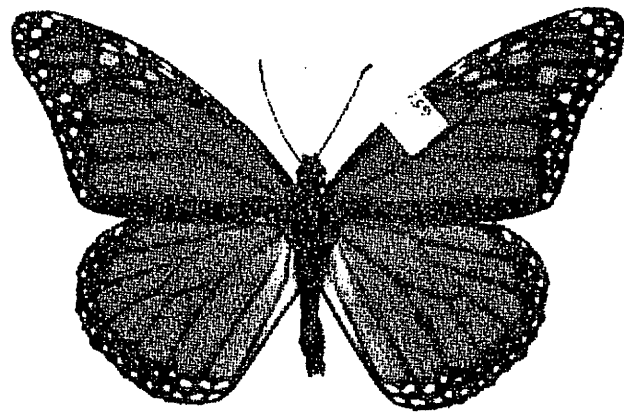


# *Insect Migration Studies*



*Newsletter  
to  
Research Associates*

VOL. 3 MARCH 1966

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 THE EDITOR, MISS AUDREY WILSON R.R. #5, COBOURG, ONTARIO, CANADA.

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FROM PROFESSOR URQUHART  
HEAD OF MONARCH RESEARCH PROJECT

In the Monarch Butterfly book (page 195) there is a discussion of the "fluctuations in numbers from year to year". It was noted that adults were of rare occurrence in 1953 and reached a peak of abundance in 1957. In 1958 they were scarce and reached a second peak of abundance in 1963-64. This past year, 1965, they were once again of rare occurrence. The time interval between the depression period was 5 years (1953-1958) and 7 years (1958-1965). This interval between the two peak years (1957-1964) was 7 years.

Thus, there is a marked fluctuation in the abundance of the monarch butterfly from year to year, but this is apparently not a regular cycle.

This past year, the obvious cause of the sudden decrease in numbers was due to a virus epidemic. We are now studying this virus in our laboratory and the results of our work will be published in the next calendar year.

In the last Newsletter, mention was made of a scientific publication dealing with data accumulated over the preceding three years. This article was accepted and should have appeared in the Proceedings of the Entomological Society of Ontario last September. For reasons unknown, there has been a long delay in the publishing of this journal. When copies of the article are available they will be sent to those requesting it, a list of which names is now in our files.

Our laboratory work, sponsored by the National Research Council, has progressed most favourably. We have been able to maintain a live culture of monarchs in all stages of development in our rearing rooms. This has been accomplished by the use of "growth chambers" in which we have been able to subject larvae, pupae and adults to varying degrees of temperature and light frequency.

Two associates, Mr. Paul Beard of Monterey, California and Mr. R. Brownlee, a student at San Jose State College in California, and I completed a short report on a study of a transient population of overwintering monarch butterflies in Santa Cruz. It was a real pleasure to work with these two associates in this program.

Once again our thanks go to Audrey Wilson, our Newsletter Editor, for her work in preparing this letter for you. Miss Wilson is pursuing her studies at Queens' University.

Much of our laboratory, and all of our tagging program studies, will be moved to Scarborough College - a new college affiliated with the University of Toronto. This will have many advantages of which the most important being the proximity to field areas where ecological experiments may be carried out as well as supplying us with an abundant supply of milkweed.

Commencing January 1st, 1966, would you address your letters to:

SCARBOROUGH COLLEGE,  
WEST HILL, ONTARIO,  
CANADA.

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#### TAGGING RETURNS FOR 1965

Due to the drastic reduction in the monarch population this year, the number of tagged butterflies which were recaptured has been greatly reduced accordingly, and consequently the number of long distance flights which have been recorded are a small percentage compared with the returns of last year.

