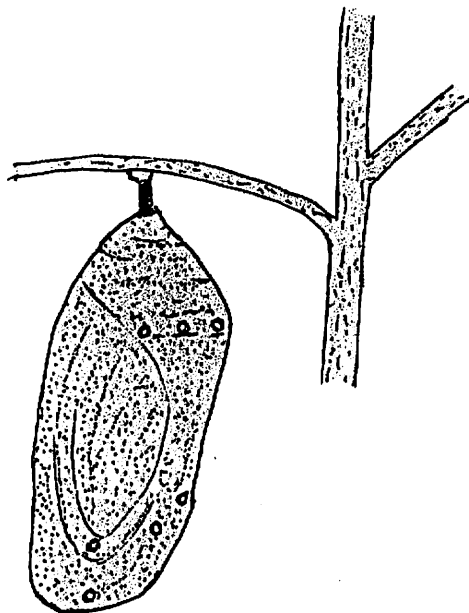

INSECT MIGRATION STUDIES

Volume 26 1989



Annual Report

UNIVERSITY OF TORONTO . SCARBOROUGH CAMPUS

Annual Report to Research Associates

Insect Migration Association:
1989

UNIVERSITY OF TORONTO SCARBOROUGH CAMPUS
Scarborough Ontario Canada M1C 1A4

To the Associates
From
Norah and Fred Urquhart

Monarch butterflies, along with all members of the insect world, struggle to maintain their existence as a species against various lethal factors in their environment. These factors may be divided into four classes: Disease; Parasitism; Weather; and Man.

Monarch butterflies are attacked by a number of disease organisms: virus; bacteria; fungus. Virus is the most deadly in reducing the population of monarchs over the continent and occurs at irregular intervals of between seven and eleven years. Since it is not an organism in the strict sense but rather a particle capable of influencing the genetic code of the chromosomes, it is able to exist in the bodies of migrants and hence carried forward from breeding areas to overwintering areas and return. Bacteria, of which there are over fifty different strains of which six may be considered lethal, tend to be more local in reducing populations. The bacterial spores remain in the breeding areas ready to attack the larvae when the migrants return. Since it tends to be of a local nature, most noticeable when rearing larvae in numbers in cages and only occasionally on larvae collected in the field, it does not influence the population over the continent, as in the case of the virus epidemics. We encountered various strains of the bacteria when we had great numbers in our rearing cages and especially under moist conditions. Fungus, which tends to be present in many species of insects, is not of common occurrence among larvae of the monarch butterfly. It tends to be most prevalent during periods of excess moisture, such as during rainy seasons. You will observe the effect of this disease in larvae kept in glass containers. The larvae remain immobilized, clinging to the sides of the jar. At death the fungus produces a mass of mycelium, thin thread-like strands that form a circular mass around the dead body of the larva.

Parasites; various species of bees and flies, rarely reach epizootic proportions. They are most noticeable when raised in rearing cages. Parasites, like bacteria and fungus, tend to be localized and have little effect on the overall population since the overwintering stages of these parasites remain in the breeding area and hence are not spread among the entire population, as in the case of the virus.

This brings us to a consideration of weather conditions with special reference to what occurred this past summer.

Usually lethal effect of weather is localized since weather patterns vary across the continent - excess rain in one area and drought in others; or cold temperatures in one area and high temperatures in others. Tornadoes occurring along the migratory routes and hurricanes along the Gulf coast, can cause marked reductions in populations in various areas. Thus, during the spring migration, if a hurricane passes through the area when the monarchs are moving

- north-eastward, areas along a particular stream could experience a marked reduction whereas other areas would be unaffected having passed through prior to or after the advent of the hurricane.

This past summer we experienced a continent-wide drought and excessive high temperatures. This had a marked effect on the monarch populations. Excessively high temperatures can have a lethal effect on all stages. Eggs do not hatch (par-boiled) ; larvae exposed to the direct sunlight at high ambient temperatures are killed; if the larvae reach the pupa stage the adults fail to emerge or have distorted wings. As a result the population is greatly reduced. This past summer of high temperatures had one unusual effect: As a result of high temperatures development was speeded up so that we experienced an extra late summer population which helped, in a small measure, to increase the fall population of migrants.

With only three exceptions, all our associates recorded low monarch populations. In our area we saw only twelve adults throughout the summer; we located only four eggs; we found no larvae on our milkweed plants. The overnight roosting trees, where under normal population conditions produce thousands of specimens for tagging, exhibited only a few scattered clusters. Despite this paucity in
* our area, Donald Davis was able to tag 1698 in an area a few miles east of ours. Doris Stifel tagged 1221 in Maumee State Park in Ohio ; and Dale Clark tagged 2045 in Texas. Don Davis and Doris Stifel, however, reported that they were able to tag only half as many as the previous year.

