ODONATOLOGICAL ABSTRACTS

1980

(6182) MENDEL, H., 1980. Leicestershire dragonflies. *Trans. Leicester lit. phil. Soc.* 71: 29--53. — (56 Carlford Close, Martlesham Heath, Ipswich, IP5 7TB, UK).
The history of odonatol. research in Leicestershire, UK is traced from 1795 to present, and a detailed catalogue, with distribution maps, of 20 spp. known to occur in the county (NW England) is presented.

1981

(6183) COIMBRA-FILHO, A.F., 1981. Animais predados ou rejeitados pelo sauí-piranga, Leontopitecus r. rosalia (L., 1766) na sua área de ocorrênca primitiva (Callitrichidae, Primates). *Revta brasil. Biol.* 41(4): 717-731. — (Centro de Primatologia, Rio de Janeiro, Brazil).
Orthemis ferruginea is listed among the food items of the Golden Lion Tamarin, Leontopithecus rosalia.

1982

(6184) DUDGEON, D., 1982. An investigation of physical and biological processing of two species of leaf litter in Tai Po Kau Forest Stream, New Territories, Hong Kong. *Arch. Hydrobiol.* 96(1): 1-32. — (Dept Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
Mnais mneme and Heliogomphus sinicus are listed among the macroinvertebrates associated with decomposing Aleurites montana and Liquidambar formosana litter in Tai Po Kau Forest Stream.

(6185) DUDGEON, D., 1982. Aspects of the microdistribution of insect macrobenthos in a forest stream in Hong Kong. *Arch. Hydrobiol.* (Suppl.) 64(2): 221-239. — (Dept Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
The microdistribution of 47 benthic insect taxa across the width of a shaded riffle reach of Tai Po Kau Forest Stream, Hong Kong was studied during the summer of 1977. The distribution of Euphaea decorata is shown in a diagram. It was among the most abundant taxa studied.

1983

(6186) CHAO, H.-f., 1983. Descriptions of three new species of gomphine dragonflies from Xizang (Odonata: Gomphidae). *J. Fujian agric. Coll.* 12(4): 269-274. (Chin., with exhaustive Engl. s.). — (Inst. Biol. Control, Fujian Agric. Coll., Fuzhou, Fujian, P. R. China).
The spp. described are preserved in the Shanghai Inst. Ent., viz. Sinogomphus leptocercus sp. n. (holotype ♂: Kabu, Motuo, Xizang, P.R. China, alt. 1670 m, 11-V-1980), Onychogomphus motuoensis sp. n. (holotype ♂, allotype ♀: Beipeng, Motuo, Xizang, P. R. China, alt. 960 m. 6-VIII-1979), and Stylogomphus lutantus sp. n. (♀ holotype: Didong, Motuo, Xizang, P. R. China, alt. 1230 m, 6-VII-1980). The morphological "affinities" of all 3 spp. are briefly discussed.

(6187) DUDGEON, D., 1983. An investigation of the drift of aquatic insects in Tai Po Kau Forest Stream, New Territories, Hong Kong. *Arch. Hydrobiol.* 96(4): 434-447. — (Dept Zool., Hui

Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
In the drift samples collected, the odon. were rare. Rhinocypha perforata, Euphaea decorata and Mnais mneme are mentioned, but no further comments are made.

(6188) DUDGEON, D., 1983. The effects of water level fluctuations on a gently shelving marginal zone of Plover Cove Reservoir, Hong Kong. *Arch. Hydrobiol.* (Suppl.) 65(2/3): 163-196. — (Dept Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
On the gently sloping marginal area of the Reservoir, the odon. larvae (mainly Ictinogomphus pertinax) occur at the density of 0.56 individuals/m^2.

1984

(6189) CHAO, H.-f., 1984. A new species of Leptogomphus Selys from Hainan island (Odonata: Gomphidae). *J. Fujian agric. Coll.* 13(4): 277-280. (Chin., with very exhaustive Engl. s.) — (Inst. Biol. Control, Fujian Agric. Coll., Fuzhou, Fujian, P. R. China).
L. hainanensis sp. n. is described and figured from 2 ♂ (holotype ♂: Jian-Feng-Lin, Hainan Is., Guangdong prov., P. R. China, 29-VII--1982). The holotype is deposited in the Biol. Dept, Zhongzhan Univ., Guangzhou; the paratype in the Inst. Biol. Control, FAC, Fuzhou (Type Cat. No. 019). The new sp. is similar to L. sauteri formosanus (Oguma) and L. elegans Lieft.