The following are a few returns which should be of interest;

<u>TAGGED BY</u>	<u>AT</u>	<u>RECAPTURED AT</u>
J. Peplinski	Erie, Pa.	Tallahassee, Fla.
Martha Schaffer	Baltimore, Md.	Port Arthur, Tex.
Brent Beam	Burlington, Ont.	Gulfport, Miss.
Lloyd Beamer, Meaford, Ont.		Vancouver, B.C.
released by Mrs. West, Gower Point, B.C.		

It should be noted that this year we have notified each associate when we received a butterfly with his tag on it and have requested the pertinent information in order to keep our records up to date.

If you have not received a notice that one of your tagged butterflies has been recaptured you may assume that none of your tagged monarchs have been returned to us.

#### TAGGING FOR 1965

Most of our associates have had great difficulty in locating monarch butterflies this year. The majority of reports indicate that little

or no tagging was done due to the marked scarcity of monarchs.

However, we would like to mention the following who were fortunate enough to tag over 50 butterflies, with special mention to Brent Beam and Edward Keith each of whom tagged over 1000 specimens;

Richard Arnold, Hinsdale, Ill.	Campbell Norsgaard, Englewood, N.J.
Brent Beam, Burlington, Ont.	Linda Oldfield, Gretna, Neb.
Marcia Chambers, Tulelake, Calif.	Martha Schaffer, Baltimore, Md.
Mrs. C. Hartley, Pensacola, Fla.	F. Stricker, Kitchener, Ont.
Edward Keith, Windsor, Ont.	J. Stull, Waterford, Pa.
William Menten, Hasbrouck Heights, N.J.	Mrs. F. Throm, Overland Pk, Kan.
D. Wiseman, Alton, Ill.	

#### TRANSFER EXPERIMENTS

Transfer experiments will be carried out on a much larger scale this coming year. We will be in contact with those associates located in strategic areas later in the spring.

We wish to thank the following for their active participation in the transfer program this past year:

Mrs. Maryanne West, Gibson's, B.C.	Mr. J. Shorthouse, Lethbridge, Alta.
Mr. Lloyd Beamer, Meaford, Ont.	Mrs. H. Gathings, Quemado, Texas.
Mrs. L. Luxenberg, Tonopah, Ariz.	Miss Martha Lussier, Orlando, Fla.
Mr. John Burton, B.B.C., Bristol, England.	

#### TRANSFERS TO ENGLAND

As a trial experiment, a shipment of monarch butterflies was sent to Mr. John Burton who is Librarian and Field Research Assistant of the Natural History Unit of the British Broadcasting Corporation. This transfer was most successful and, thanks to the cooperative efforts of Mr. Burton, fifty live monarchs were liberated. These particular butterflies had been previously reared under light and temperature conditions which, should have stimulated them to fly north instead of south. However, only one specimen was recaptured and hence no conclusions could be drawn. We hope, however, that Mr. Burton will work with us next summer in repeating this experiment on a larger scale. Mr. Burton has written a fine article on his participation in this experiment which article will be published in a natural history magazine.

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#### DONATIONS TO MONARCH BUTTERFLY RESEARCH FUND

We would like to thank the following who have contributed so generously to our research fund. Their contributions make possible certain expenditures which are not covered by our research grant.

H.F. Brevoort, Glenbrook, Conn.	Mrs. F. Marsi, Binghamton, N.Y.
Mrs. G. Brewer, Newton Highlands, Mass.	Mrs. A. Mohr, Brookfield, Wis.
R. Brownlee, San Jose, Calif.	Carol & Edw Neumann, Greenville, Ill.
Boughton Cobb, Falls Village, Conn.	Mrs. J. Schmid, Greenwich, Conn.
G. Feiszli, Vermilion, Ohio.	Mrs. Joan Senghas, Mt. Clemens, Mich.
Mrs. R. Fender, Riverton, Iowa.	P.K. Stout, Far Hills, N.J.
Mrs. J. Glynn, Limehouse, Ont.	Samuel Sweet, Manchester, Conn.
Robt & Leona Hagen, Tehachapi, Calif.	Paul Tapscott, Cobourg, Ont.
Noble Hatfield, Indianapolis, Ind.	Mrs. F. Throm, Overland Park, Kan.
John Klipstein, Wausau, Wis.	A.C. Warrick, Windsor, Ont.
Mrs. L. Luxenberg, Tonopah, Ariz.	Mrs. B. Weitgenant, Minneapolis, Min.
Mrs. M. West, Gibson's, B.C.	

