with their students the cultural relevance of science.

In turning to science pedagogy, associates at the fall meeting debated the practical utility of incorporating into their teaching strategies various ideas in current learning theory. Dis-

cussion focused particularly on the concept of constructivism—the notion that students learn by actively *constructing* their own meanings from the interplay of new thoughts with past experiences. Stated another way, constructivism reflects the idea that teachers cannot simply impart knowledge to passive students and therefore should provide instead suitable environments and creative opportunities for self-teaching.

Divisions between applied and pure science were brought into balance in Fond du Lac through a presentation on Wisconsin mining policy, courtesy of the Wisconsin Geological and Natural History Survey, and a field trip on Pleistocene geology in the Northern Kettle Moraine.

Participants wrapped up the formal part of the program by reporting on how ESRA had helped improve their teaching of earth science. These reports also summarized the status of their community leadership activities, as well as particulars on how each associate planned to assist five other science teachers selected from their districts. By far the most frequent point denoted was that ESRA had substantially increased teacher confidence and understanding of the earth sciences, while expanding the range of people and materials upon which to draw for resource assistance.

In short, the associates expressed a positive view of how ESRA had enriched their own ideas about teaching earth science and how they would carry on the program objectives by helping other Wisconsin teachers bring into the classroom the very best resource materials and educational methods available.

Robert Lovely coordinates the Earth Science Resource Associates program for the Wisconsin Academy.

Photos by Robert Lovely.

University of Wisconsin–Madison limnologist Tim Kratz prepares to take a core of peat from a bog near Trout Lake.

Contributors

Continued from page 3

lished works include *Polybius on the Writing of History* (University of California, 1981) and *Diodorus Siculus and the First Century* (Princeton University Press, 1990).

▶ James Seal has taught physics and mathematics at the university level for the past ten years, during which time his research interest has included radio astronomy, solar modeling, and statistical mechanics of fluids. He presently teaches at the University of Wisconsin-Eau Claire and also is associated with Cambridge Research and Development of Champaign, Illinois. As a graduate student at Purdue University he was involved with the mathematical framework of grand unified theories and worked with Ephraim Fishbach on the early stages of the "fifth force."

▶ Donald M. Waller is professor of botany at the University of Wisconsin–Madison. He received his undergraduate degree from Amherst College, his Ph.D. degree from Princeton University, and was a post-doctoral fellow at the Gray Herbarium, Harvard University. He is co-chair of the Wisconsin Scientific Roundtable on Biological Diversity (for the U.S. Forest Service) and has written numerous articles, book chapters, and scientific reports. He is co-author of *Wild Forests: Conservation Biology and Public Policy* (Island Press, 1994).

▶ Charyl Kneevers Zehfus, a Sheboygan librarian, has most recently published poetry in the 1994 *Wisconsin Poets' Calendar, Second Glance* (Spring 1994), and *Soundings II* anthology (Lake Shore Publishing 1994). Her poems also appear in *The Five-Petalled Blossom*, an anthology of the Milwaukee Feminist Writers Guild, and in the chapbook *Heartwood Echoes* (1993). She holds an M.A. degree in music composition from the University of Illinois and her choral music and songs have been performed in the Midwest.

WISCONSIN ACADEMY OF SCIENCES, ARTS AND LETTERS

Patron Members

Karl Andersen and Carolyn Heidemann
Ira L. and Ineva Baldwin
Norman Bassett Foundation
Exxon Corporation
Terry L. Haller
Heurikon Corporation
Mrs. Rudolph Louis Kraemer
Neviaser Investments, Inc.
Joanna A. Overn
Martha Peterson
Gerald D. and Marion Viste
Carl A. Weigell and Motor Castings Company
Wisconsin Power and Light Foundation

Sustaining Members

AZCO Group Ltd.
William Blockstein
Barbara Doty
Ben and Ann Peckham
Verner Suomi
John and Shirley Wilde
Margaret C. Winston

Supporting Members

F. John Barlow
David Boyer
Mary Jane Bumby
Phillip R. Certain
Richard B. Corey
Joseph A. and Sharon Daniels
Norman Drinkwater
Loyal and Bernice Durand
DeEtte Beilfuss Eager
Marshall Erdman
Ody J. Fish
Harry W. Fry
Jay and Mary Gallagher
Roger H. Grothaus
Harold Grutzmacher, Jr.
James S. Haney
Robert Heideman
William Huffman
Dion Kempthorne
William A. Linton and Promega Corporation
Katharine Lyall
Jere McGaffey
Howard and Nancy Mead
Gladys Meier
Laura Nohr
Susan Nurrenbern
Arthur A. Oehmcke
Philip Y. Paterson
Mary H. Rice
Robert P. Sorensen
Brock Spencer
Julie Stafford
Steven C. Stoddard
Frederick C. Suhr
Gary A. Thibodeau
Margaret Van Alstyne
William Wartmann
Thompson Webb
Gerd H. Zoller

Officers

Robert P. Sorensen, Madison, President
Ody J. Fish, Pewaukee, President Elect
Daniel H. Neviaser, Madison, Past President
Roger H. Grothaus, Racine, Vice President-Sciences
Gerard McKenna, Stevens Point, Vice President-Arts
Denise Sweet, Green Bay, Vice President-Letters
Gerd H. Zoller, Madison, Secretary/Treasurer

Councilors

DeEtte Beilfuss Eager, Evansville
Lee Halgren, Platteville
James S. Haney, Madison
Judith L. Kuipers, La Crosse
Mildred N. Larson, Eau Claire
John Thomson, Mount Horeb
Carl A. Weigell, Milwaukee

WISCONSIN ACADEMY REVIEW **Editorial Committee:** Susan Engberg and Patrick Farrell, Milwaukee; Ellen Kort, Appleton; Dale Kushner, William A. Linton, and Kevin Lynch, Madison; Curt Meine, Baraboo; Bud Hudson, Waukesha; David Graham, Ripon.

WISCONSIN ACADEMY FOUNDATION

Officers

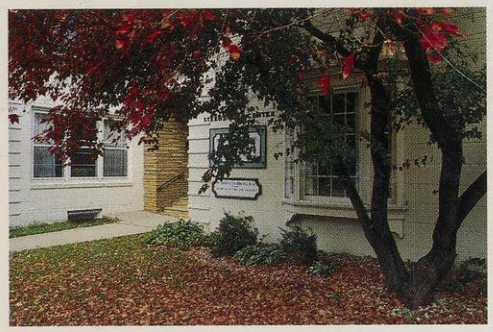
Terry L. Haller, Madison, President
James R. Johnson, River Falls, Vice President
Gerd H. Zoller, Treasurer*

Directors

Ira L. Baldwin, Madison and Key West
DeEtte Beilfuss Eager, Evansville
John Franz, Clinton
Daniel Gelatt, La Crosse
LeRoy R. Lee*
Nancy Noeske, Milwaukee
Daniel H. Neviaser*
Martha Peterson, Madison, Baileys Harbor, and Marco Island
Robert P. Sorensen*
Ody J. Fish*
Gerald D. Viste, Wausau
Sara Willsey, Milwaukee

*ex officio

WISCONSIN ACADEMY REVIEW
1922 University Avenue
Madison, Wisconsin 53705



Second Class Postage

Paid at Madison, WI