ANNUAL NEWSLETTER TO RESEARCH ASSOCIATES

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TABLE OF CONTENTS

Message from Professor and Mrs. Urquhart 1
To Miss Audrey Wilson — Our Sincere Thanks 2
Our Apology 3
Mexico and Central America 3
Associates Needed in Mexico and Central America 5
Laboratory Investigations 6
Books Available 6
California Monarchs 6
Resident Populations 7
Spring Migration 8
Annual Donation 8
Need for Research Grants 8
Membership for 1973 — Renewal Form 10
Tagging Returns for Monarch Butterflies for 1972 11
Tagging of Species other than Monarch Butterfly 11
Associates Involved in Transfer Experiments 13
Scientific Papers Free to Research Associates 14
Monarch Butterfly Research and Conservation 15
Publicity Concerning Tagging Research 15
Population Decline 19
Slides for Lectures 20
Net for Collecting Insects 21
To Collect Monarchs from High Roosting Sites 21
Requests for Tags 21
Leftover Tags 22
Simplified Recording of Tags 22
Important Notice: Re Tagging Reports 22
Reminder: Re Tagging Reports 22
Research Associates 23-31

Insect Migration Studies was made possible with the co-operation of the Graphics and Photography Department and the Printing Department of Scarborough College, University of Toronto.

THIS NEWSLETTER HAS BEEN PRODUCED IN ORDER TO INFORM OUR ASSOCIATES OF WHAT HAS BEEN DONE AND MUST NOT BE USED FOR SCIENTIFIC PUBLICATION. ANYONE WISHING SCIENTIFIC DATA SHOULD CONTACT PROFESSOR F.A. URQUHART AT SCARBOROUGH COLLEGE, WEST HILL, ONTARIO, CANADA, M1C 1A4.

TO OUR ASSOCIATES

FROM

PROFESSOR AND MRS. URQUHART

This has been a most successful year! Not because of the number of long-distant flight records but because we are beginning to see the end of the migratory flights of monarchs starting from the eastern United States and eastern Canada. When this project started many years ago we were not certain that the monarch actually travelled short distances let alone long distances. It had been suggested that only a portion of the population moved southward never to return and that the northern parts of the continent were repopulated by individuals that over-wintered beneath logs, as is the case of many hibernating insects. By means of laboratory experiments, we proved this idea to be erroneous. It was then considered that the monarchs journeyed from the eastern United States and Canada to Florida and the Gulf Coast there to remain during the winter months. However, as a result of our tagging program amplified by field expeditions throughout the winter months, this conception was also found to be incorrect. It was then thought that perhaps they journeyed as far as southern Texas, along the Gulf Coast. An extensive expedition, covering 14,000 miles, proved this to be wrong.

Over the years, with the cooperation of hundreds of research associates and after tagging over 400,000 migrating monarchs, we have now traced the migration to southern Mexico. This is indeed a most amazing flight and one which, a few years ago, would have been considered quite impossible for an insect to accomplish annually.

We now seem to be on the verge of finalizing this part of the amazing migrations of the monarch butterfly. We postulate that somewhere in southern Mexico, perhaps along the Pacific Coast, our northern butterflies finally reach the end of their long, transcontinental flight. For this reason we are now in the process of organizing a group of associates in Mexico, as well as in various parts of Central America, as explained in this Newsletter.

It has been brought to our attention by a number of interested individuals that our project is doing more for conservation than most so-called "conservation programs". When we as a research group consider what impact our activities are having on the young people of our land, the statement certainly is true. Hundreds of school children, with the guidance of their teachers, have become involved in this project and, as a result, have been introduced to the wonderful world of living things. In this way they have come to appreciate the importance of our wild life and to realize the effect on living organisms of polluting our soil and atmosphere. Many organizations, such as Girl Scouts, Boy Scouts, 4-H clubs, etc. have made this

research a project in conservation. The delicate balance of nature is strikingly exemplified by the monarch butterfly that must make long-distance flights over thousands of miles of our continent, passing through towns and cities the atmospheres of which reek with the effluent gases of chemical factories and over fields laid destitute of all living plants caused by the noxious gases, finally ending in their countless millions in areas such as California and Mexico where, if proper precautions are not taken, the entire migrating population can quite readily be exterminated. In this connection, we are pleased to report in this Newsletter that areas in California, where the monarch butterfly spends the winter in tremendous numbers, have been set aside as conservation areas for the protection of this remarkable insect. This not only protects the monarch butterfly also all living creatures and plants in the area.

