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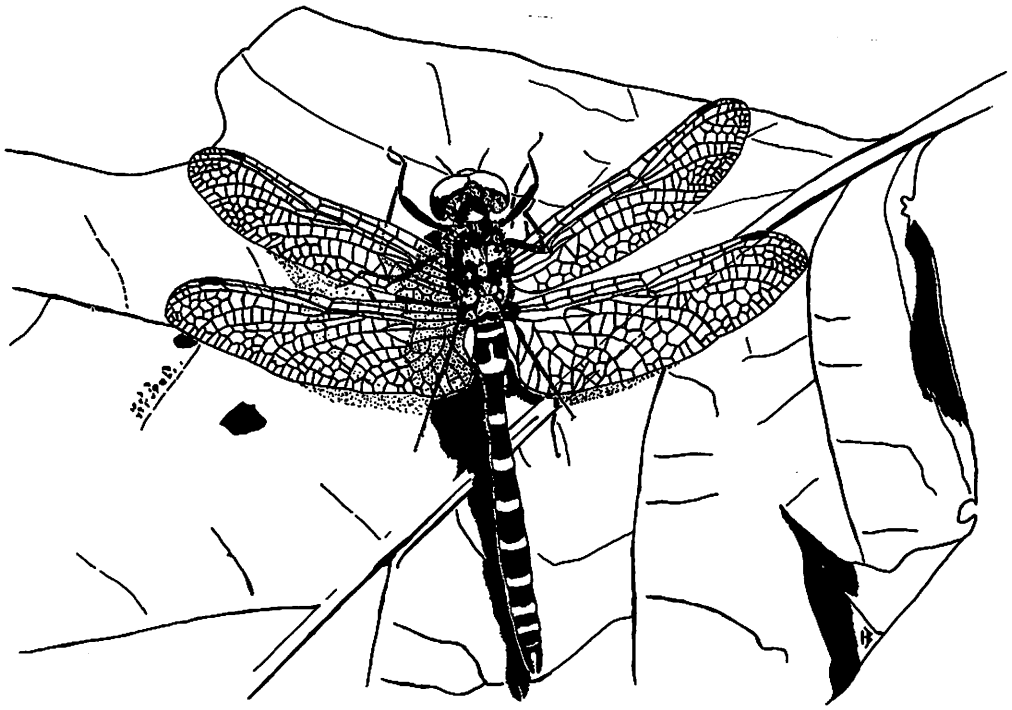
ODONATA (DRAGONFLIES) OF NEW HAMPSHIRE: AN ANNOTATED LIST



By

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Cover Picture

Williamsonia lintneri (Hagen) is a rare spring dragonfly found near sphagnum bogs. Its occurrence in New Hampshire is reported for the first time in this publication. The cover drawing was made from a photograph taken by Dr. Rudolf A. Raff in the Blue Hills of eastern Massachusetts on 2 May 1970.

PREFACE

In the past fifty years there has scarcely been a paper which has added to the knowledge of the Odonata of New Hampshire. It is apparent from our field work in the state that the older literature is incomplete and in some cases inaccurate. In this publication we attempt to bring together all the published and unpublished records of New Hampshire Odonata. This effort has been greatly aided by our friends and colleagues who have generously permitted us to include records from their own field work and from collections they have examined for us. The following persons have made significant contributions to this paper after it was first drafted: Carl Cook, Thomas W. Donnelly, Richard E. Gray, Paul D. Harwood, Paul Miliotis, and Russell Morse.

We thank particularly Mrs. Leonora K. Gloyd and Dr. Minter J. Westfall, Jr. for meticulously examining the manuscript and pointing out many errors which would have otherwise passed undetected. We assume the responsibility for any errors which may remain or for decisions on controversial areas of nomenclature.

Finally we thank the libraries at the Museum of Comparative Zoology of Harvard University and the Philadelphia Academy of Natural Sciences which gave us access to many of the 19th century journals which were not available in our respective libraries.

HBW
WJM
April 8, 1973

SUMMARY

The seasonal and geographical distribution of Odonata within New Hampshire is compiled from available published and unpublished records. Of the 134 species now known from New Hampshire, the following 23 are reported for the first time: Hetaerina americana (Fabricius), Nehalennia gracilis Morse, Coenagrion resolutum (Hagen), Enallagma geminatum Kellicott, Enallagma laterale Morse, Enallagma vernale Gloyd, Cordulegaster obliqua Say, Progomphus obscurus (Rambur), Ophiogomphus carolus Needham, Gomphus descriptus Banks, Gomphus furcifer Hagen, Gomphus scudderi Selys, Gomphus spiniceps (Walsh), Gomphus villosipes Selys, Somatochlora franklini (Selys), Williamsonia lintneri (Hagen), Perithemis tenera (Say), Celithemis eponina (Drury), Libellula luctuosa Burmeister, Libellula needhami Westfall, Pachydiplax longipennis Burmeister, Tramea lacerata Hagen, and Pantala hymenaea (Say). Unpublished records of Odonata from Maine and Massachusetts are included where they add perspective to the known and potential Odonate fauna of New Hampshire. A procedure for preserving color in fresh Odonata specimens is presented.

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by

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INTRODUCTION

The insect order Odonata is represented by a small group of conspicuous insects known as dragonflies. Frequently the name "dragonfly" is restricted to the generally larger and stronger flying species of the suborder Anisoptera. The smaller and weaker flying species of the suborder Zygoptera are usually called "damselflies."

Odonata are predatory, feeding usually on smaller insects such as mosquitoes and midges which they capture in flight. The name "mosquito hawk" is thus well-deserved. Other common names such as "devil's darning needle" or "horse stingers" conjure up fearsome images which are undeserved, since Odonata do not possess a sting and cannot harm animals larger than they are. From the human standpoint, they are harmless and can be considered beneficial because they consume other insects man finds noxious.

Dragonflies and damselflies are actually the adult form of an insect which spends most of its life as an inconspicuously colored aquatic naiad or nymph. The naiad feeds

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voraciously on other aquatic insects and occasionally on small salamanders and fish. The ecology, physiology, and behavior of Odonata are covered excellently in the book, A Biology of Dragonflies (Corbet, 1962).

Identification

Being large and active insects, Odonates are easy to spot and, in many cases, easy to identify at a distance once one is familiar with the distinctive coloration and habitats of the various species. This is fortunate, since many of the easiest to identify are the hardest to catch. The limited number which are known to or may occur in New Hampshire (fewer than 170 species) makes the task of learning the local fauna challenging but not insurmountable as it can be with most other insect orders. One or more of the following books should be consulted for the identification of specimens collected in New Hampshire (Garman, 1927; Needham and Westfall, 1955; Robert, 1963; Walker, 1953; Walker, 1958).

Early Records of New Hampshire Odonata

Despite its small size (23,350 km^2), New Hampshire has a rich and interesting Odonate fauna. The diversity of this fauna is due in part to the diversity of permanent aquatic habitats which range from salt marshes at sea level to small mountain lakes that remain ice-covered for more than half of the year. Most of these numerous habitats are suitable breeding sites for Odonata.

