

## ODONATOLOGICAL ABSTRACTS

### 1973

- (7198) PALMER, M., 1973. A survey of the animal community of the main pond at Castor Hanglands National Nature Reserve, near Peterborough. *Freshw. Biol.* 3: 397-407. — (Nat. Conserv. Council, Northminster House, Peterborough, PE1 1 UA, UK).  
Gives a list of 11 odon. spp., with detailed annotations on larval habitats of some of them.
- (7199) WHITCOMB, W.H., 1973. Natural populations of entomophagous arthropods and their effect on the agroecosystem. In: F. Maxwell, [Ed.], *Proc. Miss. Symp. Biol. Control*, pp. 150-169, Univ. Press Mississippi, Jackson, MS. — (4013 N.W. 39th Way, Gainesville, FL 32606, USA).  
A review of author's 35 yr of experience with field populations of predators in Florida is presented. The odon. are dealt with on pp. 156-157; 6 spp. are briefly mentioned.

### 1979

- (7200) LEHRER, A.Z. & F. BULIMAR, 1979. Sinteze cartografice ale patrimoniului natural al României. II. Ordinul Odonata Fabricius, 1792. — *Sintheses cartographiques du patrimoine naturel de Roumanie. II. Ordre Odonata Fabricius, 1792. Nymphaea* 7: 343-393. (Roman., with Fr. s.). — (Second Author: Centrul de Cercetari Biologice, Calcea-23-August 20 A, Iasi, Romania).  
Checklist and EIS-style distribution maps of 68 spp. in Romania.

### 1981

- (7201) BAUER, A., 1981. Heidelibelle aus Nordindien. *Insekt* 1: 18. — (Author's address unknown).  
Col. phot. of *Trithemis aurora*, with technical details on camera and exposition, but without locality data.

### 1982

- (7202) BAUSCHMANN, G., 1982. Kleine Binsenjungfer und Kleine Mosaikjungfer (Insecta, Odonata) in der Wetterau. *Beitr. Naturk. Wetterau* 2(2): 152-153. — (Author's current address not known).  
*Lestes virens* and *Brachytron pratense* are recorded, each from a different locality, from the Frankfurt/Main area, FRG.
- (7203) THORP, J.H. & M.R. DIGGINS, 1982. Factors affecting depth distribution of dragonflies and other benthic insects in a thermally destabilized reservoir. *Hydrobiologia* 87: 33-44. — (Dept Nat. Resour., Fernow Hall, Cornell Univ., Ithaca, NY 14853, USA).  
The distribution and abundance of macroinvertebrates along a water depth gradient were studied in thermal and ambient temperature areas of a reservoir in the SE USA. Benthic samples were taken at 10 depths (0.16-5 m) during Jan.-Apr., 1978. Factors affecting the depth distribution of *Creatopogonidae*, *Chaoboridae*, *Chironomidae*, *Ephemeroptera*, *Odonata*, and *Trichoptera* are discussed. The relationship between abundance of organisms and water depth was more complex than an

inverse relationship generally reported in the literature.

### 1983

- (7204) CHAPMAN, B.L. & P.J. WILSON, 1983. A study of Lincolnshire dragonflies. *Trans. Lincs. Naturalists' Un.* 20(4): 169-173. — (Second Author: "Penates", Station Rd, Reepham, Lincolnshire, UK).  
The Lincolnshire (England) records of 15 spp. are mapped, and comments are given on some spp.

### 1984

- (7205) NAJAM, M.A., 1984. *Population and feeding habits of dragonflies on insect pests of rice*. M. Sc. thesis (Ent.) Univ. Agric., Faisalabad. IV+25 pp. — (c/o Dr M. Yousuf, Dept Agric. Ent., Univ. Agric., Faisalabad, Pakistan).  
The populations of adult *Orthetrum sabina*, *Crocotermis servilia*, *C. erythraea* and *Pantala flavescens* were counted visually on 3 experimental rice plots in the districts of Sheikhupura and Gujranwala, Pakistan, at 2-week intervals, from July 15 to Dec. 1, 1983. Each plot (84x105 ft) had 140 rows (length 84 ft), at 9-inch intervals. The dragonfly population was counted from 7 rows in each plot. It was small on Aug. 1, reached a maximum during Sept. 15 - Oct. 1, declined thereafter, and was lowest on Nov. 15. No dragonfly was seen in the rice fields on July 15 and Dec. 1. — The number of rice pests consumed per dragonfly/day was determined by forced hand-feeding as described by M. Yousuf & M.A. Ali (1986, *Notul. odonatol.* 2: 117-118). Scirphophaga innotata, S. incertulas, Cnaphalocrocis medinalis, Cofana spectra, Nephrotettix nigropictus and Sogatella furcifera are considered most destructive. In this sequence, the average numbers of individuals of each prey sp., consumed per dragonfly, were: *O. sabina*: 4.8, 4.2, 5.1, 3.8, 32.1 and 68.0; — *C. servilia*: 3.9, 3.4, 4.0, 3.0, 20.3 and 39.0; — *C. erythraea*: 3.5, 3.0, 3.8, 2.7, 15.2 and 22.8; — *P. flavescens*: 2.9, 2.6, 3.3, 2.2, 9.1 and 15.2, resp. The ♀ of all spp. consume higher numbers of the preys than their ♂. When the voracity of the 4 odon. spp.

is compared, *O. sabina* tops, followed by *C. servilia* and *C. erythraea*, while *P. flavescens* is the least "effective".

- (7206) SCHAUFF, M.E., 1984. The holarctic genera of Mymaridae (Hymenoptera: Chalcidoidea). *Mem. ent. Soc. Wash.* 12: 1-67. — (Syst. Ent. Lab., Agric. Res. Serv., USDA, c/o Natn. Mus. Nat. Hist., Washington, DC 20560, USA).  
The Mymaridae are all egg parasites of other insects. Of the 22 holarctic genera, only *Polynema* is listed from an odon. host (Lestidae).

### 1985

- (7207) CHARMAN, K., M. PALMER & E.G. PHILP, 1985. Survey of aquatic habitats in the North Kent marshes. *Trans. Kent. Fld Club* 10(1): 19-32. — (First & Second Authors: Nat. Conserv. Council, Northminster House, Peterborough, PE1 1 UA, UK).  
Contains a list of 5 odon., with annotations on their local status.
- (7208) LETT, J.-M., 1985. *Les libellules de Sologne et de ses environs. Contribution à un inventaire dans le sud du département du Loir et Cher*. II+27 pp. Sologne-Nature-Environnement, Nouan-le-Fuzelier. ISBN none. — Author: rue Guynemer, cedex 2387, Lademanchère, Pruniers, F-41200 Romorantin; — Publishers: S.N.E. Centre d'Accueil, Place de la Mairie, F-41600 Nouan-le-Fuzelier).  
List of 46 spp., with annotations. General chapters on biology and conservation are mainly directed at the general reader.

### 1986

- (7209) CLAUSNITZER, H.-J., 1986. Zur Ökologie und Ernährung des Laubfrosches *Hyla a. arborea* (Linnaeus, 1758) im Sommerlebensraum (Salientia: Hylidae). *Salamandra* 22(2/3): 162-172. (With Engl. s.). — (Eichenstr. 11, D-3106 Eschede, FRG).  
The summer habitat of *H. arborea* in Germany is described. The analysis of 215 faecal pellets revealed 47.2% of Diptera, 34.2% of Cole-

optera; among the remaining 13 invertebrate groups (mostly various insect orders) the Odon. constituted 0.1% (1 specimen *Lestes sponsa*).

- (7210) TERZANI, F., 1986. Ricerche odonatologiche in Toscana. I. Lago di Sibolla (Odonata). *Atti Mus. civ. Stor. nat. Grosseto* 9/10: 57-63. (With Engl. s.). — (Mus. Stor. Nat., Univ. Firenze, Via Romana 17, I-50125 Firenze). Annotated list of 16 spp. Of particular interest is the series of *Coenagrion pulchellum mediterraneum* representing only the second record for Tuscany, Italy.

### 1987

- (7211) AUGUSTIN, H., O. MOOG, A. UNTERWEGER & W. WIENER, 1987. Die Gewässergüte der Fließgewässer der Stadt Linz und Umgebung. *Naturk. Jb. Linz* 31/32: 149-363. (With Engl. s.). — (First Author: Inst. Zool., Univ. Salzburg, Hellbrunner Str. 34, A-5020 Salzburg). *Cordulegaster boltonii* is recorded from a sample site on the Krumbach, Linz distr., Austria.
- (7212) CROWLEY, P.H., R.M. NISBET, W.S.C. GURNEY & J.H. LAWTON, 1987. Population regulation in animals with complex life-histories: formulation and analysis of a damselfly model. *Adv. ecol. Res.* 17: 1-59. — (First Author: Morgan Sch. Biol. Sci., Univ. Kentucky, Lexington, KY 40506, USA). The complex life-histories of taxa such as Zygoptera obscure the mechanisms of population regulation. Most of the available data are for the Coenagrionidae, and its best-known member is the European *Ischnura elegans*. The information suggests 4 plausible mechanisms of damselfly population regulation: food availability; feeding-related intra-specific interference; mortality-related intra-specific interference; and density-dependent predation. — The Authors derive a mathematical model of a population and obtain parameter values largely based on *I. elegans*. The model represents 6 life-stages and their interactions with a population of aquatic prey,

using coupled ordinary and delay-differential equations, which are solved numerically. Also incorporated are seasonal functions, one modifying feeding and mortality parameters according to temperate-zone temperature oscillations, and the other controlling emergence as if by photoperiod or temperature cues. The model's behavior both in steady state and dynamically with literature-derived parameter values is analysed and sensitivity analyses are performed. — The resulting larval densities, larval stage durations, emergence rate, and general emergence pattern for the standard parameter values are in good agreement with those in the literature: the generation time slightly exceeds one year, and the emergence pattern is strongly bimodal, as observed for some *I. elegans* populations in the British Midlands. Varying the size needed to achieve emergence strongly influences these patterns and densities, emphasizing the need for more data on the body sizes of emerging damselflies. — Varying the carrying capacity of the prey assemblage demonstrates a threshold below which Zygopt. are unable to persist, and a general increase in densities and decrease in stage durations of larval damselflies with increasing carrying capacity. Stage durations rapidly approach their minimum at and above intermediate prey levels, but larval densities continue to rise even at high carrying capacities. Despite this apparent food-limitation of larvae, they are generally unable to deplete their prey substantially, and are thus seemingly unable to compete with each other for food. They should nevertheless be susceptible to such competition from other animals such as fish that may be capable of substantially reducing prey densities. Feeding-related interference has essentially no effect on the damselfly population. — The zygopt. population is sensitive to changes in the larval and adult mortality parameters: particularly at low prey levels, threefold increases in one of the density-dependent mortality parameters generally resulted in extinction of the damselflies. The effectiveness of mortality-related interference and density-dependent predation in regulating the model population is clearly indicated in the stage-by-stage damping of shifts in fecundity:

small larvae responded strongly, large larvae weakly, and subsequent emergence rates hardly at all. — Emergence patterns produced by the model seem to reflect the balance between forces promoting and opposing the coexistence of the asynchronous subpopulations that produce separate emergence peaks; promoting coexistence are density-dependent predation and intra-stage, mortality-related larval interference, and opposing it is interstage interference.

- (7213) D'AGUILAR, J., J.L. DOMMANGET & R. PRÉCHAC, 1987. *Guía de las libélulas de Europa y Africa del norte*. Ediciones Omega, Barcelona. 352 pp., col. pls & maps incl. — ISBN 84-282-0792-5. — (Publishers: Plató 26, ES-08006 Barcelona).

Spanish edition of the work listed in OA 5041 (original, French) and 5650 (Engl.), revised and adapted for the Iberian peninsula by Prof. Dr M. Ferreras.

- (7214) PALMER, M., 1987. A survey of the aquatic invertebrates of Romney Marsh. *Trans. Kent Fld Club* 10(3): 123-134. — (Nat. Conserv. Council, Northminster House, Peterborough, PE1 1UA, UK).

Contains a list of 8 odon. spp. from different habitats of this locality in Kent, UK.

- (7215) PIERPONT MORGAN LIBRARY, [Publs], 1987 [?], *Medieval & Renaissance manuscripts acquired 1984-1986, including the collections of William S. Glazier & Curt F. Bühler*. 110 pp., 11 (mostly col.) pls. Author, exact publication date, publication place & ISBN nr not stated.

