# ODONATOLOGICAL ABSTRACTS

## 1971

(1826) CARLSON, P.H., 1971. Biological survey of waters entering the Choctawhatchee Bay. II + 105 pp. Florida St. Dept. Pollution Control & Florida A & M Univ., Tallahassee. – *(Dept. Ent. & Econ. Zool., Coll. Agric. Sci., Clemson Univ., Clemson, South Carolina 29631, USA).*
This is the final report on the survey carried out from July 1, 1970 through June 30, 1971. In all, the macrofauna was collected at 96 localities in Northern Florida, Georgia and Alabama, United States, and the results of 61 of these are presented here. In most cases the Odon. were identified to the sp. level.

## 1972

(1827) LEHMKUHL, D.M., 1972. Change in thermal regime as a cause of reduction of benthic fauna downstream of a reservoir. J. Fish. Res. Bd Canada 29: 1329-1332. (With Fr. s.). – *(Biol. Dept., Univ. Saskatchewan, Saskatoon, Sask. S7N OWO, CA).*
The paper deals with Ephemeroptera, whose number of spp. and individuals, like in other insects, is greatly reduced downstream of a dam on the Saskatchewan R., Canada. The phenomenon is attributed to changes in river temperatures caused by the reservoir. The river is warmed in winter and cooled in summer, and the effect is evident 70 mi downstream. Reference to Gomphidae is also made, but no spp. names are given.

## 1973

(1828) BOULOS, R. & S.M. EISSA, 1973. Ecological studies in Kom-Oshiem region, Egypt. Bull. Fac. Sci. Cairo Univ. 46: 215-234. – *(Authors' address unknown).*
Hemianax ephippiger and Crocothemis erythraea are the only Odon. recorded.

(1829) CLARKE, K.U., 1973. The biology of the Arthropoda. Edward Arnold, London. X + 270 pp. – *(Dept. Zool., Univ. Nottingham, Nottingham, UK).*
The book is intended for Univ. students in their 1st and 2nd yrs and gives a basis of facts that can be expanded in scope and depth in future studies. It contains a few interesting passages on Odon., and will certainly provide useful reading to odonatologists as well, particularly so with respect to the phylogenetic (evolutionary) position of the Order within the Class and the classification of the latter. – "Modern-day Odon. show features that link them to the Ephemeroptera and Palaeodictyoptera. One archaic group arose in the hot Laurentian forests in Carboniferous times adapting itself to increasing aridity and dying out in Jurassic times. Present-day dragonflies arose in Gondwanaland during the Permian Period, modern sub-orders being recognizable in the Jurassic of Upper Bavaria." (p. 177).

(1830) FLEMING, R.L., Jr., 1973. The general ecology, flora and fauna of midland Nepal. United States Agency for International

Development, Kathmandu. XII + 105 pp. – (*Box 229, Kathmandu, Nepal*).
On p. 32 dragonflies are used to show schematically a model of food chain in Nepal. Further reference to the Order is made on p. 36 but no spp. names are given anywhere. – (*Abstracter's notes*: The book is divided into 5 main chapters, viz. "What is ecology", "A Nepal subtropical forest", "The Oak-Rhododendron forest", "Water in Nepal", and "Man living with nature in the Kathmandu Valley". The references listed are those to publications available in the Nepalese libraries. – The title of the book does not really cover the scope, and neither a flora nor a fauna may be expected to be found in this slim volume. The latter, however, is written in such a way and on such a level, that it should be most warmly recommended to all those visitors of Nepal that are interested in nature and in the living world around them. For the Nepalese undergraduate students of pure and applied biology and for all those whose professional work is related to the Nepalese natural history the booklet will be certainly indispensable. – (For a book review cf. R. Shaha, 1974. Contr. Nepal. Stud. 1 [2]: 119-121).

(1831) GARRAD, L.S., 1973. Notes on the natural history of Raasay and Scalpay. Glasgow Natural. 19 (1): 7-11. (*Manx Mus., Douglas, Isle of Man, UK*).
The 1969 records (June 28-July 5) for the 2 islands (North Ebudes, v.c. 104), Scotland, United Kingdom, are presented. The following is the verbatim text related to Odon. (p. 9): "A number of dragonflies were seen. Loch an Leoid, on Scalpay, had a particularly large population. Spp. present appeared to be Enallagma cyathigerum, Pyrrhosoma nymphula, Libellula depressa and Cordulegaster boltoni. The last was also seen, in a very torpid state, in the waterfall gorge south-west of Brae, while the first was also noted on several of the central Raasay lochans."

(1832) RAVIZZA, C., 1973. Relitti biotici di Donaciinae (Col. Chrysom.) nella degradazione ecologica di un piccolo bacino lacustre intermorenico lombardo. Annali Fac. Sci. agr. Univ. Torino 8: 283-296. (With Engl. s.). – (*Centro Ent. alpina & forestale, C.N.R., Univ. Torino, Torino, Italy*).
Nehalennia speciosa is recorded for the small pool, Lagozzetta, Besnate, Lombardy, Italy (alt. 275 m). (Cf. also *OA* No. 203).

## 1974

(1833) ALAYO, D., Pastor, 1974. Guia elemental de las aguas dulces de Cuba. Torreia (N.S.) 37: 1-79, pls. 1-19. (Spanish). – (*c/o Direccion Nacional de Zoologicos y Acuarios de Cuba, Apartado de Correos 7097, Habana, Cuba*).
This is a popular key to the aquatic fauna (invert. and vert.) of Cuba. Odon. are dealt with on pp. 33-37, pl. 8, figs. 1-11, but only a key to the families is provided.

(1834) APPLETON, C.C., 1974. A check-list of the flora and fauna of Gladdespruit, Nelspruit District, Eastern Transvaal. Newsl. Limnol. Soc. sth. Afr. 1974 (22): 47-58. – (*Bilharzial Res. Unit, Sth. Afr. Med. Res. Counc., Box 634, Nelspruit, Transvaal, Sth. Afr. Rep.*).
During investigation of longitudinal distribution of bilharzial intermediate host snails, Oct. 1969 - Oct. 1971, lists were compiled of flora and fauna in 4 substrate zones of the stream Gladdespruit, South-African Republic. The list includes Odon. spp. on pp. 52, 53. These were 1 Platycnemididae (erroneously in Protoneuridae); 1 Synlestidae; 1 Lestidae; 8 Coenagrionidae (one of them an Agriocnemis, erroneously in Protoneuridae); 1 Chlorocyphidae; 2 Gomphidae; 2 Aeshnidae; 1 Corduliidae; 9 Libellulidae.

## 1975

(1835) DICKEHUTH, R., 1975. Das Naturschutzgebiet "Heidesumpf an der Strothe" und

seine Insektenfauna. 15 pp. Privately published. – (*Arminiuspark 3-5, D-4792 Bad Lippspringe, GFR*).
Records are given for 23 Odon. spp. in a small nature reserve near Bad Lippspringe, Westfalia, German Federal Republic. Due to planned road construction the reserve is going to be destroyed. The interesting taxa are Cordulegaster boltonii (= annulatus) (breeding in a stream for at least 2 yrs), Ischnura pumilio and Coenagrion armatum. – (*Abstracter's notes*: Identification of C. boltonii was confirmed by the Abstracter, but I. pumilio spec. turned out to be I. elegans. No spec. of C. armatum were either collected or photographed. If the identification is correct, this would be the second record for Westfalia; cf. also *OA* No. 1167).

(1836) HARR, L.E., 1975. "Tombo", 226 dragonfly haiku. Western World Haiku Society, Portland, VI + 65 pp. – Price: US $ 3.25. – (*4102 N E 130th Pl., Portland, Oregon 97230, USA*).
Haiku is a traditional Japanese 16th century verse form (5-7-5 syllables, no rhyme, unless it falls naturally). This slim volume is a collection of original, English verses on dragonflies, the inspirations for which came out of various trips of the author to Mexico, Beliz and Guatemala. – (*Abstracter's note*: The author is founder of the Western World Haiku Society, and editor of the Haiku quarterly, "Dragonfly", subscription address: as above, annual price for 1977: US $ 6.–. The journal, however, is a literary, not an odonatological periodical).

(1837) HUTCHINSON, R., 1975. Observons les libellules. Fabreries 1 (7): 53-54. – (*Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA*).
A short note encouraging young amateurs to study dragonfly life in the field.

(1838) HUTCHINSON, R., 1975. [Book Review] Corbet, Philip S. 1962. A biology of dragonflies. H.F.G. Witherby, London. Fabreries 1(7): 62-63. – (*Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA*).
*Abstracter's note*: The book is out of print.

(1839) HUTCHINSON, R., 1975. Observations sur la ponte de quelques libellules. Fabreries 1 (9): 78-79. – (*Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA*).
Observations on oviposition of Calopteryx maculata, Aeshna canadensis, Cordulegaster maculatus, Somatochlora elongata, Plathemis lydia and Sympetrum sp. are brought on record.

(1840) HUTCHINSON, R., 1975. Pourquoi ne pas observer les libellules. Fabreries 1 (10): 90-91. – (*Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA*).
A note pointing out, to young amateurs, the suitability of the Quebec province, Canada, with its numerous rivers and lakes, to the study of dragonfly behaviour in the field.

(1841) JACOB, U., S. KAUK & F. KLIMA, 1975. Eine ephemeropterologische Überraschung – Ephemera glaucops Pictet bei Leipzig. Ent. Nachr. 19 (12): 185-195. (With Engl. and Russian s's.). – (*Taxonomie & Oekol., Sekt. Biowissenschaften, Karl-Marx-Univ., Talstr. 33, DDR-701 Leipzig, GDR*).
The mayfly, E. glaucops, is recorded from the surroundings of Leipzig, German Democratic Republic. This is one of the few known localities of this sp. in the region N. of the Alps. The sp. is considered as an expansive element of the ancient mediterranean fauna, and its recent distribution is compared to that of Cercion lindeni, which has a similar range, and is believed to represent the same faunal stock (N. of the Alps known from the Nordrhein-Westfalia and from the Berlin area). The bionomy of the mayfly is also similar to that of the dragonfly.

(1842) KAISER, H., 1975. Räumliche und zeitliche Aufteilung des Paarungsplatzes bei Grosslibellen (Odonata, Anisoptera). Verh. Ges. Ökol., Wien 1975: 115-120. (With

Engl. s.). – (*Lehrstuhl Tierökologie, Univ. Bayreuth, Am Birkengut, D-8580 Bayreuth, GFR*).
The spatial and temporal partitioning of the mating site in the anisopterans is discussed. Adult dragonflies visit ponds and rivers only for mating and for oviposition. Oviposition sites serve as mating places. The ♂♂ of a population partition their presence at the mating place either spatially or temporally. In the former case they perch at the bank and stay there for longer visits (e.g. Onychogomphus forcipatus). In the latter case the ♂♂ keep on the wing all day long and pay successive short visits to the mating place relieving one another (e.g. Aeshna juncea). Some libellulid spp. have additionally an individual site tenacity and therefore territorial behaviour. In aeshnids the intermale aggressiveness causes a reduction of visit length in crowded situations resulting in a regulation of mean density at the mating place. (Author).