(6190) DAVIES, N.B. & A.I. HOUSTON, 1984. Territory economics. *In:* J.R. Krebs & N.B. Davies, [Eds], Behavioural ecology: an evolutionary approach, pp. 148-169, Blackwell, Oxford-London [ISBN 0-632-00987-X]. — (First Author: Dept Zool., Pembroke Coll., Univ. Cambridge, Cambridge, UK).
On p. 148, original observations on Libellula quadrimaculata are described as follows: In L. quadrimaculata there are sometimes physical clashes when males first set up territories around the edge of breeding ponds, but once settled for the day individuals appear to follow the simple rule "fly until you meet a neighbour, then turn round and fly back again". By obeying this rule individuals often patrol up and down the same stretch for several hours. Sometimes, however, when a neighbour is perched on vegetation, a male will fly over him unnoticed and carry on ontil he meets the neighbour beyond. He then turns round if he now meets his original neighbour on the way back, he again turns, with the result that the two will have swopped territories. Given this simple movement rule, the only way a male can "defend" a larger territory is to fly faster; he will then cover a longer stretch before he meets each neighbour and is forced to turn round and go back again.

(6191) DUDGEON, D., 1984. Longitudinal and temporal changes in functional organization of macroinvertebrate communities in the Lam Tsuen River, Hong Kong. *Hydrobiologia* 111: 207-217. — (Dept Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
10 odon. spp. are listed on p. 210, and are considered to represent only a small part of the benthic community.

(6192) DUDGEON, D., 1984. Seasonal and long--term changes in the hydrobiology of the Lam Tsuen River, New Territories, Hong Kong, with special reference to benthic macroinvertebrate distribution and abundance. *Arch. Hydrobiol.* (Suppl.) 69(1): 55-129. — (Dept Zool., Hui Oi Chow Sci. Biol. Bldg, Univ. Hong Kong, Hong Kong).
An investigation of the macrobenthos was undertaken in Nov. 1976. and at quarterly intervals during 1978-1979. Between the 2 surveys there had been a considerable increase in settlement and agricultural activity in the river valley, which had a significant effect on river ecology. Zygonyx iris was widespread in 1976 and slightly more abundant in 1978-1979, despite being less widely distributed in the lower course. All other benthic odon. were gomphids and occurred througout much of the river system. Onychogomphus sp. was the most numerous. Heliogomphus sinicus Chao (= scorpio Ris) and Ictinogomphus pertinax were restricted to the upper and lower sections of the river respectively.

(6193) STÖCKEL, G., 1984. Zur Käferfauna des Naturschutzgebietes "Degensmoor" bei Wesenberg, Kreis Neustrelitz und ein Nachtrag zur Libellenfauna des Gebietes. *Natur Naturschutz Mecklenburg* 20: 89-94. — (Rudower Str. 22, DDR-2080 Neustrelitz, GDR).
Additions to and corrective notes on a paper by H. Sensenhauser (1979, *Naturk. Forsch. Ber. Neustrelitz* 2: 29-32).

1985

(6194) EDA, S., [compiler], 1985. [Additions to the "Dragonflies of Nagano Prefecture", No. 8.] *New Entomol.* 34(3/4): 8-9. (Jap.). — (3-4-25 Sawamura, Matsumoto, Nagano, 390, JA).
These are additions to the work listed in *OA* 2703, bringing a note on Sympetrum frequens individuals with fumed wings (cf. *OA* 5608), on Polycanthagina melanictera, attracted by a fluorescent light, and republishing the Tramea virginia record, as listed in *OA* 5464. — (*Abstracter's Note:* The Editors of Odonatologica were unable to get in touch with Dr Eda, therefore the earlier parts of this series could not be listed).

(6195) HANDA, S.M. & N. KOCHHAR, 1985. Chromosomal architecture in two species of damselflies from Chandigarh and its surrounding areas. *Nat. Seminar Current Trends Chrom. Dynamics,* Chandigarh, p. 34 [Abstract only). — Dept Zool., Panjab Univ., Chandigarh-160014, India).
The chromosome numbers are reported for Enallagma parvum and Ischnura "delicata Hag." [here written as "derilicata"] which is a synonym of I. aurora Br. ($2n♂ = 27, n♂ = 14$). The centromere is said to be localized and all the elements almost metacentric. An *m*-pair occurs in E. parvum only.

(6196) MAHATO, M., 1985. Nepalka gainekirako yak choto parichaya. — [A brief introduction of Nepalese dragonflies]. *News Bull. nat. Hist. Mus., Kathmandu* 1(3): 16-17. (Nepali). — (Nat. Hist. Mus., Manjushree Bazar, Swayambhu, Kathmandu, Nepal).
A brief presentation of the order, directed at the general reader, with reference to a few interesting or endemic spp. in Nepal.

(6197) ROZEFELDS, A.C., 1985. A fossil zygopteran nymph (Insecta: Odonata) from the Late Triassic Aberdare Conglomerate, Southeast Queensland. *Proc. R. Soc. Qd* 96: 25-32. — (Palaeontol. Sect., Queensland Mus., Fortitude Valley, 4006, AU).
The larva is referred to the genus Samarura. Along with the partial wing of Triassolestes epiophlebioides Till. from the Late Triassic Ipswich Coal Measures, it represents the oldest known fossil referable to Zygoptera. — Austrolestidion duaringae Till., from the Eocene-Early Miocene Duaringa Formation was described as a zygopteran larva, but it is considered here to represent a parastacid crustacean. — A brief review of the fossil odon. material known from Australia is also included.