Man is one of the most continuing hazards to monarch populations. The indiscriminate use of insecticides and herbicides greatly reduces the numbers of monarchs in many areas. In addition the growth of cities and highways has greatly reduced areas where formerly milkweed plants flourished. We hear about the effect of removing trees in the overwintering areas as a hazard to the monarch populations but, at least at the present time, the absence of larval food material in the breeding areas is becoming much more serious. I doubt if the Mexicans will remove all the trees from all the mountains in the trans-volcanic plateau where the monarchs overwinter. This would not be in their economic interest and they are well aware of this and are giving a certain degree of protection sponsored in part by the World Wildlife Fund. But little or no consideration, except through the activities of many of our associates, is given to the breeding areas. We can continue to do our part by planting milkweed wherever possible to maintain local populations.

* For the past number of years, Donald Davis has tagged many thousands of migrants at Presqu'ile, Ontario

TRIBUTE TO AUDREY WILSON

The success of this research project in eventually tracing the monarchs to their overwintering site in the mountains of Mexico has been entirely due to the initiative and energy of research associates who have devoted so much of their time to this activity.

One of our most outstanding associates is Audrey Wilson of Cobourg, Ontario who joined our group in 1955 as one of our first associates.

Audrey had her first tagged monarch recaptured in 1959. Over the years she has done a great deal of tagging; In 1964 she tagged 1560 monarchs. She also sent 1000 live monarchs by mail to various parts of the continent as part of our transfer experiments. In 1972-73 she tagged 4400 monarch butterflies. She has also been very active with students in her capacity of Director of Outdoor Education for the Northumberland and Newcastle Board of Education in promoting the study of the monarch butterfly and its conservation.

In addition to the above Audrey relieved us of the burden of editing and arranging for the printing and mailing of the Annual Newsletter to Associates for 9 years at a time when we were completely immersed in the laboratory and field studies of the monarch and the resulting accumulation of data.

Audrey is now contemplating early retirement after which she intends to continue her monarch studies as enthusiastically as ever.

Our thanks to Audrey for her long and enduring and vital support of this research program.

WHEN REQUESTING TAGS PLEASE SPECIFY THE NUMBER THAT YOU NEED

We are more than pleased to supply you with additional tags when you need them. Please be sure, however, that you specify the number of tags that you think you will need for the current season. We realize that you may not use all of the tags that you request but you may keep them for use in the following year.

MOTTO OF THE ETOBICOKE FIELD STUDIES CENTRE

"Take only Pictures, Leave Only Footprints"

MEMBERSHIP RENEWAL FORM: 1989-1990.

Please fill out the following form and send to:

Professor F. A. Urquhart,
 Scarborough Campus,
 University of Toronto,
 1265 Military Trail,
 Scarborough, Ontario, Canada: M1C 1A4.

Based on present costs of such items as postal charges, stationery supplies, translations, printing and preparation of the Insect Migration Studies report, secretarial assistance, etc. a donation to the research fund - held in trust by the University of Toronto - of \$20.00 for an individual and \$25.00 for group participation (schools, clubs, camps, etc.) is suggested. This research is carried out on a purely voluntary arrangement; it is not supported by any outside granting agencies.

Name: _____

Address: _____

 _____ : Zip Code _____

If you live in a rural district please indicate the nearest town or city so that we may record release-recapture lines on the migration map. Nearest City or Town:.. _____

Occupation: _____

Since the Monarch butterfly has a wide appeal, it is of interest to members of the IMA to have a record of occupation: It is also of interest in popular articles.

Age if under 18: _____

Make donations payable to: Insect Migration Studies: Amount \$ _____

Number of tags required _____

Serial numbers of tags still on hand _____

When did you receive a copy of this report? _____

Please order alar tags prior to July 1st since we are usually on field studies and may not be able to fulfill your order until September.

We look forward to your continued participation.

Date: _____

RECAPTURE RECORDS FOR 1988

In spite of a sharp drop in the monarch butterfly population , 1988 was a good year for the recapture of tagged butterflies. Listed below are all the recaptured butterflies for the past year.

NAME OF ASSOCIATE	LOCATION OF TAGGING	RECAPTURED AT
Bernadette Argana	Churchville, N.Y.	Bethany, N.Y.
James Brazil	Braham, Mn.	El Rosario, Michoacan, Mex.
Dale Clark	Dallas, Tex.	Dallas, Tex.
" "	" "	" "
* " "	" "	Sulphur Springs, Ark.
" "	Mesquite, Tex.	Mesquite, Tex.
Donald Davis	Presqu'ile, Ont.	Presqu'ile, Ont.
" "	" "	Otisco Lake, N.Y.
" "	" "	Binghamton, N.Y.
" "	" "	Marcellus, N.Y.
" "	" "	Tillsonburg, Ont.
" "	" "	Nellysford, Va.
" "	" "	El Rosario, Michoacan, Mex.
Judy Evans	New Lebanon, Oh.	Lebanon, Oh.
" "	" "	Springboro, Oh.
" "	" "	Lebanon, Oh.
Margaret Elliott	Muskegon, Mich.	Muskegon, Mich.
Mary Henshall	Millbrae, Ca.	Millbrae, Ca.
** " "	Nampa, Id.	Orem, Ut.
*** " "	" "	Ventura, Ca.
Carol Hillman	White Plains, N.Y.	Ocean Grove, N.J.
Eva Kendrick	Sault Ste. Marie, Ont.	between Marquette and Autrain, Mich.
Marion Lopina	Milwaukee, Wis.	Milwaukee, Wis.
Doris Stifel	Maumee Bay State Park, Oh.	Kansas, Oh.
" "	" " " " "	El Rosario, Michoacan, Mex.
" "	" " " " "	Llano del Toro, Michoacan, Mex.
Amy Thompson	Columbus, Oh.	Columbus, Oh.