Nineteenth century biologists were quick to appreciate New Hampshire's White Mountains as a region where many boreal species of plants and animals are common at or near their southern limit of distribution (Alexander, 1940). Because of the interest in this area, many of the rarely encountered species were among the first species to be reported from the state. The type specimens of Aeshna eremita Scudder (1866), Gomphus borealis Needham (1901), Cordulia shurtleffi Scudder (1866), Somatochlora elongata (Scudder) (1866), Somatochlora forcipata (Scudder) (1866), Somatochlora minor (Calvert) (1898), and Somatochlora walshii (Scudder) (1866) were collected in the White Mountains.

In 1905, Calvert itemized the Odonata of New England by state. At that time 74 species were recorded from New Hampshire. Howe (1917-1921) expanded Calvert's list to 111 in his Manual of the Odonata of New England. Since 1921, however, only one new species has been added to those reported for New Hampshire by Howe. This lack of additional published records does not represent the thoroughness of previous workers nor a subsequent lack of interest in the Odonata of New Hampshire. One of us (WJM) has collected Odonata in New Hampshire since 1942 and with many colleagues over the years has obtained a number of new state records. Intensive collecting in recent years has increased the amount of new information on the Odonata in the state to the point where it is desirable to summarize and update Howe's work of half a century ago.

Annotated List of New Hampshire Odonata

In the annotated list that follows, we report 23 additional species from New Hampshire. Numerous new localities and extensions of the known flying season for previously reported species are also included. The literature citations following most species refer with few exceptions to the original report of that species in New Hampshire. Genera are listed systematically as they appear in Needham and Westfall (1955) for the Anisoptera and as they appear in Walker (1953) for the Zygoptera. Exceptions are made where subsequent revisions have occurred, e.g., Tetragoneuria and Epicordulia have been combined under Eptheca (Walker, 1966). Within each genus the species are listed alphabetically. Locality names generally refer to towns in New Hampshire; however, specific habitat locations are listed for some of the White Mountain stations. The Appalachian Mountain Club Guides to the White Mountains (1966) and New England Canoeing (1965) are quite useful in locating and gaining access to some of these more interesting habitats.

Initials throughout the list credit our many friends and colleagues who make this list much more inclusive than we could have alone. To them go our hearty thanks. The names and initials used in the text are given below.

G. Scott Anthony	(GSA)	James E. Kierans	(JEK)
Joseph Bailey	(JB)	David Laddey	(DL)
Robert Baird	(RB)	Kornelius Lems	(KL)
George H. Beatty	(GHB)	Christopher Leahy	(CL)
Robert L. Blickle	(RLB)	Donald J. Lennox	(DJL)
R. C. Casselberry	(RCC)	Dartmouth College Museum	(DCM)
Ronald Comeau	(RC)	B. G. Markos	(BGM)
James G. Conklin	(JGC)	A. H. Mason	(AHM)
E. M. Davis	(EMD)	Paul Miliotis	(PM)
Thomas W. Donnelly	(TWD)	Russell Morse	(RM)
Richard E. Gray	(REG)	Wallace J. Morse	(WJM)
James Hanks	(JH)	Rudolf A. Raff	(RAR)
C. N. Hardy	(CNH)	Harvey Toko	(HT)
Paul D. Harwood	(PDH)	E. B. Williamson Collection	(EBWC)
William Johoda	(WJ)	Harold B. White	(HBW)

(Lit) refers to literature records

ZYGOPTERA

Calopterygidae

Calopteryx aequabilis Say (Howe, 1917-1921) Intervale, New Hampton, Peterborough, Piscataquog River (Lit); Lee (RLB); Errol (PDH); Durham (DL,WJM); Auburn (WJM); Merrimack (RAR,HBW); Wilton (HBW).

June 5 - July 18

Calopteryx amata Hagen (1890) Dublin (Type locality), Franconia, Intervale, Peterborough (Lit); Grafton (REG); New Ipswich (EMD); Pittsburg (AHM,WJM); Wilton (RAR,HBW).

June 13 - July 29

Calopteryx maculata (Beauvois) (Howe, 1917) Fitzwilliam, Franconia, Intervale, Keene, Lisbon, Meredith Neck (Lit); Madbury (RLB); Benton (PDH); Northwood (WJ); Henniker, Peterborough, Merrimack (PM,HBW); East Rochester (RM,HBW); Antrim, Durham, Pittsburg (WJM); Wilton (RAR,HBW); Greenville, Passaconaway (HBW); Randolph (EBWC).

June 5 - August 27

This is the common black-winged damselfly that is often found in sunny glades along woodland streams. Populations can be very dense such as that found on July 18, 1970 along Scott Brook in Fitzwilliam. At that time hundreds of individuals had congregated in open sunny areas where the stream flows swiftly over its rocky bottom.

Hetaerina americana (Fabricius) (Johnson, 1973) Durham (RM); Milford (PM).

August 17 - September 5

Although this species has long been known from Maine and Massachusetts, it was collected for the first time in New Hampshire during 1971. Males are easily recognized by the bright red spot at the base of their wings. The flying season certainly extends later than indicated.

Lestidae

Lestes congener Hagen (Howe, 1918) Fitzwilliam, Franconia, Intervale (Lit); Durham, Lee (WJM); Littleton (PM).

July 3 - October 2

Lestes disjunctus disjunctus Selys (Calvert, 1894) Fabyan's, Franconia, Intervale, Jackson, Lisbon, Lyman, Meredith Neck, Moultonboro, North Conway (Lit); Pinkham Notch (TWD,HBW); Greeley Ponds (PM,HBW); Church Ponds (PM,RM, WJM,HBW); Durham, Lee, New Durham, Woodstock (WJM); Brookline, Livermore, Peterborough (HBW).

June 21 - September 13

Lestes dryas Kirby (Calvert, 1894 as uncata) Franconia, Intervale, Lake Sunapee, North Conway, Squam Lake (Lit); Stratford (REG); Durham, Gilmanton (WJM); Bath (PDH); Merrimack, Whitefield (HBW).

June 11 - August 2

Lestes eurinus Say (Howe, 1919) North Conway (Lit); Durham (WJM).

June 5 - June 29

Lestes forcipatus Rambur (Howe, 1919) Intervale (Lit).

June 21 - August 8

Considering the frequency which this species has been taken in Massachusetts and Maine, it is remarkable that no specimens have been collected in New Hampshire since 1899.

Lestes inaequalis Walsh (Calvert, 1905) Franconia, Intervale, Meredith Neck, Moultonboro (Lit); Durham (WJM).

June 14 - August 15

Lestes rectangularis Say (Calvert, 1905) Franconia, Intervale, Meredith Neck, Moultonboro, North Conway, Sunapee (Lit); Durham (RLB,WJM); Whitefield (PM); Passaconaway (PM,HBW); Amherst, Lee (WJM); Fitzwilliam, Livermore, Peterborough (HBW).

June 22 - September 18

Lestes unguiculatus Hagen (Howe, 1918) Franconia, Intervale (Lit); Groveton (REG); Dover (BGM); Durham, Lee (WJM).