On p. 10 (Inv. No.: M. 1051. 1-3), a leaf from a Book of Hours (in Latin, from the Loire valley, dated ca 1500) is described, titled "Suffrage to St Andrew", and showing a chicory and a dragonfly.

- (7216) TERZANI, F., 1987. Ricerche odonatologiche in Toscana. II. Notizie sul Cordulegaster bidentatus bidentatus Selys, 1843 nella regione e zone limitrofe (Odonata, Cordulegasteridae). *Atti Mus. civ. Stor. nat. Grosseto* 11/12: 95-99. (With Engl. s.). — (Mus. Zool., Univ. Firenze,

Via Romana 17, I-50125 Firenze).

The sp. is recorded from various localities in Tuscany, Emilia-Romagna and Lazio. The respective habitats are briefly described and/or the habitat-associated odon. fauna is stated. For 9 specimens, some measurements and venational features are given in a table.

## 1988

- (7217) CHAM, S., 1988. Dragonflies (Odonata). Report of the recorder. *Bedfordshire Naturalist* 43: 65-67. — (45 Weltmore Rd, Luton, Beds., LU3 2TN, UK).

The 1988 Bedfordshire (U.K.) records of 18 spp. are stated. — (A regional review paper is listed in OA 6601).

- (7218) LECKE, T., K. HANDKE, W. KUNDEL & K.-F. SCHREIBER, 1988. Landscape ecology in the field of conflict between nature conservation and future industrial settlements. *Münster. geogr. Arb.* 29 (Proc. 2nd Int. Seminar Ins. Assoc. Landscape Ecol.): 201-206. (Forschungst. Bremen, Lehrstuhl Landschaftsökol., Univ. Münster, D-4400 Münster, FRG).

*Lestes virens*, *Aeshna viridis*, *Anaciaeschna isosceles*, *Leucorrhinia pectoralis* and *Symptetrum depressiusculum*, all "threatened with extinction" or "highly threatened" (according to the German Red List) are listed from the Niedervieland area, nr Bremen, FRG.

- (7219) LITT, R., 1988. Capture d'une libellule par une plante carnivore. *Revue verviétoise Hist. nat.* 45(3): 41-43. — (Author's address not stated).

A capture of an unidentified *Coenagrion* sp. by *Drosera rotundifolia* (Kalmthout Heide, Belgium, 14-VI-1959) is recorded. (Cf. also e.g. OA 470, 5265).

- (7220) SEITZ, E. & B. SEITZ, 1988. Zum Vorkommen der Westlichen Keiljungfer (*Gomphus pulchellus* Selys) sowie der Keilflecklibelle (*Anaciaeschna isosceles* Müller) im südlichen Westallgäu. *Ber. naturw. Ver. Schwaben* 92(1): 2-5. — (Uferstr. 8, D-8993 Nonnenhorn, FRG).

*G. pulchellus* is recorded from various localities in southern Bavaria and Baden-Württemberg, and *A. isosceles* from the latter state, FRG. The regional occurrence of *G. pulchellus* is discussed.

- (7221) VERDONSCHOT, P.F.M. & R. TORENBEEK, 1988. Lettercodering van de Nederlandse aquatische macrofauna voor mathematische verwerking. — [Letter code of the Netherlands aquatic macrofauna for mathematical treatment]. *RIN-Rapport* 88(30): VI+76 pp. (Dutch). — (St. Res. Inst. Nature Manag., P.O. Box 46, NL-3956 ZR Leersum). An 8-position letter code for the computer treatment of the Netherlands odon. taxa is presented on pp. 20-22, along with the corresponding EIS and (the Netherlands) IAWM code numbers. — (A 7-position letter code is given in the work listed in *OA* 7314).

- (7222) WISSINGER, S.A., 1988. Spatial distribution, life history and estimates of survivorship in a fourteen-species assemblage of larval dragonflies (Odonata: Anisoptera). *Freshw. Biol.* 20: 329-340. — (Dept Biol. & Environ. Sci., Allegheny Coll., Meadville, PA 16335, USA).

Spatial and temporal changes in larval densities were used to infer patterns of habitat use and survivorship in a 14-spp. assemblage of Anisoptera in a small fishless pond. The density of all spp. combined peaked at  $> 1000 \text{ m}^{-2}$  in late summer. Most spp. (e.g. *Libellula* spp.) were restricted to shallow, nearshore habitats ( $< 1.0 \text{ m}$  in depth), but a few (e.g. *Epitheca* spp.) also used deeper areas of the pond. Only *Perithemis tenera* was most abundant in deep habitats. — Because many spp. exhibited temporal shifts in their use of habitats, it was necessary to estimate survival from changes in population size, calculated as the product of density and habitat area, summed across habitats. In most spp., periods of high mortality in autumn and spring were separated by 3-4 months of negligible mortality in winter. Survivorship was linear only in the sp. that completed all of larval development in summer (*Sympetrum vicinum* and *Pantala flavescens*). Average survival rates for

these 2 spp. ( $-0.0049$  and  $-0.0079$  log density  $d^{-1}$ ) were similar to those previous studies (e.g. *OA* 1068). — Survivorship in many spp. was confounded by other life history phenomena such as (i) mixed voltinism, (ii) overlapping migrant and resident cohorts, and (iii) asynchronous development within sp. Asynchrony made it difficult to estimate initial and final population sizes, hence total larval survivorship. However, based on emergence data, only 0.4-3% of larvae survived after peak abundance. None of this mortality can be ascribed to vertebrate predation, and only a little to overwintering stress and starvation. Thus, predation by invertebrates might play a major role in the regulation of these populations.

## 1989

- (7223) ANSELIN, A. & P. GOFFART, 1989. Odonata in Belgium: a bibliographical list of the period 1967-1988. *C.R. Symp. "Invertébrés de Belgique"*, pp. 243-246. (With Dutch s.). — (Inst. Roy. Sci. Natur. Belg., rue Vautier 29, B-1040 Bruxelles). Bibliography of 102 titles (1967-1988), pertaining to the Odon. of Belgium.

- (7224) ARGIA. The news journal of the Dragonfly Society of America. Vol. 1, Nos 1-4 (Dec. 30, 1989). — (c/o Dr C. Cook, 469 Crailhope Rd, Center, KY 42214, USA).

This is the newsletter and the medium for publication of regional scientific notes of the newly established Dragonfly Society of America, covering both continents of the New World. The first President is Dr C. Cook (address above), to whom membership applications and subscription orders should be sent. Dues 1990: regular membership fees: US\$ 3.-, sustaining: US\$ 10.-, institutional: US\$ 10.-, extra charges for airmail delivery: US\$ 7.-, others: US\$ 10.-. Cheques and international money orders are to be made payable to the Dragonfly Society of America. — Contents: *Cook, C.*: Welcome to the Dragonfly Society of America (pp. 1-2); — Society's name revised (p. 2); — DSA receives grant from SIO (p. 2); — Paulson new Director at Slater (p. 2); —

- Donnelly, T.W.*: North and Central American catalogue of Odonata — a proposal (p. 3); — U.S. endangered species — a request for information (p. 4); — *Dunkle, S.W.*: Odonate collecting in the Peruvian Amazon (pp. 5, 6); — Collecting in Costa Rica (pp. 6, 7-8); — *Garrison, R.W.*: Research in progress (p. 8); — *Cook, C.*: Season summary project (p. 9); — *Membership list* (pp. 10-11); — *Glotzhofer, R.C.*: Survey of Ohio Odonata planned (p. 11); — *Book reviews* (anonymous) of vols listed in OA 6357 (Askew) and 6746 (Dunkle) (p. 12); — *Constitution of The Dragonfly Society of America* (pp. 13-14); — *Exchange and Notices* (p. 15); — *General information* about the Dragonfly Society of America (DSA) (cover p. 4). — Information on the DSA has appeared in *Selysia* 18(2) (OA 7042) and in *Walkeria* 4(2) (OA 7180). The Charter Meeting took place in Johnson City, TN, USA, Aug. 11, 1989. It is a non-profit society, under Federal and State statutes, with its own Officers, Executive Council, and Editorial Staff. It was organised under the Auspices of the SIO, as an independent affiliate of that society's family of regional organisations. Its purposes are to encourage scientific research, habitat preservation, and aesthetic enjoyment of Odon. in the Western Hemisphere. The quarterly *Argia* and the *Annual Season Summary* are furnished with membership. Membership in DSA is open to any person interested in the society's objectives, regardless of his/her place of residence. Society's regional activities are organized into 8 Zones (each with 1 of 2 Coordinators), viz. Eastern Canada (D.F.J. Hilton), Western Canada (R.A. Cannings), Northeastern US (F.L. Carle & T. Vogt), Northwestern US (D.R. Paulson), Southeastern US, incl. the Caribbean Isls (K.J. Tennessen & R.D. Cuyler), Southwestern US (R.W. Garrison), Central America (R. Novelo G.), and South America (position of Coordinator open).
- (7225) *ASAHINA, S.*, 1989. *Orthetrum poecilops miyajimaense* discovered from Miyajima Island. *Nihon-no Seibutsu* [= Nat. Hist. of Japan] 3(12): 18-20. (Jap., with Engl. title). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).
- The Author relates his experience with this endemic subspecies from the Miyajima island in the Japanese Inland Sea, close to the mainland nr Hiroshima. It was described (from a ♀) as *Orthetrum miyajimaense* Yuki & Doi, 1938 (*Akitu* 1: 153-155). When the ♂ was discovered, the author synonymized it with the Chinese *O. poecilops* Ris from Kwang Tung. Later he had the opportunity to examine the Fukien (Foochoo) material (Kellog coll. in the US Natn. Mus.) and recognized its subspecific status. The subspecies is now classified as "vulnerable" in the Japanese Red Data Book, while the status of the Chinese population is uncertain. — (This journal can be subscribed with its publishers, Bun-ichi Sōgō Shuppan, Tokyo).
- (7226) *BALANCA, G. & M.-N. DE VISSCHER*, 1989. Inventaire écologique des odonates de Côte-d'Or. *Bull. scient. Bourgogne* 42(1): 1-7. (With Engl. s.). — (Les Ferrages 9, F-34570 Vailhauques).  
41 spp. are listed from 31 localities. Some spp. are considered "excellent biological indicators".
- (7227) *BENITEZ-DONOSO, A. & M.J. GARCIA-PARRÓN*, 1989. Datos sobre la biología de algunos anisópteros en la Península Ibérica (Odonata, Anisoptera). *Boln Asoc. esp. Ent.* 13: 195-200 (With Engl. s.). — (c/ Arriba 24, ES-06420 Castuera/Badajoz).  
Records and notes on the biology of *Orthetrum trinacria* and *Macromia splendens*.
- (7228) *BRETTFELD, R.*, 1989. Beiträge zur aquatischen Fauna des Schleuseeinzugsgebietes in Südhüringen. 1. Die Zweigestreifte Quelljungfer (*Cordulegaster boltoni* Donovan) aus der Gruppe der Fließgewässerlibellen (Insecta, Odonata). *Veröff. naturh. Mus. Schleusingen* 4: 2-12 (With Engl. s.). — (Naturh. Mus., Schloss Bertholdsburg, Pf. 44, DDR-6056 Schleusingen, GDR).  
Information is presented on the occurrence, phenology and population density of *C. boltoni* at 5 brooks in the catchment area of the Schleuse R., southern Thuringian Forest, GDR.