*This was a spring migrant that Dale reared in Dallas. A valuable record to add to our meager data on the northward migration.

**The record of a tagged monarch flying from Nampa, Idaho to Orem, Utah is unique in our experience. This southeast flight shows how monarchs of the western population must navigate through mountain valleys before arriving at the coast of California.

RECAPTURE RECORDS cont'd.

***The flight from Nampa, Idaho to Ventura, California is also unique in our data. This butterfly flew further south on the coast of California than any other tagged monarchs from locations in Idaho.

NUMBER OF MONARCH BUTTERFLIES TAGGED IN 1988

Although many factors combined to keep down the number of monarch butterflies in 1988-factors such as heat, drought, spraying of milkweed with herbicides and some cases of fatal virus nevertheless we were encouraged by the fact that so many of our associates reported being able to tag at least a few monarchs. Adding together the reports of tagging from 108 associates we have recorded that a total of 8,813 butterflies were tagged. All of you are to be congratulated for your hard work and dedication in tagging so many butterflies often in difficult circumstances. Ruth Milani reported that she "walked her feet off" while looking for monarchs and Eva Kendrick said that she was "dizzy most of the time" but she still kept on tagging.

We are pleased to report that many associates reared monarch butterflies in order to increase the population-Ruth Milani collected as many larvae as she could before her favorite field was cut for the International Ploughing Match. Mary Henshall reported, surprisingly, "the best year ever"- more eggs and butterflies than ever before.

THE MONARCH BUTTERFLY: INTERNATIONAL TRAVELLER

Copies of the book may be purchased directly from the publisher or, on request, from your local book store.

I would be pleased to autograph the book you purchase. Please include an amount of \$3.00 to cover mailing costs.

If you wish I can purchase a copy for you at a discount, autograph it and send it to you. Please include a cheque for \$40.00 U.S. to cover purchase and mailing.

SPECIAL ACTIVITIES OF ASSOCIATES

This past year our associates have reported to us on a wide variety of activities they take part in through their connection with the study of the monarch butterfly. We are delighted to list a brief account of their many activities as follows:

Carolyn Anderson demonstrates tagging to students in Madison, Wisconsin.

Don Davis reproduced cartoons from the Insect Migration Studies and made them into slides for use in lectures that he presents about monarch butterflies.

Don also lobbied the Ontario Government to improve Presqu'ile Provincial Park where he does his tagging; as a result there is a complete renovation of the Visitor Centre & there are plans for new exhibits in the Centre.

Mary Henshall was named Community Citizen of the Year in Nampa, Idaho where she is known as "The Butterfly Lady". Mary's many activities include travelling to various schools in Idaho with her slides, eggs, larvae of the all sizes and chrysalids on her manzanita tree in addition to many adult monarchs which she transports in plastic cartons. After feeding the adults she releases them in a transparent cage for the students to observe. She says "I work all summer to make the world safer for monarchs".

Marion Hill has had a business card made in the shape of a monarch butterfly to advertise her many activities connected with butterflies and other insects.

Virgil and Marcie Inman arranged many programs entitled "Life Cycle of the Monarch Butterfly" at many local libraries and schools. They also present a program "Outdoor Environmental Workshop".

Donna Kessler gives talks on monarchs throughout the year to science classes, travelling as far as 75 miles to do so. Some of the students helped to raise monarchs for tagging.

Wendy Kopley sent us a "Monarch Butterfly Unit" consisting of 18 pages of an in-depth report for grade 3 students including a butterfly quiz and bibliography.

Lee Ann Landstrom had a special display about the monarch butterfly at the Eastman Nature Center. The center also produced an article and news release for TV and radio stations as well as a cable TV videotape about monarch development and the tagging project.

Ilene Levine wrote an article about the monarch butterfly for the Roosevelt Borough Bulletin.

Kerry Pado presented programs about butterflies for the Essex/Deep River Land Trust and Malabeck Audubon. For these she prepared a special bibliography and distributed photocopies of the brochure about the book "The Monarch Butterfly-International Traveler".

Emily Pendleton presented a program on monarchs to sixth graders at a summer "discovery camp". She also presented a copy of "The Monarch Butterfly-International Traveler" to the City of Montevallo Library.

Sister Laura Banet spoke to fourth grade students about monarch butterflies. She gave dried, ripe milkweed pods to residents of the Catherin Kasper Home and a larva, milkweed plant and instructions for the care of the larva to a newly married couple as a wedding present. Neighbors were invited to a party to celebrate the emergence of the adult butterfly.