(1843) LEHMKUHL, D.M., 1975. Saskatchewan damselflies and dragonflies. Blue Jay 33 (1): 18-27. – (*Dept. Biol., Univ. Saskatchewan, Saskatoon, Sask. S7N OWO, CA*).
The paper is the first in a planned series of popular articles on the Saskatchewan, Canada, insects. A general introduction of the Order is followed by a key to the Saskatchewan odon. families. A list of spp. known to occur in Saskatchewan (47), along with data on their known distribution in the province is also given.

(1844) LEHMKUHL, D.M., 1975. Field guide to aquatic insect families. Blue Jay 33 (4): 199-219. – (*Dept. Biol., Univ. Saskatchewan, Saskatoon, Sask. S7N OWO, CA*).
This pictorial key should work for all North America. Technical terms are avoided, and an attempt is made to use the characters which can be seen with the naked eye or with a 10 X hand lens. The key should be useful in the field as well as in the laboratory; it can be used by anyone regardless of his background.

(1845) OLIGER, A.G., Jr., 1975. K voprosu o zarazhennosti strekoz (Odonatoptera) kleshchami sameistva Arrhenuridae v Donbasse. [On infestation degree of dragonflies (Odonatoptera) by mites of the family Arrhenuridae in the Donets Coal Basin]. *In*: Problemy Parazitologii. Mater. 8. nauch. Konf. Parazitol. Ukrain. SSR, Vol. 2, pp. 78-80. Naukova Dumka, Kiev. (Russian). – (*Dept. Zool., Chuvash Pedagog. Inst., Lenin Square, USSR-428000 Cheboksary*).
This is an abstract of a paper presented at the 8th Conference of the Ukrainian Parasitologists. Not further identified arrhenurid mites were found in adult spec., referable to 15 odon. spp. Percentages of infested odon. spec., spp. per sampling point, and topographic localization of the parasites on the dragonfly body are stated.

(1846) PAVLYUK, R.S., 1975. New species of gregarines of dragonflies (Insecta, Odonata) from western regions of the Ukraine. *In*: Parazity i parazitozy zhivotnyh i cheloveka. Naukova Dumka, Kiev, pp. 88-99. (Russian, with Engl. s.). – (*Zool. Mus., Lvov Univ., 4 Shcherebakov Str., USSR-290005 Lvov*).
14500 larval and adult Odon., pertaining to 58 spp., were examined and 40270 gregarine spec., referable to 8 spp., were found. Among the latter, 6 are new, and are described here.

(1847) PUFFER, L., 1975. Misconceptions about insects. Insect World Digest 2 (5): 16-18. – (*c/o Editors, Biol. Res. Inst. Am., 57 West Glenwood Drive, Latham, NY 12110, USA*).
The following superstitions were or still are associated with dragonflies (verbatim, p. 17): The dragonfly was thought to be a friend of snakes and has been called the "snake doctor." It is supposed to warn snakes of danger, show them where food is, and heal them when they are hurt. Another name is "darning needle" or "devil's darning needle," which is supposed to sew up the lips and ears of liars and those who

eavesdrop. To good boys, dragonflies are supposed to show where fish are. For bad boys they drive fish away from the hooks with stings.

(1848) SHARMA, B.D., 1975. Preferential feeding in captivity by a fresh water crab, Potamon atkinsonianum Wood-Mason (Crustacea: Potamonidae) on Notonecta undulata (Insecta: Hemiptera). J. Bombay Nat. Hist. Soc. 72 (1): 222-223. – (*Dept. Zool., Govt. Coll., Poonah, Jammu & Kashmir, India*).
A report on the preferential feeding of a P. atkinsonianum, captured in Poonah Valley, India, during Nov. 1970, is reported. Various aquatic insects, incl. larval Odon., all collected at the same location, were presented, but a definite preference for N. undulata was noted, all spec. presented being taken.

(1849) STATON, M.A. & J.R. DIXON, 1975. Studies on the dry season biology of Caiman crocodilus crocodilus from the Venezuelan Llanos. Mem. Soc. Cienc. natur. La Salle 35 (101): 237-265. (With Spanish s.). – (Address second Author: *Dept. Wildlife & Fisheries Sci., Texas A & M Univ., College Station, Texas 77843, USA*).
Most observations reported were made at Hato Masaguaral, 50 km S of Calabozo, Estado de Guárico, Venezuela. The dry season begins in Nov. and extends through Apr. or May; rainfall peaks in July/Aug. Stomachs of 13 hatchlings and 40 subadults/adults were examined. In the stomach contents of 13 hatchlings ranging in size from 13.6 to 20.0 cm SVL collected on March 9, 1974 at Hato La Guanota, San Fernando de Apure, in grassy ponds ranging from 100-1000 $m^2$ in surface area, over 90% of the identifiable food items were aquatic. Adult Hydrophilidae accounted for over 2/3 of the prey items, and insects of this family were obviously the preferred food choice amongst a wide variety of possibilities. Considering volume and number of individuals represented, the Hydrophilidae, Dytiscidae, Scarabidae, Belastomatidae, Carabidae, Naucoridae, and larval Odon. are the most abundant items. Indices of relative importance (IRI) based on these groups only point to the Hydrophilidae as the predominant food item. Odon. larvae accounted for less than 2% of the IRI, and dragonflies were found with the following frequencies (in %): Coenagrionidae larvae 7.6, adults 7.6, Libellulidae larvae 38.5. Stomach contents of hatchlings were usually well masticated. This was not the case in (sub)adults, in which no Odon. were recorded. – (For another note on Odon. as food of crocodiles cf. *OA* No. 1201).

(1850) VERSHININA, A.V. & T.Ya. POSDNUHOVA, 1975. Sezonnye izmeneniya v pitanii i tempe rosta pelyadi oz. Tsingol'. [Seasonal changes in food and growth rate of Coregonus peled (Gmelin) in the Tsingol Lake]. Trudy sib. nauch.-issled. i proektno-konstrukt Inst. ryb. Hoz., Krasnoyarsk 10: 33-38. (Russian). – (*Krasnoyarsk Sect., Siber. Res. & Design Inst. Fish., 39 Paris Commune Str., USSR-660049 Krasnoyars*).
The Tsingol Lake is a eutrophic lake in the S of the Krasnoyarsk Territory, USSR. Odon. larvae were found in 12.8% of examined spec. of this Siberian lakesalmon. In autumn the fish feeds on plankton only.

(1851) WADDELL, L.A., 1975 (*reprint*). The fauna of central and south-western Tibet, with descriptions of new birds, fish, etc. *In*: L.A. Waddell, Lhasa and its mysteries, with a record of the Expedition 1903-1904, pp. 479-490. Sanskaran Prakashak, Delhi.
The author served as Principal Medical Officer, and functioned as naturalist (zoologist) and scientific recorder in the Colonel (later Sir Francis) E. Younghusband's (diplomatic and military) mission to Tibet (1903-1904). Zoological material brought home has been worked out and published by respective specialists: the present paper gives but a brief general out-

line of the results, and a summary of those technical papers that have appeared prior to mid 1905. On p. 490 reference is made to "several spp. of ... dragonflies, ... common in all the ditches", as observed by the mission on their way from Siliguri (India) to Lhasa (Tibet). Species names are not given. – (*Abstracter's note*: The original edition of the book appeared in 1905, Murray, London, VIII + 530 pp., 6 maps. The Abstracter was unable to find any publication dealing with the odon. material of the mission, but a considerable list of Tibetan spp. can be extracted from the scattered notes in the odon. volumes in The fauna of British India [Fraser 1933, 1934, 1936, Taylor & Francis, London]).

## 1976

(1852) (Anonymous), 1976. Vom Jungforscher zum Libellendoktor. Stern Magazin 29 (19): 3.
Biographic notes on Wolfgang Dreyer (born 1948), W. German odonatologist, Staff member of the Animal Ecology Dept., Univ. of Bayreuth, German Federal Republic. A portrait is also provided.

(1853) BRETON, R., 1976. Les larves d'Odonates du Québec. Clef des genres. Alouette 1976 (Suppl. 2), 20 pp. – (*55 rue Champagnat, Lévis, Que., CA*).
This is a key to the ultimate stage larvae of the genera known to occur in Quebec, Canada, intended for use by young amateur dragonfly collectors.

(1854) DREYER, F. & E. LAUSCH, 1976. Die lautlosen Hubschrauber. Stern Magazin 29 (19): 36-50, 52. – (*LS Tierökologie, Univ. Bayreuth, Am Birkengut, D-8580, Bayreuth, GFR*).
This is a popular article on dragonflies, with emphasis on 21 colour photographs, most of which are of very high quality. (For a biographic note on the senior author cf. *OA* No. 1852).

(1855) GREEN, J., S.A. CORBET, E. WATTS (née BETNEY) & O.B. LAN, 1976. Ecological studies on Indonesian lakes. Overturn restratification of Ranu Lamongan. J. Zool., Lond. 180: 315-354. – [*Zool. Dept., Westfield Coll., Univ. London, Hampstead, London NW3 1ST, UK*).
Ranu Lamongan is one of several crater lakes on the lower slopes of the mildly active volcano Gunung Lamongan, East Java, Indonesia (alt. 240 m, diameter 800 m, max. depth 30 m). In July 1974 the lake overturned. The paper described the recovery of stratification of temperature and oxygen and follows short-term changes in the plankton during the 3 weeks after overturn. Comparison is also made between the present situation and that described by the 1928 German Sunda Expedition. Remarkably few changes have occurred in the lake and its biota during the 45-yr interval (despite the introduction of 4 new fish spp.). A list is given of 26 odon. spp. collected on the lake. Among these, Brachydiplax chalybea, Orthetrum sabina and Trithemis aurora have not been recorded by the Sunda Expedition. The lake is fringed with a floating mat of Eichhornia whose submerged roots support and shelter a rich invertebrate community. Libellulidae were most frequent among the Eichhornia roots, preying mostly on mayfly larvae. Notes on food and brief observations on behaviour are given for several taxa, viz. Ischnura senegalensis, Brachythemis contaminata, Crocothemis servilia, and Ictinogomphus decoratus; for the latter 2 spp. the oviposition behaviour is described. Orthetrum sabina has been seen devouring B. contaminata.

(1856) HUTCHINSON, R., 1976. Notes de chasse et observations du comportement territorial chez Tetragoneuria canis Mclachlan. Fabreries 2 (5): 60-61. (With Engl. s.). – (*Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA*).
Feeding habits, flight and territorial behaviour of T. canis, as observed on May 24, 1975 at Pointe-Fortune, Quebec (nr. the Ontario border), Canada, are briefly

described. Notes on the distribution of this sp. in Quebec are added.