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### REPORTS

We would like to thank all of those who submitted their reports so promptly this year, along with the questionnaire regarding the abundance of monarchs.

When we are handling such a large number of reports, it is of great assistance to us if the associates present the data neatly and clearly, using the specified headings and noting the total number of specimens tagged. This year we had a particularly high percentage of reports which were well presented and therefore made the task of interpretation much easier for us.

### ADDITIONAL SLIDES AVAILABLE

In addition to the sets of 15 slides illustrating the life history of the monarch butterfly, which we have been renting to our associates, we now have an extra 10 slides, making a set of 25 slides. These cover the life history of the monarch butterfly, tagging procedures and overwintering sites. They are excellent photographs selected from 800 original slides, many of which have been taken by professional photographers.

If you wish to rent a set of these slides for lecture or classroom purposes send \$2.00 to Dr. F. Urquhart, Scarborough College, West Hill, Ontario. These are available only to our research associates. PLEASE NOTE THE CHANGE OF ADDRESS.

### DATA CONCERNING RESEARCH ASSOCIATES

We thought you might be interested in learning what happens after you register as a research associate in the monarch butterfly project.

First, a page is kept for each associate in a loose-leaf notebook, this page gives the following information, name, address, date of

registration, the payment of the fee and the tags which have been issued. When the tagging report is submitted, a note is made of the date and the number of butterflies tagged.

Second, a file is set up under the name of each associate. This file contains correspondence and reports.

Third, a card is made, bearing the name and address of each associate and this card is filed according to state or province.

Fourth, a pin is placed on our large (three feet by three feet) map of the United States and the southern part of Canada indicating the location of each associate.

In this way we are able to keep quite a comprehensive history of each associate which is helpful in interpreting our data and in setting up transfer experiments etc.

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#### VERIFICATION OF RECAPTURED MONARCHS

Sometimes we have been asked how we verify the fact that a particular tagged butterfly has flown from one point to another and so, for your interest, we will outline the method which we are currently using.

The tagged monarch or portion of it is returned to us by mail here at the Department of Zoology. Our first task is to fasten the tag to the letter or sometimes to the wrapper of the box, making sure that we have the name and address of the sender and the date and place of recapture. We then write the number of the tag in a record book, and look up our list of tags issued to find out which research associate tagged the butterfly.

A form letter is then sent to the associate telling him the name and address of the captor and the date and place of recapture. He is then asked to let us know where and when the specimen was tagged. This information is duly noted in the record book. If either the date or place of recapture is missing we write to the captor asking for the information. Once this is received it is recorded and the captor is informed of the name and address of the associate who tagged the butterfly. If all the necessary information was included in the original letter, we inform the captor of the pertinent information.

You might be interested to learn that all of the original tags of recaptured specimens are retained in our laboratory, also any correspondence involved so that it is possible for us to verify this information at any time, if necessary.

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### PUBLICITY AND SCIENTIFIC PROJECTS

Norman Sibley of Whittemore, Michigan, has actively promoted the monarch research program through a variety of media this year; through an exhibit of monarch butterflies for a 4-H nature program; through an article which he wrote for the Florida Naturalist and through a biographical account of his work and an editorial which were published in "The North Woods Call" November, 1965 published in Roscommon, Michigan.

Mrs. Joan Senghas of Mount Clemens, Michigan, was the subject of a note in the Newsletter of the Michigan Entomological Society, May, 1965, describing her activities as a research associate in the monarch butterfly research project. At the invitation of Dr. Dowdy of Michigan State University Mrs. Senghas participated in a state meeting of 4-H entomology leaders where she presented material dealing with monarch research.