Doris Stifel was so concerned about the survival of monarch butterflies in her area near Toledo, Ohio, that she contacted Delta Airlines about the possibility of their taking the tagged monarchs by air to Atlanta, Georgia where they could be liberated in warm weather. Delta cooperated enthusiastically and transported, on two separate trips many local monarch butterflies which might have succumbed to the cold weather. Doris reports, "The second flight had been announced in the newspaper and the response was amazing. I had phone calls from surrounding areas in Ohio and Michigan requesting reservations on the next Atlanta flight for the butterflies that nature lovers had raised and were unable to release. These calls came from adults who had recently learned about the amazing migratory feat of the

SPECIAL ACTIVITIES cont'd

of the butterfly as well as school children who had been growing them in their classrooms."

Faye Sutherland has erected a rearing cage for monarch butterflies at the Boise, Idaho zoo where she has student helpers maintain a population all summer for the education of children who visit the zoo. Faye has also had a colorful card made with a monarch butterfly motif which identifies her as "Butterfly Lady".

Edna Sutton gave illustrated talks on monarchs at the following places; a church group, seventh grade science classes, second and third grades at St. Mary's school and at the Christian Women's Club.

Bill Thomas was elected to the Board of Education of Springfield, Missouri. Bill gave talks on monarchs to nine classes of second grade students.

Amy Thompson attended a workshop on butterflies at "National Wildlife" Conservation Summit in Estes Park, Colorado.

Matt Tribo gave a talk at the Boy Scouts' Association on monarch butterflies.

Matt also grew many milkweed plants and a garden of mixed flowers and milkweed plants to lure monarchs to his home.

Doug Wood obtained funds to purchase a tractor with cutter bar and tiller attachments to mow Wills Field in order to create a habitat suitable for monarch butterflies. Doug spent many hours on this project, mowing, raking, pruning and creating brush piles. With the help of his mother, Loretta Wood, Doug made butterfly nets to use in the tagging effort. Doug also hopes to erect an interpretive sign depicting the life cycle of the monarch butterfly.

EXPEDITION TO THE OVERWINTERING SITE IN MEXICO

If you are planning to visit the overwintering site of the monarch butterfly in Mexico you may contact:

Ralph Ramey
Glen Helen
405 Corry Street
Yellow Springs
Ohio 45387

or you may contact

Alfredo Arellano
Head of Research
Monarca A.C.
Av. Constituyentes 345-806
Mexico D.F. 11830
Mexico

SIGHTING OF SPRING MIGRANTS

For all of us who are devoted to the study of the monarch butterfly, the first exciting event of the year is the sighting of the first spring migrant in our area. It is possible to build up a feeling of anxiety if the monarchs do not return to our favorite haunts at the usual time- and it is a great relief when we can say for sure that the fluttering creature we observed is really our most popular butterfly. We always speculate as to whether what we are seeing is a tattered, faded migrant which actually flew all the way from the overwintering site in Mexico or whether the fresh, bright orange one is actually the first generation of offspring from parents at the site.

Listed below are reports of first sightings for 1988-always welcome news for us:

Dorothy Yeager	Pearsall, Tex	March 21/88
Walter Zimmerman	Mesquite, Tex.	March 25/88
Pearl Eslinger	Dauphin, Ala.	April 8/88
James Brazil	Braham, Mn.	May 20/88
Doris Stifel	New Lexington, Oh.	May 21/88
Darlene Bamman	Jacksonville, Mo.	May 23/88
Lee Ann Landstrom	Osseo, Mn.	May 27/88
Don Davis	Brighton, Ont.	June 3/88
" "	Point Pelee, Ont.	June 4/88
Mary Henshall	Nampa, Id.	June 10/88
Erma DeWitt	New Paltz, N.Y.	July 13/88
Lee Darst	Brecksville, Oh.	August 11/88

FIRST EGGS OF MONARCHS OBSERVED

Walter Zimmerman	Mesquite, Tex.	March 25/88
Frane Jackson	Dallas, Tex.	April 16/88
Doris Stifel	Toledo, Oh.	May 24-28/88
Marion Hill	Lyndhurst, N.J.	June 19/88
Pearl Eslinger	Terre Haute, Ind.	August 31/88
Erma DeWitt	New Paltz, N.Y.	September 1/88

OBSERVATIONS cont'd

Monarch butterfly larvae were first reported:

Vince Shane	Bloomington, Mn.	May 31/88
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Very late observations of laying eggs, and mating are as follows:

Marion Lopina	Wauwatosa, Wis.	September 9/88
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Patricia Kester	Appleton, Wis.	November/88
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Fall migrants were sighted:

Joan Senghas	New Baltimore, Mich.	September 10/88
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Lee Darst	Brecksville, Oh.	October 16/88
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Ann Irwin	Bloomfield Hills, Mich.	October 16/88
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NOTICE ABOUT REPORTING PLACE NAMES WHEN YOU ARE TAGGING

When you are reporting the place where you tagged a butterfly, please specify the nearest center which we can locate in the atlas. It would be helpful if you would also record the distance and direction from the center if you are tagging in a rural area so that we may trace the flight of the butterfly as accurately as possible.