(1857) HUTCHINSON, R., 1976. Capture d'Odonates par temps de pluie. Fabreries 2 (7): 100. – *(Coll. Bourget, C.P. 1000, Rigaud, Que, JOP 1PO, CA).*
A note on a dragonfly collecting trip in rain (Saint-Nérée, Bellechassee, Quebec, Canada; July 15, 1975; Amphiagrion saucium, Ischnura verticalis).

(1858) HUTCHINSON, R., 1976. Observations et récoltes des individus ténéraux (Odonates). Fabreries 2 (9): 129-130. – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
Brief general considerations on teneral dragonfly imagoes, with an appeal to collectors to refrain from taking too many such individuals, but rather allow them to reach the reproductive stage.

(1859) HUTCHINSON, R., 1976. Simulation de la mort chez les Odonates. Fabreries 2 (10): 135-136. (With Engl. translation of the title). – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
A popular narrative on feigned death in odon. larvae, with a considerable number of bibliographic references on the subject.

(1860) KAISER, H., 1976. Quantitative description and simulation of stochastic behaviour in dragonflies (Aeschna cyanea, Odonata). Acta Biotheor. 25 (2/3): 163-210. – *(Lehrstuhl Tierökologie, Univ. Bayreuth, Am Birkengut, D-8580 Bayreuth, GFR).*
(1) A dynamic description model of the flight path a dragonfly takes is required in order to derive the encounter frequency of the dragonfly ♂♂ visiting a pond. It is considered as the first part of a realistic description of the regulation of dragonfly density at the pond by behavioural interaction. – (2) Since the ♂♂ fly strictly along the shoreline of the pond, their displacement may be perceived as a quasi linear movement. The flight paths were recorded in the field by registering at regular time intervals (1,5 sec) the number of the shoreline section (1 m length) in which the dragonfly was staying at that moment. – (3) The recorded flight paths show a wide variety from circling around the pond or flying widely to and fro to remaining in a narrow sector of the shoreline. – (4) The records were classified into 9 flight style groups. The flight style is temperature dependent, but there are also individual differences between the dragonflies. – (5) The strategy adopted for model building is to start with the most simple assumptions and parameters. The dynamic performance of each model is assessed by simulations. The model has to be extended until the simulated flight path patterns resemble the observed patterns. – (6) In a model with one parameter the displacement for every time interval is given by a stochastic decision using the probabilities evaluated from the observed frequencies of step length. – (7) This model was run with different sets of data. The simulated patterns using the data from all records together slightly resemble some observed patterns. They represent, however, only a small range of the variability observed. With data from the different style groups or the single records the simulated patterns are much more variable, but they are too irregular and contain too many turns. – (8) Therefore the description model was extended by a second parameter determining the direction of each step. The probability of turning is dependent on the number of steps already taken in the same direction. The probabilities are evaluated from the observed frequencies of step series. (Author).

(1861) LAROCHELLE, A., 1976. Liste préliminaire des publications entomologiques d'Adrien Robert. Fabreries 2 (4): 44-47. – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
The list contains 75 titles, many of which are related to Odon. (For an outline of life and work of A. Robert cf. *OA* No. 1407).

(1862) LEEUWENHOEK, A. van, 1976. Letter No. 121 (73), dated June 24, 1692, addressed to the Royal Society, London. *In*: J. Heniger, [Ed.]. The collected letters of Antoni van Leeuwenhoek, Vol. 9, pp. 36-67, figs. V-VIII. Swets & Zeitlinger, Amsterdam. (Bilingual: Dutch/English).
The original signed autograph letter is in the Royal Society, London, MS 1945, Early Letters L 2, 37 (14 quarto pp. 2 of which blank, with 4 engraved figs. on a separate sheet). Here the contemporary (17th century) Dutch text is given along with the modern Engl. translation. The annotations are bilingual. On p. 50 (Dutch), 51 (Engl.) Van Leeuwenhoek makes reference to his Letter No. 65 (33), of Nov. 12, 1680 (Collected Letters, Vol. 3 [1948], pp. 278-343, pls. 34-49), where he described the copulation in Zygoptera (pp. 316-319, fig. XXXIII). In the present letter (pp. 50, 51) he deals with the "blood circulation" in the zygopteran wings.

(1863) LEWANDO, I. & B. LEWANDO, 1976. Goodbye biocide. Today I saw a dragonfly ... York County Coast Star, Maine, issue of Apr. 21, 1976, 1 p. – (*c/o "Dragonflies vs. Mosquitoes Project", Chamber of Commerce, P.O.Box 356, Wells, Maine 04090, USA*).
The main part of this newspaper article deals with a description of dragonfly life, with special emphasis on methods of rearing dragonflies in the field in artificial containers. It has been written on the occasion of an organized campaign for mosquito control by dragonflies. The news item runs verbatim: "This Saturday (April 24th) is the deadline for Wells-Ogunquit [Maine, USA] residents to place orders for dragonfly larvae through the Wells Chamber of Commerce in a project to reduce the mosquito population. The larvae will be parceled out to purchasers of bags of 25 bugs for $5, at the Chamber headquarters on Eldredge Road on Saturday May 1st. Individuals and organizations may also donate to the general fund for buying larvae to be planted in areas not covered by property owners, and may specify that larvae be planted in a particular region". (Cf. also *OA* Nos. 1875, 1910, 1912; photocopies of all 4 articles are available from the Editors of Odonatologica).

(1864) LIEM, K.K. & R.N. LaSALLE, 1976. Effects of Abate 2G$^R$ and Abate 4E$^R$ mosquito larvicides on selected non-target organisms coexisting with mosquito larvae in woodland depressions. Mosq. News 36 (2): 202-203. – (*S. Cook County Mosquito Abatement District, P.O.Box 30, Harvey, Il. 60426, USA*).
In an experiment to study the effect on non-target organisms of Abate 2G and 4E applied against larvae of Aedes fitchii, Ae. canadensis, Ae. stimulans and Ae. vexans, population estimates were made for each organism during the period from 5 days pre- to 10 days post-treatment. Non-target organisms studied were: Simocephalus sp., Ceriodaphnia sp. (both Cladocera), Cyclops sp., Ectocyclops sp. and Eucyclops sp. (all Copepoda), an Ostracoda sp. and Lestes sp. The insecticide was applied when the culicid larvae were in the 2nd and 3rd instars. Abate 4E was applied at 1 oz a.i. per ac and Abate 2G at 5 lbs per ac. The results showed that total mortality of culicid larvae was observed within 24 h. Non-target organisms varied in their mortality rates. All however returned to their normal population levels after 48 h. The most susceptible organisms were Cladocera, a 40% population reduction occurring within 48 h. The copepods, ostracods and Lestes sp. were only slightly effected. A decrease of 10% of the copepod and ostracod populations was observed after 24 h. No mortality was observed in the Lestes population.

(1865) MAMAEV, B.M., L.N. MEDVEDEV & F.N. PRAVDIN, 1976. Predelitel' nasekomyh evropeiskoi chasti SSR. [Keys for identification of insects of the European part of USSR]. Prosveshchenie, Moskow, 304 pp., 16 col. pls. (Russian). – (*Dept.*

*Invertebr. Zool., Lenin St. Pedagog. Inst., 1 Malaya Pirogovskaya Str., USSR-119882 Moscow*).
The volume is intended for the biology students of the USSR pedagogical institutes. Odon. are dealt with on pp. 30-42, pl. 1 (18 figs.), and the adult stages of 49 more common spp. are keyed.

(1866) PEISKER, V. & H. WILDERMUTH, 1976. Das Hoperenriet bei Uster. Monographische Notizen aus der Sicht des Naturschutzes unter besonderer Berücksichtigung der Amphibien. Vjschr. naturf. Ges. Zürich 121 (3): 269-291. – (*Haberweidstr. 42, CH-8610 Uster*).
The Hoperenriet is a nature reserve in the Canton Zürich, Switzerland, about 5.8 ha in size, comprising a reed-covered swamp and moraine area surrounded by hills, fields and cliffs. The plant associations of the wet locations are reviewed. Floristically, the area studied contains about 120 cormophyte species. Because of the insecticide-free development of the vegetation, the invertebrate fauna is fairly rich. The single pond harbours no fish, and its vegetation consists of reeds and other plants, designated by association. Between 1973-1975, 18 odon. spp. were recorded, though not all of them are considered autochthonous (pp. 273-274). From the nearby Werrikerriet and Glattenriet Calopteryx virgo, C. splendens and Aeshna cyanea are also mentioned, but they were not noticed at the Hoperenriet.

(1867) PESEK, T. & G.L. HERGENRADER, 1976. The influence of water quality upon the benthic macroinvertebrates of Salt Creek, Lancaster County, Nebraska. Trans. Nebr. Acad. Sci. 3 (1974/1976): 45-60. – (*Nebraska Nat. Resour. Committee, Lincoln, Nebr. 68508, USA*).
The influence of water quality upon the diversity and abundance of benthic macroinvertebrates, incl. Odon., in Salt Creek, Lancaster Co., Nebraska, USA, was studied during 1971-72. Water quality in the creek, as indicated by dissolved $O_2$ and conductivity levels, varies along the course of the creek and is poorest in the lower reaches where wastes from the city of Lincoln are discharged. The changes in water quality are reflected in the community structure and abundance of macroinvertebrates in the creek; the highest community diversity occurred at the upper stations where water quality is unaffected by municipal wastes, while the lowest occurred at the stations immediately downstream from the Lincoln sewage treatment plant. Macroinvertebrates generally considered to be intolerant of pollution were confined to the stations upstream from the treatment plant outfall, while the downstream stations were dominated by those which are associated with polluted environments. Highly significant correlations were observed between average community diversity, dissolved $O_2$ and conductivity.

(1868) PRASAD, M. & A. SINGH, 1976. Odonata of Doon Valley – 2. Zygoptera. Rec. zool. Surv. India 70: 121-131. – (*Zool. Surv. India, 34 Chittaranjan Ave., Calcutta-700012, India*).
27 spp. are listed for the Doon Valley, Uttar Pradesh, India, along with the usual locality data, measurements, and, for most spp., brief descriptive notes and notes on general range. (For pt. 1 cf. *OA* No. 1871).

(1869) RUBTSOV, I.A., 1976. New species of mermithids. Zool. Zh. 55 (9): 1292-1298. (Russian, with Engl. s.). – (*Zool. Inst., USSR Acad. Sci., Leningrad, USSR*).
5 new spp. are described from different regions of USSR and from different hosts. Among these, Paramermis (?) fovesta sp. n. is described from a larval Lestes sponsa.