In addition to our studies of the long-distant migrations of the monarch butterfly we have also been actively engaged in studies of "resident populations" which occur in California and Florida. Concerning the latter, we are now in a position to analyze the mass of data resulting from the excellent work done by Dr. and Mrs. Reuter for Florida. We had the real pleasure of visiting Mrs. Reuter and discussing various aspects of the work with her during February of this year. We suspect that in southwestern Arizona there is a similar resident population which we hope to study in the near future. There are other areas in Mexico and Central America that appear to have resident populations but as yet we do not have sufficient data upon which to base even a tentative conclusion. We hope to obtain such data as a result of our growing group of associates in Mexico and Central America.

The study of the monarch butterfly is an exciting one. The data we collectively obtain is of great interest to all entomologists studying the movements of various species of insects throughout the world. We are beginning to understand the factors involved in causing insects to move from one part of the country to the other.

But, in addition to the scientific value of our collective efforts, it is a real pleasure we share and one in which we take a great pride in having introduced the study of nature to so many thousands of our young people and naturalists of all ages.

TO MISS AUDREY WILSON – OUR SINCERE THANKS!

Miss Wilson, in the pursuit of her many interests in natural history, has become one of Canada's most eminent teacher-naturalists. In addition to her regular assignments as nature instructor in the various schools of her district, she is called upon by many groups to conduct field courses. She is also an author, having written a book about birds and will no doubt continue in this field of activity in the future. As a result of her many commitments, she finds it no longer possible to take on the heavy duty of preparing the Newsletter for distribution to our associates.

I am certain that you will wish to join in a sincere vote of thanks to Miss

Wilson for her many years of devotion to this study and the preparation of the Newsletter. THANKS AUDREY! !

OUR APOLOGY

We have over six hundred associates now working as a team following the migratory routes and the ecology of the monarch butterfly. Owing to the lack of sufficient funds we cannot afford to hire a full time secretary to look after the mail, record release and recapture data, and so on. Therefore, we must, at intervals, bring in temporary help who occasionally make mistakes. Usually, we can correct the errors with but little effort. However, this past year, the young lad in charge of recording our paid-up associates failed to record some of them with the result that we had to write and ask whether or not you had paid your annual fee. There were also errors made in sending out letters to some of our associates informing them that we would not need any further data in their particular area.

We trust that such errors, thanks to your replies to our letters, have now been corrected.

MEXICO AND CENTRAL AMERICA

That the monarch butterflies can travel from the northeastern parts of the North American continent to the far southwest has now been proven by our tagging method. It now remains to locate and study the overwintering populations, wherever they may be, in Mexico. We are gathering much information from this part of the continent and we feel certain that by the time the next Newsletter is being prepared we will have more exact information to pass on to you.

There are also good indications that our North American (eastern) migratory population pass down the Florida Penninsula and, following the islands of the Greater Antilles, reach the coast of Central America in Honduras and Nicaragua. There is also some indication that they may reach the Panama Canal Zone. However, we are faced with a difficulty: There are two subspecies of the monarch butterfly in North America (including Central America). The one with which we are most familiar and which migrates through the United States and Canada is *Danaus plexippus plexippus.* The subspecies found in parts of extreme southern Mexico and Central America is *Danaus plexippus megalippe. Megalippe* is the South American subspecies and is found north of the Amazon drainage and into the islands of the Antilles and Central America. Thus, both subspecies are found overlapping in their distribution in Central America. There are also resident populations of *plexippus* in southern Mexico and Central America and it would also appear that there are resident populations of *megalippe.* The problems are: Do these two subspecies interbreed? Is *megalippe* a migrant from South America and does it also have resident populations? The answers to these questions can only come from the activity of those interested in this study and by laboratory experimentation.

Please refer to the Monarch Butterfly book for the characteristics that separate these two subspecies as well as notes on the distribution of *megalippe.*

LABORATORY INVESTIGATIONS

We have completed, and have published, our laboratory investigations on the possible morphological significance of the "gold spots" on the pupa of the monarch butterfly; copies of this paper will be sent to you free on request. (See form in Newsletter). We now have a good deal of laboratory information pertaining to the cellular structure of the "alar gland" on the wing of the male monarch. These data will be published in the near future.

We hope to continue our research on the genetics of the sub-species *megalippe* as it pertains to our species, *plexippus*, by cross-breeding. A start on this work was carried out two years ago, but owing to the increased amount of work involved in our migratory studies, we have been unable to carry out further laboratory breeding experiments. A study of this kind is most important now that we know that our species actually travels to the breeding grounds of the other and hence there might be an interbreeding population, which raises some interesting questions, particularly if *megalippe* is also found to be a migrant.

BOOKS AVAILABLE

THE MONARCH BUTTERFLY: We have only fifteen copies now available at the reduced price for our associates ($4.25 postage included). When these have been used up, any further requests will be submitted to the University of Toronto Press at the regular press price.