- (7229) BRISBIN, I.L., D.D. BRESHEARS, K.L. BROWN, M. LADD, M.H. SMITH, M.W. SMITH & A.L. TOWNS, 1989. Relationship between levels of radiocaesium in components of terrestrial and aquatic food webs of a contaminated streambed and floodplain community. *J. appl. Ecol.* 26: 173-182. — (First Author: Savannah River Ecol. Lab., P.O. Drawer E, Aiken, SC 29801, USA). With reference to the recent Chernobyl reactor accident and the consequent release of long-lived fission products, the concept of trophic level concentration of radiocaesium is used to prove some general principles for predicting the distribution of contaminants into food-web compartments. — Radiocaesium concentrations of plants and animals from the watershed of a former reactor effluent stream (Steel Creek, Barnwell Co., South Carolina, USA) declined 50-98% from 1971 to 1981. Radiocaesium concentrations of animals did not differ significantly between samples from locations along the stream channel, reflecting a previously demonstrated uniform distribution of radiocaesium in the sediments, and did not differ between animals from terrestrial vs. aquatic food webs. Significant correlations between radiocaesium contents of food-web components were about twice as frequent as would be expected by chance, but only seven of the twenty-three significantly correlated pairs contained components that were likely to have a direct trophic association. Caution should be used in arguing causation on the basis of simple correlations of contaminant levels of biotic compartments alone. The best "indicator species" for radiocaesium contamination in aquatic food webs were the plants *Typha* and *Polygonum* and, even better, the animals *Palaemonetes* and *Etheostoma*. In terrestrial food webs, the best indicators were the plants *Alnus* and *Salix* and the animal groups of *Aranea*, *Odon.* (*Zygoptera*) and *Orthoptera*.
- (7230) BUTLER, M.J., 1989. Community responses to variable predation: field studies with sunfish and freshwater macroinvertebrates *Ecol. Monogr.* 59(3): 311-328. — (Dept Biol. Sci., Old Dominion Univ., Norfolk, VA 23529-0266, USA). The impact of variable predation by bluegill sunfish, *Lepomis macrochirus*, on macroinvertebrate prey was studied in Dog Lake (oligotrophic, 12 ha), Apalachicola Natn. Forest, nr Tallahassee, Leon Co., Florida, USA. Caging experiments revealed that variable predation altered prey community composition and increased the mean size and size range of some prey, incl. the odon., compared to the constant predation treatment. Detailed figures for *Pantala* sp. and *Enallagma* spp. are presented and discussed.
- (7231) CONVEY, P., 1989. Influences on the choice between territorial and satellite behaviour in male *Libellula quadrimaculata* Linn. (*Odonata: Libellulidae*). *Behaviour* 109(1/2): 125-141. (With Germ. s.). — (Brit. Antarctic Surv., High Cross, Madingley Rd, Cambridge, CB3 0ET, UK). Male territorial behaviour was investigated at Wicken Fen, Cambridgeshire, in 1986. Males were intensely territorial, expelling any other males that flew into their territory. Territories were defended for the mating opportunities that they provided. As local population density increased a number of males adopted satellite behaviour, although most continued to behave territorially. Wingspan and hindwing length were significantly larger in satellites than in territorial males. The likelihood of satellite behaviour was not related to male age. There was also no difference in age between satellite-host pairs in which both individuals were of known age. Satellite males were not observed to mate successfully, though they did not suffer the costs associated with territorial defence. A series of removal experiments demonstrated that the satellites could take over a territory and behave aggressively to other males. Scaling factors may have an important function in forcing larger males to adopt the less successful satellite role. Notably, flight muscle content was lower than expected in larger individuals, which should result in lower power output per unit body weight, and thus lower maximum acceleration and manoeuvrability.

- (7232) DOSDALL, L.M. & D.M. LEHMKUHL, 1989. Drift of aquatic insects following methoxychlor treatment of the Saskatchewan River system. *Can. Ent.* 121: 1077-1096. (With Fr. s.) — (Second Author: Dept Biol., (12) Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0, CA).  
Methoxychlor treatment of the Saskatchewan R. system initiated catastrophic drift of aquatic insects as far as 107 km downstream from injection, and included spp. that normally do not drift. *Gomphus intricatus* is the only odon. sp. mentioned. It occurred in drift samples during the catastrophic phase following the injection, at stations 21 and 38 km downstream the injection, but not in the preceding or following 24-h intervals.
- (7233) EGUCHI, E., T. SEKI & T. SUZUKI, 1989. Comparative studies of chromophore contents inside and outside the rhabdoms of arthropod compound eyes. *J. comp. Physiol. (A)* 165(1): 589-604. — (First Author: Biol. Dept, Yokohama City Univ., Kanazawa-ku, Yokohama, 236 JA).  
The intracellular distribution of visual pigments in the reticular cells of the compound eyes of *Papilio xuthus*, *Actias artemis* (both Lepid.), *Ranatra chinensis* (Hemipt.), *Pantala flavescens*; *Procambarus clarkii* and *Hemigrapsus sanguineus* (both Decapoda) was investigated. *Actias*, *Ranatra*, *Pantala* and *Procambarus* contain more than 75% of total chromophores probably as visual pigments in their rhabdoms, but the butterfly and the marine crustacean contain only 28.6 and 39.2%, resp. The remainder of the chromophore molecules (*Papilio* 71.4%, *Actias* 5.7%, *Ranatra* 18.9%, *Pantala* 23.2%, *Procambarus* 24.3%, and *Hemigrapsus* 60.8%) are supposed to exist mostly in the cytoplasm of the reticular cells. The localization of such extrarhabdomic chromophores is discussed in relation to the cytoplasmic membrane systems such as endoplasmic reticulum and lysosomal elements. In view of the results of the present investigation, it seems clear that the butterfly *Papilio* possesses a very large extra-rhabdomic pool of chromophores that is available for rapid regeneration of visual pigment.
- (7234) GEREND, R., 1989. Nachweis von *Leucorrhinia rubicunda* (Linné, 1758) im Süden Luxemburgs (Odonata: Anisoptera). *Päiperlék* 11(2): 57-62, 1 col. pl. incl. (With Engl. s.). — (35 rue de Hellange, L-3487 Dudelange).  
*L. rubicunda* is recorded from a man-made conservancy pond nr Dödelingen. This is the first record of this sp. from Luxembourg since 1958. The occurrence of the sp. in the Saar-Lor-Lux area is summarised, and the ecology and odon. fauna of the Dödelingen pond are briefly discussed.
- (7235) GLEADALL, I.G., T. HARIYAMA & Y. TSUKAHARA, 1989. The visual pigment chromophores in the retina of insect compound eyes, with special reference to the Coleoptera. *J. Insect Physiol.* 35(10): 787-795. — (First Author: Natn. Inst. Basic., Okazaki, 444, JA).  
A new survey, by HPLC, of the visual pigment chromophores in the compound eye of Japanese insects was made during 1988. The results largely agree with those of the previous studies in Europe, Japan and the USA, except for the discovery of several coleopterans unusual in containing both retinal ( $A_1$ ) and 3-hydroxyretinal ( $A_3$ ). The occurrence of  $A_1$  and  $A_3$  is tabulated for 171 spp. of 13 orders (incl. 42 odon. spp.) and it is discussed in terms of phylogeny, diet, and the photic environment. The coleopterans using both  $A_1$  and  $A_3$  are widely separated phylogenetically, but most are carnivorous and associated with aquatic environments. It is interesting, therefore, that the occurrence of  $A_1$  and  $A_3$  is the norm also in the Odon. (cf. OA 6350) and it is likely these occur in Ephemeroptera, — both aquatic orders.
- (7236) GLITZ, D., H.-J. HOHMANN & W. PIPER, 1989. *Artenschutzprogramm Libellen in Hamburg*. Umweltbehörde Hamburg. 92 pp., 4 col. pls incl. (Naturschutz u. Landschaftspflege in Hamburg, No. 26). — (First Author: Kakenhaner Weg 135, D-2000 Hamburg-35, FRG). Available also from the SIO, Bilthoven.



The status of the fauna is updated to Sept. 1989, the book is dated 1989, and it has apparently been published in March, 1990. After the works listed in *OA* 6593 and 7097, this is the third monograph on the odon. fauna of a German region, recently published by the FRG regional Conservancy Authorities, the present publication dealing with the 56 spp. of the Hamburg area. For each sp. information is given on its general range, local occurrence, habitat requirements, biology, status, and on the specific management required. The distribution maps show records prior to 1920, during 1921-1959, and since 1960, where applicable. The introductory section contains chapters on the local and regional Red Lists, and on various types of man-made habitats. Of interest are the garden pond succession tables. — This is a valuable work, of more than local interest. Upon its appearance, newspaper reports were published in the Hamburg dailies *Morgenpost* (issue of March 12, p. 12, by H. Haupt) and *Hamburger Abendblatt* (issue of March 19, p. 3, anonymous).

- (7237) HAYASHI, F., 1989. Discovery of the adult dobsonfly, *Protohermes* sp. (Tanida, 1974) on Ishigaki and Iriomote islands. *Insectarium, Tokyo* 26(12): 354-356. (Jap., with Engl. title and fig. captions). — (Author's address not stated).

The unidentified insular *Protohermes* sp. (Megaloptera) is considerably smaller than the continental *P. costalis*. This is compared with the similar situation in the Odon., where *Euphaea yayeyamana* on the small Japanese islands is also inferior in size to the allied *E. formosana* from Taiwan. It is assumed that the insular dwarfism is due to inferior larval nutrition prevailing under insular conditions.

- (7238) HOFFNAGEL, W.J.W., 1989. Libellen in De Lieskampen. — [Dragonflies in the Lieskampen]. In: Infoboekje Veren. Natuurwacht Bommelerwaard, Alem, 25-28. (Dutch). — (Tienhout 38, NL-5301 VZ Zaltbommel). 9 spp. are listed from the nature reserve, "De Lieskampen", nr Zaltbommel, the Netherlands.

- (7239) HORI, H., 1989. [Obituary]. Sajiyo Makino (1906-1989). *Zool. Sci.* 6(6): 1045-1046, portrait incl. — (Author's address not stated). A concise biography and evaluation of work of the late Dr S. Makino (born: Narita, June 21, 1906, deceased: Aug. 6, 1989; Emer. Prof. Hokkaido Univ.) are given, but his bibliography is not provided (16 books, over 400 papers, etc.). He was the leading cytogeneticist in Japan and one of the early workers on odon. cytology (1935), *J. Fac. Sci. Hokkaido Univ.* (VI) 4(2): 67-86; — 1935, *Jap. J. Genet.* 11: 234-235). In his "An atlas of chromosome numbers in animals" (1951, Iowa St. Coll. Press, Ames, xxx+290 pp.) he produced the first catalogue of odon. chromosome cytology.

- (7240) KINCEL, F., 1989. Tierflug und Flugtechnik. *Mitt. pathol.-anat. Bundesmus. Wien* 1989(1): 35-56. — (Author deceased).

Comprehensive, posthumously published essay, containing a paragraph on the Odon.

- (7241) KRISTENSEN, N.P., 1989. Insect phylogeny based on morphological evidence. In: B. Fernholm, K. Bremer & H. Jörnvall, [Eds], The hierarchy of life: molecules and morphology in phylogenetic analysis. (Proc. 70th Nobel Symp., Karlskoga, Sweden, 1988), pp. 295-306, Excerpta medica, Amsterdam-New York-Oxford (Int. Congr. Ser. 824). ISBN 0-444-81073-0. — (*Zool. Mus., Universitetsparken 15, DK-2100 Copenhagen-O*).

The cladogram, updated and modernised is largely based on the original presentation of A.V. Martynov (1938, *Trudy paleontol. Inst. akad. Nauk SSSR* 7(4), fold. graph.), and it is emphasised that on the basis of neontological evidence Martynov's Palaeoptera certainly do not represent a monophyletic entity, since the dragonflies share with the Neoptera a suite of apparently derived features that are lacking in Ephemeroptera. — Cf. also *OA* 3222.

- (7242) LAND, M.F., 1989. Variations in the structure and design of compound eyes. In: D.G. Stavenga & R.C. Hardie, [Eds], Facets of vision, pp. 90-111, Springer, Berlin-Heidelberg-New York-London-Paris-Tokyo, ISBN

3-540-50306-4. — (Sch. Biol. Sci., Univ. Sussex, Falmer, Brighton, BN1 9QG, UK).

The text relative to the Odon. is largely based on the primary papers by G.A. Horridge and T.E. Sherk, listed in *OA* 1929, 2024, 2453, and mainly deals with the "acute zones" concerned with the capture of prey and females. These are regions of the eye, pointing forwards or upwards, serving for detection of small insects at greater distances. Often this region is only present in the male (simuliid midges, hoverflies, drone bees, mayflies), suggesting a role in sexual pursuit, but in predatory insects such as mantids, robberflies and dragonflies, it occurs in both sexes. — There is a great variety in the distribution of resolution across the eyes of different odon., and this appears to be closely related to the life-styles of the different groups. Primitive zygopterans have only a weakly developed frontal acute zone, whereas in the faster-flying corduliids this is more pronounced, and there is also a second nearly vertical zone. In perching libellulids the frontal acute zone is minimal, but there is a high-resolution region about 40° across in the fronto-dorsal region. The most impressive eyes are those of the migratory fast-flying aeshnids; they have the greatest numbers of ommatidia (28,672 in *Anax junius*) amongst the largest facets (62 µm) and certainly the smallest inter-ommatidial angles (0.24° in the dorsal acute zone of *A. junius*). The dorsal acute zone takes the form of a relatively narrow band of high resolution extending right across the upper eye along a great circle intersecting the midline about 30° in front of the dorsal pole. It is clearly visible on the eye as a wedge of enlarged facets, whereas the frontal acute zone is not obviously different from the rest of the eye. The value of  $p$  in the dorsal zone is 0.48 µm, and 0.55 in the frontal zone. Interestingly, in the Australian *Zyxomma obtusum*, whose habits are crepuscular,  $p$  in the acute zone is higher (0.93 µm) than would be expected, although in the frontal zone it is 0.63, hardly different from its value in *Anax*. It is interesting that in dragonfly eyes the acute zones are combined with different functions; the frontal zone is presumably concerned with forward flight, like its counterpart in bees and

butterflies, whereas the dorsal zone is for finding prey. One imagines the great stripe in *Anax* trawling through the air, picking out small insects against the sky rather in the manner of the scan line in a radar set. Interestingly, the predatory larvae of aeshnids also have an acute zone with vertical interommatidial angles as small as 0.2°. Here, however, the acute zone is frontal, much as in mantids. Most of the eye in the adult, including both acute zones, is new growth, only a small region of facets at the back being retained from the larval eye.