Linda Oldfield of Gretna, Nebraska, won first place with her monarch butterfly exhibit at the Nemaha Valley Conference Fair at Nebraska City and as a result won the right to attend the National Science Fair in St. Louis, Missouri, in May 1965. Linda has also solicited help for the project through letters to local papers and journals.

Rob Hedges, son of H.G. Hedges of Burlington, Ontario, who exhibited a project dealing with experiments in transferring tagged monarch butterflies from one part of the continent to another, won a Certificate of Merit at the Science Fair.

### ABUNDANCE

With few exceptions, our associates reported the monarch butterfly as of rare occurrence during this past summer. In order to prepare a scientific report on the virus as a causative agent in this sudden decline, a questionnaire was sent to our associates. The response to this request was most generous and we wish to thank all those who took the time to fill in the questionnaire and return it to us. We are particularly grateful to those who, in addition to submitting the questionnaire, also added accounts of their experiences with respect to the virus infection and reduction in numbers. Such cooperative effort makes it possible to find out more and more about the monarch butterfly and, in so doing, more about insects in general.

### HOW MANY MONARCHS NEXT YEAR?

From previous experience, we expect that the monarch populations will be very low next summer. There will be a few exceptions in those areas where they congregate on their southern flight, such as southern Texas and parts of California.

We do not expect the numbers to be as abundant again, as in 1963 - 64, until 1969 - 1970. However, we will continue the tagging program and more particularly our transfer experiments.

Many hundreds of specimens may be obtained by rearing them from the egg stage. By capturing a female in the act of laying her eggs and placing her with some milkweed in a screen cage, (this is one way) you can obtain up to several hundred eggs from one female.

#### EGGS FROM NIAGARA FALLS

Miss Ruth Haigh, now in her third year at Guelph University, worked with us this past summer obtaining eggs for us in our laboratory experiments. As a result of Miss Haigh's assistance we were able to obtain over a thousand adults from larvae reared under various laboratory conditions to be liberated at various areas in North America and in England. We were also able to obtain a continuous breeding stock for our winter's experiments.

#### MATING IN CAPTIVITY

It is only occasionally that the monarchs will mate in captivity. Occasionally, during the warmer parts of the summer, frequent matings may be obtained, but not during the colder parts. Yet, in nature, the temperature does not seem to have much effect.

Miss Haigh of Niagara Falls, Ontario, has, during the past number of years, been most successful at "forced mating" of specimens in captivity. The method used is to hold a male and female close together, ventral sides facing each other, and allow the tips of the abdomens to touch. When so stimulated, the male can be induced to clasp the female with his clawlike claspers and, when so attached, they may be liberated in a screen cage. The mating act lasts in excess of twelve hours after which the female will deposit her fertilized eggs upon the leaves of the milkweed plant.

#### MEDICINE FOR MONARCHS

Mrs. Alice Hopf of New York City, N.Y. has found that the following treatment is effective in treating diseased cecropia larvae and would like to recommend its use for diseased monarch larvae.

Mrs. Hopf purchased an antibiotic called "Petmycin" from a pet store. She took one pellet and immersed it in water according to directions, then soaked a few leaves of the food plant in the solution. She then put the larvae on the treated leaves.

Using two groups of larvae, one of which received the normal leaves and the other received the treated leaves as food, Mrs. Hopf was able to raise some normal larvae on the treated leaves and she concluded that the medicine had prevented the larvae from becoming diseased.



We would be interested in learning whether any of our other associates have used a similar method of feeding larvae and, if so, what success they had.