(6198) SMOCK, L.A., E. GILINSKY & D.L. STONEBURNER, 1985. Macroinvertebrate production in a southeastern United States blackwater stream. *Ecology* 66(5): 1491-1503. — (First Author: Dept Biol., Virginia Commonwealth Univ., Richmond, VA 23284, USA).
Macroinvertebrate production was studied by replicated monthly sampling of 5 different substrate types in a second-order South Carolina blackwater stream. The Odon. are suborder-wise considered. In a tabular review, their production/biomass ratios and cohort production intervals are stated.

(6199) WILD, K., 1985. *Ökologische Analyse der Odonatenfauna von Feuchtgebieten im Raum Meckenheim.* Schriftliche Hausarbeit, Erste Staatsprüfung Lehramt Sekundarstufe I, Univ. Bonn, 210 pp. — (Südstr. 45, D-5309 Meckenheim-Lüftelberg, FRG).
The odon. fauna (26 spp.) is reported from a number of habitats in the Meckenheim area nr Bonn, FRG. The emphasis is on photographic documentation of the records and on ecological analysis of the local fauna. Of particular interest is the description of the Cordulegaster bidentatus breeding habitat in the hanging moores on the Kurfürstenweiher.

1986

(6200) ANSELIN, A. & F.J. MARTIN, 1986. Odonatos de las provincias de Teruel y Cuenca. *Misc. zool., Barcelona* 10: 129-136. (With Engl. s.). — (Second Author: Cat. Zool. Artrop., Fac. Biol., Univ. Complutense de Madrid, Ciudad Universitaria, ES-28003 Madrid).
An annotated list is given of 42 spp. 34 of which. (1 new) from the province of Teruel, and 35 (11 new) from the province of Cuenca, Spain.

(6201) BUCHWALD, R., J. KUHN, A. SCHANOWSKI, K. SIEDLE & K. STERNBERG, 1986. *3. Sammelbericht (1986) über Libellenvorkommen (Odonata) in Baden-Württemberg (Stand: März 1986).* Schutzgemeinschaft Libellen in Baden-Württemberg, Freiburg-Tübingen, 34 pp. — (c/o Dr. K. Sternberg, Inst. Biol. I-Zool., Univ. Freiburg, Albertstr. 21a, D-7800 Freiburg/Br. FRG).
The scope is the same as in the 1984 edition, listed in *OA* 4562, but only 65 spp. are dealt with.

(6202) DUDGEON, D. & C.Y.M. WAT, 1986. Life cycle and diet of Zygonyx iris insignis (Insecta: Odonata: Anisoptera) in Hong Kong running waters. *J. trop. Ecol.* 2: 73-85. — (Dept. Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
Z. iris is widespread in tropical Asia, and larvae are sprawlers/clingers on rock surfaces in fast-flowing streams and rivers. In the Lam Tsuen River, Hong Kong, it is univoltine; emergence occurs prior to the summer monsoon and larval recruitment during the wet season. Studies on larval dietary composition in 4 habitats indicated that Z. iris is a generalist predator, consuming epibenthic prey taxa in proportion to their abundance in the environment. Larval Chironomidae and Baetis (Ephem.) were the commonest food items at all sites and there was little consistent evidence of preference for individual taxa. Larger Z. iris larvae tended to consume more prey taxa than did smaller larvae, and Baetis prey size was positively correlated with predator size. No size selection of chironomid larvae was apparent. Despite its unusual larval habit, Z. iris is a generalist feeder resembling lotic and lentic temperate-zone Odon.

(6203) GONZALEZ SORIANO, E., 1986. Una nueva especie de Aeshna Fabricius (Odonata; Aeshnidae) del Estado de Guerrero, Mexico. *An. Inst. Biol. Univ. nac. auton. Mex.* (Zool.) 56(1): 47-51. (With Engl. s.). — (Lab. Ent., Depto Zool., Inst. Biol., Univ. Nac. Auton. Mexico, Apdo Postal 70-153, MX-04510 Mexico, D.F.).
A. (Hesperaeschna) vazquezae sp. n. (holotype ♂: Acahuizotla nr Chilpancingo, Guerrero, Mexico; 15-XI-1983; deposited in Inst. Biol., UNAM) is described, figured, and its affinities with the closely related A. williamsoniana Calv. are discussed.

(6204) JOHNSON, T.D., J.C. COUGHLAN & F.W. RABE, 1986. The influence of damselfly naiads, phytoplankton, and selected physicochemical factors on the population growth of Daphnia schødleri. *J. Freshw. Ecol.* 3(3): 383-390. — (Dept Biol. Sci., Univ. Idaho, Moscow, ID 83845, USA).
Among the factors studied, only the density of zygopteran larvae with head capsule width greater than 2.0 mm was significantly correlated with D. schødleri population growth rate.