- (7243) *LIBELLULA*. Mitteilungsblatt der Gesellschaft deutschsprachiger Odonatologen (GdO), Vol. 8, Nos 3/4 (dated 1989, published March 1990). — (c/o Prof. Dr R. Rudolph, Biol. Didaktik, Univ. Münster, Fliednerstr. 21, D-4400 Münster, FRG).

*Schmidt, E.*: Gomphus vulgatissimus (Linnaeus, 1758), klassisches Beispiel für nomenklatorische Wirrnisse (Anisoptera: Gomphidae) (pp. 107-114); — *Heidemann, H.*: Der Begriff Stylurus: Bemerkungen zu seiner Begründung (Anisoptera: Gomphidae) (pp. 115-144); — *Berthelmann, J.*: Die Pokal-Azurjungfer, *Cercion lindenii* (Selys, 1840) in einer Kiesgrube bei Holzminden — Erstfund für Niedersachsen (Zygoptera: Coenagrionidae) (pp. 145-150); — *Fuchs, U.*: Wiederfund von *Ophiogomphus serpentinus* (Charpentier, 1825) in Baden-Württemberg (Anisoptera: Gomphidae) pp. 151-155; — *Schlumprecht, H. & I. Stubert*: Libellen im Stadtgebiet Bayreuth. I. Vorkommen, Verteilung, Gefährdung (pp. 157-171); — *Ott, J.*: Wiederfund der Grossen Moosjungfer, *Leucorrhinia pectoralis* (Charpentier, 1825) in Rheinland-Pfalz (Anisoptera: Libellulidae) (pp. 173-175); — *Jurzitza, G.*: Anmerkungen zu den üblichen Kriterien für eine Bodenständigkeit von Libellen (pp. 177-179); — *Loos, G.H.*: Drei neue Fundorte des Kleinen Granatauges, *Erythromma viridulum* (Charpentier, 1840) in der Westfälischen Bucht (Zygoptera: Coenagrionidae) (pp. 181-184).

- (7244) *MAES, J.-M.*, 1989. Catálogo de los insectos controladores biológicos en Nicaragua. I. In-

- sectos depredadores (prima parte). *Revta nicaraguense Ent.* 8: 1-104. (With Engl. s.). — (Mus. Ent., Serv. Entomol. Auton., A.P. 527, León, Nicaragua).  
On pp. 3-15, 2 pls incl., 90 odon. spp. are listed and their general range and Nicaraguan localities are stated. The family coverage is as follows: Polythoridae (1 sp.), Calopterygidae (6 spp.), Lestidae (2), Megapodagrionidae (1), Pseudostigmatidae (2), Platystictidae (2), Protoneuridae (2), Coenagrionidae (22), Aeshnidae (7), Gomphidae (9), Corduliidae (1) and Libellulidae (35 spp.).
- (7245) MARDEN, J.H., 1989. Bodybuilding dragonflies: costs and benefits of maximizing flight muscle. *Physiol. Zool.* 62(2): 505-521. — (Dept Zool., Marsh Life Sci. Bldg, Univ. Vermont, Burlington, VT 05405-0086, USA).  
For the verbatim abstract cf. *OA* 6817.
- (7246) MURDOCH, D.A., 1989. The dragonflies of London's East End. *Lond. Naturalist* 68: 81-84. — (1 Porchester House, Varden St., London, E1 2JF, UK).  
11 spp. are recorded (1984-1988) and briefly discussed; 5 of these are breeding in the urban environment of London's East End. — Cf. also *OA* 7106.
- (7247) NEL, A., 1989. *Piroutetia liasina* Meunier, 1907, insecte du Lias de France, espèce-type des *Piroutetiidae* nov. fam. *Bull. Mus. natn. Hist. nat., Paris* (IV) 11(C) 2: 15-19. (With Engl. s.). — (8 av. Gassion, F-13600 La Ciotat).  
*P. liasina* Meunier, 1907 (*Bull. Mus. Hist. nat., Paris* 1907(7): 521-522) is redescribed. Due to its nodal structure, it is placed into a new fam., *Piroutetiidae* fam. n., infraorder Triatophlebiomorpha Pritykina, 1981, suborder Meganeurina Pritykina, 1980.
- (7248) PORESCU-GORJ, A., 1989. *Sympetrum pedemontanum* (Allioni) (Odonata-Anisoptera) présent dans les zones de plaine du sud de la Roumanie. *Trav. Mus. Hist. nat. "Grigore Antipa"* 30: 67-70. (With Engl. & Roman s's). — (Muzeul de Istorie Naturala "Grigore Antipa", Sos. Kiseleff 1, RU-71243 Bucurest).
- S. pedemontanum* is recorded from the southern Dobrogea and from the Bucurest area, bringing the status of the known odon. fauna of Romania up to 69 spp. *Cordulegaster insignis montandoni* is confirmed from the Comana Forest, S of Bucurest.
- (7249) RODRIGUES CAPITULO, A. & J. MUZON, 1989. Nuevas citas y localidades para les Odonata de la Argentina. *Revta Soc. ent. argent.* 47(1/4): 143-156. (With Engl. s.). — (Inst. Limnol. "Dr Raúl A. Ringuelet", Univ. Nac. La Plata, C.C. 712, AR-1900 La Plata, Buenos Aires).  
New records are presented for 35 spp. *Diasatops pullata*, *Gynothemis heteronycha*, *Macrodiplax balteata*, *Micrathyria spuria*, and *Orthemis ambrifusa* are for the first time reported from Argentina.
- (7250) ROWE, R.J., 1989. Odonata (damselflies and dragonflies): key to larvae. In: M.J. Winterbourn & K.L.D. Gregson, Guide to the aquatic insects of New Zealand, pp. 12-15. *Bull. ent. Soc. N.Z.* 9: 1-95. — (Author: Dept Zool., James Cook Univ., Townsville, Quid 4811, AU).  
Revised and updated edition of the work listed in *OA* 3321.
- (7251) SAMWAYS, M.J., 1989. Insect conservation and the disturbance landscape. *Agriculture, Ecosystems & Environment* 27: 183-194. — (Dept Zool. & Ent., Univ. Natal, P.O. Box 375, Pietermaritzburg-3200, RSA).  
Sampling of odon. larvae in a pond and an adjacent stream in Pietermaritzburg, Natal, was followed later in the year by the heaviest precipitation since meteorological records began. The bottom of the stream was so scoured that within hours it was washed of silt, leaving only stones. In contrast, the pond gradually expanded into surrounding sedgeland. The reduction of population levels of odon. larvae was severe in the stream, but not in the pond. Nevertheless, the recovery was rapid, and the status quo was regained within a single summer season. Such rapid recovery of this stream fauna was made possible by newly emerged ovipositing females, dispersing from

the pond to the quieter reaches of the stream following the floods. Changes in population levels (prior to, during, after the flood) are shown in a graph (*Pseudagrion kersteni*, *P. salisburyense*, *Platycypha caligata*, *Notogomphus praetorius*, *Paragomphus cognatus*, *Trithemis arteriosa*, *T. dorsalis*). Had similar conditions been created by man (e.g. opening the sluice gates of a dam above a stream, the impact presumably would be similar.

- (7252) SCHWIND, R., 1989. Size and distance perception in compound eyes. *In*: D.G. Stavenga & R.C. Hardie, [Eds], *Facets of vision*, pp. 425-443. Springer, Berlin-Heidelberg-New York-London-Paris-Tokyo, ISBN 3-540-50306-4. — (Inst. Zool., Univ. Regensburg, Universitätsstr. 31, D-8400 Regensburg, FRG).

Examples are presented to illustrate some principles by which absolute size or absolute distances of single objects can be gauged by arthropods with compound eyes. While in those adult Odon. where the eyes meet in the median plane distance measurements by binocular cues are unlikely, binocular zones of considerable extent were found in larval *Aeshna cyanea*, where 76% of the ommatidia contribute to the zone of binocular vision.

- (7253) SINGER, F., 1989. Interspecific aggression in *Leucorrhinia* dragonflies: a frequency-dependent discrimination threshold hypothesis. *Behav. Ecol. Sociobiol.* 25(6): 421-427. — (Dept Biol., Radford Univ., Radford, VA 24142, USA).

Male *Leucorrhinia* defend territories from conspecific and heterospecific intruders. Defense against heterospecifics is surprising, as mating and oviposition are the only activities that occur on the territories, and heterospecific males are not expected to pose a reproductive threat. *L. frigida* and *L. intacta* males respond aggressively with equal frequency and intensity against intrusions by conspecifics and heterospecifics. In contrast, *L. proxima* males respond more aggressively against conspecifics. The apparent lack of species discrimination shown by *L. frigida* and *L. intacta* males may result because territorial males that

assess intruders (as do *L. proxima*) suffer a tactical disadvantage from hesitating when an intruder flies in. This assessment process may lead to reduced fighting success by the territorial male. Thus there is a tradeoff between assessment cost incurred when the intruder is a conspecific and benefit from avoiding conflict when the intruder is a heterospecific. Given this assessment cost, males of species that only rarely encounter conspecific intruders are more likely to evolve species discrimination than males of species that commonly encounter conspecific intruders.

- (7254) SIVA-JOTHY, M.T. & Y. TSUBAKI, 1989. Variation in copulation duration of *Mnais pruinosa pruinosa* Selys (Odonata: Calopterygidae). 2. Causal factors. *Behav. Ecol. Sociobiol.* 25(4): 261-267. — (Second Author: Sch. Agric., Nagoya Univ., Chikusa-ku, Nagoya, 464-01, JA).

The sp. shows 3 distinct copulation durations (cf. *OA* 6633). A variety of factors which might influence copulation duration were investigated. Results indicate that the temperature in the vicinity of copulating pairs, the rate at which males encountered receptive females, territory quality, the rate of agonistic interactions between males, female gravidity and female "willingness" to oviposit have no effect on copulation duration. The most significant factor was the location of the site at which males captured their mates. It is suggested that under natural conditions the location of the capture site provides males with reliable, indirect information about a female's intention to oviposit: it is important for males of this sp. to acquire such information since sperm precedence, and therefore reproductive success, is in part dependent on the interval experienced by females between copulation and subsequent oviposition. The results are discussed and it is suggested that the 3 observed mate-securing tactics of *M. p. pruinosa* are facultative and information-dependent.

- (7255) STERNBERG, K., 1989. Reversibler, temperaturabhängiger Farbwechsel bei einigen *Sympetrum*-Arten (Odonata, Libellulidae). *Dr. ent. Z. (N.F.)* 36(1/3): 103-106. (With Engl.

s.). — (Inst. Biol. I/Zool., Univ. Freiburg, Albertstr. 21a, D-7800 Freiburg, FRG).

A reversible, temperature dependent colour change in ♂ *S. sanguineum*, *S. pedemontanum*, *S. vulgatum* and *S. striolatum* is described. It is most pronounced in the first 2 spp., and least in *striolatum*. With decreasing temperatures the bright crimson red of the abdomen in *sanguineum*, *pedemontanum* and *vulgatum* changes to very dark red, the yellowish-red abdomen of *striolatum* becomes brownish. The darkening process commences at temperatures below 12° C and it is completed in about 10 h (at 6° C), the reverse colour change needs about 30-60 min (at 23° C). The possible adaptive significance of this phenomenon is discussed.

- (7256) TIJMAN, J., 1989. Libellen. — Dragonflies. *Trias* 89(2): 11-12. (Dutch). — (Deventerstr. 62, NL-8171 AG Vaassen).

Instructions and hints on dragonfly collecting and field observations, directed at young members of the Netherlands Youth Federation for Nature Study.