### FROM MEXICO TO ???

One of the BIG mysteries of the monarch migrations is, where do they go from Mexico? We suspect that they travel along the Gulf Coast of Mexico as far as Central America and perhaps reach the Pacific coast there to mingle with the southern extension of the California population. But, we have very little data to support such conclusions. Hence, we are bending every effort to tag as many butterflies in southern Texas as possible. We also hope to supply our associates in Texas with many hundreds of butterflies next fall.

### CALIFORNIA

A considerable amount of work is being done on the overwintering, populations of the monarch butterfly in California. As Dr. Urquhart has mentioned, the tagging carried out by Mr. Brownlee and Mr. Beard has been written up as a contribution to science and should appear in print in the near future. Mr. Munger of Whittier, California has been carrying out a most energetic rearing program. In addition to tagging many hundreds of butterflies, which resulted in most valuable information, he is travelling through California from Los Angeles to Santa Cruz, making notes on the abundance and flight direction of the over-wintering monarchs. We will look forward to reading about Mr. Munger's findings in our next Newsletter.

### SPRING MIGRATION

Although we now have a great deal of data concerning the fall migration, we have very little significant information dealing with the spring movement. It is therefore most important to tag butterflies in the spring and early summer. Associates living in the southern parts of the United States, and most particularly in the south-west, can contribute a great deal of valuable information by tagging spring migrants. Also, rearing butterflies obtained from larvae occurring in the southern parts of the migratory route would make it possible to obtain second generation specimens, the flight direction of which is little understood.

### REARING OF SPRING MIGRANTS

If you are located in the southern United States, particularly the Gulf States, and you would like to rear monarch butterflies from larvae, the adults to be tagged and liberated in the spring or early summer, please write to Dr. Urquhart and so inform him. If the present program expands, as we hope it will, larvae will be sent to those wishing to take part. All that is required is a suitable rearing cage and an abundant supply of milkweed leaves.

CHIT CHAT

Mrs. Charles B. Hartley of Pensacola, Florida reports that most of the monarchs she tagged had to be captured among briar bushes with snakes close by. Despite these hazards she was able to tag 70 in all.

Mrs. Alice Hopf of New York, N.Y. has recently published a book for children on the monarch butterfly. We wish her every success with the sale of her book.

Bill Eckel of Homewood, Illinois, constructed a large nylon net with a diameter of one and one-half feet and a length of three feet. He found this very effective for storing one butterfly while he captured another. Also, he made an emergency butterfly cage on his porch with window screens and plastic and found this very convenient for storing butterflies until they were tagged.

Mr. Campbell Norsgaard of Englewood, N.J. prevailed on the local airline to transport his tagged monarchs from the freezing temperatures of New Jersey. The butterflies, placed in a box of flowers, were flown from Englewood, N.J. to Atlanta, Georgia where they were released, still in excellent condition.

Mr. F. Munger of Whittier, California, one of our very active research associates and a retired professional entomologist, has cooperated with his next door neighbour, Mr. J.T. Carlisle, to raise thousands of monarchs this year. This task required much time, attention and ingenuity as there is no native population of monarchs in Whittier and milkweed, which is scarce there, had to be cultivated so that there would be sufficient food for the caterpillars.

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NOTICE REGARDING MEMBERSHIP FOR 1966 - 67

If you wish to continue as a research associate in the monarch butterfly research project, please fill out the following form and send it to (NOTE NEW ADDRESS)

Prof. F. Urquhart,  
Scarborough College,  
West Hill, Ontario,  
Canada.

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Research Associate Form

Mr.  
Name - Mrs. \_\_\_\_\_  
Miss \_\_\_\_\_  
Age if under 18 \_\_\_\_\_

Mailing Address \_\_\_\_\_

If you are in a rural district please indicate the nearest town \_\_\_\_\_

Occupation \_\_\_\_\_

Year in which you first registered as a research associate \_\_\_\_\_

Enclosed please find fee of \$1.00 \_\_\_\_\_

Number of tags required \_\_\_\_\_

I understand that I may request more tags if I need them.