June 12 - September 20

Lestes vigilax Hagen (Howe, 1917) Meredith Neck, Moultonboro, North Conway, Squam Lake (Lit); Durham, Lee (WJM).

June 14 - August 30

Coenagrionidae

Argia fumipennis violacea (Hagen) (Howe, 1917) Fitzwilliam, Intervale, Littleton, Meredith Neck (Lit.); Rochester (RLB); Woodville (PDH); Durham, Lee, Woodstock (WJM); Livermore (WJM,HBW); Hancock, Henniker, Merrimack,

Milford, Peterborough (HBW); Nelson (CNH).

June 20 - August 30

Argia moesta (Hagan) (Howe, 1917) Fitzwilliam, Meredith Neck, Moultonboro, North Conway, Squam Lake (Lit); Dummer (RLB); Henniker, Merrimack (PM,HBW); Durham, Gilmanton, West Lebanon (WJM); Hancock, Milford, Passaconaway, Peterborough (HBW).

June 13 - August 23

Chromagrion conditum (Hagen) (Calvert, 1905) Franconia, Intervale, Jaffrey (Lit); Piermont (GSA); Durham (DL,WJM); Hollis (PM); Antrim, Charlestown, Sanbornton (WJM); Livermore, Northumberland, Passaconaway, Whitefield, Wilton (HBW).

May 14 - August 1

Amphiagrion saucium (Burmeister) (Calvert, 1905) Franconia, Intervale, Jaffrey, Lyman (Lit); Groveton (CL, PM,HBW); Errol (PM,HBW); Durham, Pittsburg (WJM); West Henniker (HBW).

June 5 - August 2

Nehalennia gracilis Morse Spruce Hole Bog in Durham (WJM); Heath Bog in Rochester (HBW).

July 1 - July 25

The restricted habitat and small size of this species explain why it has not been hitherto reported from New Hampshire.

Nehalennia irene Hagen (Calvert, 1905) Franconia, Intervale, Littleton, Meredith, Moultonboro, North Conway (Lit); Madbury (RLB); Groveton (REG); Durham, New Durham (WJM); Greeley Ponds, Henniker, Nancy Ponds, Northumberland, Milford, Peterborough, Rochester, Whitefield (HBW).

June 4 - August 7

Coenagrion resolutum (Hagen) Livermore (HBW); Whitefield (CL, PM,HBW); Littleton (PM).

June 28 - July 4

Although this is the first time this species has been reported from New Hampshire, it may be a fairly widespread species in the northern part of the state. It was fairly common at a beaver pond by Route 3 southeast of Whitefield on July 4, 1971.

Enallagma aspersum (Hagen) (Calvert, 1894) Intervale, North Conway (Lit); Mont Vernon (RLB,WJM); Pinkham Notch (TWD); Amherst, Durham (WJM); Livermore, New Durham (HBW).

June 17 - August 21

Enallagma boreale Selys (Howe, 1917 as calverti) Franconia, Intervale, Lincoln (Lit); Northwood (WJ): Durham, Moultonboro (WJM); Greeley Ponds, Whitefield (HBW).

May 17 - August 12

The specimens from the White Mountains seem morphologically distinguishable from those near the coast. The northern form is found near cold mountain lakes and ponds and its flight season extends into August. The coastal form is

one of the earliest damselflies to emerge in the spring and is rarely seen after late June.

Enallagma civile (Hagen) (Howe, 1917) Lake Asquam, Meredith Neck, Moultonboro (Lit); Durham, Hampton (WJM).

May 24 - August 28

Enallagma cyathigerum Charpentier (Selys, 1876) Hermit Lake, Franconia, Intervale, Pemigewasett Pond (Lit); Franconia Notch (WJM); Lily Pond (HBW); Nancy Ponds (RB,CL,PM,HBW).

June 8 - July 4

Many of the specimens in the authors' collections, originally identified as this species, have upon examination by Mrs. Leonora K. Gloyd proved to be E.vernale, a species she described in 1943. It is possible that some of the literature records also refer to E.vernale.

Enallagma divagans Selys (Howe, 1918) Pemigewasset Pond (Lit); Antrim (WJM); Merrimack (HBW).

June 25 - July 17

Enallagma ebrium (Hagen (Calvert, 1894) Fabyan's, Franconia, Lyman, Meredith Neck, Moultonboro (Lit); Madbury (RLB); Bath (PDH); Albany, Charlestown, Durham, Londonderry, Sanbornton (WJM); Littleton (PM); Merrimack, Peterborough, West Henniker (HBW); New Springs (EMD).

June 16 - August 23

Enallagma exsulans (Hagen) (Howe, 1917) Meredith Neck (Lit); Rochester (RLB); Croydon (WJM); Durham, Greeley Ponds, Merrimack, Peterborough, West Henniker (HBW).

June 2 - August 14

Enallagma geminatum Kellicott Manchester (JH); Durham, Lee, Errol (WJM); Hancock, Livermore (HBW).

June 17 - September 3

The absence of this species on previous reports seems to be an oversight as it is widespread and fairly frequent in New Hampshire.

Enallagma hageni (Walsh) (Howe, 1917) Franconia, Intervale, Lisbon, Littleton, Meredith, Moultonboro, North Conway, Sunapee (Lit); Dummer (RLB,WJM); Woodville (PDH); Lancaster (AHM,WJM); Hollis (PM,HBW); Church Ponds (WJM,HBW); Livermore, Rochester, Whitefield (HBW).

May 30 - August 12

Enallagma laterale Morse Auburn (WJM).

June 2

First record from New Hampshire. Previously known from Maine and Massachusetts.

Enallagma minusculum Morse (Howe, 1917) Meredith Neck (Lit); Manchester (JH); Church Pond (HBW).

June 17 - August 23

Enallagma signatum (Hagen) (Howe, 1917) Meredith Neck, Moultonboro (Lit); Lee (WJM); Durham (WJM,HBW).

July 1 - September 2

(Enallagma traviatum Selys) Howe's 1917 record of a female from Moultonboro represented a tentative identification and should be considered questionable until other specimens are collected. This species should be found in New Hampshire as it is common in eastern Massachusetts.

Enallagma vernale Gloyd Durham, Pittsburg, Eaton, Moultonboro (WJM); Kancamagus Highway (WJM,AHM); Wolfeboro Notch, Wilton, Hollis (HBW); Benton (PDH).

May 17 - July 13

This species, although not previously reported from New Hampshire, appears to be fairly common and widespread in the state. We also have records for it from Vermont and Massachusetts. The above specimens collected by the authors were determined by Mrs. Leonara K. Gloyd.

Enallagma vesperum Calvert (Howe, 1917 as pollutum) Moultonboro (Lit); Durham, Lee (WJM).

July 2 - August 30

Ischnura posita (Hagen) (Howe, 1918) Exeter, Mt. Washington (Lit); Hampton (WJM); Merrimack, Milford, Peterborough, Rochester, Wilton (HBW).