- (7257) UTZERI, C. & L. DELL'ANNA, 1989. In-sorgenza della territorialità in Libellula depressa L. (Libellulidae). *Boll. Acc. Gioenia Sci. nat.* 20(332) [1987]: 237-239. — (Dipto Biol. Anim. & Uomo, Univ. Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma).  
Extensive abstract of the paper listed in *OA* 6831.

- (7258) UTZERI, C. & G. GIANANDREA, 1989. Aspetti del comportamento territoriale di *Crocothemis erythraea* (Brullé) (Libellulidae). *Boll. Acc. Gioenia Sci. nat.* 20(332) [1987]: 241-243. — (Dipto Biol. Anim. & Uomo, Univ. Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma).  
Extensive abstract of the paper listed in *OA* 6832.

- (7259) VINTILA, C., 1989. The dragonfly fauna (Odonata) of the lake Căldărușani (Romania). *Trav. Mus. Hist. nat. "Grigore Antipa"* 30: 101-104. (With Fr. & Roman. s's). — (Soveja St. 20, RU-78353 Bucarest).

Annotated list of 30 spp. from the lake situated ca 30 km NE from Bucarest, Romania. The national status is given for each sp., consequently the present paper represents the first attempt towards an odon. Red Data List of Romania.

- (7260) VOGT, K., 1989. Distribution of insect visual chromophores: functional and phylogenetic aspects. *In*: D.G. Stavenga & R.C. Hardie, [Eds], *Facets of vision*, pp. 134-151, Springer, Berlin-Heidelberg-New York-London-Paris-Tokyo, ISBN 3-540-50306-4. (Inst. Biol. I, Univ. Freiburg, Albertstr. 21a, D-7800 Freiburg, FRG).

The Zygoptera (*Calopteryx*) and the Anisoptera (*Aeshna*) eyes contain both 3-hydroxyretinal and retinal. The Odon. are thus the only animals where both chromophores have been found to be present in one and the same eye. Interestingly, in *Aeshna cyanea* the dorsal part of the eye (which has mainly short wavelength receptors) contains virtually only retinal whilst both chromophores are present in the ventral eye (Vogt unpubl.) — As far as phylogeny is concerned, the Odon. can obviously not be regarded as the "missing link" between insects with rhodopsin and those with xanthopsin, since this would mean complete revision of all accepted insect systematics. The presence of 3-hydroxyretinal in the Odon. must thus be considered as an independent acquisition.

- (7261) WHEELER, W.C., 1989. The systematics of insect ribosomal DNA. *In*: B. Fernholm, K. Bremer & H. Jörnvall [Eds], *The hierarchy of life: molecules and morphology in phylogenetic analysis*. Proc. 70th Nobel Symp., Karlskoga, Sweden, 1988), pp. 307-321, *Excerpta medica*, Amsterdam-New York-Oxford (Int. Congr. Ser. 824). ISBN 0-444-81073-0. — (Dept Organismic & Evol. Biol. and Mus. Comp. Zool., Harvard Univ., Cambridge, MA 02138, USA).

Among 11 orders, the Odon. are represented by *Argia fumipennis*. 3 kinds of data were collected, viz. restriction fragment length variation, gene size polymorphism, and direct sequence variation; each type of data addressing different aspects of the insect phylo-

genies in question. The Pterygota are unified by a medium-sized sequence insertion, the Odonata+Neoptera by restriction site changes, the Eumetabola by both sequence data and a large structural change, and the Coleoptera+Neuroptera again restriction site synapomorphies. Without the simultaneous examination of molecular information at multiple levels, many of the distinctions among these genealogies would be missed.

### 1990

- (7262) (Anonymous), 1990. Vuoden 1989 tulokset 21 suomalaisen hyönteislajin levinneisyyskartoituksesta. — Resultat av kartering av 21 insektarters utbredning i Finland år 1989. — Results of the mapping in 1989 of the distribution of 21 insect species in Finland. *Notul. entomol.* 69: 175-190. (Finn. & Swed., with Engl. s.). — (Reprints available from: Div. Ent. Mus. Zool., Univ. Helsinki, P. Rautatiekatu 13, SF-00100 Helsinki).  
Continuation of the series, last mentioned in *OA* 6840; 3 spp. were added to the original monitoring program. For an identic project in Estonia cf. *OA* 7283.
- (7263) ADAMS, C.E., D.W. BROWN, S.S. LITTLE & R. TIPPETT, 1990. A check-list of the freshwater invertebrate fauna of the Loch Lomond catchment. *Glasgow Naturalist* 21(5): 537-554. — (Univ. Fld Stn, Rowardennan, Glasgow, G63 0AW, UK).  
Loch Lomond is Britain's largest area of freshwater, located 25 km N of Glasgow. 9 odon. spp. are listed.
- (7264) AIDA, M., 1990. Notes on *Stylurus nagoyanus* Asahina from the Noubi Plains, central Japan. (3). *Gekkan Mushi* 227: 11-15. (Jap., with Engl. title). — (Sakae 1-7-15, Ichinomiya-shi, Aichi, 491, JA).  
[Abstract not available]. Contains a drawing of the ultimate instar larva.
- (7265) AIDA, M., 1990. Notes on *Stylurus nagoyanus* Asahina from the Noubi Plains, central Japan. (4). *Gekkan Mushi* 230: 12-17. (Jap., with Engl. title). — (Sakae 1-7-15, Ichinomiya-shi, Aichi, 491, JA).  
[Abstract not available]. For the earlier parts of this series cf. *OA* 6842, 6946, 7264.
- (7266) ARAI, Y., 1990. Life history and ecology of *Aeschna juncea* L. in Chichibu district. III. Description of the larva. *Nature & Insects* 25(3): 28-30. (Jap., with Engl. title). — (1233-2, Oaza Suezou, Yorii-machi, Osato-gun, Saitama Pref., 369-12, JA).  
Description and figs of the egg and all larval stages.
- (7267) ASAHINA, S., 1990. "Iconographia" are not taxonomic literature. *Gekkan Mushi* 227: 28-30. (Jap., with Engl. title). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).  
[Abstract not available]. Deals in part with the Odon.
- (7268) ASAHINA, S., 1990. The Odonata of Korean peninsula, a summarized review. Part IV. Anisoptera 3 (Libellulidae). *Gekkan Mushi* 228: 16-22. (Jap., with Engl. title). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).  
Annotated checklist of 20 spp., with figs of structural features of all of them. The comparison of *Sympetrum depressiusculum* and *S. frequens* is of particular interest. — For the earlier parts of this series cf. *OA* 6845, 6950, 6951.
- (7269) AŠMERA, J. & A. DOLNY, 1990. Vážka červená, *Crocothemis erythraea* (Brullé, 1832) a její výskyt v ČSSR. — *Crocothemis erythraea* (Brullé, 1832) and the situation of its sightings in ČSSR. *Sbor. Prací pedag. Fak. Ostravě* (Přir.) 117: 95-102. (Czech, with Russ. & Engl. s's). — (Krajská hygienická stanica, Partizánské nám. 7, CZ-728 92 Ostrava).  
*C. erythraea* is recorded from the distr. of Nový Jičín, Czechoslovakia (15-VII-1980), and its occurrence in central Europe is (partly) reviewed.
- (7270) BARGOS, T., J.M. MESANZA, A. BASAGUREN & E. ORIVE, 1990. Assessing river water quality by means of multifactorial methods using macroinvertebrates. A compa-

rative study of main water courses in Biscay. *Wat. Res.* 24(1): 1-10. — (Lab. Ecol., Depto Biol. Vegetal y Ecol., Univ. Pais Vasco, Apdo 644, ES-48080 Bilbao).

92 taxa of benthic macroinvertebrates were used to ordinate 175 sites from main water courses of Biscay (Basque Country), Spain. 5 odon. spp. are listed from various localities.

- (7271) BEUTLER, H., 1990. Differenzierte Populationsstrukturen bei Libellen (Odonata) und ihre Bedeutung für den Artenschutz. *Zusammenfass. Int. Symp. NatSchutz & Verhalten, Hamburg*, 1 p. (abstract only; no pagination). — (Frankfurter Str. 23, DDR-1230 Beeskow, GDR).

It is argued that larval and adult Zygoptera habitats are usually restricted to small localities, therefore the local populations of threatened spp. should be protected. The Anisoptera, save for the rheophilous taxa, tend to disperse over large areas, therefore the protection is needed of a network of dispersion centres. — (*Absiracter's Note*: This was essentially a German Symposium, with some participation from the neighbouring countries, the presentation language was German, and all papers solely deal with central European fauna and situations).

- (7272) BORISOV, S.N., 1990. O lete strekoz (Odonata) na iskusstvennye istochniki sveta. — On flight of Odonata to artificial light sources. *Zool. Zh.* 69(2): 29-35. (Russ., with Engl. s.). — (Inst. Zool. & Parasitol., Tadzhiik Acad. Sci., USSR-734000 Dushanbe, Tadzhiikistan).

Out of 35 Tadzhiik spp. studied, 20 were recorded to fly towards artificial (ultraviolet) light sources. While in 12 spp. such flights were incidental, 8 spp. are considered obligatory photoxens, viz. *Ischnura evansi*, *I. fountainei*, *Anax parthenope*, *Hemianax ephippiger*, *Crocothemis servilia*, *Selysiothemis nigra*, *Sympetrum decoloratum* and *S. fonscolombeii*. These are often active at dusk.

- (7273) BOUDIER, F. & M. LEVASSEUR, 1990. Les odonates du bassin versant de la Claise tourangelle (France: Indre-et-Loire). *Martinia*

(Hors-série) 1: 1-96. (With Engl. & Germ. s's). — (Second Author: 11 rue de la Maubertière, St-Avertin, F-37170 Chambray-les-Tours).

The results of the inquiry into odon. populations of the Claise R. encatchment are reported with special reference to the Gomphidae. The monographic treatment of the fauna (incl. population biology, notes on ecology, exuviae, behaviour) is concluded by a discussion of the human impact on the regional odon. habitats.

- (7274) BOUDOT, J.-P., G. JACQUEMIN & P. GOUTET, 1990. Odonates des lacs tourbières à sphaignes des Hautes-Vosges, France. *Opusc. zool. flumin.* 52: 1-11. (With Engl. s.). — (Second Author: Lab. Biol. Insectes, Univ. Nancy-I, B.P. 239, F-54506 Vandoeuvre-les-Nancy).

27 spp. are recorded from lakes and bogs, of which *Aeshna subarctica elisabethae* Djak. is rather common, while *Somatochlora alpestris* (Sel.) and *S. arctica* (Zett.) are scarce. *Epithecina bimaculata* (Charp.) has been only recently discovered in the region. The percentage of the peat bog spp. is higher (32%) in the Hautes-Vosges than in other highland regions of France. This may be due to the geographic position and local climatic conditions, and to the availability of numerous adequate habitats.

- (7275) CHOVANEC, A. & S.E. ENDEL, 1990. Ökologische Ansprüche von Amphibien und Libellen als Richtlinie für die Planung von Feuchtgebieten. *Landschaft+Stadt* 22(1): 26-32. — (With Engl. s.). — (Inst. Zool., Univ. Wien, Althanstr. 14, A-1090 Wien).

The dragonfly and amphibian habitat requirements are discussed from the point of view of the featuring of man-made wetlands, based on the experience with 5 interconnected ponds at the Donauinsel in Vienna, Austria. The requirements of the 2 groups are similar and are generally characterised by a high environmental heterogeneity of aquatic and terrestrial habitats. They are good habitat quality indicators, hence the adequate management of their biotopes also has positive effects on non-target groups, such as other aquatic insects and birds.