(6205) LARSSON, J.I.R., 1986. Ultrastructural investigation of two Microsporidia with rod-shaped spores, with descriptions of Cylindrospora fasciculata sp. nov. and Resiomeria odonatae gen. et. sp. nov. (Microspora, Thelohaniidae). *Prostistologica* 22(4): 379-398. (With Engl. s.). — (Dept Zool., Univ. Lund, Helgonavägen 3, S-223 62 Lund).
Resiomeria odonatae gen. n., sp. n. is described and figured from squash preparations of Aeshna grandis larvae (Helge å, nr. Knislinge, Sweden; 26-IX-1984).

(6206) MAHATO, M., 1986. Onychogomphus risi Nepalko naya gainekira. — [Onychogomphus risi, a new dragonfly for Nepal]. *News Bull. nat. Hist. Mus., Kathmandu* 1(4): 23. (Nepali).

— (Nat. Hist. Mus., Manjushree Bazar, Swayambhu, Kathmandu, Nepal).
First Nepalese record of O. risi (Phallyak Sangu, alt. 672 m, Sept. 4, 1986). Cf. also *Notul. odonatol.* 2(1986): 121-123.

(6207) MEYER, W., G. HARISCH & A.N. SAGREDOST, 1986. Biochemical aspects of lead exposure in dragonfly larvae (Odonata: Anisoptera). *Ecotoxicol. environ. Safety* 11: 308--319. — (First Author: Inst. Zool., Tierärztliche Hochschule Hannover, Bischofsholer Damm 15, D-3000 Hannover-1, FRG).
The effects of lead exposure on the oxidative properties of different organs of dragonfly larvae (advanced instars) were estimated by biochemical and histochemical methods. The lead load of the water was 20 μg/liter during 6 weeks at a temperature of 15° C and a normal diurnal rhyhm. Lead was not accumulated in the brain, but in considerable amounts in the midgut, fat body, rectum, and cuticula of the test animals, while the control larvae showed astonishing concentrations of the heavy metal in the cuticula. The activities of the oxidative enzymes studied were significantly lowered only in the brain. Histochemically, lead could be visualized in all the organ tissues, apart from the brain, of the test animals, the controls exhibiting lead only in the cuticula. The enzyme histochemical evaluation of succinic dehydrogenase demonstrated typical changes of reaction intensities within the organs of the test animals, as compared to the controls. The results obtained are discussed in view of the specific biology of the tested animals and their normal biotope.

(6208) SAXENA, P.N. & S.C. SAXENA, 1986. Acute toxicity of O, O-dimethyl-S-bis (carboethoxy) ethyl phosphorodithioate to dragonfly (Bradinopyga geminata) larvae, the non-target insect species. *Indian Biologist* 18(1): 18-19. — (Toxicol. Lab., Dept Zool., Univ. Rajasthan, Jaipur-302004, India).
The percentage mortality is given in a tabular review for larvae treated with different malathion concentrations. The lowest (11%) mortality was at 0.2 ppm, the higest (86%) at 0.8 ppm.

(6209) SHERK, T., 1986. Insect emergence from Findley Lake in the Cascade Mountains of Washington, U.S.A. *Proc. 3rd Europ. Congr. Ent., Amsterdam*, pp. 139-142. — (P.O. Box 331, Branford, Connecticut 06405, USA).
The 1386 my dry weight of insects that emerged per m^2/year from the lake included 0.4% Odon. (Aeshna palmata, Somatochlora albicincta). Biomass of insects that emerged from a 2.0 m deep pond included 1.7% Enallagma boreale, 1.1% Aeshna palmata and 1.4% Somatochlora albicincta. About 3% of the Aeshna larvae were referable to A. umbrosa.

(6210) SMOCK, L.A. & C.E. ROEDING, 1986. The trophic basis of production of the macroinvertebrate community of a southeastern U.S.A. blackwater stream. *Holarct. Ecol.* 9: 165-174. — (Dept Biol., Virginia Commonwealth Univ., Richmond, VA 23284, USA).
Enallagma spp., Epitheca cynosura, Gomphus lividus, and Macromia georgina are the Odon. studied. Save for Gomphus, their foregut contents consisted for 100% of animal material. In Gomphus, the latter amounted to 98%, the remaining 2% were made up by fine detritus.