(1870) SCHLOETH, R., 1976. Der Schweizerische Nationalpark. Ringier, Zofingen. 224 pp., brief author's biography and portrait on the wrapper. – Price: sFr 47.20. – (*Chasa dal Parc Naziunal Svizzer, CH-7530 Zernez*).

On p. 143 an "Engadiner" (quotation marks by the Abstracter) is quoted, who has stated to the Author that in his youth he has been told not to run after dragonflies, since they are dangerous and may sting him in the eyes. Since then he has an aversion from all flying insects. This is the only reference to Odon. in this representative popular volume on the Swiss National Park, situated in the central part of the Engadine Valley. – (*Abstracter's notes*: (1) The German dragonfly folk name "Augenstecher" is based on the same superstition; – (2) According to personal information received from the Author, the "Engadiner" is now living at Celerina, Upper Engadine, but was born in Poschiavo, one of the Cisalpine Swiss valleys; hence his statement may apply to his native area rather than to the Engadine; – (3) Though not rich, the odon. fauna of the Engadine is greatly interesting as a characteristic alpine fauna (alt. 1100-3000 m). For a reference to the current research on the subject cf. *OA* No. 1733).

(1871) SINGH, A. & M. PRASAD, 1976. Odonata of Doon Valley – 1. Anisoptera. Rec. zool. Surv. India 70: 21-38. – (*Northern Reg. Stn, Zool. Surv. India, 13 Subhas Rd., Dehra Dun-248001, India*).
42 spp. are listed for the Doon Valley, Uttar Pradesh, India, along with the usual locality data, measurements, and, for most spp., brief descriptive notes and notes on general range. – (For pt. 2, cf. *OA* No. 1868).

(1872) TARANOVA, V.M., 1976. Zhiznenny cikl Sympetrum vulgatum L. (Odonata). [Life history of Sympetrum vulgatum L. (Odonata)]. Inf. Byull. Biol. vnutr. Vod 1976 (32): 33-36. (Russian). – (*Inst. Inland Water Biol., USSR Acad. Sci., USSR-152742 Borok, Nekouz, Yaroslavl*).
The life history (10 larval stages) is described on the basis of field observations, carried out in the surroundings of the village of Borok, Yaroslavl prov., USSR). Figures of the development of the leg, antenna and labium are also provided.

(1873) TARANOVA, V.M., 1976. Razvitie i rost nekotoryh vidov strekoz (Odonata). [Development and growth of some dragonfly species (Odonata)]. Biol. Sist. presnovod. Bespozvon. 34 (37): 88-102. (Russian). – (*Inst. Inland Water Biol., USSR Acad. Sci., USSR 152742 Borok, Nekouz, Yaroslavl*).
The spp. dealt with are Lestes dryas, L. sponsa and Coenagrion hastulatum. (For the latter cf. also *OA* No. 1932). A comparison of the life histories of the Lestes spp. to that of C. hastulatum is also made.

## 1977

(1874) (Anonymous), 1977. Dragonfly. Linn's Stamp News 50 (38): 1. (Issue of Sept. 19, 1977).
[Verbatim text]: Japan features the red dragonfly (Boninthemis insularis) as the subject of its 17th Nature Conservation Series on this 50-yen stamp introduced on Sept. 14, 1977. Produced in four-color photogravure in 30 million copies, the design of Motoharu Morita shows a "shimaakane" on a tree branch. (A photograph of the stamp is also provided). – (*Abstracter's note*: B. insularis is endemic to the Bonin Islands, Japan, and is protected by law).

(1875) (Anonymous), 1977. Mosquitoes lose to dragonflies. Extra, New York 1 (7): 4. – (*Publishers' address: Mr. Ralph Ginzburg, Avant-Garde Media Inc., 1775 Broadway, New York, N.Y. 10019, USA*).
The verbatim text of this news item, published in a monthly magazine runs as follows: "Wells, Maine [USA] – The Chamber of Commerce [P.O.Box 356, Wells, Maine 04090, USA] imported dragonfly larvae again this year to eat the local mosquitoes. The town first used baby dragonflies last year after voters rejected a $ 6,000 request to hire a helicopter to spray the mosquitoes. Instead

nearly 200 residents spent $ 2,400 to place 11,500 dragonfly larvae in the waters in which the mosquitoes breed. A survey of 40 of the persons who bought dragonflies last year indicated success. Townspeople found that the dragonflies not only cost less than spraying, but they fight mosquitoes all summer. The mosquitoes often become immune to spraying ..." (Cf. also *OA* Nos. 1863, 1910, 1912).

(1876) (Anonymous), 1977. Pollution research turns up new bugs. The Messenger-Clemson, S.C., issue of Sept. 7, 1977, p. 8 A.
A brief newspaper article on the scope and preliminary results of the cataloguing of aquatic insect populations in streams of South Carolina, United States, carried out by the Clemson University Staff, Richard Fox, Paul Carlson and Tina White. The aim of the project is to determine whether or not certain spp. are hurt seriously by a change in their environment. In the course of the inventarisation several odon. spp. were added to the state list. One of these is Plathemis lydia, whose photograph (but without the sp. name) appears in the article. – (*Abstracter's note*: Details on the project could be obtained from Mr. P.H. Carlson, for address cf. *OA* No. 1826).

(1877) ARMETT-KIBEL, C., I.A. MEINERTZ-HAGEN & J.E. DOWLING, 1977. Cellular and synaptic organization in the lamina of the dragon-fly Sympetrum rubicundulum. Proc. R. Soc. (B) 196 (1125): 385-413, pls. 1-6. – (*Dept. Biol., Univ. Massachusetts, Harbor Campus, Boston, Mass. 02125, USA*).
The cellular and synaptic organization within the cartridges of the lamina were analyzed by light microscopy and EM. The ommatidium contains 8 retinular (photoreceptor) cells all of which project to a single cartridge in the lamina. Of the retinular cells, 6 terminate within the cartridges of the lamina (retinular terminals R 1-5 and R 8) and 2 pass through to the medulla (long visual fibers R 6 and R 7). The retinular terminals are arranged in pairs, which are matched in size, position and length. One pair terminates in the distal portion of the cartridge, while the remaining 2 pairs terminate at its proximal border. The cartridge also includes 2 large and 2 small axons of monopolar cells (M I, M II and M III, M IV, respectively) and several unidentified minor profiles. The spatial arrangement of the main elements within a cartridge is constant through most of the depth of the lamina. All synapses within the cartridges contain similar elongate presynaptic specializations and have either a dyadic or triadic arrangement of postsynaptic elements. Analyses of serial sections reveal 3 principal types of synaptic configurations: A, a triadic synapse in which retinular cells (R 1-5 and R 8) are presynaptic to monopolar elements, usually with M II as the central postsynaptic process and M I as the lateral processes; B, found only in the proximal lamina, is a dyadic feedback synapse from M I upon 1 pair of retinular terminals (R 5 and R 8); and C, a triadic synapse in which the long visual fiber (R 7) is presynaptic to M II, the central postsynaptic element. Each cell type in the lamina is involved in specific synaptic connections and this results in different synaptic relationships for the 2 large output axons of the lamina, M I and M II. (Authors).

(1878) BELFIORE, C., C. UTZERI, E. FALCHETTI & G. CARCHINI, 1977. Enallagma cyathigerum (Charp.) in biotopi di media e bassa quota dell'Italia centromeridionale e altre catture di Odonati. Boll. Ass. romana Ent. 31 [1976] (1/4): 1-4. (With Engl. s.). – (*Ist. Zool., Univ. Roma, Città Universitaria, I-00100 Roma*).
Medium- and low altitude records of E. cyathigerum are reported from the Abruzzo, Basilicata and Puglia regions, Italy. In Lazio and Puglia the sp. has not been previously recorded. For 8 further spp. regionally new and/or otherwise interesting records are also listed.

(1879) BELYSHEV, B.F., 1977. On quantitative discrepancies in odonatofaunae in pri-atlantic countries of Holarctic region of Boreal faunistic kingdom and probable reasons of this phenomenon. Izv. sib. Otdel. Akad. Nauk SSSR (Biol., 2) 1977 (10): 87-89, Russian abstract on p. 166). (Russian, with Engl. s.). – *(Inst. Biol., Siberian Sect. USSR Acad. Sci., Ul. Frunse 11, USSR-630091 Novosibirsk).*
It is suggested that the high number of genera and spp. in Canada, in comparison to that in Europe, is due to specific influence of Pleistocene glaciations rather than to higher degree of speciation in the Nearctic region. While many of the odon. taxa disappeared in Europe during the Pleistocene, a large part of the Canadian odon. fauna has survived the glaciations.

(1880) BUISSINK, F. & M. BASTIN, 1977. Een libel wordt pas gelukkig op haar oude dag. [A dragonfly is happy not until its old age]. Libelle (Haarlem, Netherlands) 1977 (35): 54-55. (Dutch). – *(Duindoorn Plantsoen 36, Schoorl. NL).*
A popular, very pleasantly readable article on dragonflies, their biology, life history and behaviour, published in a well-known Dutch ladies magazine. It is particularly suitable reading for young children. – (For another similar dragonfly article in the same magazine cf. *OA* No. 196).

(1881) BURKHARDT, D., 1977. On the vision of insects. J. comp Physiol. (A) 120: 33-50. – *(Inst. Zool., Univ. Regensburg, Universitätsstr. 31, D-8400 Regensburg, GFR).*
The resolving power of insect eyes in both time and space, as well as the perception of wavelength and plane of polarization, have been the topics of investigations, employing diverse methods. Here some milestones on the path to our present knowledge are sketched and a comprehensive bibliography on the subject is given. References to Odon. are made here and there.

(1882) CALOW, P., 1977. Conversion efficiencies in heterotrophic organisms. Biol. Rev. 52 (3): 385-409. – *(Dept. Zool., Univ. Glasgow, Glasgow G12 8QQ, UK).*
The Odon. are considered on the basis of earlier publications, viz. Lestes sponsa (cf. *OA* No. 500), and Pyrrhosoma nymphula (cf. *OA* No. 59).

(1883) COOKE, N.H., 1977. Of the Society's representative on the Joint Committee for the Conservation of British Insects. Bull. amat. ent. Soc. 36 (316): 107-109. – *(8 Gerard Rd., Barnes, London SW13 9RG, UK).*
The following information, on p. 108, is of odonatol. interest: (1) "Dr. Chelmick has completed an important survey of dragonflies in Scotland for Nature Conservancy", and (2) "A rare dragonfly Ceriagrion tenellum has been introduced into Wood Walton Fen". (For other odonatol. activities of the Committee cf. *OA* No. 845).