June 13 - August 28

Ischnura verticalis (Say) (Calvert, 1894) Fabyan's Franconia, Intervale, Jackson, Lisbon, Littleton, Meredith Neck, Moultonboro, North Conway, Sunapee (Lit); Amherst (RLB); Bath (PDH); Northwood (WJ); Lancaster (AHM,HBW); Antrim, Durham, Hampton, Pittsburg (WJM); Brookline, Fitzwilliam, Greeley Ponds, Hancock, Henniker, Hollis, Livermore, Merrimack, Milford, Nancy Ponds, New Durham, Northumberland, Passaconaway, Pinkham Notch, Rochester, Whitefield, Wilton (HBW).

May 18 - September 20

This species is probably the only species found in New Hampshire which is truely ubiquitous. It has a long flying season and is relatively unselective with respect to habitat.

ANISOPTERA

Petaluridae

Tachopteryx thoreyi (Hagen) (Burnham, 1901) Manchester (Lit.)

June 5 - June 8

Although Burnham remarks that this species was "flying in considerable numbers on the sandy pine plains near Cohas Brook", the only specimens from New Hampshire of this very large species were taken by him on two days in June 1900.

Cordulegastridae

Cordulegaster diastatops (Selys) (Selys, 1878) Franconia, Intervale, Jackson, Peterborough, Waterville (Lit); Whitefield (CL); Pittsburg (AHM,WJM); Durham, Stuartstown (WJM); Greeley Ponds, Livermore, Nancy Ponds, West Henniker (HBW).

May 28 - August 16

Cordulegaster maculata Selys (Burnham, 1901) Franconia, Intervale, Manchester, Meredith, New Hampton, North Conway (Lit); Bath (PDH); Pittsburg (AHM,WJM); Barrington (RM); Durham, Stuartstown (WJM); West Henniker (HBW); Whitefield (KL); State Line (JB); Caanan, Temple (EMD).

May 13 - July 27

Cordulegaster obliqua (Say) Northwood (WJ); Belmont, Durham (WJM).

June 15 - July 12

These are the first records of this species from New Hampshire. It had been known previously from Maine and Massachusetts.

Gomphidae

Progomphus obscurus (Rambur) East Rochester (RM,HBW); Merrimack (PM,HBW); West Henniker (HBW).

July 1 - July 17

Nymphs of this species were collected in the fine sand of the Contoocook and Souhegan Rivers. These localities are the first for New Hampshire. The specimens collected on the Salmon Falls River in East Rochester also represent the first records of this species from Maine.

Hagenius brevistylus Selys (Burnham, 1900) Manchester, Meredith Neck, Moultonboro, Peterborough (Lit); Fitzwilliam Depot, West Caanan (JB); Durham (WJM,RM); Harrisville, Merrimack, Passaconaway (HBW); Sanbornville (RM).

June 20 - August 22

Ophiogomphus aspersus Morse (Howe, 1919) Intervale, Mt. Bartlett (Lit); Merrimack (PM,HBW); Jaffrey, West Henniker (HBW); Durham (RM).

June 2 - July 20

Ophiogomphus carolus Needham Pittsburg (AHM,WJM).

July 12, 1972

First record for New Hampshire. Four males collected on the Connecticut River below the Third Connecticut Lake.

Ophiogomphus columbrinus Selys (Banks, 1892) "White Mountains" (Lit).

No dates given.

Ophiogomphus mainensis Packard (Selys, 1878) Franconia, Merrimack Valley, "White Mountains" (Lit); Pittsburg (AHM,WJM); Durham (WJM); Wilton (RAR,HBW); West Henniker (HBW).

June 4 - July 12

Ophiogomphus rupensulensis (Walsh) (Burnham, 1901) Franconia, Manchester (Lit); Durham (JGC,WJM); West Henniker (HBW).

June 17 - June 26

Dromogomphus spinosus Selys (Burnham, 1900) Fitzwilliam, Lake Winnipesaukee, Manchester, Meredith Neck, Moultonboro, Newfound Lake, Sharon, Squam Lake (Lit); Durham, Lee (JGC, WJM,RM); Wakefield (RM); Windham (WJM); Madison (PM); Merrimack, West Henniker (HBW).

June 19 - August 23

Stylogomphus albistylus (Hagen) (Burnham, 1900 as Gomphus naevius) Franconia, Manchester (Lit); Durham (WJM,RM); East Rochester (RM,HBW); Madbury (RM); Fitzwilliam, Merrimack, West Henniker, Wilton (HBW).

June 1 - August 14

Lanthus parvulus Selys (Hagen, 1875) Franconia, Peterborough, "White Mountains" (Lit); Albany (RLB); Colebrook (RLB,WJM); Groveton (GSA); Grafton (REG); Pittsburg (AHM,WJM); Passaconaway, West Henniker (HBW).

June 7 - July 12

Gomphus (Arigomphus) furcifer Hagen Durham (RM).

June 14 - July 15

First New Hampshire record. This species may be fairly widespread in the southeastern part of the state.

Gomphus (Arigomphus) villosipes Selys Durham, Madbury (RM).

June 14 - July 8

First New Hampshire records.

Gomphus (Gomphurus) vastus Walsh (Burnham, 1900) Manchester (Lit).

No dates provided.

Gomphus (Gomphurus) ventricosus Walsh (Kormondy, 1960) Connecticut River 1/4 mile from the Massachusetts border (Lit).

July 4

Gomphus borealis Needham (1901) Franconia (a type locality), Intervale (see comment under G. descriptus), Jaffrey (Lit).

May - June 21

A teneral male collected June 5, 1971 by Paul Miliotis in Maine near Wentworths Location, N. H., appears to be the first time this species has been taken in Maine.

Gomphus descriptus Banks Milan, Pittsburg (WJM); Wilton (RAR).

June 13 - June 20

Howe (1919) discounts without explanation the record of a female of this species from Intervale, preferring to include it under G. borealis. It appears that Howe did not see the specimen but suspected it to be G. borealis because a type locality for G. borealis was nearby Franconia. G. descriptus was unknown from New Hampshire at the time, and the specimen in question was collected and identified two years before G. borealis was described. Without the specimen it is probably best to ignore the record as being either species.

Gomphus exilis Selys (Burnham, 1900) Fitzwilliam, Franconia, Intervale, Lisbon, Manchester, Meredith Neck, Moultonboro, North Conway, Peterborough, Profile Lake, Squam Lake (Lit); Auburn, Eaton, Gilmanton, Hooksett, Hudson, Pittsburg, Sanbornton (WJM); Durham (BGM,WJM,RM); Barrington (RM); Merrimack (PM,RAR,HBW); East Rochester, Hancock (HBW).

May 27 - August 2

Gomphus quadricolor Walsh (Howe, 1922 as alleni) Squam Lake (Lit); Merrimack (PM,HBW).

June 3 - June 22

Seven nymphs collected below Wildcat Falls on May 31 emerged June 3, 1971.

Gomphus spicatus Hagen (Calvert, 1905) Franconia, Intervale, Peterborough, Pemigewasset Pond (Lit); Benton (PDH); Auburn, Andover, Wakefield (WJM); Lily Pond (HBW).