List of Research Associates 1965 -1-

Mrs. Nancy Aeillo, 2½ Berkeley St., Cambridge, Mass.  
Richard Arnold, 735 McKinley, Hinsdale, Ill.  
Doris Atwater, 180 Brattle St., Arlington, Mass.  
Stephen Auburn, 6 Fairlawn Drive, Rochester, N.Y.  
Kit Axelson, 3369 McLaughlin Ave., Los Angeles, Calif.  
Brent Bailey, 601 Larkspur Ave., Kalamazoo, Mich.  
Nancy Baram, 651 Harris Ave., Woonsocket, R.I.  
Robert Barrett, 701 Hartranft Ave., Fort Washington, Pa.  
Jonathan Bazinet, 19 Joyce St., Webster, Mass.  
Brent Beam, 2015 Edinburgh Dr., Burlington, Ont.  
Lloyd Beamer, Meaford, Ont.  
Paul Beard, 17 Cielo Vista Terrace, Monterey, Calif.  
Wm. Bechtel, 6 West Columbus Ave., Nesquehoning, Pa.  
Mr & Mrs. Harry Bedson, Chain-o-Lake Trailer Camp. Leesburg, Fla.  
Mrs. K. Bergen, Empire School, Waterloo, Ont.  
Larry Berndt, 1204 N.17 Ave., Melrose Park, Ill.  
Brian Bertino, 160 The Uplands, Berkeley, Calif.  
Mrs. J.W. Bliss, Kilgore, Neb.  
Roger Blood, Camp Hayo-Went-Ha., Central Lake, Mich.  
Ray Bracher, 17145 Cherokee Drive, Granger, Ind..  
Mr. A. Brandhorst, 2124 S. Corona, Denver, Col.  
H. Brevoort, 33 Glendale Circle, Glenbrook, Conn.  
Mrs. G. Brewer, 1090 Walnut St., Newton Highlands, Mass.  
David Bridge, Smithsonian Institution, Washington, D.C.  
Diane Bridgford, 630 Green Acre Drive, Fullerton, Calif.  
Simeon Brigden, 58 Eastbourne Ave., Toronto, Ont.  
Katherine Bronson, 1019 E. Sixth St., Corinth, Miss.  
Anne Brooke, 22 Derby Lane, Weston, Mass.  
R. Brownlee, 680 S. 5th, San Jose, Calif.  
Wm. Burns, Witte Museum, 3801 Broadway, San Antonio, Tex.  
Daryl Burns, R.R. 1, Bourbonnais, Ill.  
Mrs. Roy Busby, Dilley, Tex.  
Donald Cacciapuoti, 10 Wakefield St., Webster, Mass.  
James Carll, 210 S. Seventh St., Olean, N.Y.  
J. Carlisle, 515 E. Mar Vista, Whittier, Calif.  
William Casello, 315 N. Ravenna, Ann Arbor, Mich.  
Marcia Chambers, Rte 2 Box 71, Tulalake, Calif.  
Lura Chapman, Box 47, Hamlin, Pa.  
Madge Clements, 603 Panferio Drive, Pensacola, Fla.  
Scott Clevenger, R.R.3, Piqua, Ohio.  
Boughton Cobb, Falls Village, Conn.  
Martin Corry, 1946 Normandy Drive, Zanesville, Ohio.  
Gary Cress, 1517 Floberta, Wichita, Kan.  
Donald Cruikshank, North Hollow Encampments, Rochester, Vt.  
Ted Currie, Island Science School, Toronto Island, Toronto, Ont.  
Paul Cyr, 66 Little Neck Ave., Swansea, Mass.  
Robert Dahlnader, Box 121, New Milford, Pa.  
Donna Dahmer, 344 Thorncliff Rd., Kenmore, N.Y.