(1884) CORDULIA. Cahier d'amateurs. Published by the Collège Bourget, Rigaud, Quebec, Canada; edited by R. Hutchinson & A. Larochelle, Collège Bourget. Vol. 3, No. 2 (June, 1977). (French and Engl., most larger papers with s's in Engl.). – Annual subscription for 1977 (4 issues): Can. $3.– (Canada, USA), Can. $4.– (others). – *(c/o R. Hutchinson, Collège Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
*Hutchinson, R.*: Histoire naturelle de Pantala flavescens Fabricius (Anisoptera: Libellulidae); – *Legault, J.* (62 Place Le Roy, Repentigny, Que., CA): Liste de contrôle préliminaire des Odonates de la région du Mont Pinacle, sud du Québec; – *Larochelle, A. & R. Hutchinson* (Coll. Bourget, C.P. 1000, Rigaud, Que. JOP 1PO, CA): Publications available (incl. the 1977 Suppl. of Cordulia, Nos. 3 and 4, i.e. "Catalogue des Libellules du Québec", and "Manuel d'identification des Libellules du Québec", at the price of Can. $3.– and 6.– resp.); – *Hutchinson, R.*: Préservation des couleurs des Odonates adultes en collection (Première note); –

*Larochelle, A.*: Les Amphibiens et Reptiles comme prédateurs des Odonates (Première note bibliographique) [Giving annotations of 26 references on the subject].

(1885) DIEHL, D. & M. DIEHL, 1977. Zur biologischen Charakteristik der verschiedenartigen Gewässer in der Schellbruch-Niederung. Ber. Ver. "Natur Heimat" u. naturhist. Mus. Lübeck 1977 (15): 7-25. – *(Naturhist. Mus. Lübeck, Mühlendamm 1-3, D-2400 Lübeck, GFR).*
Various water types of the Schellbruch Valley, Lübeck, Schleswig-Holstein, German Federal Republic, are biologically characterized. On p. 16, 5 odon. spp. are considered with reference to the paper listed in *OA* No. 1082.

(1886) DUMONT, H.J., 1977. A review of the dragonfly fauna of Turkey and adjacent mediterranean islands (Insecta Odonata). Bull. Ann. Soc. r. belge Ent. 113: 119-171. (With Fr. s.). – *(Inst. Zool., Univ. Ghent, Ledeganckstr. 35, B-9000 Ghent).*
This is a comprehensive review of all that is known on the odon. fauna of Turkey (100 spp.). It is based on a critical study of literature (bibliography given is probably complete), and on extensive own collections (1972, 1973, 1975) supplemented by unpublished material of diverse provenience. Orthetrum ransonetti Br., reported earlier from Eastern Anatolia is, for the time being, omitted from the list. Onychogomphus forcipatus unguiculatus (Vander L., 1820) and O. f. cypricus Schmidt, 1954 are synonymized. Of particular importance are considerations on status, speciation and evolutionary trends given for some taxa. Some suggestions for future research are added.

(1887) DUMONT, H.J., 1977. Odonata from Mali, West Africa (Insecta). Rev. Zool. afr. 91 (3): 573-586. – *(Inst. Zool., Univ. Ghent. Ledeganckstraat 35, B-9000 Ghent).*
49 spp. from the area of Bamako and the northern fringe of the River Niger delta lakes and swamps are reported, bringing the total number of spp. known from Mali up to near 100. A sharp contrast exists between the areas N and S of the River Niger. The swamps in the northern area of Tanda-Niafounké and Goundam-Tombouctou are extremely poor in spp. (about 10), and only 1 ubiquitous zygopteran (Ischnura senegalensis) was found; the faunal richness is restricted to the southern areas, where permanent or near-permanent running water exists. An interesting exception is the Sahel canal between Markala and Dyabali-Sokolo, which allows a richer fauna to penetrate the northern Sahel area, but in a strictly local way. The 2 Ethiopian relict Zygoptera now known from various gueltas in the Mauretanian Sahara (Pseudagrion whellani, Agriocnemis zerafica) do not occur in the northern delta, apparently for ecological reasons (astatic, hypertrophic environments unfit for these spp.). It is concluded that this chorological picture needs to be completed with data from NW-Mali. The greatest part of this collection is deposited in the Musée Royal de l'Afrique Centrale, Tervuren, Belgium. (Author).

(1888) ETIENNE, A.S., 1977. The control of two antagonistic locomotor activities in a predatory insect. Behaviour 60 (1/2): 122-178. (With German s.). – *(F.P.S.E., Fac. Sci., Univ. Genève, Palais Wilson, CH-1200 Genève).*
Aeshna cyanea larvae are ambush hunters which, however, may readily pursue an escaping prey. Target tracking at first consists of lively swimming movements, and later of rapidly decelerating walking and creeping movements. If a dummy prey is removed after having been presented for 40-80 s, the insect (1) freezes and simultaneously looks in the direction where the prey stimulus has just disappeared. (2) Then it steps backwards repeatedly, and finally (3) it changes its body orientation by a series of (clockwise and/or counterclockwise) turning movements. Experiments in which the duration of the pre-

sentation of a moving dummy prey was extended from 5-80 s showed that the longer the insect spends tracking, the more probable and the more intense its subsequent backing-turning responses, and the sooner these responses occur after the disappearance of the prey. The occurrence and intensity of the backing-turning pattern seems to be more closely related to the insect's preceding tracking time than to the simultaneously covered tracking distance, which depends on the tracking speed. Intense backing-turning responses were not only primed by an extended presentation of the dummy, but also by a series of discontinuous brief presentations. Short tracking spells therefore exert a cumulative after-effect upon backing-turning. A model is proposed according to which the performance of tracking exerts a negative feedback effect upon itself and at the same time progressively lowers the threshold of the mechanism controlling backing-turning. Therefore, after a prolonged pursuit, backing-turning starts to interfere with tracking. As long as the prey stimulus remains present, fixation and approach reactions alternate with backing and turning away from the prey. If the prey, however, is completely removed, positive appetitive behaviour towards the prey can no longer compete with backing-turning, and the stereotyped pattern can appear in its full intensity. On the other hand, tracking itself seems to be facilitated by the previous performance of backing-turning. From a functional point of view, the stereotyped pattern of locomotion may be conceived as a device (a) to stop the larva's unsuccessful attempts to reach a rapidly escaping prey, and (b) to diminish the probability that the insect may re-encounter this prey after its momentary disappearance.

(1889) ETIENNE, A.S., 1977. A descriptive and functional analysis of a stereotyped pattern of locomotion after target tracking in a predatory insect. Anim Behav. 25 (2): 429-446. – (*F.P.S.E., Fac. Sci., Univ. Genève, Palais Wilson, CH-1200 Genève*).
Aeshna cyanea larvae react to the disappearance of a moving prey with backtracking and turning movements, the frequency and intensity of which are directly proportional to the insect's previous tracking time. These movements also appear during a prolonged presentation of a prey, so that the insect will back and turn away from this stimulus. Backing-turning is shown in the same form and under identical conditions by larvae of the last 4 instars and therefore seems to play a consistent role in the insect's predatory life. The occurrence of this pattern of locomotion in a variety of experimental and semi-natural situations suggested that it fulfils the following functions: (1) to stop the larva's unsuccessful attempts to catch a rapidly escaping prey and (2) to diminish the probability of further encounters with an unattainable prey after its momentary disappearance.

(1890) FRANKENHUYZEN, K. van, 1977. The dragonflies of the Lonneker Meer. Anax 9 (1): 3-9. (Dutch, with Engl. s.). – (*Jagerskamp 113, Wageningen, NL*).
The results of the 1973-1974 odon. survey (17 spp.) of the Lonneker Meer (= Lake), Overijssel prov., Netherlands, are presented. A peculiar feature of the lake is the occurrence of the trematode Prosthogonimus ovatus, the hosts of which are Cordulia aenea, the snail Bythinia tentaculata, and the Black Tern, Chlidonias niger. Field observations on the behaviour of some spp. are also briefly related.

(1891) FRANTSEVICH, L. & P. MOKRUSHOV, 1977. Jittery movement fibers (JMF) in dragonfly nymphs: stimulus-surround interaction. J. comp. Physiol. (A) 120 (2): 203-214. – (*Inst. Zool., Acad. Sci. Ukrain. SSR, Ul. Lenina 15, USSR-252000 Kiev-30*).
(1) JFMs in the optic lobes of the larvae of Aeshna cyanea, A. grandis and A. coluberculus discharge at a rate of 150-250 spikes upon the movement of single black targets

in a large receptive field. – (2) Expansion of a dark convex edge (approaching of a black disc) excites the JMF more strongly than the contraction of a concave one (withdrawal of the white disc). – (3) The response to steady movement consists of high-rate bursts separated by pauses. The distribution of bursts across the receptive field depends dynamically upon the initial point direction, and velocity of movement. – (4) JMF habituates to repeated movement along the same trajectory, recovery takes several seconds. – (5) Movement of a complex pattern in one part of the receptive field inhibits the response to a single target in another part of the field. Flickers with the same contrast frequency produce similar inhibitory action. The after effect of spreading inhibition takes several seconds. – (6) Probably the local habituation and spreading inhibition share the common source of input signals: local phasic-tonic off-discharges. The dissimilarity of spatial properties in these processes is discussed. (Authors).

(1892) GREEN, L.F.B., 1977. Aspects of the respiratory and excretory physiology of the nymph of Uropetala carovei (Odonata: Petaluridae). N.Z.Jl Zool. 4 (1): 39-43. – *(Dept. Zool., Univ. Auckland, Private Bag, Auckland, NZ).*
Respiration and excretion were investigated experimentally in the semi-terrestrial larva of Uropetala carovei. The rate of oxygen uptake in large larvae is only slightly less in air than in water, but in smaller larvae it is markedly less. In both water and air the oxygen uptake of large larvae at 25°C is more than double its value at 15°C; that of small larvae barely increases in air but doubles in water. The principal nitrogenous excretory product of the larvae is ammonia (mean: 91% of total N). Urea and uric acid contribute respectively only 6% and 3% of total N excretion. Burrow water contains ammonia and urea, but no detectable uric acid; similar results were obtained from adjacent stream water. The significance of these results is discussed with reference to the semi-terrestrial mode of life of the larvae. (Author).

(1893) HORRIDGE, G.A., 1977. The compound eye of insects. Scient. Am. 237 (1): 108-120, 154 (References), biographic note on the author on p. 20. – *(Dept. Zool., Univ. Cambridge, Cambridge, UK).*
The principal aim of the paper is to demonstrate that the size, pattern and aiming of the ommatidia are determined by the requirements of the insect's way of life. In spite of the general nature, emphasis is on Odon.; in particular, reference is made to Austrogomphus, Diplacodes nematodes and Zyxomma.

(1894) [HUTCHINSON, R.], 1977. Publications importantes pour l'étude des libellules du Québec. Fabreries 3 (2): 27-28. – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
Bibliographic references are listed of a number of publications dealing with the odon. fauna of Quebec, Canada, or considered of importance for the study of the latter.