INTRODUCING THE INSECT: The Clarke Irwin eidition of this book, which contains a number of colour plates, is now out of print from the publishing company. However, we still have a good supply on hand for our associates at $4.50, as stated in our last Newsletter. When these have been distributed, this edition will be exhausted. However, an abridged edition of the book, without the colour plates, has been produced by Frederich Warne and Company Limited of London, England, for world distribution and this should be available to you for some time to come. However, the Clarke Irwin edition is far superior in content and format.

CALIFORNIA MONARCHS

We are now starting to examine a tremendous amount of data pertaining to the monarch populations of California. Most of this data, obtained by our associates over the past eighteen years, has been as a result of the efforts of Paul Beard, Bob Brownlee, Paul Cherubini and William Coleman.

Our first effort to study the overwintering populations of the monarch butterflies in northern California, at a site referred to as "Butterfly Trees Lodge" and Washington Park located on the Monterey Peninsula. This was in the winter of 1955. At that time we had not been able to work out a satisfactory tagging method. However, with the assistance of three students from the University of California at Berkeley, we tagged approximately a thousand butterflies that were roosting in

dense clusters on the Monterey pines. During the following night a heavy fog accompanied by a fine drizzle, rolled in from the ocean drenching the clusters of butterflies. In the morning we returned to our tagging sites and, much to our dismay, found the ground strewn with out small alar labels. The reason for this calamity was that we were using a water soluble glue on the tags with the result that the paper absorbed water and loosened the glue. We tagged another five hundred specimens using a fast drying adhesive which was waterproof. As a result of our activities only a few returns were obtained and none of them of any significance. Hence, our trip from Toronto, Canada to California was a failure - but we did learn that a different type of tag was needed. Later, as a result of the work done by Mr. Beard much more significant results were obtained, using labels similar to those now distributed to our associates. As a result of the work done by Bob Brownlee, who tagged many thousands of specimens, a small but somewhat significant paper was published.

We are looking forward to analyzing the data now on hand as the result of the work of William Coleman and Paul Cherubini.

RESIDENT POPULATIONS

The ornithologists have found that, in some species of birds, if conditions of food supply and shelter are available, a resident population of what would otherwise be a migratory species, will be established. Thus, in the northern breeding areas of certain species of duck populations will remain throughout the winter months by artificially feeding them.

In the case of the monarch butterfly we have found that if summer females are taken into the laboratory and there deposit their eggs, the resulting progeny under laboratory temperature and availability of food, will continue to breed throughout the winter months with no ovarian dormancy period in the females.

We now find that, in nature, if a segment of the population in North America reach areas where temperature and food supply are adequate, populations will occur throughout the winter and summer months. These we refer to as "resident populations". We have found such to be the case in the populations in southern California (published results may be obtained on requests). We now find a similar situation in parts of Florida. It would appear that a similar situation occurs in south-western Arizona. And if is now quite evident that such a resident population occurs in southern Mexico and Central America. Whether or not such resident populations would become migratory remains for further investigations in the field and in the laboratory. Experiments in the laboratory might indicate the possibility of ovarian dormancy resulting from decreased temperatures similar to that in the northern breeding areas. At present we do not consider the difference to be a genetic one but rather one related to extrinsic factors of temperature and availability of food. As a result of our studies of the monarch populations of Florida and Mexico, we might be able to find a possible relationship between resident and migratory populations.

This will indicate to you that the study of the migrations of the monarch butterfly is not a simple one that can be explained in a manner applicable to birds.

We are dealing with a creature the body temperature of which varies with that of the environment with the result that they, unlike birds, will react differently under different conditions of temperature.

SPRING MIGRATION

Although we have a great deal of information concerning the Fall migration, we have very little of statistical value with respect to the spring movement. We are hoping that more of our associates will make an effort to tag spring migrants as well as early summer specimens (June and July). As yet we have no data that can be used to validate, or disprove, the hypothesis that the populations in California eventually meet those on the east side of the mountains. William Coleman and Paul Cherubini have been doing an excellent job of tagging members of the populations over-wintering in California and as a result of such efforts we hope to obtain a number of returns. As far as we can tell, there does not appear to be any apparent difference in the population in California and those of the rest of the continent and hence we strongly suspect that they do intermingle.

As yet we do not have sufficient release-recovery data to negate or indicate the possibility of a migrant making a complete return from its breeding grounds to the over-wintering sites in Mexico and return. It would appear from what information we now have that the spring migrants mate before leaving the over-wintering sites, or shortly thereafter, and the females deposit their eggs as they travel northward. The migrants reaching the more northern parts of the continent in the eastern United States and Canada being the progeny of the original migrants. Hence, we are in need of more definitive data upon which to arrive at a decision on this important phase in the migrations of the monarch butterfly.