Research Associates -2-

Monroe Davids, 2451 Belfast Ave., S.E., Grand Rapids, Mich.  
Ezra Day, 3789 S. 5200W., Salt Lake City, Utah.  
Frank Devillers, 728 Western Drive, Santa Cruz, Calif.  
Daniel Dirk, Cardinal Muench Minor Seminary, 1310 Broadway, Fargo, N.D.  
Barbara Dodge, Back Creek Rd., Hamburg, N.Y. 14075  
Dorothy Dreese, Millerstown, Pa.  
Martin Dutra, 509 Turner Road, Middletown, R.I.  
Jess Dutzi, 9341 Carnation Drive, Westminster, Calif.  
Bill Eckel, 2855 W. 183rd St., Homewood, Ill.  
Anne Eisfeller, 101 N. Strickler, Mount Carroll, Ill.  
Mrs. P. Elliott, 1513 Nelson St., Muskegon, Mich.  
Diane Faiers, 44 Melville Rd., Peterborough, Ont.  
Ann Fallon, River Rd., Pawcatuck, Conn.  
Mrs. F. Faust, 23 Highland Ave., Buffalo, 22, N.Y.  
Glenn Feiszli, 728 Douglas St., Vermilion, Ohio.  
Ruby Fender, Riverton, Iowa.  
Laura Fish, 909 S. 19th St., Terre Haute, Ind.  
Mrs. K. Fuge, Rte 2, Box 70, Jefferson, Wis. 53549  
Margaret Fuzek, Sylvan Hill Rd., Elizabethton, Tenn.  
Roy Garrison, 425 S. Houston, New Braunfels, Tex.  
Mrs. H.H. Gathings, Quemado, Tex. 78877  
Alan Gehret, 112 Stnabridge St., Norristown, Pa.  
Sally Gibert, 1955 Patio Drive, San Jose, Calif.  
Roselee Gibson, 5702 S. 17th St., Saint Joseph, Mo.  
Stephen Ginell, 848 McKenna Ave., Baldwin, N.Y.  
Karen Shea, 260-20th Ave., Santa Cruz, Calif.  
Jessie Glynn, Limehouse, Ont.  
Joyce Goldberg, 715 N. Lombard, Oak Park, Ill.  
Mark Grabill, 361 Carmita Ave., Rutherford, N.J. 07070  
Jeffrey Graham, 26 Lotus Pace, Providence, R.I.  
Jonathan Gumpert, 244 E. 68th St., New York, N.Y. 10021  
Thelma Gunning, Parkdale School, Parkdale Ave, East Aurora, N.Y.  
Robert and Leona Hagen, Box 387, Tehachapi, Calif.  
Ruth Haigh, 2575 Riall St., Niagara Falls, Ont.  
James Hallenbeck, Lowell Rd., Concord, Mass.  
David Hammes, 6 Lincolnshire Blvd., Owego, N.Y. 13827  
Douglas Hansen, 131 Canberra, K.I. Sawyer A.F.B. Mich.  
Selma Harter, R.D. 2 Delaware, Ohio.  
Mrs. Chas. Hartley, Star Rte Box 730, Perdido Hts., Pensacola, Fla.  
Noble Hatfield, 2416 E. Northgate Rd., Indianapolis, Ind.  
Earl Hatinger, Deckerville Community School, Deckerville, Mich.  
Glen Heddesheimer, R.R. 2 Salisbury, Mo.  
H.G. Hedges, 4271 Lakeshore Rd., Burlington, Ont.  
Richard Hildreth, 135 Washington St., Holliston, Mass.  
Mrs. Frances Hilsenrod, 6917 Rosemont Drive, McLean, Va. 22101  
Nancy Hoeflich, 90 George St., Arlington, Mass. 02174  
Claire Holston, P.O. Box 56, Auberry, Calif. 93602  
Alice Hopf, 136 W. 16th St., New York, N.Y.  
Fred Hough, Accord, 1, N.Y.