(1895) HUTCHINSON, R., 1977. Notes sur les Ophiogomphus du Québec. Fabreries 3(4): 54-56. – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
There are 6 spp. pertaining to this genus in Quebec, Canada, viz. anomalus Harvey, aspersus Morse, carolus Needh., colubrinus Sel., mainensis Packard, and rupinsulensis Walsh. Structural, biological, and ecological features of the genus are briefly outlined.

(1896) HUTCHINSON, R., 1977. Les Agriidae (Zygoptera) du Québec. Fabreries 3 (5): 74-78. – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
A key and brief characterizations of the Hetaerinidae and Calopterygidae spp. known to occur in Quebec, Canada, viz. Hetaerina americana, Calopteryx aequabilis, amata, and maculata are presented.

(1897) HUTCHINSON, R., 1977. Les mâles de certaines espèces de libellules surveillent la ponte. Fabreries 3 (6): 108. – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
♂ accompanying ♀ during oviposition was observed in Calopteryx maculata, Libellula quadrimaculata and Plathemis lydia. Observations were made at various localities in Quebec, Canada.

(1898) HUTCHINSON, R., 1977. Cordulia shurtleffi Scudder (Odonata: Corduliidae) au Québec. Fabreries 3 (7): 119-122. – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
A brief summary is presented of what is known on this sp., with special reference to original observations in Quebec, Canada.

(1899) [HUTCHINSON, R.], 1977. Survol de quelques méthodes pour préserver les couleurs des libellules. Fabreries 3 (7): 125-127. (With Engl. s.). – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
A synopsis is given of 4 methods for colour preservation in dragonfly specimens. Among these, a freeze-drying method is suggested e.g. with an EF2 Freeze Dryer, produced by Edwards High Vacuum (Can) Ltd., 430 South Service Rd. West, Oakville, Canada.

(1900) HUTCHINSON, R., 1977. Aperçu sur la biologie de Lestes vigilax Hagen. Fabreries 3 (7): 128. – *(Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
Some biological and behavioural features of this sp. are briefly related.

(1901) HUTCHINSON, R. & A. LAROCHELLE, 1977. Catalogue des Libellules du Québec. Cordulia (Suppl.) 3, 45 pp. (With Engl. s.). – Price: Can $3.–. – *(Collège Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA).*
133 spp. known to occur in the Province of Quebec, Canada, are catalogued. The catalogue is based on literature records (bibliography of 154 titles, 1895-1977 partim), and on unpublished material originating from 247 localities. For each sp. the following data are given: (1) Quebec distribution (locality list per county, northernmost and southernmost limit), (2) phenology, (3) notes on habitats. Particularly well explored is the fauna of southern Quebec, mostly that of the following regions: Hull (Gatineau Co.), Rigaud (Vaudreuil Co.), Mt. Tremblant Park (Montcalm Co.), St. Nérée (Bellechasse Co.), La Ferme (Abitibi Co.) and Cape Jaseur (Chicoutimi Co.). – *(Abstracter's note*: The two Authors should be warmly congratulated on the compilation of this extremely useful work, which will certainly be a cornerstone of dragonfly faunistics in Quebec for many years to come).

(1902) JURZITZA, G., 1977. Die Libellen. Lebensweise und Entwicklung. Biologische Lichtbildreihe D 22149, V-DIA-Verlag, Heidelberg. (With an explanatory text booklet, 11 pp.). – (Author's address: *Bot. Inst. I, Univ. Karlsruhe, Kaiserstr. 12, D-75 Karlsruhe, GFR*; – Publishers' address: *V-DIA-Verlag, Postfach 105 980, D-69 Heidelberg-1, GFR).*
This is a series of 12 colour slides on biology and life-history of dragonflies for classroom use. The explanatory text gives a brief general introduction to the Order, and detailed comments on each slide. – *(Abstracter's note*: Due to an editorial error, the names of 2 spp. should be corrected, viz. No. 4 is Libellula quadrimaculata, and No. 9 is Platycnemis pennipes).

(1903) KEEN, D., 1977. Collecting and studying dragonflies (Odonata). Amat. Ent. Soc. Leaflet No. 12, IV + 24 pp., 4 pp. Appendix excl. – Price: £1.60. – *(Corbiere, 3 Woodbourne, Farnham, Surrey, UK).*
The booklet is divided into the following chapters: "Introduction", "Habitats", "Life-history", "Collecting equipment", "Rearing – the early stages", "Killing", "Pinning", "Setting", "Arranging the collection", "Interesting studies", "Books

for further reading" and "Bibliography". The 2 added appendages (one of these on a separate sheet) are giving "A code for insect collecting" and "A check-list of the British Odonata". The booklet is intended for amateur collectors and will be a useful introduction into the field and "laboratory" work for the lower grade univ. students as well. It can be ordered from the Society's Publication Agent, L. Christie, 137 Gleneldon Rd., Streatham, London, S.W. 16, UK).

(1904) KINGSBURY, P.D. & W.J.G. BEVERIDGE, 1977. A simple bubbler for sorting bottom fauna samples by elutriation. Can. Ent. 109 (9): 1265-1268. – (*Chemical Control Res. Inst., Environment Canada, Ottawa KIA OW3, CA*).
A simple bubbler for separating insects and other macroinvertebrates from aquatic bottom samples by elutriation is described. The apparatus is simple in construction and use and separated all groups of aquatic organisms from stream bottom samples with about 99% overall efficiency. As far as Odon. are concerned, the efficiency is 100%.

(1905) LAROCHELLE, A., 1977. Signification des termes pour désigner les genres de libellules. Fabreries 3 (2): 35-36. (With Engl. s.). – (*Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA*).
A vocabulary of French meanings of the Latin terms used in the generic names of the Odon. of Quebec, Canada, is given.

(1906) LAROCHELLE, A., 1977. Thomas Say (1787-1834). Fabreries 3 (3): 37-38. (With Engl. s.). – (*Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA*).
A brief appreciation of life and work of the early American entomologist and author of several odon. spp. are given, without his bibliography.

(1907) LAROCHELLE, A., 1977. James G. Needham (1868-1957). Fabreries 3 (7): 109-110. (With Engl. s.). – (*Coll. Bourget, C.P. 1000, Rigaud, Que., JOP 1PO, CA*).
A brief appreciation of life and work of this American aquatic entomologist and well-known odonatologist are given, without his bibliography.

(1908) LEBEUF, L. & J.-G. PILON, 1977. Cycle biologique d'Enallagma boreale Sélys (Odonata: Coenagrionidae), en milieu conditionné. Ann. Soc. ent. Québec 22 (2): 78-118. – (With Engl. s.). – (*Dép. Sci. biol., Univ. Montréal, C.P. 6128, Montréal-101, Que., H3C 3J7, CA*).
The morphology of the different larval instars and the growth of specific morphological structures in relation to different instar stages are described in detail. The observations are based on laboratory reared material.

(1909) LEGRAND, J., 1977. Odonates. *In*: P.-C. Rougeot Ed., Missions entomologiques en Éthiopie 1973-1975, Fasc. 1. Mém. Mus. natn. Hist. nat., Paris (N.S.) (A) 105: 121-122. – (*Lab. Ent., Mus. natn. Hist. nat., 45 rue Buffon, F-75005 Paris*).
An annotated list is given of 9 spp., referable to 4 families, collected in Ethiopia (3) and Kenya (6).

(1910) LEWANDO, I., 1977. Wells Chamber welcomes "mosquito hawks". York County Coast Star, Maine, issue of Apr. 6, 1977, 1 p. – (*c/o "Dragonflies vs. Mosquitoes Project", Chamber of Commerce, P.O.Box 356, Wells, Maine 04090, USA*).
In 1976 the Wells Chamber of Commerce, Wells, Maine, USA, organized a campaign to control the mosquitoes by releasing dragonfly larvae; cf. *OA* No. 1863. The venture has been a great success, hence it has been repeated, on a larger scale, in 1977; cf. *OA* Nos. 1875, 1912. The present newspaper article relates the results of 1976, and gives details for the execution of the 1977 project. – (*Abstracter's note*: The larvae were provided by the Connecticut Valley Biological Supply Co., Valley Rd., Southampton, Mass. 01073,

USA).

(1911) MARSHALL, A.G. & R.M. GAMBLES, 1977. Odonata from the Guinea Savanna Zone in Ghana. J. Zool., Lond. 183 (2): 177-187. – *(Dept. Zool., Univ. Aberdeen, Aberdeen, Scotland, UK).*
An account is given of the Odon. collected on 2 visits to Mole National Park, Ghana (1974, 1975), totalling 46 spp., with brief notes on their habits and ecology, and these are compared with similar observations, published and unpublished, from corresponding latitudes in the Ivory Coast and Nigeria. – An appendix, with figures, notes the differences between Orthetrum brachiale (Pal. de Beauv. 1805) and O. kalai Longfield 1936, and between Ceriagrion suave Ris 1921 and C.moorei Longfield 1952, species not readily distinguishable with the available literature, and adds brief notes on the other West African Ceriagrion spp. not yet found in the reserve. (Gambles).

(1912) MARSTERS, S., 1977. Nasson to launch 3-year study. Wells looks beyond dragonfly project. York County Coast Star, Maine, issue of May 11, 1977, pp. 1, 16. – *(Author's address unknown,* address correspondence to Mr. B. Marriner, former President of the Chamber of Commerce, P.O.Box 356, Wells, Maine 04090, USA).
The President of the Nasson College, Dr. W. Graham Cole, is preparing to launch a 3-yr study of dragonfly control techniques. The research will be carried out through the College's Environmental Studies Dept., with funding from the National Science Foundation, or the Environmental Protection Agency. Research will be done by students and faculty under direction of Mr. Larry J. Kelts, a graduate of the Univ. of New Hampshire. The idea of the project was born after the success of the 1976 campaign of controlling mosquitoes by releasing great numbers of dragonfly larvae in the infested areas of the surroundings of Wells, Maine, USA. (Cf. also *OA* Nos. 1863, 1875, 1910).