NOTE: Please do not record local areas such as 1. street names 2.parks 3.counties unless you also include a reference to a larger center.

PUBLICITY

This year we were fortunate to receive many interesting and sometimes amusing newspaper clippings and magazine articles about the monarch butterfly and the many people who are actively involved in rearing monarchs and tagging them. The articles are usually illustrated with excellent pictures- all a tribute to the unending fascination which the monarchs have for an ever growing number of people eager to learn about nature and get involved in the conservation of wildlife.

We would like to thank the following for sending us excerpts from their local and national publications: Sister Laura Banet, David Beaudoin, Dan Best, James Brazil, Dick Buegler, Cecelia Burnett, Nina Cowan, Don Davis, Dale Clark, Pearl Eslinger, Leon Harris, Marion Hill, Dorothy Hoskins, Ann Hughes, Joseph Klinkon, Wendy Kopley, Ilene Levine, Rick Mikula, Kerry Pado, Ralph Ramey, Margaret Schmitz, Nadine Smith, Doris Stifel, Faye Sutherland, Bill Thomas, Matt Tribo, Edna Sutton, Dorothy Yeager, Cyril Zewe.

Excerpts from the following were sent to us in 1988: Kasper-Writes, Muskegon-Chronicle, Whitelake Beacon, Geauga Park District-Green Diamond, Cambridge Star, Staten Island Advance, The Story City Herald, The Tampa Tribune-Times, Toronto Globe and Mail, The Toronto Star, Animal Kingdom, Landmarks, American Forests, Presqu'ile Provincial Park, Travel-Holiday, The Sciences, Travelmex, Dallas Morning News, Vincennes Sun-Commercial, The Courier Times, The Herald Telephone, The Times-Argus, New York Times, The Boston Sunday Globe, San Francisco Sunday Examiner and Chronicle, The Morning Sun Press Observer, Roosevelt Borough Bulletin, The Times News, New Haven Register, New London Day, The Xenia Ohio Daily Gazette, The Grapevine, Nature Canada, Northwest Living, The Idaho Statesman, Agriview, The Harbinger, Sentinel, The Wall Street Journal, Country Living, Ann Landers column-newspaper source unknown.

NOTE: When you send us a clipping please identify the publication from which it was taken. Otherwise we cannot list it as above.

DO YOU WANT MILKWEED PLANTS FOR YOUR GARDEN?

Carol Hillman has generously offered to send milkweed plants to any of our associates who would like to start or expand their milkweed garden. If you would like to have some of these plants please let us know and we shall forward your request to Carol.

NOTE: Because of government regulations applying to the importation of plant material, this offer applies only to those associates living in the U.S.A.

DO YOU HAVE TAG NUMBER 54801?

We are missing the record of the associate to whom tag number 54801 was issued. This tag was returned to us with the pertinent information about the recapture which we would like to send to the associate who used this tag. If this is yours, please let us know.

SPECIAL DONORS

The funds which are required to make this research project possible are provided by donations of research associates who belong to the Insect Migration Association. These funds are paid to the University of Toronto where they are held in trust.

The expenses incurred by the Association are mainly used for postage costs, office supplies, translation services, clerical assistance, purchase of alar tags and long distance telephone to verify data as well as the publication of the annual report, Insect Migration Studies.

Since the cost of postage in Canada has been increased again this year we are particularly grateful to those associates who have donated more than the suggested amount.

These special donors are as follows:

Fred Armstrong	Carol Hillman	Molly Monica
Sister Laura Banet	Dorothy Hoskins	Emily Pendleton
David Beaudoin	Harvey & Lorraine Houck	Patricia Peterson
Yvonne Blanchard	Shirley Hupp	Protectors of Pine Oak Woods
Ken Borisch Family	Joan Johnson	Ralph Ramey
Betsy Briggs	Donna Kessler	Pat Reese
Dick Buegler	Patricia Kester	Dale Reichert
Gray Carter	Joseph Klinkon	Millicent Scott
Lee Darst	John Knapik	Marion Smith
Erma DeWitt	Debbie Knutson	Sally Spooner
Margaret Elliott	Jaci Kroupa	Doris Stifel
Pearl Eslinger	Patricia Kucker	Edna Sutton
Anne Firlit	Edith Lerch	Sonja Teraguchi
Russell Fontaine	Marion Lopina	Bill Thomas
Jessie Glynn	Jonathan Maendel	Regina Van Scoy
Denis Hahn	Marjorie Mathes	Elaine Warner
John Klein	Roland Matson	Jane Wenger
Mary Henshall	Ruth Milani	Alice Woodcock
Marion Hill	Helen Millward	

IS THE MONARCH AN ENDANGERED SPECIES?

At the present time, the monarch butterfly is not an endangered species.

Periodically, newspaper reports would indicate that all the trees on the mountains of Mexico are being removed and hence the overwintering site of the monarch are being destroyed. This is a gross exaggeration.

If a forest fire should break out in the areas where the monarchs are clustering on the trees, this could have a marked effect on the numbers of the eastern population. This could happen. Thus strict supervision must prevent visitors from making fires in the area, which has happened in the past.