1987

(6211) ALCOCK, J., 1987. The effect of experimental manipulation of resources on the behavior of two calopterygid damselflies that exhibit resource-defense polygyny. *Can. J. Zool.* 65(10): 2475-2482. (With Fr. s.). — (Dept Zool., Arizona St. Univ., Tempe, Az 85287 USA).
Male odonates offer many examples of resource-defense mating systems and provide opportunities to test the hypothesis that in such systems the amount of resources controlled by a male will determine his mating success. Experimental alterations in oviposition site resources contained in the territories of Calopteryx maculata and Hetaerina vulnerata yielded different results. Removal of all oviposition resource substrate from occupied territories of H. vulnerata did not cause males to abandon their sites, nor did it affect the probability that females would come to these areas to

mate. In contrast, males of C. maculata whose territories had been stripped of floating plant material generally abandoned the area within 1 h. Females of this species were more strongly attracted to sites with the most oviposition resources and males fought more intensely for these territories. Because females and males of C. maculata can assess the amount of floating substrate in a territory, this information influences where individuals mate, which sites they defend, and the intensity with which they fight for a location. In H. vulnerata, however, females oviposit underwater into sunken plant material hidden beneath fast-moving water. Because resource assessment is more difficult in H. vulnerata, females do not secure information on the quantity of oviposition substrate in a male's territory prior to mating, and male mating tactics, therefore, differ substantially from those employed by C. maculata.

(6212) ARAI, Y., 1987. Dragonfly nymphs feigning death. *Insectarium, Tokyo* 24(12): 358-361. (Jap., with Engl. title). — (1233-2, Oaza Suezo, Yorii-machi, Osato-gun, Saitama Pref., 369--12, JA).
A review of the phenomenon in various Japanese spp. (Jap. names only).

(6213) BEUTLER, H., 1987. Ein Fund von Cordulegaster heros Theischinger, 1979 im Pirin--Gebirge in Bulgarisch-Mazedonien (Insecta, Odonata, Cordulegasteridae). *Faun. Abh. Mus. Tierk. Dresden* 15(2): 11-14. (With Engl. s.). — (Frankfurter Str. 23, Postfach 63-13, DDR-1230 Beeskow, GDR).
This is the same record as briefly mentioned in the paper listed in *OA* 5999. Adult ♂ and ♀ and a ♀ exuviae were collected on 5-7 July, 1986 at Sandanska bistrica, N Liljanovo (alt. 700 m). Both sexes and the exuviae are described and figured. The sp. co-occurs with C. bidentatus.

(6214) BIEDERMANN, J., 1987. Die Libellen--Fauna des Naturschutzgebietes Schwabbrünnen-Äscher, Liechtenstein (Odonata). *Ber. bot.-zool. Ges. Liechtenstein-Sargans-Werdenberg* 16: 39-56. (With Engl. s.). — (Blachastr. 78, FL-9494 Planken).
The area studied (surface 56 ha, mean alt. 445 m) represents one of the last remaining Rhine reedlands in the Schaan (Liechtenstein)--Feldkirch (Austria) region. During 1974-1986, 27 odon. spp. were recorded, among which Coenagrion mercuriale is of more than regional interest, while the local population of Sympecma fusca is among the largest so far recorded in the literature. The fauna is compared with that of the neighbouring Swiss Rhine Valley, and its biogeographic composition is briefly discussed.

(6215) BRADT, P.T. & M.B. BERG, 1987. Macrozoobenthos of three Pennsylvania lakes: responses to acidification. *Hydrobiologia* 150: 63-74. — (Cent. Marine & Environ. Stud., Chandler-Ullmann No. 17, Lehigh Univ., Bethlehem, PA 18015, USA).
Statistical differences among the macrozoobenthos communities of 3 lakes with varying sensitivities to acidification were: (1) a high biomass, expressed as wet weight (incl. Odon., but no spp. list), in the least acid lake; — (2) more Ephemeroptera, Gastropoda and Pelecypoda at the least acid lake; — (3) more predators and Chironomidae at the most acid lake. There were no significant differences in total numbers, number of taxa, diversity or evenness among the 3 lakes.

(6216) CANNINGS, S., 1987. Bugs, birds, and glaciers. *Boreus* 7(1): 3-5. — (Spencer Ent. Mus., Dept Zool., Univ. British Columbia, 6270 University Blvd, Vancouver, B.C., V6T 2A9, CA).
The article gives various examples of present--day distribution and speciation of Canadian dragonflies as influenced by the Pleistocene glaciations.

(6217) CORDERO RIVERA, A., 1987. Estructura de población en Ischnura graellsi Rambur, 1842 (Zygop., Coenagrionidae). Bol. Asoc. esp. Ent. 11: 269-286. (With Fr. s.). — (Depto Ecol., Fac. Biol., Univ. Santiago, Es-15706 Santiago de Compostela).
The ecology and structure of a population of I. graellsi in an artificial pond nr Pontevedra (alt. 500 m) is described in detail.

(6218) COUNCIL OF EUROPE, COMMITTEE OF MINISTERS, 1987. *Recommendation No. R(87) 14 of the Committee of Ministers to Member States on the Protection of dragonflies (Odonata) and their biotopes.* Strasbourg, 2 pp. (in Engl. & Fr. versions). — (c/o Bern Convention Secretariat, Council of Europe, B.P. 431 R6, F-67006 Strasbourg-Cedex).
The verbatim text of the Engl. version appears also in *Notul. odonatol.* 3(1): 1-2 (1988).