ANNUAL DONATION

Owing to the increased cost of clerical assistance, postage, purchase of material, and so on, we find it necessary to increase the annual donation to the project to $7.50 for an individual membership and to $10.00 for institutional membership (schools, recreational groups, nature clubs, etc.). The burden of increased costs of material and clerical help is more onerous as we no longer have the support of the National Geographic Society having completed the program as outlined at the time of application. We are hoping to obtain further financial assistance from some other source, as yet unknown.

The donations from our associates cover only a small portion of this research; most of the cost is covered by the University of Toronto and by granting agencies.

NEED FOR RESEARCH GRANTS

Since a research program such as this one does not have a direct economic value, it is most difficult to obtain adequate financial support. Although it is agreed that from the scientific point of view it is most important, it does not lend itself to

such things as insect control or productivity. Hence we must rely on granting sources that are interested in basic research and knowledge for knowledge sake.

There are some manufacturing firms that could, perhaps, assist in this work at the same time deriving a considerable amount of publicity through our tagging methods - we have now had over two thousand news releases dealing with various aspects of our program. There are also individuals who, aware of the importance of such an activity from the conservation point of view and the interest to our young people, might be willing to contribute amounts either through their personal donations or through some financial enterprises in which they may be directly or indirectly involved.

If you have any ideas please pass them along and we will take it up. We are now working on a few leads and hope that at least some of them will bear fruit.

TAGGING RETURNS FOR MONARCH BUTTERFLIES FOR 1972

The list of recaptured monarch butterflies which appears here is merely a sample of the hundreds of valuable flight records which have been accumulated in the past year. We selected these to give you an idea of the scope of our work.

We should make special reference to the work done by Paul Cherubini and William Coleman, both of California, who have done a monumental amount of tagging this past year and also to Mrs. R. Reuter of Florida for her tremendous contribution to our studies in Florida. The work of these associates is dealt with in more detail in another part of this Newsletter.

No. of Tag	Tagged by	Tagged at	Recaptured at
d2-830	Lloyd Beamer	Meaford, Ontario	Kalamazoo, Michigan
n5-191	Donald Davis	Colborne, Ontario	Cottondale, Florida
n5-225	Donald Davis	Colborne, Ontario	Athens, Georgia
n5-118	Donald Davis	Colborne, Ontario	Rolla, Missouri
j8-990	Jim Drobka	Manitowoc, Wisconsin	Cuatrociengas, Coahuila, Mexico
b8-141	Ruth Duncan	Brampton, Ontario	Appalachicola, Florida
n4-859	Timothy Heath	Millburn, N.J.	Fairhope, Alabama
a2-324	Nancy Hoeflich	Concord, Mass.	Flushing, N.Y.
k2-789	Mrs. F. Hupp	Hinton, Virginia	Whitney, Texas
n7-121	Edward Keith	Long Point, Ontario	Oakwood, Texas
n7-636	Edward Keith	Long Point, Ontario	Ashtabula, Ohio
k2-317	Mrs. M. McFarland	Potomac, Maryland	Miami, Florida
j5-582	Mark Minno	Mineral Point, Penn.	Rosman, N. Carolina
38-833	Mrs. Hellen Ochs	Columbus, Indiana	San Antonio, Texas
g5-499	Dale Reichert	Hanover, Penn.	Alexandria, Virginia
m9-89	Dean Roosa	Goldfield, Iowa	Oklahoma City, Okla.
g7-827	James Stull	Waterford, Penn.	Chidester, Arkansas
* nf-553	Mrs. D. Yeager	Pearsall, Texas	Shiner, Texas

*(note: this was a northeastern flight during the spring migration of May 1972).

TAGGING OF SPECIES OTHER THAN THE MONARCH BUTTERFLY

We are delighted to be able to report that a great variety of butterflies and moths have been tagged during this past year and we are hoping that you will continue your efforts to tag as many species as possible.

We cannot overemphasize the pioneer aspect of this work. To date, our records for flights of the monarch butterfly are the only definitive data in existence tracing the movements of one species of butterfly, all other reports are based on sight observations alone.

Our study of the monarch butterfly continues unabated, but there is a tremendous challenge to be met in tagging other species of insects since no definitive data (except ours) exists to trace their movements.

It is entirely possible that many species of butterflies and moths do migrate. By tagging as many species as you can we may be able to find out that other species move over long distances which information would add to an entirely new phase in the study of butterfly migrations.