May 17 - July 1

Gomphus (Hylogomphus) abbreviatus Hagen (Burnham, 1901) Franconia, Manchester (Lit); Merrimack, West Henniker (HBW).

June 10 - July

Gomphus (Hylogomphus) brevis Hagen (Howe, 1919) Intervale (Lit); Auburn, Durham (WJM,RM); Merrimack, Wilton (PM,RAR, HBW); West Henniker, Peterborough (HBW).

May 14 - July 9

Gomphus (Stylurus) scudderi Selys Durham (WJM); Merrimack (PM, (HBW).

July 17 - August 17

First records for New Hampshire. Nymphs have been collected and reared and exuviae have been found along the Souhegan River in Merrimack; however, adults have never been observed at this productive location.

Gomphus (Stylurus) spiniceps (Walsh) Merrimack, Milford (PM, HBW).

July 17 - August 14

The spectacular nymph of this species is fairly common in the fine sand and silt along the Souhegan River. The distribution of sizes among nymphs suggests a three year life cycle. Although exuviae are common along the banks

of the river in mid-summer, adults are rarely seen. Adult males fly over the swifter water in midstream. Emergence is in mid-July.

Aeshnidae

Gomphaeschna furcillata Say (Howe, 1917 - 1921) Jaffrey, Meredith (Lit); Barrington (RLB,RM); Northwood (WJ); Whitefield (RB); Durham, Eaton, Hudson (WJM).

May 27 - July 4

Basiaeschna janata (Say) (Hagen, 1873) Franconia, Intervale, Meredith, Peterborough, Squam Lake (Lit); Auburn, Durham, Hudson (WJM); Pittsburg (WJM,RM); Church Ponds (RM); Merrimack, Wilton (HBW).

May 13 - August 1

Boyeria grafiana Williamson (Howe, 1921) Sunapee (Lit); Livermore (RM).

August 1 - August 7

The Livermore record is from the Swift River area near Church Ponds.

Boyeria vinosa Say (Howe, 1917) Jackson, Meredith Neck (Lit); Caanan (JB); Albany (JEK); Durham (JGC,WJM,RM); Lee (WJM); Passaconaway (PM,HBW); Fitzwilliam, Henniker, Merrimack (HBW); Sanbornville (RM); Wolfeboro (EBWC).

June 18 - September 15

Anax junius Drury (Burnham, 1900) Amherst, Franconia, Manchester, Meredith, Peterborough (Lit); Durham (WJM); Lee (RLB); Northwood (WJ); Brookline, Fitzwilliam, Henniker (HBW).

May 27 - August 15

Nasiaeschna pentacantha Rambur (Howe, 1917) Moultonboro (Lit); Durham (RM).

June 14 - July 9

Epiaeschna heros (Fabricius) (Burnham, 1900) Hampton, Manchester, Mt. Monadnock (Lit); Charlestown, Durham (WJM).

June 3 - June 24

Aeshna canadensis Walker (Walker, 1912) Carter Notch, Fitzwilliam, Franconia, Hermit Lake, Intervale, Jackson, Lyman, Meredith, Moultonboro, North Conway, Sunapee (Lit); Dummer, Durham (WJM); Lee (WJM,RM); Littleton (PM); Church Ponds, Lily Pond, Whitefield (HBW).

July 4 - September 17

Aeshna clepsydra Say (Howe, 1917) Moultonboro (Lit); Durham, Lee (RLB,WJM); Ossipee (RM,WJM); Nashua (PM).

July 22 - September 6

Due to confusion with the preceding species, many of the pre-1908 records can be questioned. For instance, Walker (1912, p. 143) notes that Calvert's (1894) record as "presumed A. clepsydra" from New Hampshire was actually the then undescribed A. canadensis. Other specimens (Walker, 1912, p. 127) determined by Calvert (1894) are

eremita. A. canadensis is much more common and widespread than A. clepsydra.

Aeshna constricta Say (Howe, 1917 - 1921) Fitzwilliam (Lit); Durham, Nottingham (WJM,RM).

July 25 - October 18

There are numerous early records of A. constricta from the White Mountains. It is almost certain that these records refer to the much more common and related A. umbrosa which was not described until 1908.

Aeshna eremita Scudder (1866) Franconia, Hermit Lake (Type Locality), Jackson, Lonesome Lake, Moultonboro, North Conway (Lit); Pinkham Notch (TWD); Hooksett (JEK); Lily Pond (RM,HBW); Dummer, Nelson, Woodstock (WJM); Greeley Ponds, Church Ponds (HBW); Long Pond, Round Lake (JB).

July 6 - September 24

Aeshna interrupta Walker (Howe, 1917 - 1921) Jackson (Lit); Nelson (RM,WJM); Lily Pond (RM,WJM,HBW); Littleton (PM).

August 1 - September 24

Aeshna juncea Linnaeus (Scudder, 1866 as propinqua in part) Franconia, "White Mountains" (Lit).

August 22

Aeshna septentrionalis Burmeister (Hagen, 1890) "White Mountains" (Lit).

No dates given

Aeshna tuberculifera Walker (Howe, 1919) North Conway (Lit); Durham (WJM,RM); Lee (RLB).

July 19 - August 9

Aeshna umbrosa Walker (Walker, 1912) Fitzwilliam, Franconia, Hermit Lake, Jackson, Jaffrey, Keene, Meredith Neck, Peterborough, Sunapee (Lit); Enfield, Groveton (REG); Auburn, Durham (WJM); Littleton (PM); Church Ponds, Lily Pond, Pinkham Notch, West Henniker (HBW); Intervale (EBWC).
July 14 - October 18

Aeshna verticalis (Hagen) (Burnham, 1900) Intervale, Manchester, Meredith Neck, North Conway, Sunapee (Lit); Durham (WJM,RM); Lee (RLB,WJM); Lily Pond (HBW).
July 2 - September 28

Macromiidae

Didymops transversa (Say) (Burnham, 1901) Exeter, Jaffrey, Manchester, Meredith Neck, Peterborough, Squam Lake (Lit); Durham (RM); Hudson, Pittsburg (WJM); Hanover (DCM); Merrimack, West Henniker (HBW).
May 14 - July 11

Macromia illinoiensis Walsh (Burnham, 1900) Fitzwilliam, Intervale, Manchester, Meredith Neck, Moultonboro, Squam Lake (Lit); Durham, Lee (RLB); Sanbornville (RM); Merrimack, West Henniker (PM,HBW); Wilton (RAR,HBW).
June 13 - August 14

Corduliidae

Neurocordulia obsoleta (Say) (Burnham, 1900) Manchester, Meredith Neck, Squam Lake (Lit); Hancock (HBW); Merrimack (PM,HBW).

June 28 - July 29

Although adults of this species have not been collected in New Hampshire in recent years, about 20 exuviae were found clinging to an overhanging bank along the Souhegan River. This suggests that it is more common than the records indicate considering also that the adults tend to fly at dusk.