If the Mexicans should decide to remove all trees from all mountains on the Neovolcanic Plateau, this would have a decided effect on the eastern population. But, we can't imagine the Mexicans doing this. But man has committed similar atrocities to our North American forests.

Every animal on the earth is in danger of extinction. During the past world war, species of birds on islands in the South Pacific were exterminated. Many animals, such as the dodo bird and the passenger pigeon have disappeared owing to man's actions. No doubt many others will suffer similar fates as forests are destroyed and the air and water are polluted. But, long before man entered the scene bringing his destructive forces, nature has done its part in eliminating not only species but entire orders and families of animals, from trilobites to dinosaurs.

At the present time - a mere fraction of a second in cosmic time - the monarch butterfly is not an endangered species. Fortunately, as a result of our finding the overwintering site in Mexico, we have been able to preserve the areas to a considerable extent. Had we not made this momentous discovery and shown the Mexican authorities how important this was to the economy of their country, a phenomenon unknown in any other part of the globe, it is quite likely that the eastern population might have been seriously reduced owing to lumbering operations. It is now up to the Mexican authorities to see that this does not happen. Under the watchful eye of Monarca A.C. and since it is now of economic importance to the inhabitants of the area, we believe that the monarchs are being cared for during the winter months. But what about the summer months?

As cities expand and multitudes of roadways are being built across the country, thousands of acres of arable land are being destroyed. Thus, the supply of milkweed plants upon which the larvae of the monarch depend, are being drastically reduced. In addition, the indiscriminate use of herbicides has destroyed hundreds of acres of milkweed, especially along roadways and railway lines. This not only affects the monarch but also many other species of butterflies whose host plants are also destroyed.

Although we cannot restore the areas where the milkweed has been removed, we can, in a small measure, increase the amount of milkweed by spreading seeds in vacant fields, along roadways and railway lines and planting milkweed in our gardens. Teachers can make the planting of milkweed a project. A study of the milkweed would introduce the students to the science of botany and it would expand their knowledge of the relationship of plants to insects and finally to all animal life. If a few hundred school classes took part in such a project, there would be many thousands of milkweed plants growing in various parts of our country. For every female larva that reaches maturity, because it had milkweed plants to feed upon, there might be seven hundred more larvae. Multiply this by several thousand larvae that were able to complete their metamorphosis and thus produce several thousand more females we can begin to realize the benefits that a little effort can produce.

In the absence of milkweed the monarch butterfly could become an endangered species, or at least a species of rare occurrence.

So, let's grow more milkweed.

PHOTOGRAPH OF MATING MONARCHS

Although we have photographs of mating monarchs when they are at rest, we do not have one of the pair in flight. If you happen to have such a photograph we would appreciate receiving a copy either in black and white or in colour. We occasionally receive requests for such a photograph, one which we were never able to secure.

PLANTING MILKWEED

We suggest that you collect milkweed seed pods in your area in late summer, before the pods have completely opened to discharge their seeds.

In northern areas, place the seeds in cardboard cartons - not glass containers since this will encourage mould to form - and leave them all winter in your garage or an out-building so that they will be exposed to ambient winter temperatures. Plant the seeds the following spring preferably in pots transferring the seedlings to your home garden or school garden or neighbouring fields. You may also dig up the roots of such species as syriaca cutting the vegetative centers out and planting them. The planting of milkweed makes an excellent school project not only for the monarch butterfly but to study other insects that are attracted to the scented flowers.

CONSERVATION GOALS PROMOTED BY MONARCH BUTTERFLY RESEARCH

Charles Binkley of the Etobicoke Field Studies Centre, Brampton, Ontario, finds that tagging monarch butterflies helps fulfill several of their objectives and goals which include:

Helping develop respect for the environment and commit to the wise use of resources;

Knowledgeable concern for the quality of the environment, the careful use of natural resources and the humane treatment of all living things;

Developing scientific investigative skill using a variety of techniques in a natural setting;

Developing an awareness of environmental issues which upset the balance of our ecosystem.

Research Associates: 1988-1989

Adler, Dani: Port Jefferson, New York.
 Allenbaugh, Billy: Reynoldsville, Pennsylvania.
 Allgrove, Carl: Windsor, Connecticut.
 Anderson, Carolyn: Madison, Wisconsin.
 Argana, Bernadette: Caledonia, New York.
 Armstrong, Fred: Red Bank, New Jersey.
 Austing, Ronald: Dillsboro, Indiana.

Bamman, Darlene: Jacksonville, Missouri.
 Banet, Sister Laura: Cicero, Illinois.
 Banet, Mary: Calumet, Illinois.
 Baumgardner, Sally: Naperville, Illinois.
 Beaudoin, David: Whitehall, Michigan.
 Benyi, David & Ryan: Columbus, Ohio.
 Best, Dan: Chardon, Ohio.
 Binkley, Charles: Brampton, Ontario.
 Blanchard, Yvonne: Lake Shastina, California.
 Bluemont School: Manhattan, Kansas.
 Borisch, Ken: Cincinnati, Ohio.
 Bracher, Ray: South Bend, Indiana.
 Bragg, Margaret: Lebanon, New Hampshire.
 Brazil, Susan & family: Braham, Minnesota.
 Breen, Jean: Brookfield, Connecticut.
 Briggs, Betsy: Marshfield Hills, Massachusetts.
 Brown, Joe Eddy: Lisle, Illinois.
 Buegler, Richard: Staten Island, New York.
 Burnett, Cecilia: Ames, Iowa.
 Burns, Ann: Maquoketa, Iowa.