- (7276) CONRAD, K.F. & T.B. HERMAN, 1990. Seasonal dynamics, movements and the effects of experimentally increased female densities on a population of imaginal *Calopteryx aequabilis* (Odonata: Calopterygidae). *Ecol. Ent.* 15(2): 119-129. — (Dept Biol., Queen's Univ., Kingston, Ont., K7L 3N6, CA). A population was sampled daily on a tributary of Canard River, Kings County, Nova Scotia, for the entire flight season in 1983 (29 May to 13 August), using capture-mark-recapture techniques. 2701 sightings of 678 individuals were obtained along a 635 m segment of the stream. A maximum daily count of 174 imagines was reached on 11 June, after which the population gradually declined. More females than males were marked but sexually mature males outnumbered females at the water on all but four days. Immigration rather than local emergence accounted for a large proportion of the population after 20 June. Females were consistently vagile: males were site-specific but occasionally moved long distances between captures. Males and females first marked as tenerals became reproductively mature after about 5 days. The Authors experimentally increased female density on a partially isolated section of the study stream to see how increased female numbers affected the demographics and movement patterns of the population. Residence times for introduced and resident females were similar. In contrast, during a similar introduction of males a year earlier, most introduced males disappeared quickly. Males decreased the distance they travelled daily between captures, their total distance travelled and their range following the introduction, and females showed a tendency (not statistically significant) toward increased movements and dispersal, as predicted.
- (7277) DREYER, W., 1990. Flieger überm Tümpel. *Kosmos* 86(6): 38-45. — (Zool. Mus., Hege- wischstr. 3, D-2300 Kiel-1, FRG). A general narrative on dragonfly emergence and early adult life, by a well known German odonatologist, with numerous col. phot.
- (7278) EISLÖFFEL, F., 1990. Erstnachweis des Südlichen Blaupfeils *Orthetrum brunneum* (Fonsc.) im Regierungsbezirk Koblenz. *Fauna Flora Rheinland-Pfalz* 5(4): 1072-1074. — (Ellerbachstr. 3, D-6551 Rüdesheim, FRG). *O. brunneum* is recorded from the claypit Birkenfeld, distr. Koblenz, FRG (19-VII-1989). The record is briefly discussed and the odon. fauna of the locality is listed.
- (7279) *GOMPHUS*. Mededelingsblad van de belgische libellenonderzoekers — Bulletin de liaison des odonatologues belges, Vol. 6, No. 1 (May, 1990). (Dutch & Fr.). — (c/o A. Anselin & P. Goffart, Inst. Roy. Sci. Nat. Belg., 29 rue Vautier, B-1040 Bruxelles). *Anselin, A. & P. Goffart*: Editorial (pp. 2-3); — *Van Mierlo, M./Goffart, P.*: Compte-rendu d'excursions (pp. 4-9); — *Goffart, P.*: Premiers resultants de la saison 1989 et lancement de la saison 1990 (pp. 10-25); — *Anselin, A./Goffart, P.*: Publications odonatologiques récentes (pp. 30-36); — *Anselin, A.*: Récession d'ouvrages (P. 37). — The issue also contains various notifications (pp. 26-27) and announcements of meetings (pp. 28-29) and field trips (pp. 38-39).
- (7280) *GRACILE*. [Newsletter of Odonatology]. Published by the Kansai Research Group of Odonatology, Osaka, No. 43 (Apr. 1, 1990), with a separate Index to Nos 1-40. (Jap., with Engl. titles). — (Distribution outside Japan: K. Inoue, 5-9, Fuminosata 4-chome, Abeno-ku, Osaka, 545, JA). *Tsuda, S., T. Takeuchi & S. Nishu*: Mesh code of "Dragonflies of Kinki District", 1984. Part 1. Zygoptera (pp. 1-9); — *Hisakawa, T.*: A mass occurrence of *Nihonogomphus viridis* at the middle reaches of Niu River, Nara Prefecture (p. 10); — *Muraki, A.*: A small knowledge on three odonate species at Ishigaki Island, Okinawa Prefecture (pp. 11-12); — *Nagase, K.*: Additions to "What occurring in large cities" (p. 13); — *Kimura, T.*: Report on the survey trip to Hotani River and Yamada Pond, Hirakata, Osaka Prefecture (pp. 14-16); — *Hisakawa, T.*: Report on the survey trip to some ponds in Gojo, Nara Prefecture (pp. 16-19); — *Kataatani, N.*: Obituary Mr M. Rokuyama (pp. 20-24; with his complete bibliography); — *Kimura, T.*: Memories of the late



Masataka Rokuyama (p. 25).

- (7281) GRIBBIN, S.D. & D.J. THOMPSON, 1990. Asymmetric intraspecific competition among larvae of the damselfly *Ischnura elegans* (Zygoptera: Coenagrionidae). *Ecol. Ent.* 15(1): 37-42. — (Dept Environ. & Evol. Biol., Univ. Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK).

A laboratory competition experiment is described in which the growth and development rates of larvae were measured over an entire instar. 2 larval instars which commonly occur together in the field were used in the experiment; they were maintained with a superabundance of prey and either larvae from the same or the larger/smaller instar. Small larvae suffered increased development times and decreased size increases at the moult in the presence of large larvae but similar interference effects were not evident when these smaller larvae were in the presence of other small larvae. Development time and size increases of large larvae were not significantly affected by the presence of small larvae. Irrespective of the instar combinations investigated, interference effects were reduced when there were more perches available, although in only a few cases was this reduction significant. The consequences of the asymmetric competition reported in the experiment for the study of lifetime reproductive success in damselflies are discussed. Late emerging adults may incur reduced reproductive success.

- (7282) HERMANS, J.T., R. GUBBELS, F. SCHEPERS & R. SCHOLS, 1990. Het belang van de zuidlimburgse beken voor de fauna. — The importance of the streams in South-Limburg for wildlife. *Natuurh. Maandbl.* 79(3/4): 71-104, 2 col. pls excl. (Dutch, with Engl. s.). — (First Author: Hertestraat 21, NL-6067 ER Linne).

The odon. chapter (pp. 98-100, pl. 1, fig. 9) is authored by J.T. Hermans and deals exclusively with the status of *Calopteryx splendens* and *C. virgo* in the Zuid Limburg prov., the Netherlands. For *C. virgo*, a detailed list is presented of all (43) known records from 1904 to 1984.

- (7283) HULDÉN, L., 1990. Insect-mapping project started in Estonia. *Notul. entomol.* 69: 191-194. — (Div. Ent., Zool. Mus., Univ. Helsinki, P. Rautatiekatu 13, SF-00100 Helsinki).

During the summer of 1989, a monitoring project, related to the Finnish Insect-Mapping 81, was introduced in the Baltic state of Estonia, USSR. *Calopteryx splendens* and *C. virgo* are among the 24 target spp., whose distributional maps (grid 10x10 km) are produced. These are the same as in the Finnish project (cf. OA 7262).

- (7284) HUTCHINSON, R., 1990. *Nannothemis bella* (Uhler) (Odonata: Libellulidae), la plus petite libellule du Québec et d'Amérique du Nord. *Fabriques* 15(1): 10-13. (With Engl. s.). — (Centre Biosyst. Res., Agriculture Canada, K.W. Neatby Bldg, Ottawa., K1A 0C6, CA). The larval habitat, i.e. water holes in fens (Masham Township, Gatineau, Quebec, Canada) is described and the ultimate instar is figured.

- (7285) INOUE, K., 1990. Annual review of entomology for 1989: Odonata (overseas). *Gekkan Mushi* 229: 7-11. (Jap., with Engl. title). — 5-9, Fuminosato 4-chome, Abeno-ku, Osaka, 545, JA).

This review series was commenced in 1979 by Dr S. Asahina, highlighting in a single paper the main odonatological achievements in the 1970s (OA 6951). While the period 1980-1981 has apparently not been covered, between 1982-1989 the same author produced 7 annual reviews for the years 1982-1988 (OA 4283, 4659, 5490, 5532, 5828, 6262, 6846). The series is now to be continued by the present author. — In this paper the general set up and coverage remain similar as heretofore, mainly based on primary papers published in the main SIO periodicals (taxonomy, distribution, morphology & functional morphology, physiology, ecology, behaviour, and obituaries). Sections on the current Int. Symp. Odonatol., on commercially available identification books, and on the SIO are also included. The world literature, covered by Odonatological Abstracts, is not reviewed.

- (7286) *JOURNAL OF THE BRITISH DRAGON-FLY SOCIETY*, Vol. 6, No. 1 (Apr., 1990). — (c/o Mrs J. Silsby, 1 Haydn Ave., Purley, Surrey, CR2 4AG, UK).

*Brownett, A.*: Predation of *Enallagma cyathigerum* (Charpentier) by Grey Wagtail (*Motacilla cinerea* Tunstall) (pp. 1-2); — *Fox, A.D.*: The flight period of *Ischnura pumilio* (Charpentier) in Britain and Ireland (pp. 3-7); — *Miller, P.L.*: The rescue service provided by male *Enallagma cyathigerum* (Charpentier) for females after oviposition (pp. 8-14); — *Brook, J. & G. Brook*: Have you got the pond bug? (15-17; on the odon. in garden ponds); — *Limbert, M.*: Notes on the Dorchester Nymph, *Leucorrhinia dubia* (Vander Linden) (pp. 18-19); — *Recent odonatological publications* (p. 20).

- (7287) *KIMMINSIA*. Newsletter of the United Kingdom National Office of the International Odonatological Society (SIO), Vol. 1, No. 1 (May 1, 1990). Edited by J. Silsby & G. Vick (1 Haydn Ave., Purley, Surrey, CR8 4AG, UK). — Free for SIO members resident in UK and Ireland, upon application free for SIO members resident in all Commonwealth countries and Sth Africa. All others: US \$ 1.-per issue, orders to the SIO Central Office, Bilthoven, The Netherlands.

In accordance with the SIO tradition, the newsletter is scheduled to appear semiannually. It will be monitoring to the odonatol. activities in the U.K. and Commonwealth, reporting also on the work of British workers scattered throughout the globe. The periodical is named after Douglas Eric KIMMINS (1905-1985), the late odon. curator at the Brit. Mus. (1925-1970; cf. *OA* 5539, 5644). Consequently, the Editorial (p. 1) of this first issue brings a few recollections (*B. Kiauta, P. Corbet*) of "a man who is remembered with respect, affection and gratitude" by all who ever had the privilege to meet him, and contains also a brief text contributed by his widow, *N. Kimmins*. The exhaustive section "News from members" (pp. 2-4) reports on the current interest and work-in-progress of *S. Butler* (field key of European Aeshnidae, extensive rearing of European larvae), *P. Corbet* (updating his "A biology of

dragonflies", mosquito control by odon. larvae), *T. de Fonseca* (preparation of a handbook on the odon. of Sri Lanka), *K. Goodyear* (larval habitat requirements of closely related British spp.), *T. Graves* (collecting in the Ruwenzori, Uganda), *R. Kemp* (Oriental & Australasian fauna), *E. McCabe* (Galapagos, Ecuador, Amazon), *P. Miller* (reproductive behaviour & sperm competition, courtship in libellulids, under-water oviposition), *N. Moore* (long-term population change, conservation & its scientific backup), *M. Parr* (behavioural work on some British libellulids), *J. Pickup* (larval feeding ecology & growth dynamics), *J. Silsby* (southern Africa, Brazil, Peru), *D. Thompson* (zygopt. larval ecology & lifetime reproductive success), and *G. Vick* (Nepal, Arabian peninsula). *J. Silsby* narrates her impressions from the Tenth Int. Symp. Odonatol. (p. 4). Odonatol. "News from the universities" (p. 5) was contributed by *P. Miller, M. Parr* and *D. Thompson*. Impressive is the account by *S. Brooks* on the "Odonata visitors to the National History Museum in 1989" [= *Brit. Mus. Nat. Hist.*] (p. 5), listing 21 workers and the objectives of their visits. Under the heading "Help offered" (p. 7), *S. Foster* is offering his Australian duplicates, and *B. Kemp* reports on his database, based on the Davies & Tobin world list, updated with papers & abstracts published in *Odonatologica* & *Notul. odonatol.* The sole technical note in this issue was contributed by *B. Kemp*: An encounter with *Tanypteryx hageni* in the Cascade Mountains (pp. 6-7). — The newsletter is nicely edited, very efficiently organised, and, due to the world-wide activities of British workers, it is bound to be of more than national interest.

- (7288) KREBS, B.P.M., 1990. Libellelarven uit Zeeland (Odonata). — Larvae of dragonflies from the province of Zeeland (Odonata). *Ent. Ber., Amst.* 50(3): 25-32. (Dutch, with Engl. s.). — (Delta Inst. Hydrobiol. Res., Vierstraat 28, NL-4401 EA Yerseke). Detailed habitat descriptions are given for the records of 16 spp. (Zeeland prov., the Netherlands). Of interest is that of *Sympetrum vulgatum* from a brackish pond (0.33-1.97% Cl).