Epitheca canis (MacLachlan) (Calvert, 1905 as spinosa) Franconia, Jaffrey (Lit); Groveton (GSA); Benton, Woodville (PDH); Durham, Lancaster, Pittsburg (WJM); Northwood (WJ).

May 14 - June 22

Until recently (Walker, 1966) this species and all of the following species in the genus Epitheca except princeps were in the genus Tetragoneuria. We have accepted this change recognizing, however, that there is reason to question the validity of this grouping of Epicordulia and Tetragoneuria under Epitheca.

Epitheca cynosura (Say) (Burnham, 1900 as semiaquea) Fitzwilliam, Jaffrey, Manchester, Meredith, Moultonboro, Peterborough, Squam Lake (Lit); Dover (BGM); Durham (WJM,RM); Auburn, Eaton (WJM); Madbury (RLB); Whitefield (DJL); Hancock, West Henniker, Wolfeboro (HBW).

May 13 - July 20

Epitheca princeps Hagen (Howe, 1917) Concord, Meredith Neck, Moultonboro (Lit); Durham, (RM,WJM); Merrimack (HBW).

June 5 - August 2

Formerly known as Epicordulia princeps (Walker, 1966).

Epitheca spinigera (Selys) (Burnham, 1901 as cynosura) Fitzwilliam, Franconia, Jaffrey, Manchester, Meredith, Peterborough, Squam Lake (Lit); Auburn, Eaton, Madison, Hudson (WJM); Moultonboro (RLB); New Hampton (RLB,JGC); Northwood (WJ).

May 27 - July 11

Helocordulia uhleri (Selys) (Howe, 1919) Franconia (Lit); Dixville Notch, Durham, Pittsburg (WJM); Pittsfield (RLB), West Henniker (HBW).

May 15 - July 20

Somatochlora albicincta (Burmeister) (Scudder, 1867) Carter Notch, Hermit Lake, Lincoln, Lonesome Lake, Profile Lake, Waterville (Lit); Nancy Ponds (CL,HBW); Greeley Ponds (HBW).

July 3 - August 25

Recently emerged adults were among those collected at Nancy Ponds July 3, 1971.

Somatochlora cingulata (Selys) (Hagen, 1875) Carter Notch, Franconia, "White Mountains" (Lit); Pinkham Notch (TWD); Greeley Ponds (HBW).

July 22 - September 15

Somatochlora elongata (Scudder, 1866) Bretton Woods, Center Harbor, Fabyan's, Franconia, Greenfield, Hermit Lake (Type Locality), Jackson, Plymouth, Sunapee, Tupper Lake (Lit); Church Pond Brook (PM,RM,HBW); Whitefield (PM);

Durham, Lee (WJM); Pinkham Notch (TWD,HBW); Lily Pond (HBW).

June 29 - August 30

Somatochlora forcipata (Scudder, 1866) Fitzwilliam, Mt. Washington, Profile Lake, The Glen (Type Locality) (Lit); Church Ponds (WJM).

July 20 - August 1

Somatochlora franklini (Selys) Groveton (HBW).

July 4, 1971

First record for New Hampshire

Somatochlora kennedyi Walker (Howe, 1917 - 1921) Boscaween, Meredith (Lit); Auburn, Durham (WJM); Whitefield (CL,HBW).

June 2 - July 4

Somatochlora minor Calvert (1898) Franconia (Type Locality) (Lit); Benton (PDH); Northumberland (PM,HBW); Whitefield (CL,RB,HBW).

July 4

Somatochlora tenebrosa (Say) (Calvert, 1905) Intervale, North Conway (Lit); Belmont (RLB); Durham (WJM,RM); Madbury (RM)

July 12 - August 15

Somatochlora walshii (Scudder, 1866) The Glen (Type Locality) (Lit). Belmont, Durham, Lee, Wakefield (WJM); Church Pond Brook (PM,HBW).

June 19 - August 26

Somatochlora williamsoni Walker (Howe, 1919) Merdith Neck, Sunapee, Tupper Lake (Lit); Durham (RLB,RM,WJM); Shelburne (GHB); Sanbornville (RM).

June 20 - September 4

Cordulia shurtleffi Scudder (1866) Crawford Notch, Hermit Lake (Type Locality), Intervale, Jaffrey, Meredith, Moultonboro, Peterborough (Lit); Auburn, Clarksville, Conway (WJM); Durham (RM); Hooksett (JH); Northwood (WJ); Pittsburg (RLB, WJM); Fitzwilliam, Hollis, Lily Pond, Nancy Ponds, West Henniker, Whitefield (HBW); New Ipswich (EMD).

May 14 - August 2

Dorocordulia lepida (Hagen) (Burnham, 1900) Manchester, Meredith, "White Mountains" (Lit); Auburn, Durham (WJM); Barrington (RLB); Rochester (RM,HBW); New Ipswich (EMD).

May 25 - July 15

Dorocordulia libera (Selys) (Calvert, 1905) Franconia, Meredith, Moultonboro, Mt. Monadnock, Peterborough (Lit); Alton Bay, Auburn, Hudson (WJM); Durham (WJM,RM); Northwood (WJ).

May 27 - July 24

Williamsonia lintneri (Hagen) Durham (WJM).

May 7 - June 15

Previously unknown from New Hampshire. The June 15 date from Spruce Hole near Durham is the latest record anywhere for this species. W. lintneri is featured in the cover picture to this publication.

Libellulidae

Nannothemis bella (Uhler) (Burnham, 1901) Franconia, Lyman, Manchester, Swanzey (Lit); Durham (WJM); Westmoreland (RC).

June 15 - August 1

Perithemis tenera (Say) Durham (DL,WJM); Merrimack (HBW).

July 16 - August 7

Previously unreported from New Hampshire. It is probably restricted to the southern part of the state.

Celithemis elisa (Hagen) (Burnham, 1900) Derry, Moultonboro (Lit); Durham (DL,WJM,RM); Eaton, Lee, Madbury, New Durham, Windham (WJM); Manchester (JH); West Henniker (HBW); Richmond (JB).

June 11 - August 14

Celithemis eponina (Drury) Durham, Gilmanton, Lee (WJM,RM); Milford (HBW).

July 23 - August 14

Previously known from Maine and Massachusetts but not from New Hampshire.

Celithemis martha Williamson (Burnham, 1900 as ornata) Manchester (Lit).

No date given

Known from several coastal freshwater ponds in Maine up to Mount Desert Island and therefore might be expected to be more frequent in New Hampshire than the records indicate.

Libellula cyanea Fabricius (Burnham, 1900) Manchester (Lit); Durham (DL,WJM,RM); Merrimack (PM).

June 4 - July 23

Libellula (Ladona) exusta Say (Burnham, 1900) Franconia, Intervale, Manchester, Meredith Neck, Moultonboro, Peterborough, Squam Lake (Lit); Auburn, Alton Bay, Durham, Hudson, New Durham, Pittsburg (WJM); Lee, Madbury (RM); Hooksett (JH); Grafton (REG); Northwood (WJ); Caanan (DCM).