A sample of recaptures made during the 1972 season:

No. of Tag	Species	Tagged by	Tagged at	Recaptured at	Distance
xx152	Common Eastern Swallowtail Butterfly	Mrs. John Naas	Feasterville, Pa.	Huntingdon Valley Pa.	3 1/2 miles
k9-768	Black (parsnip) Swallowtail Butterfly	Steve Powers	Oley, Pa.	Reading, Pa.	9 miles
a8-485	Promethea Moth	David Schuhknecht	Elgin, Ill.	Elgin, Ill.	3/4 miles

SPECIES, OTHER THAN THE MONARCH BUTTERFLY, THAT HAVE BEEN TAGGED DURING 1972

Gulf Fritillary, Pipevine Swallowtail, Giant Swallowtail, Black (parsnip) Swallowtail, Brazilian Skipper, Silver-spotted skipper, Hackberry, Viceroy, Great Spangled Fritillary, Polydamas Swallowtail, Queen, Cloudless Sulphur, Tiger Swallowtail, Tawny Emperor, White Admiral, Western Tiger Swallowtail, Lorquin's Admiral, Anise Swallowtail, Mourning Cloak, Cabbage Butterfly, Comma Butterfly, Spicebush Swallowtail, Red Admiral, California Tortoiseshell, PinkSpottedHawk Moth, Buckeye.

SPECIAL DONORS TO INVERTEBRATE MIGRATION RESEARCH FUND DURING 1972

The following associates have generously contributed to our research fund. We are immensely grateful for their assistance.

Boughton Cobb, Falls Village, Conn.
E.R. Currie, Toronto, Ontario
Jerome Draper Jr., San Francisco, Cal.
Jessie Draper, San Francisco, Cal.
Mrs. Helen Grossman, Saranac Lake, N.Y.
Mrs. Evelyn Kendrick, Sault Ste. Marie, Ontario
Mrs. Richard Klein, Geneva, Ohio

Ivy Lemon, Gloucester, Mass.
Steve Lewis, Bradenton, Florida
Dr. and Mrs. Lester Luxenberg, Tonopah, Arizona
Mrs. Harriet Marsi, Binghamton, N.Y.
Mrs. Helen Raub, Chatham, N.J.
Mrs. Robert Ridgeway, North Tarrytown, N.Y.
Mrs. L.G. Senghas, Mount Clemens, Mich.
Prentice K. Stout, Far Hills, N.J.
Mrs. Frank Throm, Overland Park, Kansas
Mrs. Maryanne West, Gibson's, B.C.

ASSOCIATES INVOLVED IN TRANSFER EXPERIMENTS

Senders of Live Monarchs	Receivers
Paul Cherubini, Castro Valley, Cal.	O.M. McClure, Salem, Oregon
Paul Cherubini, Castro Valley, Cal.	Mrs. A. Gaspari, Eagle Pass, Texas
Donald Davis, Colborne, Ontario	Mrs. M. West, Gibson's, B.C.
Bill Dufour, El Cerrito, Cal.	Mr. C. McQueen, Mercedes, Texas
Franz Pogge, Morgantown, W. Va.	Mr. C. McQueen, Mercedes, Texas
Franz Pogge, Morgantown, W. Va.	Mr. Fred Mayberry, Harlingen, Texas
Audrey Wilson, Cobourg, Ontario	Mrs. R. Reuter, Bradenton, Fla.

The above associates have assisted us immensely in our efforts to send tagged monarch butterflies to areas of the country where we feel that records of great significance might be made as far as the migration flights are concerned. The transfer of live monarchs requires a great deal of effort in packaging, sending and in being on hand to receive the specimens which must be individually recorded when they are released.

MONARCH BUTTERFLY RESEARCH AND CONSERVATION

Although our work on the migrations of the monarch butterfly is primarily of a scientific nature and adds to the volume of data being gathered from all over the world for many different species of insects, it has proved of inestimable value in introducing our young people to the outdoors and an appreciation of nature. As a result, many of our associates have become interested in conservation and the damage being done to our fauna and flora by pollution. Our Associates have given lectures using the monarch butterfly research as the basis for their arguments for conservation and the setting aside of areas that will remain free from man's interference.

We congratulate Robert C. Young, who is County Chairman of the Small Wilderness Area Preserves of San Rafael California for his action in setting aside a large area in the San Rafael district for the preservation of the over-wintering monarch butterflies. This not only protects the monarch but also all animals and plants in this particular biome.

David Cavagnaro, Resident Biologist of the Audubon Canyon Ranch at Stinson Beach, reports that the Board of Directors of Audubon Canyon Ranch recently authorized the purchase of a grove containing the roosting site of the monarchs in this area.

Perhaps it will be possible for many of our associates to take action in having areas, even small areas (referred to as "pocket handkerchief reserves") set aside for the preservation of our fauna and flora; areas, untouched by humans, where those who enjoy nature in the wild state can spend many happy hours. Remember, the areas do not need to be large. Small reserves are most important in an area being rapidly depleted of its natural flora and fauna.