(6219) DIXON, S.M. & R.L. BAKER, 1987. Effects of fish on feeding and growth of larval Ischnura verticalis (Coenagrionidae: Odonata). *Can. J. Zool.* 65(9): 2276-2279. (With Fr. s.). — (Dept Zool., Univ. Toronto, Erindale Coll., Mississauga, Ont., L5L 1C6, CA).
Laboratory studies were used to investigate how fish affected a larval zygopteran's activity, ability to locate a food patch, and growth. Larval Ischnura verticalis spent less time at food patches in the presence of fish (Lepomis gibbosus) when food patches were permanent, but when food patches were ephemeral, fish did not have significant effect. In addition, fish had no effect on larval feeding on mobile prey (Daphnia magna), nor did fish have any effect on growth of larvae supplied with ephemeral prey patches.

(6220) DUDGEON, D., 1987. The ecology of a forest stream in Hong Kong. *Arch. Hydrobiol.* (Ergebn. Limnol.) 28: 449-454. — (Dept Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
The ecology of the Tai Po Kau Forest Stream, New Territories is described. The stream is poor in dissolved minerals and slightly acidic. Over 130 macrobenthic taxa (mostly insects) were recorded. The odon. listed are: Euphaea decorata. Mnais mneme, Rhinocypha perforata and Zygonyx iris. All of them are univoltine, with adult emergence immediately before the summer monsoon.

(6221) DUDGEON, D., 1987. The development of benthic macroinvertebrate communities in Plover Cove Reservoir, Hong Kong, with special reference to the significance of the marginal zone. *Arch. Hydrobiol.* (Ergebn. Limnol.) 28: 497-502. — (Dept Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
The occurrence of the larvae of Ictinogomphus pertinax is recorded.

(6222) FRYE, B.L. & J.V. ROBINSON, 1987. Ischnura posita (Hagen) and Telebasis salva (Hagen) (Odonata: Coenagrionidae) as potential fungal dispersal agents. *SWest. Nat.* 32(1): 131-134. — (Dept Biol., Univ. Texas, Box 19498, Arlington, TX 76019, USA).
28 fungal genera were recorded from samples of the adults of the 2 spp., collected at Arlington, Texas, USA. The relative frequencies of occurrence were highest in Rhizopus, Cladosporium, Penicillium and Alternaria. These are stated for all fungi and for each of the 2 dragonflies spp., and the media on which the fungi were grown in the laboratory are described.

(6223) GALLETTI, P.A., M. PAVESI & F.P. ROMANO, 1987. Brachythemis leucosticta (Burm.) e considerazioni su altri odonati nuovi per la Sicilia (Insecta, Odonata). *Naturalista sicil.* (IV) 11(1/4): 27-46. (With Engl. s.). — (First Author: Via Monte Generoso 2, I-20155 Milano).
Calopteryx xanthostoma, Enallagma cyathigerum and Brachythemis leucosticta are recorded from Sicily for the first time, and the southernmost hitherto known Sicilian locality of Cordulegaster trinacriae is stated. Biogeography and the taxonomic status of C. xanthostoma are discussed in detail, and so are the European records and behaviour of B. leucosticta. The exuviae of the latter is also described and figured. Appended is a checklist of the 50 spp. known to occur in Sicily, in which Anaciaeschna isosceles is erroneously listed as Aeshna cyanea.

(6224) HANSELMANN, U., 1987. Libellenvorkommen in Liechtenstein. Dia-Vortrag von Josef Biedermann, Planken. *Ber. bot.-zool. Ges. Liechtenstein-Sargans-Werdenberg* 16: 206. — (c/o Dr J. Biedermann, Blachastr. 78, FL-9494 Planken).

This is a summary of a talk, given for the Liechtenstein Bot.-zool. Soc. on Nov. 27, 1987. So far 40 spp. are known to occur in Liechtenstein, of which only about 20 spp. are supported by man-made habitats. Some local folk names are mentioned, and 7 spp., considered particularly threatened in the Principality, are listed.

(6225) HASEGAWA, H., 1987. [Field note for children, No. 9]. *Insectarium, Tokyo* 24(9): 273. (Jap.). — (Author's address not stated).
A brief note on Aka-tombo, Sympetrum frequens, stating its migratory habits, and incl. a beautiful water-colour painting.

(6226) JAKOBS, W., 1987. Ergänzungen zur Libellenfauna der Dübener Heide. *Ent. Nachr. Ber.* 31(2): 90. — (Thomas-Müntzer-Str. 2, DDR-4600 Wittenberg, GDR).
Supplementary notes on the paper listed in *OA* 5716.