Carter, Gray: Perry, Florida.
 Casson, Gail: Boston, Massachusetts.
 Cavanna, Pedro: Norfolk, Connecticut.
 Christensen, Lanette: Minneapolis, Minnesota.
 Clark, Dale: Dallas, Texas.
 Clements, Marta: West Paris, Maine.
 Coleman, William: Ventura, California.

Darst, Lee: Breckville, Ohio.
 Davis, Donald: Downsview, Ontario.
 De Montes, Barbara: Can Cun, Quintana Roo, Mexico.
 De Wind, Joan: Sherman, Connecticut.
 De Witt, Erma: New Paltz, New York.
 Doughty, Jean: Clarion, Pennsylvania.
 Dreyer, Kay: Farragut, Iowa.
 Duffy, Shirley; Essex, Massachusetts.

Eisele, Carolyn & Ronald: Reynoldsville, Ohio.
 Elliott, Margaret: Muskegon, Michigan.
 Eslinger, Pearl: Terre Haut, Indiana.
 Evans, Judy: New Lebanon, Ohio.

Firlit, Anne: Beller, Connecticut.
 Fontaine, Russell: Davis, California.
 Foster, Paul: Idaho Falls, Idaho.

Glovas, Gregory: Bethlehem, Pennsylvania.
 Glynn, Jessie: Limehouse, Ontario.
 Goemaat, Dennis: Marion, Ohio.
 Goin, Ann: Toronto, Ontario.
 Goldburg, Kristin: Dallas, Texas.
 Gottfried, Carlos: Coyoacan, Mexico.
 Grey, Lois: New Harmony, Indiana.

Hagenson, Barbara: Clinton, Iowa.
 Hahn, Denis: Bloomington, Minnesota.
 Hamilton County Park Dist.: Cincinnati, Ohio.
 Haycraft, Amanda: Owatonna, Minnesota.
 Hayes, Mike: Oakfield, Wisconsin.
 Hayner, Melanie: Atlantic, Iowa.
 Henninger, Raychel: Owego, New York.
 Henshall, Mary: Nampa, Idaho.
 Hill, Marion: Lyndhurst, New Jersey.
 Hillman, Carol: White Plains, New York.
 Hoeflich, Nancy: Bedford, Massachusetts.
 Holden, Joann: Birmingham, Michigan.
 Holtzman, Lynn: Xenia, Ohio.
 Horr, Alta: Dunbar, Nebraska.
 Hoskins, Dorothy: West Dennis, Massachusetts.
 Houck, Harvey & Lorraine: Decorah, Iowa.
 Hughes, Ann: Walnut Creek, California.
 Hughes, Charlotte: Wilmington, Delaware.
 Hunter, Alan: Jamesville, New York.
 Hupp, Shirley: Hinton, Virginia.
 Hutchinson, Ann: Maplewood, Minnesota.

Inman, Virgil: South Bend, Indiana.
 Irwin, Ann: Bloomfield Hills, Michigan.
 Island Natural Science School: Toronto, Ontario.

Jackson, Franne: Dallas, Texas.
 Jacques, Diane: Bridgehampton, New York.
 Johnson, Joan: Winchester, Virginia.

Kaestner, Marilyn: Northville, Michigan.
 Karcher, Gregory: Souderton, Pennsylvania.
 Kauss, Sandy: Black River Falls, Wisconsin.
 Keeney, Norwood: New Port, New Hampshire.
 Kelley, Patricia: London, Ohio.
 Kendrick, Eva: Sault Ste Marie, Ontario.
 Kessler, Donna: Audubon, Iowa.
 Kester, Patricia: Appleton, Wisconsin.
 Kietzke, Hilmer: Baraboo, Wisconsin.
 Klinkon, Joseph: Girard, Kansas.
 Knutson, Debbie: Iron Mountain, Michigan.
 Kopley, Wendy: Skaneateles, New York.
 Kroupa, Jaci: Wimberley, Texas.
 Kucker, Patricia: Raleigh, North Carolina.

Landstrom, Lee Ann: Osseo, Minnesota.
 Larsen, Kirk: Wooster, Ohio.
 Larson, Donald: Minnetonka, Minnesota.
 Lee, Steven: Waynesville, Ohio.
 Lerch, Edith: Andrews, North Carolina.
 Libbey, Jan: Clarion, Iowa.
 Little, Jim: Toledo, Iowa.
 Locher, Tami: Chesterland, Ohio.
 Lopina, Marion: Wauwatosa, Wisconsin.
 Lorimer, Mary: West Bloomfield, Michigan.
 Lovallo, Patricia: Rochester, New York.
 Lucille, Sister: Saukville, Wisconsin.
 Lutz, Marilyn: Yellowstone Nat. Park, Wyoming.