- (7289) KÜHN, D., 1990. Tagung in Braunschweig: [...] Sorgt der Triebhauseffekt dafür, dass bald wieder mehr Libellen umherschwirren? *Wolfsburger Nachrichten*, issue of March 17, pagination not available. — (Author's address not stated; for the information apply to: Prof. Dr G. Rüppell, Zool. Inst., Techn. Univ. Braunschweig, Pockelsstr. 10a, D-3300 Braunschweig, FRG).  
Local daily's report on the 10th Symposium of German Odonatologists (Braunschweig, March 16-18, 1990, Organizing Secretary: Prof. Dr G. Rüppell). Of particular interest is Dr Rüppell's announcement of a 10-yr research project on the Odon. as possible indicators of climatic changes. The idea is based on the increasing evidence on the current northward range expansion of numerous spp. (Cf. e.g. *OA* 6969).
- (7290) LANDRY, B., 1990. Une chasse de nuit en torbière au mois de septembre dans la Gatineau. *Fabries* 15(1): 15-19. (With Engl. s.). — (31 Edgar, Ottawa, Ont., K1Y 3K5, CA).  
Symptetrum vicinum is recorded from a bog in the Masham Township, Gatineau, Quebec, Canada (2-IX-1988).
- (7291) LANDRY, B., 1990. Monsieur Raymond Hutchinson, récipiendaire de la décoration Insecte de bronze. *Fabries* 15(1): 21-23. — (31 Edgar, Ottawa, Ont., K1Y 3K5, CA).  
Presents a brief biography of the well known Quebecois odonatologist R. Hutchinson (born March 7, 1937; for his current address cf. *OA* 7284) and an appreciation of his work. He is the author of ca 160 odonatol. papers and 2 monographic works. (*OA* 1901, 2516) and was the founder and joint Editor of the quarterly *Cordulia*, published in 6 vols during 1975-1980 (cf. *OA* 1165, 1368, 1395, 1523, 1613, 1736, 1884, 1970, 2210, 2351, 2558, 2625, 2791).
- (7292) LEO, P., 1990. Segnalazioni faunistiche italiane. 151. Hemianax ephippiger (Burmeister, 1839) (Odonata: Aeshnidae). *Boll. Soc. ent. ital.* 121(3): 231. — (Via Tola 21, I-09128 Cagliari).  
6 Sardinian records (1986-1989) are listed. The teneral condition of some of the specimens indicates that the sp. may be capable of reproduction in Sardinia.
- (7293) LOHMANN, H., 1990. Anax immaculifrons Rambur, 1842 in Iran (Odonata: Aeshnidae). *Opusc. zool. flumin.* 54: 9-10. (With Engl. s.). — (Ziegelackerweg 1, D-7888 Rheinfelden, FRG).  
With reference to the paper listed in *OA* 7054, the sp. is for the first time recorded from Iran (1 ♂, 1 ♀, Shah Bazan, Ab-i-Diz River, ca 80 km NE of Dezful, alt. 500; 16/17-IV-1937; deposited in ZMVC). Herewith Battin's suggestion on the rheophilous character of the sp. is confirmed.
- (7294) LOHMANN, H., 1990. Coenagrion ponticum intermedium subsp. nov. von der Insel Kreta, Griechenland (Odonata: Coenagrionidae). *Opusc. zool. flumin.* 54: 1-7. (With Engl. s.). — (Ziegelackerweg 1, D-7888 Rheinfelden, FRG).  
The new spp. is described and illustrated from 9 ♂ and 3 ♀ (holotype ♂: Greece, W Crete, Wukolies-Kándano; 31-V-1942; deposited in NHMV). It differs from the nominate ssp. mainly in the shape and variability of the inferior appendages, and in the colour pattern of ♂ abdominal segments 5-6.
- (7295) MARTINIA. Bulletin de liaison des Odonatologues de France, Vol. 6, No. 1 [=No. 15, but the consecutive numbering is discontinued with this issue] (Apr., 1990). — (c/o J.-L. Dommanget, 7, rue Lamartine, F-78390 Bois d'Arcy).  
*Boudot, J.-P., Goutet & G. Jacquemin*: Note sur quelques odonates peu communs observés en France (pp. 3-10); — *Papazian, M.*: Les odonates du Puy-Sainte-Réparate, Bouches-du-Rhône (pp. 11-15); — *Prot, J.-M.*: Observations sur les caractères de nervation du genre Somatochlora (Odonata, Anisoptera: Corduliidae) (p. 16); — *Machet, P.*: Présence de Lestes macrostigma (Eversmann, 1836) dans l'Ile de Noirmoutier, Vendée (Odonata, Zygoptera: Lestidae) (pp. 17-18) — *Sueur, F., P. Carruette & R. Balej*: Migrations d'odonates dans le département de la Somme (pp. 19-23); — *Dommanget, J.-L.*: Rubrique bibliogra-

phique (pp. 24-25); — *Boudier, F.*: Analyse d'ouvrage (pp. 26-27); — *Machet, F.*: Nouvelles philatéliques (p. 28).

- (7296) MATSUKI, K., 1990. Description of the larva of *Gomphidia parakensis* Laidlaw from Thailand (Gomphidae, Odonata). *Gekkan Mushi* 228: 32-33. ( Jap., with Engl. title & fig. captions). — (Hasama-cho 3-1575-14, Funabashi-shi, Chiba, 274, JA).

The ♂ and ♀ exuviae from the Chiang Mai area are described and illustrated.

- (7297) McPEEK, M.A., 1990. Determination of species composition in the *Enallagma* damselfly assemblages of permanent lakes. *Ecology* 71(1): 83-98. — (Kellogg Biol. Stn & Dept Zool., Michigan St. Univ., Hickory Corners, MI 49060, USA).

The ecological interactions, responsible for the species distributional patterns in various *Enallagma* spp. in the lakes that do and in those that do not support fish populations, were examined in 26 SW Michigan lakes. The patterns are conditioned by differences in predator compositions and by intrageneric competition rather than by water chemistry. Predation by large Anisoptera in fishless lakes and that by fish in fish-containing lakes are the major environmental factors governing the *Enallagma* spp. distributions. In the laboratory, when simultaneously offered an *Enallagma* sp. from a fishless lake group (*aspersum*, *boreale*, *cyathigerum*) and another from a fish-containing lake group (*antennatum*, *carunculatum*, *civile*, *ebrium*, *exulans*, *geminatum*, *hageni*, *signatum*, *vesperum*), fish consumed more individuals of sp. from the fishless lake group, while all anisopterans, regardless the lake type affiliation, consumed more individuals of sp. from the fish-containing lake group. Field experiments show that large anisopterans in fishless lakes and fish impose much greater mortality on *Enallagma* spp. with which they do not coexist. Density-dependent competitive interactions among the *Enallagma* spp. were only apparent in the fishless lakes, affected spp. from both groups similarly, and altered their growth but not their survival. The evidence is discussed in

the context of overall community organisation and in the terms of consequences to the evolution of spp.

- (7298) MILLER, P.L., 1990. Mechanisms of sperm removal and sperm transfer in *Orthetrum coerulescens* (Fabricius) (Odonata: Libellulidae). *Physiol. Ent.* 15(2): 199-209. — (Dept Zool., Univ. Oxford, South Parks Rd, Oxford, OX1 3 PS, UK).

An account of the structure of the secondary male genitalia is given together with an outline of the internal genitalia of the female. Observations on the experimental inflation of the penis are described. No sperm was released during fast inflations and deflations of the penis, but sustained inflation of the penis led to the release of a clear fluid followed by the slow discharge of sperm. Examination of natural copulations in the field has shown that rapid rhythmic movements at up to 5 Hz take place in the male's third abdominal segment throughout most of copulation, but towards the end they cease though inflation is maintained. It is suggested that the rapid movements coincide with the removal of rival sperm from the female and that sperm is transferred to the female only during the maintained inflation. Possible mechanisms of sperm translocation, sperm removal and sperm transfer are discussed with reference to male and female genital structures and the action of relevant muscles.

- (7299) MUZÓN, J., A. RODRÍGUEZ-CAPITULO & G. JURZITZA, 1990. Populations-dynamik von *Telebasis willinki* Fraser, 1948 im Galeriewald des Rio de la Plata bei Punta Lara, Argentinien (Odonata: Coenagrionidae). *Opusc. zool. flumin.* 53: 1-10. (With Engl. & Span. s's). — (Third Author: Bot. Inst., Univ. Karlsruhe, Kaiserstr. 12, D-7500 Karlsruhe-1, FRG).

Demography, seasonal development and sex ratio of a larval population from the gallery forest of Punta Lara (34°47'S, 58°01'W) are reported. The population lives on the southern limit of the known, mainly tropical range of the sp. It is demonstrated that *T. willinki* is a univoltine summer sp. (sensu P.S. Corbet,

- 1983, A biology of dragonflies, Clasley, London). The unfavourable season (autumn-winter) is passed in a quiescent state. The seasonal synchronisation is remarkably high. The sex ratio is about 1:1 ( $\chi^2 = 2.39$ ,  $P < 0.05$ ).
- (7300) NEL, A. & P. BLOT, 1990. Paléontologie de la paléotufière éocène de Sézanne (Marne, France) (Insecta: Odonata, Trichoptera, Hemiptera, Diptera). *Entomol. gall.* 2(1): 26-30. (With Engl. s.). — (First Author: 8 av. Gassion, F-13600 La Ciotat).  
Contains descriptions and figs of 2 unidentified libelluloid larvae from the travertine deposits of Sézanne (Marne, France), from the Nunier-Chalmas coll. A bibliography on the travertine fossil insects is appended.
- (7301) NEWSLETTER [OF THE] BRITISH DRAGONFLY SOCIETY, No. 17 (Spring, 1990). — (c/o Mrs J. Silsby, 1 Haydn Ave., Purley, Surrey, CR2 4AG, UK).  
It contains 24 numbered news items and scientific notes, incl. brief reports on various meetings, local groups, etc. Of more than national interest is the note by G. Fenton: Odonata of the Auvergne, Ardeche & Camargue (p. 3).
- (7302) NORTHCOTT, P., 1990. Survey of the status of *Epiophlebia laidlawi* Tillyard in the Shivapuri Watershed and Wildlife Reserve, 1988. In: N. Saville, P. Northcott, T. Tufton & N. Jones, Report of the Cambridge Entomological Expedition to Nepal, 1988, pp. 31-35, Dept. Zool., Univ. Cambridge. — (Dept Zool., Univ. Cambridge, Downing St., Cambridge, CB2 3EJ, UK).  
In Dec., larvae (length 8-23 mm) were found abundantly in the headwaters of the rivers Bagmati, Likhu and Dhobi, alt. 1860-2380 m, in mature forest undisturbed by heavy cattle grazing or soil erosion. They were present in the waterfalls and fastest stretches of fast clear streams. Detailed locality data and habitat descriptions are provided, and it is concluded that the Shivapuri Hills apparently support healthy populations, which are effectively protected by the "Wildlife Reserve" status. — (Cf. *OA* 3662, 6517).
- (7303) ODONATOLOGICAL LIBRARY NEWS. Published by the Kansai Research Group of Odonatology, Osaka (Jap., with Engl. title). No. 6 (Apr. 1, 1990). — (Distribution outside Japan: K. Inoue, 5-9, Fuminosato 4-chome, Abeno-ku, Osaka, 545, JA).  
The details on this periodical are stated in *OA* 7074. The present issue contains bibliographic data of 476 Japanese papers, incl. 421 published in *Gracile*, Nos 1-40 (1965-1989).
- (7304) PAARLBERG, A. & H.H. TOLKAMP, 1990. Macrofauna van de zuidlimburgse beken. — Macroinvertebrate fauna of streams in Southern-Limburg. *Natuurh. Maandbl.* 79(3/4): 105-115. (Dutch, with Engl. s.). — (First Author: Hatterm 123, NL-Roermond).  
Springs and streams are characteristic elements in the natural environment of the southernmost part of the Zuid Limburg prov., The Netherlands; they display physical features of mountain streams. *Calopteryx splendens*, *C. virgo* and *Cordulegaster boltonii* are the characteristic odon. spp., listed areawise in a table.
- (7305) PERICH, M.J. & L.R. BOOBAR, 1990. Effects of the predator *Dugesia dorotocephala* (Tricladida: Turbellaria) on selected nontarget aquatic organisms; laboratory bioassay. *Entomophaga* 35(1): 79-83. — (U.S. Army Biomed. Res. & Development Lab, Fort Detrick, Frederick, MD 21701-5010, USA).  
The effects on 17 spp., incl. 2 odon., were determined under controlled laboratory conditions. The mean percent survival of *Erythemis simplicicollis* was 100, and that of *Ischnura* sp. 89.9.
- (7306) PICKUP, J. & D.J. THOMPSON, 1990. The effect of temperature and prey density on the development rates and growth of damselfly larvae (Odonata: Zygoptera). *Ecol. Ent.* 15(2): 187-200. — (First Author: Brit. Antarctic Surv., N.E.R.C., High Cross, Madingley Rd, Cambridge, CB3 0ET, UK).  
The effects of prey density and temperature on the feeding and development rates of several late instars of the larvae of *Lestes sponsa*, *Coenagrion puella* and *Ischnura elegans* were in-

vestigated in a laboratory experiment. — Functional responses were used to estimate maximum feeding rates. The latter were compared between spp., instars and temperatures by expressing prey consumption in terms of prey biomass consumed per unit predator biomass. *Lestes* was capable of feeding at almost twice the rate of either *Coenagrion* or *Ischnura*. — Higher feeding rates led to faster development rates and there was an interaction between sp. and temperature. With the exception of those with very low feeding rates, larvae maintained at higher temperatures, but similar feeding rates, developed faster. Under similar conditions of temperature and feeding rate, *Lestes* larvae developed faster than larvae of either *Coenagrion* or *Ischnura*. — Faster development rates at similar rates of food intake were achieved at the cost of reduced size-increases between instars. — The differences in the responses of the 3 spp. are discussed in the light of their respective life histories, and with reference to a recent model of population regulation in damselflies.