(6227) JAMIESON, B.G.M., 1987. *The ultrastructure and phylogeny of insect spermatozoa.* Cambridge Univ. Press, Cambridge-London-New York-New Rochelle-Melbourne-Sydney. XVI+320 pp. — [ISBN 0-521-34441-7]. (Author: Dept Zool., Univ. Queensland, Brisbane, AU).
Based on literature, the odon. spermatozoon is described (pp. 109-111) and the phylogenetic position of the order is discussed (p. 288). The odon. sperm are much les apomorphic than those of Ephemeroptera. Features of the odon. sperm, with apomorphies relative to the presumed pterygote ground plan italicized, are: *acrosome monolayered, rod and periacrosomal material lost.* Nucleus rodlike, condensed. Centriole adjunct and 2 accessory bodies present. Mitochondrial derivatives 2, elongate cristate, non-crystalline. Axoneme 9+9+2; outer singlets regular. Intersinglet material not reported. — Only 1 sp. has been at all thoroughly examined spermatologically. The monolayered acrosome is the only known internal autapomorphy for the order but is seen in several other orders, including the Ephemeroptera, Plecoptera and Diptera with which, as a predictably widespread loss, it need not indicate affinity. However, it might be regarded as a weak, and the only, synapomorphy linking the Ephemeroptera and Odon. as the Palaeoptera. Further work on these orders should allow this relationship to be tested. If crystallization of the mitochondria were attributed to the pterygote sperm ground plan, absence of crystallization in Odon. would be an apomorphic loss. — There is no known synapomorphy, other than the pair of accessory bodies basic to all pterygotes, to support the sister group status of the Odon. relative to the non-ephemeropteran insects. (cf. N.P. Kristensen, 1981, *A. Rev. Ent.* 26:135-137).

(6228) JARZEMBOWSKI, E.A., 1987. The occurrence and diversity of Coal Measures insects. *J. geol. Soc., Lond.* 144: 507-511. — (Booth Mus. Nat. Hist., Dyke Rd, Brighton, BN1 5AA, UK).
General characterisation of insect fauna of the Upper Carboniferous Coal Measures, United Kingdom, with references to Protodonata and Odonata.

(6229) JOHNSON, D.M., C.L. PIERCE, T.H. MARTIN, C.N. WATSON, R.E. BOHANAN & P.H. CROWLEY, 1987. Prey depletion by odonate larvae: combining evidence from multiple field experiments. *Ecology* 68(5): 1459-1465. — (First Author: Dept Biol. Sci., East Tennessee St. Univ., Johnson City, Tenn. 37614, USA).
The previously published data regarding the response of several prey populations to manipulation of predaceous larval dragonfly densities in 4 separate field enclosure experiments are re-analyzed. Using a computer-intensive "re-randomization" approach to testing hypotheses, it is shown that the individual experiments were not sufficiently powerful to consistently reject false null hypotheses. Combining the data from 3 comparable experiments, the power associated with such tests could be enhanced. — 3 prey categories (Trichoptera, Oligochaeta, large Cladocera), comprising less than one-third of the typical odon. diet, were found to be consistently depleted in enclosures with odon. larvae; but the extent of their depletion was not increased at high (ambient)

compared with low (half-ambient) odonate densities. These results support our previously published conclusions that exploitation competition was not an important phenomenon for odon. larvae in these experiments.

(6230) KETELAAR, R., 1987. Libellen en plaatsbepaling binnen een biotoop. — [Spatial distribution of dragonflies within a biotope]. *Amoeba, Amsterdam* 1987 (NH): 22-23. (Dutch). — (Zwinstraat 18, NL-7417 CJ Deventer).
Report of a one-day field work on this subject in the Talingenveen nr Nijmegen, the Netherlands.

(6231) KETELAAR, R. & M. WASSCHER, 1987. De Ruenbergerbeek. *Amoeba, Amsterdam* 1987 (NH): 3-5. (Dutch). — (Second Author: Minstraat 15 bis, NL-3582 CA Utrecht).
The Ruenbergerbeek is a stream on the German-Netherlands border. After 1968, Calopteryx virgo seems to have disappeared there, but C. splendens and Ischnura elegans are recorded in this note.

(6232) LAHIRI, A.R., 1987. Studies on the odonate fauna of Meghalaya. *Rec. zool. Surv. India* (Occ. Pap.) 99: 1-402, 539 figs & 15 maps incl. — (Zool. Surv. India, M Block, New Alipur, Calcutta-700053, India).
This is a very comprehensive monograph on the Odon. of the state of Meghalaya, eastern India. 147 spp. and sspp. are described in great detail, figured and keyed. All the known regional records are listed, the regional distribution is discussed in terms of the physical and environmental parameters, and the biogeographic composition of the fauna is analyzed. The following 6 taxa are new: Megalestes raychaudhurii sp. n. (holotype ♂, allotype ♀: Shillong, 10-VII-1974), Orolestes durga sp. n. (holotype ♂: Rongrengiri, 19-IV-1973), Lestes garoensis sp. n. (holotype ♂: Rongrengiri, 20--IV-1973, allotype ♀: Manipur, Moreh, 22-II--1975), Nihonogomphus indicus sp. n. (holotype ♂, allotype ♀: Rongrengiri, 19-IV-1973), Onychogomphus meghalayanus sp. n. (holotype ♀: Rongrengiri, 19-IV-1973) and Zygonyx iris intermedia ssp. n. (holotype ♂: Barapani 26-VII--1969). — This is by far the largest and most detailed work on the Indian Odon., published since the publication of F.C. Fraser's work in the Fauna of British India.