Madison, Brenda: Jefferson City, Missouri.
 Maendel, Jonathan: Macgregor, Manitoba.
 Mahan, Harold: San Diego, California.
 Mathes, Eldred & Marjorie: Pontiac, Michigan.
 Matson, Roland: Minneapolis, Minnesota.
 McCabe, Micki: Greens Farms, Connecticut.
 McCouch, Theresa: Ft. Leonard Wood, Missouri.
 Mikula, Richard: Hazleton, Pennsylvania.
 Milani, Ruth: Meaford, Ontario.
 Millward, Helen: Fallon, Nevada.
 Monica, Molly: Berkeley Heights, New Jersey.
 Mullally, Dick: Muskegon, Michigan.

Naturalist Club of Broome County: Endwell, New York.
 Nikolai, Dick: Appleton, Wisconsin.
 Nolin, Wendy: Sunapee, New Hampshire.
 Norenberg, Marilyn: Duluth, Minnesota.

O'Connell, Elizabeth: Staten Island, New York.
 O'Neil, Catherine: Whitmore Lake, Michigan.
 O'Neil, Karen: Fenton, Michigan.
 Ortt, Marilyn: Marietta, Ohio.
 Osterbauer, Ron: Faribault, Minnesota.

Pado, Kerry: Old Lyme, Connecticut.
 Palo Alto Conservation Bd.: Ruthven, Iowa.
 Pendleton, Emily: Montevallo, Alabama.
 Perzanowski, Lee & Phyllis: Havre de Grace, Maryland.
 Peterson, Patricia: Stillwater, Minnesota.
 Pfeiff, Miriam: Ruthven, Iowa.
 Post, Earle: West Milford, New Jersey.
 Preston, Vicki: Whiteford, Maryland.
 Protector of Pine Oak Woods: Staten Island, New York.

Ramey, Ralph: Yellow Springs, Ohio.
 Rappeport, Sally: Brooklyn, New York.
 Reese, Pat: West Hartford, Connecticut.
 Reese, Randy: Greensboro, North Carolina.
 Reichert, Dale: Hanover, Pennsylvania.
 Ritzenthaler, John: Dayton, Ohio.
 Rongish, Kathy: Underwood, Iowa.

Saehler, Edward: Iowa City, Iowa.
 Schmitz, Margaret: Fond du Lac, Wisconsin.
 Schneider, Dan: Guelph, Ontario.
 Schwarz, Joanne: Johnson, City, New York.
 Scott, Millicent: Casper, Wyoming.
 Senghas, Joan: Mount Clemens, Michigan.
 Shane, Vince: Bloomington, Minnesota.
 Shaw, Carol: Kaufman, Texas.
 Shrake, Jennifer: Columbia, Maryland.
 Siegel, Russell: Danbury, Connecticut.
 Sinclair, Jean: Earlysville, Virginia.
 Slowik, Nancy: Staten Island, New York.
 Smith, Janice: Indianapolis, Indiana.
 Smith, Leslie: Citrus Heights, California.
 Smith, Marion: Lyndonville, New York.
 Smith, Nadine: Kings Park, New York.
 Smith, Trudy: Noank, Connecticut.
 Southard, Donna: St. James, Missouri.
 Spooner, Sally: Lakeville, Massachusetts.
 Stifel, Doris: Toledo, Ohio.
 Strike, Megan: Maplewood, Minnesota.
 Strong, William: Novelty, Ohio.
 Stull, Jean: Waterford, Pennsylvania.
 Sutherland, Faye: Boise, Idaho.
 Sutton, Edna: Richland Centre, Wisconsin.

Teraguchi, Sonja: Cleveland, Ohio.
 Thames, Bev.: Bay City, Texas.
 Thomas, Bill: Springfield, Missouri.
 Thompson, Amy: Stoneboro, Pennsylvania.
 Totman, Lori: Newark, Ohio.
 Totton, Larry: Granger, Iowa.
 Tribo, Mathew: Washington, West Virginia.

Van Scoy, Regina: Limestone, New York.

Warner, Elaine: Rochester, New York.
 Wenger, Jane: Hershey, Pennsylvania.
 Westwood Hills Environmental Ctr., St. Louis Park, Minnesota.
 Williams, Betty: Kent, Ohio.
 Williams, Gary: Glen Ellyn, Illinois.
 Wilson, Audrey: Cobourg, Ontario.
 Wilson, Marsha: Jefferson City, Missouri.
 Wilson, Roger: Merville, Iowa.
 Wilson, Thomas: Pownal, Maine.
 Wood, Douglas: Nitro, West Virginia.
 Woodcock, Alice: Upper Montclair, New Jersey.

Young, Holly: Shawnee Mission, Kansas.
 Yeager, Dorothy: Pearsall, Texas.

Zewe, Cyril: North Huntingdon, Pennsylvania.
 Zimmerman, Helen: Vineland, Ontario.
 Zimmerman, Walter: Mesquite, Texas.

Note: Please let us know of any omissions.