(1913) MATHAVAN, S. & T.J. PANDIAN, 1977. Patterns of emergence, import of egg energy and energy export via emerging dragonfly populations in a tropical pond. Hydrobiologia 54 (3): 257-272. – *(Zool. Dept., Madurai Univ. P.G. Cent., Arulmingu Palaniandavar Arts Coll., Palni 624601, Tamil Nadu, India).*
Brachythemis contaminata, Orthetrum sabina, Diplacodes trivialis, Pantala flavescens and Trithemis festiva in the tropical pond Idumban, Palni, India, emerged from Nov. to Apr. (1973, 1974, 1975). The date of initiation of emergence of all spp. was synchronized and tied to the events following the north west monsoon in Nov. During the seasons '73-74 and '74-75, as many as 10,693 and 7,910 adults emerged; ♀♀ outnumbered the ♂♂ in all 5 spp.; ♂ populations of B. contaminata, O. sabina, D. trivialis, P. flavescens and T. festiva represented 47, 48, 46, 49 and 44% during the '73-74 season, 48, 48, 46, 46 and 49% during the '74-75 season, respectively. The adult dragonflies equivalent to 2,442 Kcal emerged from the pond during the season '73-74. Of this, B. contaminata contributed 30%, D. trivialis 7%, O. sabina 12%, P. flavescens 23% and T. festiva 28%. For the season '74-75, the dragonflies equivalent to 1,602 Kcal emerged from the pond and the contribution was in the following order: B. contaminata: 31%, O. sabina: 8%, D. trivialis: 13%, P. flavescens: 27% and T. festiva: 21%. Import of energy due to inoculation of B. contaminata eggs into the pond Idumban was 73 Kcal/yr and the output from the pond via emerging B. contaminata population alone amounted to 620 Kcal/yr; the net energy loss from the pond was 548 Kcal/yr. During either season, as much as 99.7% of B. contaminata eggs failed to attain adulthood due to infertility (5.8%), unhatchability (12%) and predation during the egg and larval stages (82.5%). The GPP of the pond was 26,073 Kcal/$m^2$/yr, and output of energy

through emergence of 5 spp. amounted to 0.0045 Kcal/m²/yr, i.e. 0.00002% of the GPP is lost through the emerging carnivorous Odon.; comparable values available for the emerging detritivorous chironomids, herbivorous dipterans and mayflies fall between 1.0 and 0.1%. (Authors).

(1914) McCREERY, D.B., 1977. Two types of electroreceptive lateral lemniscal neurons of the lateral line lobe of the catfish Ictalurus nebulosus; connections from the lateral line nerve and steady-state frequency response characteristics. J. comp. Physiol. (A) 113 (3): 317-339. – (*Dept. Neurosurg., Med. Sch., Univ. Minn., Minneapolis, Minn. 55455, USA*).
A Fourier analysis of the potentials recorded from a small fish, Lepomis macrochirus, and from a Libellula sp. indicates that there is a good match between their frequency spectra and the steady-state bandpass characteristics of the lemniscal units.

(1915) MIZUTA, K., N. UBUKATA & M. HISADA, 1977. The world of dragonflies. Anima, Tokyo 7 (52): 5-43. (Japanese, with a brief Engl. s.). – (*Hiroshima Agric. Coll., Saijo-cho, Higashi-Hiroshima, Hiroshima Pref., 724, JA*).
A general picture of the order is presented along with photographs by a number of well known Japanese dragonfly photographers (S. Ishida, K. Ueno, A. Sato and others). The authors invited collaboration of several well known Japanese odonatologists, hence the paper gives a popular but authoritative and well organized, rounded-off account on the Japanese dragonflies. The status of the Japanese fauna is estimated at approx. 180 spp. For some of these the vernacular names are also provided. The Japanese name for the larval tombo is "yago". Of particular interest is a 2-page aquarel of the biotopes of the Japanese spp., composed by S. Ishida and executed by T. Okumura. A chapter on the flying techniques is contributed by M. Hisada, and the phylogeny is dealt with by S. Asahina. The small "monograph" closes with an account on old Japanese dragonfly paintings (by H. Hisagawa), giving black-and-white reproductions of the 18th and 19th century illustrations by Shigekata Hosokawa and Masatami Hotta respectively. The paper contains a huge amount of well organized data on various aspects of ecology and behaviour. In all these features it is quite unique in this kind of odonatol. literature. – (*Abstracter's note*: Engl. texts of figure captions and page-to-page summaries, prepared by K. Inoue, are available from the Editors of Odonatologica. – The journal issue could be ordered from the Publishers: "Heibonsha", Chiyoda-ku, Tokyo, JA. – In view of the old dragonfly culture and tradition, well organized odonatological research, and excellent popular odonatological literature in Japan, it is surprizing that a modern, up-to-date technical treatment of the Japanese odon. fauna is still lacking).

(1916) NIELSEN, M.C., 1977. Invertebrate predators of Michigan Lepidoptera. Great Lakes Entomol. 10 (3): 113-118. – (*3415 Overlea Drive, Lansing, Mich. 48917, USA*).
39 observations were made of predation on adult Lepidoptera by 4 invertebrate groups: Araneae, Diptera, Hemiptera, Odon. The observations for Odon. were: Erynnis juvenalis (Fabr.) by Gomphus fraternus (Say); Lethe eurydice (Hohansson) by Erythemis simplicicollis (Say); Oeneis jutta ascerta Masters & Sorensen by Gomphus fraternus (Say); Nephelodes emmedonia (Cramer) by Aeshna umbrosa Walker; Eufidonia discospilata Walker by Tetragoneuria spinigera Sel. All Odon. were ♀ individuals.

(1917) PACIONI, G., 1977. Interessanti funghi entomogeni italiani: I. Paecilomyces fumoso-roseus, Cordyceps memorabilis. G. bot. ital. 111 (5): 145-151. (With Engl. s.). – (*Ist. e Orto Bot., Univ. L'Aquila,*

*L'Aquila, Italy*).
P. fumoso-roseus (Wize) (Deuteromycetes, Moniliales), isolated from an adult specimen of Ceriagrion tenellum, taken at Castelporziano nr. Rome, Italy (Sept. 22, 1972) is redescribed, and a fresh drawing of it is provided. This is the same material as described in the paper listed in *OA* No. 1246.

(1918) PAULSON, D.R. & R.W. GARRISON, 1977. A list and new distributional records of Pacific coast Odonata. Pan-Pac. Ent. 53 (2): 147-160. – (*Burke Mus., Univ. Washington, Seattle, Wash. 98195, USA*).
The paper adds to the knowledge of the distribution of 55 of the 113 spp. (49%) of Odon. that occur in Washington, Oregon and California. A check-list of the fauna of each of these states is also given, and 12 spp. that have been reported in the literature from California without having been convincingly documented are discussed. Of particular interest is the discussion on recent changes in the odon. fauna of the states considered. Enallagma civile, Libellula luctuosa, Pantala hymenaea and Tramea lacerata have spread out in the Pacific states since the time of Kennedy (1915, 1917). The group including Anomalagrion hastatum, Enallagma basidens, Gomphus plagiatus and Macrodiplax balteata is associated with irrigation water, and these spp. may be present because of the extensive modification of the Colorado River valley. Many spp. have become rare or extinct locally in the Pacific states because of human activities (damming, pollution, introduction of predatory fish), but no evidence of any severe contractions of range of any sp. in this region was found. Although some additional spp. might occur in the border areas (northern Washington, southern and eastern California), the present list is believed reasonably complete.

(1919) PAVLOVEC, R., 1977. Kačji pastirji na ekslibrisih. [Dragonfly book plates]. Proteus, Ljubljana 39 (8): 318. (Slovene). – (*Trubarjeva c. 14, YU-61000 Ljubljana*).
A brief note, written on the occasion of the 25th anniversary of Prof. Clarence Hamilton Kennedy's death (25.VI.1879-6. VI.1952), showing his 3 dragonfly book plates (exlibris), entitled "Out of the night Triacanthagyna", "This cockeyed world" and "3 a.m., Meganeuria moneyi". A brief outline of Dr. Kennedy's biography is also given, and reference is made to 2 of his unpublished letters to Dr. M.A. Lieftinck (Nov. 22, 1949 and Sept. 27, 1950).

(1920) PERRY, T.E., 1977. Boyeria grafiana, a rare Ohio dragonfly (Odonata: Aeshnidae). Great Lakes Entomol. 10 (3): 159-161. – (*Chagrin River Rd., Gates Mills, Ohio 44040, USA*).
B. grafiana is recorded as a resident Ohio sp. It occurs in Kentucky, Massachusetts, New Hampshire, New York, North Carolina, Ohio, Pennsylvania, Tennessee and Virginia (all United States), and in New Brunswick, Nova Scotia, Ontario and Quebec (all Canada). Habitats of B. grafiana (photograph) and B. vinosa are contrasted.

(1921) PINHEY, E.C.G., 1977. Report on Falcon College Expedition: December 1975. Odonata. Falcon 6 (2): 72-73. – (*Natn. Mus., P.O.B. 240, Bulawayo, Rhodesia*).
List of 33 spp. collected on this expedition in Northern Transvaal, South African Republic, by F.C. de Moor; furthest southern record of Lestes simulans Martin; unusual abundance of Agriocnemis pinheyi Balinsky in Mosdene farm swamp. (Author).

(1922) POPOVA, A.N., 1977. Otryad strekozy Odonata. [Order dragonflies Odonata]. *In*: L.A. Kutikova & Ya.I. Starobogatov [Eds.], Opredelitel' presnovodnyh bespozvonochnyh evropeyskoi chasti SSSR (plankton i bentos). [Keys for identification of freshwater invertebrates of the European part of the USSR (plankton and benthos)]. Gidrometeoizdat, Leningrad, pp. 266-288. (Russian). – (Author deceased).
The book is intended for the workers of

the Freshwater Pollution Monitoring Service. The odon. section contains identification keys for the larval stage of 51 spp. The spp. met with in the extreme North and South of the territory, as well as those occurring only sporadically, are omitted. – (*Abstracter's note*: This posthumous publication should be added to the bibliographic list of Mrs. A.N. Popova, as appearing in the obituary in Odonatologica 2 [1973]: 45-47).

(1923) PRASAD, M., 1977. Odonata of District Kangra (Himachal Pradesh). Rec. zool. Surv. India 71: 95-119. – (*Zool. Surv. India, 34 Chittaranjan Ave., Calcutta-700012, India*).
48 spp. (13 Zygoptera, 35 Anisoptera), brought together by the Northern Regional Station survey party of the Zoological Survey of India (Dehra Dun), mainly during Aug.-Sept. 1967, are listed along with the usual locality data, measurements, and data on general range. Supplementary descriptive notes are given for some spp.

(1924) RUSSEV, B., 1977. Die Struktur der benthalen Zoozönosen im bulgarischen Donauabschnitt und ihre Wandlungen unter Einwirkung des Menschen. Hydrobiology, Sofia 5: 81-88. (With Russian s.). – (*Inst. Zool., Bulg. Acad. Sci., Boul. Rouski 1, BG-1000 Sofia*).
The structure of the benthos zoocenoses of the Bulgarian part of the Danube has been studied (1956-1973) with reference to its changes as caused by anthropogenic influence. Larval Gomphus flavipes represents 2.19-3.70% of biomass in the pelorheophile zoocenosis, and up to 11.25% in the psammorheophile zoocenosis. The density and biomass of various groups (incl. Odon.) in different associations and periods are given in tables.