May 15 - July 28

Ladona is considered to be a subgenus of Libellula (Bennefield, 1965). This subgeneric assignment is open to question.

Libellula incesta Hagen (Hagen, 1875) Manchester, Meredith (Lit); Durham (WJM,RM); Gilmanton, Lee, Windham (WJM); Mont Vernon (RLB,WJM); Brookline, Fitzwilliam, Peterborough (HBW); New Ipswich (EMD); Richmond (JB).

June 13 - August 27

Libellula (Ladona) julia Uhler (Calvert, 1905) Franconia, Jaffrey, Keene, Meredith, Moultonboro (Lit); Piermont (GSA); Falls Pond, Groveton, Hollis, Lily Pond, Nancy Ponds, Whitefield (HBW), Merrimack (PM); Marlow, Richmond (JB).

May 31 - August 1

L. julia and L. exusta were considered to be the same species at one time and therefore some of the early records may refer to the wrong species (Bennefield, 1965).

L. julia becomes more common to the north and west while L. exusta has the reverse distributional pattern, being most common near the Atlantic Coast.

Libellula luctuosa Burmeister Durham (WJM,RM,GSA); Merrimack (HBW).

June 4 - August 2

First records for New Hampshire.

Libellula needhami Westfall "Rockingham, Co" (RCC).

No date.

Salt marsh species previously known from Massachusetts and southward.

Libellula pulchella Drury (Hagen, 1874) Center Harbor, Franconia, Intervale, Jaffrey, Keene, Lisbon, Lyman, Manchester, Meredith, Moultonboro (Lit); Dover (BGM); Durham, Northwood (WJM); Groveton (RB); Lebanon (REG); Fitzwilliam, Hancock, Merrimack, Northumberland, Peterborough, Rochester, West Henniker, Whitefield (HBW).

June 14 - August 31

Libellula quadrimaculata Linnaeus (Burnham, 1900) Center Harbor, Franconia, Hanover, Intervale, Jaffrey, Lisbon, Lyman, Manchester, Meredith, Moultonboro, (Lit); Piermont (GSA); Auburn (HT,WJM); Durham (WJM,RM) Whitefield (DJL,HBW); Groveton, Peterborough, West Henniker (HBW).

May 18 - July 25

Libellula semifasciata Burmeister (Burnham, 1900) Manchester (Lit); Durham (WJM); Madbury (RM); Merrimack (PM).

June 17 - August 17

Plathemis lydia Drury (Burnham, 1900 as trimaculata) Center Harbor, Franconia, Intervale, Keene, Manchester, Squam Lake (Lit); Durham, Northwood, Portsmouth (WJM); Groveton, Grafton (REG); Hanover (DCM); Lily Pond, Merrimack, Nancy Ponds, Peterborough, West Henniker, Whitefield, Wilton (HBW).

May 15 - July 24

Erythemis simplicicollis (Say) (Burnham, 1900) Manchester (Lit); Colebrook, Durham, Lee (WJM); Moultonboro (RLB); Merrimack (PM).

June 14 - July 18

Leucorrhinia frigida Hagen (Calvert, 1905) Franconia, Meredith, Moultonboro, Mt. Washington, North Conway (Lit); Durham (WJM,RM); Church Ponds (RM,WJM); Brookline, Hollis, Peterborough, Rochester, West Henniker (HBW).

May 18 - August 14

Leucorrhinia glacialis Hagen (Hagen, 1875) Crawford Notch, Franconia, Lincoln, Meredith, Moultonboro, Mt. Washington, North Conway (Lit); Durham (RM,WJM); Jefferson (DJL); Whitefield (DJL,GSA); Lily Pond, Nancy Ponds (HBW).

June 2 - August 1

Leucorrhinia hudsonica (Selys) (Calvert, 1905) Franconia, Mt. Washington (Lit); Durham, New Durham (WJM); Pittsburg (RLB,WJM); Errol, Nancy Ponds, Northumberland, Peterborough, Rochester, Whitefield (HBW).

May 30 - July 4

Leucorrhinia intacta Hagen (Burnham, 1900) Center Harbor, Franconia, Intervale, Jaffrey, Lyman, Manchester, Meredith, Moultonboro, Mt. Washington, Peterborough, Sunapee (Lit); Bath (PDH); Durham (WJM,RM) Hooksett (JH); Merrimack, Nancy Ponds, Rochester, West Henniker, Whitefield (HBW).

May 23 - September 12

Leucorrhinia proxima Calvert, (1890) Franconia, Mt. Washington (Lit); Allenstown (JGC); Durham (WJM,RLB); Alton Bay (WJM); Nancy Ponds, Peterborough, Rochester, Whitefield (HBW).

May 18 - July 18

Sympetrum costiferum (Hagen) (Howe, 1918) Franconia, Intervale, North Conway, Whitefield (Lit); Durham (WJM); Church Ponds (RM,WJM,HBW); Madison (PM).

July 12 - August 31

Sympetrum danae (Sulzer) (Howe, 1917 - 1920) Franconia (lit).

No dates

Although this species has not been collected in New Hampshire in this century, it should be expected in the White Mountains and northward.

Sympetrum internum Montgomery (Needham and Westfall, 1955) Concord (RCC); Intervale (EBWC).

July 29 - September 6

Sympetrum obtrusum (Hagen) (Calvert, 1894) Center Harbor, Fabyan's, Franconia, Intervale, Lisbon, Meredith Neck, North Conway (Lit); Durham (WJM); Lily Pond (HBW); Bethlehem, Littleton (PM).

July 4 - September 17

Sympetrum rubicundulum (Say) (Hagen, 1875) Bethlehem, Center Harbor, Fabyan's, Fitzwilliam, Franconia, Glen House, Hermit Lake, Intervale, Kingston, Lisbon, Lyman, Manchester, Meredith Neck, Moultonboro, Mt. Monadnock, North Conway, Sunapee (Lit); Bath (PDH); Durham, Gilmanton, Lee, Woodstock (WJM); Bethlehem (PM); Church Ponds, Lily Pond, Merrimack, Milford, Peterborough, Rochester (HBW); Groveton, Lebanon (REG).

June 13 - September 17

Sympetrum semicinctum (Say) (Hagen, 1875) Fabyan's, Franconia, Intervale, Lyman, Manchester, Mt. Washington, North Conway (Lit); Durham, Hampton, Lee (WJM); Littleton (PM); Church Ponds (HBW); Lily Pond (HBW,RM); Groveton (REG).

July 11 - September 20

Sympetrum vicinum (Hagen) (Calvert, 1894) Fabyan's, Franconia, Fitzwilliam, Intervale, Jaffrey, Kingston, Jackson, Little Sunapee Lake, Manchester, Meredith Neck, Mt. Monadnock, Ringe (Lit); Auburn, Dummer, Durham, Lee (WJM); Pike (JB); Church Ponds, Greeley Ponds, Peterborough (HBW).

July 18 - September 21.

Pachydiplax longipennis Burmeister Durham, Lee (WJM,RM); Windham (WJM); Merrimack (PM).

June 15 - August 18

First records for New Hampshire.