- (7307) PILON, J.-G. & D. LAGACÉ, 1990. Première mention de *Celithemis eponina* (Drury) (Odonata: Libellulidae) au Québec. *Fabriques* 15(1): 1-2. (With Engl. s.). — (Dép. Sci. Biol., Univ. Montréal, C.P. 6128, Montréal, Qué., H3C 3J7, CA).

A ♂ from Philipsburg (Missisquoi) is brought on record (27-VIII-1989), and the distribution, habitat ecology and phenology of the sp. in Canada are summarised.

- (7308) PILON, J.-G., L. PILON & D. LAGACÉ, 1990. La faune odonatologique de la zone boréale du Québec. *Soc. int. odonatol. rapid. Comm.* (Suppl.) 11: VI+42 pp. (With Engl. s.). — (Dép. Sci. Biol., Univ. Montréal, C.P. 6128, Montréal, Qué., H3C 3J7, CA).

A crossreferenced list is presented of regional records, referable to 87 spp., based on 73 publications, published during 1877-1989. The exact topographic positions of all odon. localities known in the boreal zone of Québec, Canada, are given in the introductory chapter.

- (7309) PROGRAMM UND KURZFASSUNGEN DER VORTRÄGE zur 10. Tagung der Gesellschaft deutschsprachiger Odonatologen (GdO) in Braunschweig vom 16. bis 18. März 1990. 12 pp. Edited by G. Rüppell, published by the GdO, Braunschweig. — (Editor: Zool. Inst., Techn. Univ. Braunschweig, Pockelsstr. 10a, D-3300 Braunschweig, FRG). — Also available from the SIO Central Office, Bithoven.

Programm (pp. 1-3); — Posters (p. 4; titles only); Brock, K.: Libellen im Kreis Steinburg; — Jahn, P.: Mediterrane und seltene mitteleuropäische Libellen; — Jödicke, R.: Habitatselektion von *Sympecma braueri* im Hernst; — Krüner, U.: Eine Wasserfalle für Kleinlibellenlarven; — Kuhn, K.: Libellen aus Madagaskar; — Ruddeck, J.: Die Bremer Libellengruppe; — Libellenbeobachtungen im 19. Jahrhundert; — Die Libellenfauna im Raum Bremen: Verbreitung der Libellen an typischen Gewässern in Grossraum Bremen; — Schunke, E.: Libellen typischer ostniedersächsischen Gewässer; — Kurzfassungen der Vorträge: Wildermuth, H.: Libellen im Umfeld des Naturschutzes: Forschung und Praxis (p. 5); — Donath, H.: Analyse der aktuellen Gefährdungssituation der Odonatenfauna der DDR (p. 5); — Müller, J.: Übersicht und Gefährdungssituation zur Libellenfauna des Bezirkes Magdeburg (DDR) (p. 6); — Kuhn, K.: Aktueller Stand der Libellenkartierung in Bayern (p. 6); — Ott, J.: Die Odonatenfauna (Imagines) unterschiedlich strukturierter und genutzter Kiesgruben im Regierungsbezirk Rheinhessen-Pfalz (p. 6); — Brockhaus, T.: Das Vorkommen von Fließgewässer-Libellenarten im Bezirk Karl-Marx-Stadt aus Sicht des Naturschutzes (p. 7); — Michiels, N.: Problems and recent investigations on reproductive behaviour in dragonflies (p. 7; title only); — Grunnert, H.: Eiablage-Verhalten und Substratnutzung von *Erythromma najas* (p. 7); — Martens, A.: Eiablageplatzwahl und Aggregationsverhalten von *Platycnemis pennipes* (p. 8); — Rudolph, R.: Territorial- und Balzverhalten von *Platycypha caligata* und *fitzsimonsi* (p. 8); — Wenst, M.: Grünfrösche als Predatoren von Kleinlibellen (p. 8); — Rüppell, G.: Zwei verschiedene Fortpflanzungssysteme: Sym-

petrum depressiusculum und Leucorrhinia rubicunda (p. 8); — *Mauersberger, R.*: Zum Vorkommen von Gomphus vulgatissimus in der DDR (pp. 8-9); — *Schmidt, E.*: Horizontales Schlüpfen bei heimischen Zygoteren (p. 9); — *Müller, L.*: Gomphus pulchellus an nassen Abbauflächen in Ost-Niedersachsen (p. 9); — *Sternberg, K.*: (Hoch)moorlibellen: Ursachen der Moorbinding und die Rolle der Gewässerphysiognomie und Vegetation bei der Habitatselektion (pp. 9-10); — *Buchwald, R. & B. Schmidt*: Der Kleine Blaupfeil (Orthetrum coerulescens) in Südbaden: ökologische Ansprüche, Populationsdynamik, Gefährdung (p. 10).

- (7310) REAVEY, D. & M. SIMMONS, 1990. Entomology and young people: the ideas and aspirations of 125 young entomologists. *Bull. amat. Ent. Soc.* 49(369): 66-75. — (7 Birches Close, North Baddesley, Southampton, Hants., SO5 9HL, UK).

233 people listed as Junior members of the (British) AES have been approached with a questionnaire as to their interests in entomology; 125 of these have replied. 3% of them are interested in the odon. as the main group, 18% included the odon. among the groups they are interested in. 36% were always interested or became so through school or family, 9% through reading and 7% through collecting or collections. Collecting represents the main interest in 26%, and one of the interests in 64% (for "site surveys" and "photography" the resp. figures are 14%/41% and 7%/44%). 83% are interested in British fauna, 48% in the rest of Europe, and 58% in the tropics. Among the "factors most important in helping to develop their interest in insects", 66% are listing "buying livestock", 64% field guides, 58% bulletins, 48% exhibitions, 36% talking to experts, 25% surveys, 24% fairs, 24% buying specimens, and 20% fieldcourses. 3% are "professional" entomologists, and 64% would like to become so. The sex ratio of the respondents was: in the age group below 18 years 8% were girls, and in the 18-24 yr group the girls were represented by 15%.

- (7311) SELYSIA. Newsletter of the Societas Internati-

onalis Odonatologica and of the U.S. National Office, Vol. 19, No. 1 (March 1, 1990). — (c/o Dr D.M. Johnson, Dept Biol. Sci., East Tennessee St. Univ., Box 23580 A, Johnson City, TN 37614-0002, USA).

The issue contains the following signed announcements, appeals and queries: *Esquivel, C.*: The dragonflies of Costa Rica (p. 1); — *Dunkle, S.W.*: Ischnura prognata (p. 1); — *Srivastava, V.K.*: Adult Zygotera specimens requested (p. 1); *McPeck, M.A.*: Enallagma population differentiation study (p. 1); — *Thompson, D.J. & B. Kiauta*: Dragonflies recorded from caves: a request (p. 2); — *Dunkle, S.W.*: New Florida damselfly book (p. 3); — Mahato completes M.S. degree (p. 3; author & title: sic!); — *Arderson, M.*: Minnesota collection available for study (p. 3); — *Dunkle, S.W.*: Where you can go (p. 3). — The sole scientific note is by *Belle, J.*: A visit to the Easter Island (p. 2). — The *Selysia Mailing List* is appended (pp. 4-12).

- (7312) SOEFFING, K., 1990. Untersuchungen zur Ökologie und Ethologie von Leucorrhinia rubicunda (L.). *Zusammenfass. Int. Symp. Nat.-Schutz & Verhalten, Hamburg*, 1 p. (abstract only; no pagination). — (Zool. Inst. & Mus., Martin-Luther-King-Platz 3, D-2000 Hamburg-13, FRG).

Mainly based on the work reported in OA 5988.

- (7313) UEDA, K., 1990. Specimens collected by P.F. von Siebold and entomology in Japan. *Insectarium, Tokyo* 27(1): 22-28. (Jap., with Engl. title). — (Author's address not stated).

Narrative on the collecting activities in Japan of, and a biographic note on Philipp Franz von Siebold (1796-1866). His collection is in the RMNH, Leiden. His famous booklet, "*De historiae naturalis in Japonia statu, nec non de augmento emolumentisque in decursu perscrutationum expectandis dissertatio, cui accedunt spicilegia faunae japonicae*" (16 pp., Bataviae, 1824; republished in a number of reprint editions) and his 6-vols monograph, "*Fauna japonica, sive descriptio animalium, quae in itinere per Japoniam... suscepto, annis 1823-30 collegit, notis, observationibus et adumbrationibus illustravit...*" (Lugduni Batavorum,

1833-1850) contain no odonatol. information, but 3 extant odon. taxa (*Agriion sieboldii* Sel., *Cordulegaster sieboldii* Sel., *Sieboldius* Sel.) and 1 fossil sp. (*Libellula sieboldiana* Göpp.) are dedicated to him.

- (7314) WEGMÜLLER, R., 1990. *Zur Naturschutz-problematik von Feuchtgebieten im intensiv genutzten Kulturreaum, dargestellt am Beispiel der Libellen des Grossen Moores*. Inauguraldiss. Univ. Bern, VI+82 pp., App. 1+2 excl. — (Gurnigelstr. 26, CH-3132 Riggisberg). On the basis of the odon. fauna of a wetland area in the Berner Seeland distr., Switzerland, a method is developed for the assessment of wetland habitats for conservancy objectives.
- (7315) WESTHOFF, V., 1990. Over de noodzaak van natuurbeheer. — [On the necessity of nature management]. *NRC Handelsblad, Rotterdam* 20(166): 3 (Issue of Apr. 17). (Dutch). — (Siep 5, NL-6561 KK Groesbeek). National daily's interview with Professor Emeritus V. Westhoff, geobotanist and founder of the scientific nature management in the Netherlands. It contains a passing reference to the odon. in the diet of Black Stork, *Ciconia nigra*.
- (7316) WRABER, T., M. GOGALA, J. GREGORI & F. ADAMIČ, 1990. Rastline in živali iz Slovenije v Valvasorjevi grafični zbirki. — [Plants and animals from Slovenia in the

Valvasor collection of graphic arts]. *Proteus, Ljubljana* 52(9/10): 343-356. (Slovene). — (Second Author: Slovene Nat. Hist. Mus., P.O. Box 290, YU-61001 Ljubljana, Slovenia). The inventory, annotations and some (col.) reproductions are given of the plant and animal water paintings, brought together by Johann Weichard von Valvasor (1641-1693), contained in vol. 18 of his unpublished graphic arts collection, deposited in the Metropolitan Library of Zagreb, Croatia. The volume is titled, "*Underschiedliche Frucht / Bluemen / Krautter wie auch Vogl / Fisch / Thier / Ungeziffer und dergleichen / maistentheils Nach dem Leben mit Wasser-Farben gemahlene Stuck. Welche mit Sonderbahrem Fleiss zusammen gebracht Durch Johann Waycherd Valvasor / Freyherrn [...] zu Wagensperg in Crain Anno 1685*", but the actual dates and authorship of the artwork are unknown. The odon. are represented on pls 29-30 (*Libellula depressa*, ♂, ♀), 52 (? *Gomphus vulgatissimus*, ♂, ♀) and 74 (*Calopteryx virgo padana*, ♂). Since the material includes several taxa endemic to Slovenia, its Slovene provenience is tentatively assumed. The quality of illustrations is superb, therefore the identification was in most cases easy. — (For a monograph on Valvasor cf. B. Reisp, 1984, *The Carniolan polymath Janez Vajkard Valvasor*, Mladinska Knjiga, Ljubljana [Slovene, with very extensive Engl. & Germ. s's]).