PUBLICITY CONCERNING BUTTERFLY TAGGING RESEARCH

Since the scope of our program depends to a great extent on the publicity given to it, thus drawing the attention of those interested in insect migration to our work, we are always pleased to receive items of publicity from our research associates and to pass them along to you to demonstrate the widespread interest in this fascinating search for the migration route.

A frozen tagged monarch butterfly was pictured in the "Cabrillo Times and Green Sheet" of December 21, 1972 with the little girl who found it in Rio del Mar, California, testifying to the exceptionally cold weather which killed many hundreds of monarch butterflies on the California coast.

A very large migration of monarch butterflies through Dallas, Texas was noted by the "Dallas Times Herald" of October 21, 1972; the clipping was sent to us by Mrs. Carolyn Barney of Dallas.

One of our very active research associates, Mrs. Gladys Black of Pleasantville, Iowa and her groups of young helpers, were the subject of a long illustrated article in the "Des Moines Sunday Register" of July 30, 1972.

Mr. Jerome Draper of San Francisco, California sent us an illustrated article published in the "Mercury" about a recaptured monarch which had been tagged by Paul Cherubini of Castro Valley, California.

Mrs. Dorothy Yeager of Pearsall, Texas sent us a clipping from the "San Antonio, (Texas) Light" which reported two monarch butterflies which were sent for Kent, Washington south by airplane, since they had emerged too late to join the annual fall migration and survive the cold weather.

One of Paul Cherubini's tagged monarchs which he had transferred to Mr. Mickey McClure of Salem, Oregon was pictured with its captor in the "Statesman", October 2, 1972. This same picture, copied by AP wirephoto on October 7, 1972 was sent to us by Mrs. Dorothy Yeager of Pearsall, Texas, showing the nationwide interest which has been evoked by our tagging program.

The "Tucson Daily Citizen" (Tucson, Arizona), in an illustrated article reported the recapture of another of Paul Cherubini's (Castro Valley, California) tagged monarchs in Bellingham, Washington, one of the longest flights recorded in the northern California migration.

The headline in the "Santa Barbara News-Press" of October 24, 1972 proclaimed "Tagged Monarch Butterfly Had Made 300 Mile Flight". The butterfly in question was one tagged by Paul Cherubini of Castro Valley and also represents one of the longest flights recorded in California.

A long distance telephone call to our office at Scarborough College first announced the recapture of one of William Coleman's (Soquel, California) tagged monarchs. This was later reported in the "Record Searchlight".

"The Spokane Daily Chronicle" published a picture of Paul Cherubini's tagged monarch which was recaptured in Washington state.

Richard Ebright of Reading, Pa. and his experimentation with the diseases of monarch caterpillars was the subject of an illustrated article in the "Sunday Eagle Magazine" of September 10, 1972.

David Fagle of Marshalltown, Iowa sent us a clipping from the "Marshalltown Times Republican" describing the migration there of a large population of monarch butterflies.

Mr. Perry Glick of Brownsville, Texas, noted research entomologist, sent us a clipping from the "Brownsville Herald", October 8, 1972 about the recapture of Paul Cherubini's tagged monarch in Bellingham, Washington.

Eric Hill, of Jenks, Oklahoma, was pictured in the "Tulsa Daily World" with one of the monarch butterflies that he had tagged as a research associate.

Mrs. Harvey Houck of Decorah, Iowa sent us an illustrated article from a Decorah newspaper showing students from her class holding a tagged monarch ready for flight.

Professor Norwood Keeney Jr. of Hudson, N.H. sent us copies of 2 newspapers featuring son Woody and his work with our project. The two papers were "The Hudson News" of September 28, 1972 and the "New Hampshire Sunday News" of October 8, 1972.

The Sault Ste Marie, Ontario, "Star" published a lengthy description of the butterfly research done by Mrs. Evelyn Kendrick of the Sault and her interest in conservation.

A cecropia moth tagged by Charles Lipscomb of San Antonio, Texas was recaptured 3/4 mile from the point of release. A picture of the moth and its captor appeared in the "San Antonio Express".

Mr. James Malick's (Stevens Point, Wisconsin) knowledge of local butterflies was put to good use in a comprehensive list of the butterflies of Wisconsin. Mr. Malick's interest was reported in the "Stevens Point Daily Journal", September 1972.

Mrs. Marks Marcum of San Angelo, Texas sent us an illustrated article about the migration of butterflies which appeared in the "Evening Standard-Times".

Tom Morgan of Kansas City, Missouri and his work as a research associate was the subject of an article in the "Kansas Star-Times".