Tramea lacerata Hagen Durham, Madbury (RM).

July 2 - September 14

Most of the 6 specimens collected in September 1969 were teneral. These are the first records of this species from New Hampshire. It had been previously known from Maine and Massachusetts.

Pantala flavescens Fabricius (Burnham, 1900) Manchester (Lit); Durham, Madbury (RM); Milford (HBW).

June 27 - September 21

Pantala hymenaea (Say) Durham (RM); Merrimack (PM).

July 21 - September 7

First New Hampshire records.

In addition to the preceding 134 species, there are a few species which are not on this list which have been reported from New Hampshire. Among them are Gomphus fraternus and Gomphus notatus whose identification and assignment to New Hampshire are at best questionable and Epitheca (Tetragoneuria) morio which is no longer considered to be a valid species.

ODONATA KNOWN FROM NEIGHBORING STATES BUT NOT FROM NEW HAMPSHIRE

The following species are known from Maine and/or Massachusetts but have not been found in New Hampshire. It is likely that many of them will be discovered in New Hampshire in the future.

Calopteryx dimidiata Burmeister Massachusetts (Hagen, 1861) as apicalis)

Argia translata Hagen Massachusetts (HBW,PM, unpublished).

Argia apicalis Say Massachusetts (HBW,PM, unpublished).

Coenagrion interrogatum Hagen Maine (Borror, 1951).

Enallagma carunculatum Morse Massachusetts (Howe, 1917-1921); Maine (HBW, unpublished).

Enallagma doubledayi Selys Massachusetts (Calvert, 1894) One of the most common damselflies on Cape Cod.

Enallagma daeckii (Calvert) Massachusetts (White, 1969).

Enallagma durum Hagen Massachusetts (Calvert, 1894) Coastal, found in brackish ponds.

Enallagma traviatum Selys Massachusetts (Selys, 1876) See note under this species in the New Hampshire list.

Ischnura kellicotti Williamson Massachusetts (Gibbs and Gibbs, 1954); Maine? (Wadsworth, 1890 as ramburii).

Ischnura ramburii Selys Massachusetts (Howe, 1918).

Anomalagrion hastatum Say Massachusetts (Hagen, 1861); Maine (Hagen, 1861).

Ophiogomphus anomalus Harvey Maine (Harvey, 1898).

Ophiogomphus howei Bromley Massachusetts (Bromley, 1924).

Gomphus adelphus Selys Massachusetts (Hagen, 1885).

Gomphus amnicola Walsh Massachusetts (Howe, 1921).

Gomphus notatus Rambur Massachusetts Hagen (1885) records a nymph from "Crampton, Massachusetts." Since there is no such town in Massachusetts and there is a Campton, New Hampshire, Howe (1919) speculates that the record may have come from New Hampshire. Considering the difficulty of identifying immature Odonata, the confusion over the

origin of the specimen, and that the species has not been found in New England subsequently, it is probably best to ignore the record.

Gomphus lividus Selys Massachusetts (Hagen, 1875). It is surprising that this species has not been taken in New Hampshire since one of us (HBW) has collected it several times within five miles of the southern border of New Hampshire.

Anax longipes Hagen Massachusetts (Hagen, 1884).

Aeshna multicolor Hagen Massachusetts (Beatty and Beatty, 1969). This is a western species quite unlikely to be collected again in New England. The specimen from Martha's Vineyard was most certainly a stray.

Aeshna mutata Hagen Massachusetts (Williamson, 1908).

Aeshna sitchensis Hagen Maine (Ahrens, 1941).

Aeshna subarctica Walker Maine (White, unpublished).

Neurocordulia yamaskanensis Provancher Maine (Harvey, 1901).

Somatochlora incurvata Walker Maine (White, 1969).

Somatochlora linearis Hagen Massachusetts (HBW,CL, unpublished). The record from Maine (Wadsworth, 1898) was expunged by Walker (1925) because examination of the specimen revealed it to be S. tenebrosa instead.

Williamsonia fletcheri Williamson Massachusetts and Maine (Montgomery, 1943). A male of this species was taken by WJM on June 1, 1970 in Lincoln Tract, Maine within one mile of the New Hampshire border. Collecting during late

May and early June in the vicinity of spruce bogs in northern New Hampshire should produce this rare species.

Celithemis monomelaena Williamson Massachusetts (Howe, 1919a).

Libellula auripennis Burmeister Massachusetts (Calvert, 1894).

Libellula (Ladona) deplanata Rambur Massachusetts (Gibbs and Gibbs, 1954).

Erythrodiplax berenice Drury Massachusetts (Hagen, 1873); Maine (Borror, 1951). Strictly a salt marsh species and undoubtably will be found in New Hampshire when someone takes the time to examine this habitat.

Sympetrum ambiguum Rambur Recorded from Massachusetts by Hagen (1873) as S. albifrons, but is probably the result of a misidentification. Quoting from Hagen, "....specimen is a fragment of an immature male belonging, as I believe, to this species." Since this species is southern in distribution and has not been collected subsequently in New England, the record should be ignored.

Sympetrum corruptum Hagen Massachusetts (Howe, 1921).

Tramea carolina Linnaeus Massachusetts (Hagen, 1873). The lone record of the tropical T. abdominalis from Nantucket Island was most likely a misindentification of T. carolina or possibly of Pantala hymanea as suggested by Mr. Paul Miliotis.

APPENDIX I

Preserving the Color of Fresh Specimens

Living dragonflies are notable for their beautiful colors. In most instances these colors quickly fade. Several methods have been reported which prevent or diminish this irreversible process (Longfield, 1960; Robert, 1959, p. 58-61; Williamson, 1916; Young, 1966). The following method has been used successfully by the senior author.

Freshly killed specimens are placed in triangular paper envelopes with their wings folded together, head turned to the side, and legs together and drawn forward away from the body. The triangles containing the specimens are then submerged in a large jar of acetone and closed tightly with a screw cap lid. Peanut butter jars (3 - 4 lb. size) work quite well. With fresh acetone, the triangles can be removed after 24 hours and dried in a well-ventilated place. The duration of the acetone extraction is dependent upon the size of the specimen and the condition of the acetone. Large specimens require the longest extraction periods. A small amount of water should be added to fresh acetone to prevent specimens from becoming too brittle. Used acetone should be replaced when specimens remain pliable after the extraction. After one day of air drying, the specimens can be placed in clear cellophane envelopes now used in many large collections (Beatty and Beatty, 1963).

This procedure is particularly successful for preserving the fragile blues of Aeshna and Enallagma or the yellows of

Cordulegaster which ordinarily would fade to gray or black. This procedure is not as successful with the brilliant green of Ophiogomphus which often fades to yellow, although the color pattern is well-preserved.

There are probably several reasons solvent extraction methods are successful. Firstly, they prevent bacterial growth which frequently can destroy good specimens. Secondly, the body is partly dehydrated in dry solvents. Lastly, the extraction of lipids removes the barriers to the evaporation of the remaining water. It should be noted that acetone and other organic solvents are quite volatile and flammable. The vapors should not be inhaled.

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