(1925) RUSSEV, B., 1977. Die Verunreinigung und Selbstreinigung des Ossam nach den strukturellen Änderungen seiner Benthosfauna. Hydrobiology, Sofia 6: 3-22. (Bulgarian, with Russian and German s's.). – (*Inst. Zool., Bulg. Acad. Sci., Boul. Rouski 1, BG-1000 Sofia*).
During 1968-1972 the invertebrate fauna of the Ossam R., Bulgaria, was sampled at 31 stations. Among the 157 taxa collected there are also 5 odon. spp. (Platycnemis pennipes, Calopteryx splendens, C. virgo, Gomphus vulgatissimus, Onychogomphus forcipatus), mentioned on p. 8.

(1926) SCHMIDT, E., 1977. 6. Ord. Odonata, Libellen. *In*: W. Tischler [Ed.], Paul Brohmer Fauna von Deutschland. Ein Bestimmungsbuch unserer heimischen Tierwelt. 13th revised ed., Quelle & Meyer, Heidelberg. pp. 185-189. – (*Biol. Seminar, Pädagogische Hochschule, Mürwikerstr. 77, D-239 Flensburg, GFR*).
This is a slightly revised edition of the publication listed in *OA* Nos. 113 and 895. Its main novelty is the separation of the genera Cercion and Coenagrion.

(1927) SCHMIDT, E., 1977. Die Libellen der Mühlenau bei Warder, Kreis Rendsburg-Eckernförde. Heimat (Kiel) 84 (7/8): 219-223. – (*Biol. Seminar, Pädagogische Hochschule, Mürwikerstr. 77, D-239 Flensburg, GFR*).
An annotated list is given of 20 spp. recorded at the outflow of the Warder lake, between Neumünster and Rendsburg, Schleswig-Holstein, German Federal Republic. The status of the fauna is analyzed, and a plea is made for the conservation of this relatively rich dragonfly area.

(1928) SERVICE, M.W., 1977. Mortalities of the immature stages of species B of the Anopheles gambiae complex in Kenya: comparison between rice fields and temporary pools, identification of predators, and effects of insecticidal spraying. J. Med. Ent. 13 (4/5): 535-545. – (*Dept. Ent., Liverpool Sch. Trop. Med., Pembroke Pl., Liverpool, UK*).
Larval and pupal populations of sp. B of the A. gambiae complex were sampled from rice fields and small ponds and pools near Kisumu, Kano Plain, Kenya (approx. 1100

m above sea level). To detect natural predators of A. gambiae, antiserum to A. gambiae from immunized rabbits was used in precipitin tests performed on gut contents of 2295 possible predators collected from rice fields and 545 collected from pools and ponds. This serological technique identified over 42 predator sp., incl. 10 Odon. The predator fauna and intensity of predation differed between the rice fields and the pools and ponds. This was considered a possible cause for the differently shaped survivorship curves shown by A. gambiae in these 2 habitats. Insecticidal spraying of the rice fields killed both the mosquitoes and predators. The former reestablished themselves very quickly, but recolonization by the predators was slower. This possibly accounted for the apparent reduction in preadult mortality (84%) found in A. gambiae after spraying. – For the Kisumu area (Ahero rice fields) the following Odon. are recorded: Agriocnemis inversa, Ceriagrion sp., Ischnura senegalensis, Pseudagrion sp., Aeshna sp., Brachythemis lacustris, Crocothemis erythraea, Hemistigma albipunctata, Pantala flavescens, Trithemis sp. (Cf. also *AO* No. 1275).

(1929) SHERK, T.E., 1977. Development of the compound eyes of dragonflies (Odonata). I. Larval compound eyes. J. exp. Zool. 201 (3): 391-416. – (*Dept. Biol., Yale Univ., Kline Biol. Tower, New Haven, Conn. 06520, USA*).
Interommatidial angles and numbers of ommatidia that viewed each segment of the visual field were mapped for a variety of dragonfly larvae from 4 families, selected for different behaviours and phylogenetic divergence, by measuring the directions of view of ommatidia contributing to the pseudopupil. – The size of the visual field and the amount of interommatidial angle specialization are greater than reported from histological sections, primarily because the optical axes are not perpendicular to the cornea. – Each sp. has interommatidial angle specializations that match its behaviour. Larvae which are visual predators (Aeshnidae) have interommatidial angles which vary from 4.9° in some parts of the eye to as little as 0.13° in the developing ommatidia at the anterior border. A foveal area can be defined with interommatidial angles of 0.2° which is the theoretical limit for ommatidia of their diameter, and is narrower than the interommatidial angles reported for adult insects. Foveal interommatidial angles measured along a vertical plane are considerably smaller than along a horizontal plane, resulting in an extremely elongate pseudopupil. – Larvae which are less dependent on vision for prey capture have correspondingly less structural specialization in the eye, but the same pattern of regional variation is still recognizable. – In contrast to the great range of interommatidial angles, ommatidial diameters are relatively uniform; the inverse relationship expected for highest visual acuity is not found. (Author).

(1930) [SIEEC], 1977. Verzeichnis der an den Insekten Mitteleuropas arbeitenden Taxonomen und Faunisten. Bull. ent. Pol. 47 (3): 507-574. – (*c/o Dr. H. Malicky, Biol. Station Lunz, Oesterr. Akad. Wiss., A-3293 Lunz am See*).
This is a (greatly incomplete) directory of workers on taxonomy and faunistics of the 10 member-states of the S[ymposium] I[nternationale] E[ntomofaunisticum] E[uropae] C[entralis]. It includes addresses of 14 odonatologists from German Federal Republic, incl. West Berlin (3), German Democratic Republic (2), Austria (2), Poland (3), Czechoslovakia (1), Hungary (1), USSR (2, addresses in cyrillic script only). No odonatologists are listed from the remaining 3 member states, viz. Yugoslavia, Romania, Switzerland. (Cf. also *OA* No. 1152).

(1931) SVENSSON, B., 1977. Life cycle, energy fluctuations and sexual differentiation in Ephemera danica (Ephemeroptera), a stream living mayfly. Oikos 29: 78-86.

(With Russ. s.). – (*Dept. Anim. Ecol., Univ. Lund, Lund, Sweden*).
The larval growth patterns of E. danica from a South Swedish stream are compared to those recorded in Coenagrion puella and Ischnura elegans (cf. J.H. Lawton, 1972, Odonatologica 1: 209-219; and M.J. Parr, 1970, Proc. R. ent. Soc. Lond., A, 45: 130-139).

(1932) TARANOVA, V.M., 1977. Stadii razvitiya lichinok Coenagrion hastulatum Charp. (Odonata, Coenagrionidae). [Larval stages of Coenagrion hastulatum Charp. (Odonata, Coenagrionidae)]. Inf. Byull. Biol. vnutr. Vod 1977 (34): 44-46. (Russian). – (*Inst. Inland Water Biol., USSR Acad. Sci., USSR-152742 Borok, Nekouz, Yaroslavl*).
The observations obtained in the field (Borok, Yaroslavl prov., USSR) are compared to the evidence on the life history as published by A.E. Gardner (1954. Entomol. Gaz. 5: 17-40). In both cases there are 9 larval stages, but there are some differences in total larval length and in size and morphology of various characters as observed in the field and under laboratory conditions (Gardner). (Cf. also *OA* No. 1873).

(1933) VEENSTRA, J.A., 1977. Dragonflies in the Liemers from the 1st-11th of July 1975. Anax 9 (1): 11-15. (Dutch, with Engl. s.). – (*Hoevestein 239-16-C, Wageningen, NL*).
12 spp. collected at De Liemers, Gelderland prov., Netherlands, and just across the border in Western Germany are enumerated and briefly discussed. The more interesting of these are Platycnemis pennipes and Gomphus pulchellus. Brief notes on mating and oviposition of Erythromma najas, Libellula quadrimaculata and Orthetrum cancellatum are also provided.

(1934) VOGT, W., 1977. [Ougusch, das isch der Libellemonet]. [August, that is the dragonfly month]. 2 pp. – (*Weststr. 3, CH-3074 Muri/BE*).
This is the tape-transcribed text, in Bernese German dialect, Switzerland, of a popular talk on dragonflies, broadcast by the Swiss DRS-I wireless channel, on Aug. 9, 1977. – (*Abstracter's note*: Reprints are distributed by Miss I. Siegenthaler, Filmstudio 2 S, Seestr. 26 J, CH-3601 Thun-1).

(1935) WAGER, V.A., 1977. Sand-track dragonflies. The mysterious spoor yields an unsuspected secret. Sth. Afr. Garden and Home 1977 (June): 34. – (*Ocean View Hotel, 354 Musgrave Rd., Durban, Natal, Sth. Afr. Rep.*).
A note (incl. 3 figs.) on meandering tracks in sand in shallow water caused by larvae of Paragomphus cognatus in South Africa. Similar tracks have been observed by the Author in Malaysia and Thailand, and reference is made to the Lake Butiaba, Uganda, where an average density of 73 larvae/$m^2$ was recorded.

(1936) WAINSTEIN, B.A. & V.M. TARANOVA, 1977. Discrimination of stages of the larval phase in dragon flies. Zool. Zh. 56 (8): 1239-1242. (Russian, with Engl. s.). – (*Inst. Inland Water Biol., USSR Acad. Sci., USSR-152742 Borok, Nekouz, Yaroslavl*).
3 methods were tested: (1) statistical treatment of individual characters, (2) summation of deviations from the mean by all characters, (3) multivariate statistical analysis (method of principal components). The first method proved to give different results for different characters and, hence, to be unsuitable. The second method consists in the summation of standardized deviations of characters. It is proposed to use it for standardization of the relationship of the given variance to the standard one (maximal, average, etc.). This method allowed to divide the material into stages. The third method gave the same results but it is more complicated in calculation. (Authors).

(1937) WATSON, J.A.L., 1977. The Argiolestes

pusillus complex in Western Australia (Odonata: Megapodagrionidae). J. Aust. ent. Soc. 16: 197-205. – (*Div. Ent., CSIRO, Canberra, A.C.T. 2601, AU*).
The third sp. of the Argiolestes pusillus complex is described and figured, viz. A. parvulus sp. n. (♂ holotype: Western Australia, no date, Aust. Nat. Ins. Coll., CSIRO, Canberra, Type No. 9858; – ♀ allotype: data as for holotype, ANIC No. 15357; – additional material: 123 ♂, 40 ♀, localities mapped). It occurs together with A. pusillus Till., but not with A. pusillissimus (Kenn.) from the southern coastal region. The ♀♀ of the 3 spp. can be identified only by association with ♂♂. A key for the latter is given. The eastern Australian Argiolestes spp. are not as closely allied to the A. pusillus complex as the latter are to one another, indicating that speciation must have occurred within the south-west.

(1938) WENGER, O.-P., 1977. Otto R. Strub & Irene Siegenthaler, Das Libellenjahr. Mitt. schweiz. ent. Ges. 50 (2): 166. – (*Schloss-Str. 102, CH-3008 Bern*).
A book review, by a well known Swiss odonatologist, of the volume listed in *OA* No. 1563. (For references to other reviews of the same book cf. *OA* No. 1764).