"The Southampton Spirit" published an article about Mrs. John Naas of Feasterville Pennsylvania, and her intense interest in butterfly gardens and the migration research.

"The Miami Herald", of October 30, 1972 carried a photograph and story about 21 monarch butterflies which emerged too late to join the fall migration. After an appeal by Mrs. Margaret McFarland of Potomac, Maryland the butterflies were flown to Miami by Eastern Airlines where they continued their migration.

Two illustrated articles showing Mike Peterson of Naperville, Illinois and his insect collection appeared in "The Naperville Sun" and in "The Clarion Herald". The Herald article also described at length the whole Peterson family's involvement with entomology and Mike's work as a research associate with our program.

Mrs. Helen Raub of Chatham, N.J. and her tagging large members of monarch butterflies was the subject of a nature column in "The Evening News" of Newark, N.J.

Mrs. R. Reuter of Bradenton, Florida and the fact that she sent live monarchs to us for rearing purposes and the tagging which she did at St. Mark's Refuge were the subject of an illustrated article in "The Sarasota Herald-Tribune" December 3, 1972.

A nature article written by Mrs. Ruth Rippel of La Porte City, Iowa appeared in the "La Porte City Progress Review". Mrs. Rippel described the life history of the monarch butterfly and the scope of our migration research.

The migration research done by the fourth grade class of Lincoln School, and the teacher, Mrs. Estes Rowland of Jerome, Idaho appeared in an illustrated article in the "Times-News" of Twin Falls, Idaho.

Mrs. J.L. Shea of Santa Cruz, California, leader of the Junior Girl Scout Troop 1038 and her troop tagging monarch butterflies were shown in the June 1972 issue of "Girl Scout Leader" of New York, N.Y.

"The Sioux City Sunday Journal" of October 1, 1972 published a profusely illustrated article about the research activities of Mrs. Ethyl Suhumskie and her third grade class at Lincoln School, Sioux City, Iowa.

Mrs. Arthur Welden of New Orleans, Louisiana sent us a column from "The States-Item" of New Orleans referring to the recapture of a tagged monarch butterfly by a local teacher.

"The Corpus Christi Caller-Times" carried an article on October 28, 1972 about the visit to Corpus Christi of Mrs. Dorothy Yeager of Pearsall, Texas. Mrs. Yeager asked the residents to notify her of concentrations of migrating monarchs in the area.

An item from "The Radio Post" of Fredericksburg, Texas, January 11, 1973 explained how one would-be research associate was referred to us through a series of knowledgeable people.

"The News" of Mexico City, February 25, 1973 carried a feature article about the migration of the monarch butterfly and our search for new associates in Mexico and Central America.

The February issue of "Mexican World", published in Minneapolis, Minnesota also carried an article about our attempt to extend the scope of our work in Mexico and Central America.

Mrs. Margaret McFarland of Potomac, Maryland presented an illustrated lecture on the monarch butterfly research at the National Teachers Association Convention held at St. Louis, Missouri in September 1972.

Mr. Roy W. Rings, Associate Chairman of the Ohio Agricultural Research and Development Center at Wooster, Ohio, prepared a display on the migration research which was exhibited at the Farm Science Review and at Ohio State University to an estimated total of 5,300 persons, in the fall of 1972.

"The New Jersey Nature News" Winter Edition announced a talk "The Life Cycle of the Monarch Butterfly" by Mrs. H. Raub of Chatham, N.J.

Dale Clark of Dallas, Texas won the Grand Prize at his school fair with his project entitled "Monarch Tagging".

Ian Gerber of Glenview, Illinois gave a talk on "Banding Butterflies" at the meeting of the Illinois Audubon Society-Lake Cook Chapter in the spring of 1972.

David Kipperman of Dousman, Wisconsin received first prize for his project dealing with the monarch butterfly which he entered at the science fair.

Glenn Patterson of Anaheim, California won a trophy and blue ribbon for his project on "The Monarch Butterfly" at the Anaheim Elementary School Science Fair.

Joseph A. Muench of Manitowoc, Wisconsin and his students had a butterfly display at the local mall during American Education Week. The slides and lecture were seen by about 400 high school students and adults.

POPULATION DECLINE

We are now involved in a follow-up analysis of data relating to the fluctuation in the numbers of monarch butterflies in North America. We have previously published an account of the cyclical variations in numbers (a copy of which is available to you) and we forecasted a marked decline in populations for the summer of 1972. Although there was a drop in numbers in the mid-west, the populations remained high over most of the continent, as reported by our associates. This past summer a most interesting drop in population took place after the first initial migratory push in early September. Thus for a short period of time during the migratory period, our associates in the eastern United States and southern Ontario reported large numbers of monarchs on over-night roosting sites. Within a short period of two weeks the numbers dropped to the point of relative scarcity on the same sites. Whether or not this drop in population, which we believe was due to an early frost period, will reduce the over-wintering migrants and thus affect the populations this coming summer, is a possibility which should be recorded in various parts of the continent. The over-wintering populations in California and southern Mexico appear to have remained high, thus giving promise of a large spring migration and resulting high population density for 1973.