Research Associates -3-

Richard Hulle, Rt. 1, Westtown, N.Y.  
Miss D.N.R. Jackson, Dept. of Athletics, and Physical Education,  
Benson Bldg., University of Toronto, Toronto, Ont.  
Yvonne Jenkins, Box 184 Argyle, Tex. 76226  
Jeffrey Johnson, Waldorf College, Forest City, Iowa.  
J.H. Johnson, 942 Oriole Dr., Peterborough, Ont.  
Kenneth Johnson, R.D. 1, Box 327A, Southington, Ohio.  
Lynn Johnson, Box 54, McGregor, Iowa, 52157  
Gary Kantner, Peach Ridge Rd., Athens, Ohio.  
Leslie Kaufman, 259-12 147th Ave., Rosedale, New York, N.Y.  
Norwood Keeney Jr., Wason Rd., R.D. 2, Hudson, N.H.  
Edward Keith, 1995 Vimy Ave., Windsor, Ont.  
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Wausau, Wis.  
Terry Krueger, 22129th Place., Two Rivers, Wis.  
Bruce Lafleche, 295 Gilchrist Ave., Alpena, Mich.  
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Andrew Lantner, 120 Highland St., Woonsocket, R.I.  
Brent Lehman, Box 87, Wilcox, Pa.  
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Richard Lippha, 271 Revere Rd., Clifton Heights, Pa.  
Charles Lipscomb, 437 Elmwood Dr., San Antonio, Tex. 78212  
Martha Lussier, 1221 Pine Hills Rd., Orlando, Fla.  
Mrs. L. Luxenberg, Star Rte., Tonopah, Arizona.  
Elisabeth Lytle, 5050 Audubon Rd., Detroit, Mich. 48224  
Fran Maby, P.O. Box 263, Kittery, Maine.  
Chane Mairs, 202 Rainbow Dr., Marshalltown, Ill.  
James Malick, 2049 Oak St., Stevens Point, Wis.  
Linda Malick, 2049 Oak St., Stevens Point, Wis.  
Harriet Marsi, Friendsville Stage, Binghampton, N.Y.  
Richard Mathes, 2015 D. Ave., N.E., Cedar Rapids, Iowa.  
Ted McDonald, 92 Hope St., Port Hope, Ont.  
Kathryn McLaughlin, 9850 W. Tittabawassa, Freeland, Mich. 48623  
Thomas McLaughlin, 16 Hartford St., Claremont, N.H.  
Bill Menten, 141 Harrison Ave., Hasbrouck Heights, N.J.  
Don Meritt, Box 73, Newcomb, Md., 21653  
Donna Miller, Box 111, Gloucester, Ont.  
David Miner, Cook's Canyon, Barre, Mass. 01005  
Arthur Moeck, 301 East Armour Ave., Milwaukee, Wis. 53207  
Mrs. A.E. Mohr, 925 Harvey Ave., Brookfield, Wis.  
Alexander Monell, Eastern Point, Gloucester, Mass.  
Grace Moore, 827 C. St., San Diego, Calif.  
Steven Morse, 7261 Bradford St., Philadelphia, Pa.  
Francis Munger, 519 E, Mar Vista, Whittier, Calif.  
Carol and Edward Neumann, R.R. 4, Greenville, Ill.  
Frank Nichols, R.D. 2, Milford, N.J.  
Campbell Norsgaard, 81 Woodland S., Englewood, N.J.

Research Associates -4-

Edward O'Connell III, Box 257, Forest Pk Stn., Springfield, Mass.  
Linda Oldfield, Gretna, Neb. 68028  
Fredric Oltsch, 224 Butterfield, University of Mass, Amherst, Mass.  
John Oster, 40 Edgemere Drive, Rochester, N.Y. 14612  
Mrs. Maureen Pammatt, 265 Park St. N., Peterborough, Ont.  
Gwen Parsons, 243 Hendrick St., Easthampton, Mass.  
Eugene Patterson, 126 Mary St., Johnsonburg, Pa.  
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