It is most important for us to make careful observations on the relative abundance and scarcity of monarchs in our areas. Therefore, would you please include in your report a statement as to whether in your opinion the monarchs seemed to be either: 1. scarce; 2. abundant; 3. no change. We are in the process of writing up the data on hand and would appreciate any further comments you may have for the summer of 1973 as well as the summer of 1972.

NET FOR COLLECTING INSECTS

From time to time our associates write to ask directions about the making of an insect net. The following instructions are to help you make an insect net from materials which should be readily available.

The first necessity is insect netting. This may be simply a piece of mosquito netting, or nylon netting, draped around a round metal frame, the latter firmly fixed to a small pole. An iron hoop or a stout piece of iron wire, such as a coat-hanger, which has been bent to the proper shape and approximately fourteen inches in diameter will prove very satisfactory. The iron hoop may be cut through with a hack saw and the free ends bent so that they may be placed along the side of the wooden pole and then tied into place with a piece of stout cord. If you wish to dismantle the net, the free ends of the iron hoop, or bent wire, can be made so that they fit into the grooves, one on each side of the pole. A metal sleeve can then be thrust over the free ends thus holding them in place.

Although mosquito netting is used by many amateur collectors for making their insect nets it is not the best material. Wet mosquito netting tends to fray and form large holes which permit the specimens to escape. Nylon netting, on the other hand, is a fabric which will not fray when wet. An old white curtain will prove far superior to mosquito netting for the insect net.

In making the bag of the insect net, be sure that it is at least twice as long as the diameter of the supporting frame and that it <u>does not taper</u> to a point at the bottom. If it is not long enough you will be unable to imprison the specimen when caught. A flick of the wrist should cause the net to overlap the mouth and still leave enough room for the captured specimen. If the net is tapered to a point, butterflies and moths will work their way into the folds and thus become damaged.

TO COLLECT MONARCHS FROM HIGH ROOSTING SITES

Mr. William Coleman of Santa Cruz, California suggests taping the handle of your insect net to a long thin dead tree limb at a location where monarchs are roosting high in the trees. This eliminates carrying a long pole for collecting monarchs from roosting sites.

REQUESTS FOR TAGS

If you are asking for a supply of tags, please mark on the <u>Outside</u> of the envelope <u>"Urgent Tags"</u> if your request is made during the tagging season in your part of the country. We shall send them as quickly as we can. Otherwise, please

request tags (any number you believe you will be able to use) when you send in your renewal fee and renewal sheet (found in the Newsletter).

LEFTOVER TAGS

If you have tags left over from last season, please keep them for use in 1973, and report the numbers which you have kept on the renewal sheet in this newsletter.

The adhesive on the tags will keep for several years if the tags are kept tightly wrapped in order to preserve the moisture.

SIMPLIFIED RECORDING OF TAGS

Mrs. Helen Raub of Chatham, N.J. suggests using one sheet of tags for female monarchs and another sheet of tags for males. In this way she cuts down on recording the sex of the butterfly: e.g.

monarchs a1 - a50 females a51 - a100 males

IMPORTANT NOTICE: RE TAGGING REPORTS

Please be sure to include both the identifying letters and numbers when reporting the tags you have used. Unless we have both the letters and numbers, we have difficulty in preparing data from your reports. In some cases where the numbers only are given and the serial letters omitted, the report is useless.

Also we would like you to keep a carbon copy of the report which you send to us, since occasionally material is lost in the mail and valuable data is destroyed. If you keep a copy of your tagging we can refer back to your data if necessary.

REMINDER: RE TAGGING REPORTS

We would like to thank all of you who submitted your reports promptly. May we remind you that we would like you to send in your reports as soon as you have completed your tagging for the season as we need to have the reports available when we are compiling data about recaptured specimens. We regret that we were unable to complete some of the data which we would have liked to publish in this Newsletter as some of the reports were not sent in and others were not complete.

PLEASE SEND IN YOUR REPORTS AS SOON AS THEY ARE COMPLETED. If you have already sent in your reports will you check them to see if you have sent in all of the information about your tagging, otherwise we shall not be able to use the data from your tagging when we compile information for a scientific paper.

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PLEASE NOTE — The names of some research associates will not appear on the above list as these people joined our group after the Newsletter was sent to the printer.