(6233) *LIBELLULA*. Mitteilungsblatt der Gesellschaft deutschsprachiger Odonatologen (GdO), Vol. 6, Nos 3/4 (Dec. 1987; published Apr. 1988; exact dates not stated). — (c/o Prof. Dr R. Rudolph, Biol. Didaktik, Univ. Münster, Fliednerstr. 21, D-4400 Münster, FRG).
Schmidt, E: Zur Felddiagnose und Habitatspräferenz des Östlichen Blaupfeils Orthetrum albistylum (Selys 1884) (pp. 71-77); — *Fischer, P.P.:* Ein neuer Fund der Schabrackenlibelle. Hemianax ephippiger (Burmeister) im Bodenseegebiet (Lützelsee bei Radolfzell/Bad. Württ.) (78-80); — *Müller, K.:* Die Pokalazurjungfer (Cercion lindeni Navas) und die Feuerlibelle (Crocothemis erythraea Brullé) im mittleren Remstal (81-82); — *Frank, H.:* Die Libellen des Steinacher Rieds (Bad. Württ.) (83-101); — *Soeffing, K.:* Eine Wasserfalle für Libellenlarven (102-104); — *Donath, H.:* Untersuchungen in einer Larvenkolonie von Cordulegaster boltoni (Donovan) in der Niederlausitz (105-116); — *Heitz, A., Heitz, S. & K. Bruder:* Fortpflanzung des Östlichen Blaupfeils (Orthetrum albistylum Selys 1884) am südlichen Oberrhein Bad. Württ. (117--120); — *Schmidt, E.:* Zur Odonatenfauna des Geroldsees bei Garmisch-Partenkirchen/Obb. (FRG) — Ein Beitrag zur Analyse von Odonaten-Artenspektren bei kleiner Stichprobe (121--134); — *Hartung, M.:* Eine heteromorphe Regeneration an einer Exuvie von Lestes macrostigma Eversmann (135-141).

(6234) LIEBIG, W.-H. & J. GEBERT, 1987. Spezialistenlager für junge Entomologen des Bezirkes Cottbus 1986. *Ent. Nachr. Ber.* 31(1): 43-44. — (First Author: Platz der Befreiung 20, DDR-7582 Bad Muskau, GDR).
Calopteryx virgo and Ophiogomphus serpentinus are recorded from the Reuthener Moor, Distr. Spremberg, GDR.

(6235) MAHATO, M., 1987. Barsat aghi paine purbi Nepalka kehi gainekira. — [Premonsoon drag-

onflies of eastern Nepal]. *News Bull. nat. Hist. Mus., Kathmandu* 2(1/4): 22-23. (Nepali). — (Nat. Hist. Mus., Manjushree Bazar, Swayambhu, Kathmandu, Nepal).
Contains a list of 17 spp., with locality names.

(6236) MAHATO, M., 1987. [Dragonfly and its economic importance]. *Bull. Tribhuvan Univ., Kathmandu* 20(6): 4-5. (Nepali). — (Nat. Hist. Mus., Manjushree Bazar, Swayambhu, Kathmandu, Nepal).
Information note, listing various examples as published in *Soc. int. odonatol. rapid Comm.* (Suppl.) 6, 1986.

(6237) METZ, R., 1987. Recent traces by invertebrates in aquatic non-marine environments. *Bull. New Jersey Acad. Sci.* 32(1): 19-24. — Dept Geol. & Meteorol., Kean Coll., Union NJ 07083, USA).Erythrodiplax larvae were observed resting on or ploughing through the mud substance of numerous ponds and streams in Middlesex Co., New Jersey, USA. Resting and crawling trails were made, and some portions of these probably also represent select feeding locations. The difference in the detail of the crawling trails is believed to be related to the silt/clay ratio at each locality, the degree of compaction of the mud and the relative speed of movement of the organism. Comparison of recent traces to fossil traces can provide analogies useful in determining the organism responsible and the conditions under which the fossil traces were formed.

(6238) MEYERHOFF, R.D. & O.T. LIND, 1987. Aquatic insects of McKittrick Creek, Guadalupe Mountains National Park, Texas. *SWest. Nat.* 32(2): 288-289. — (First Author: Dept Ent., Oregon St. Univ., Corvallis, OR 97331, USA; — Second Author: Dept Biol., Baylor Univ., Waco, TX 76798, USA).
Argia lugens, A. plana, Archilestes grandis, Aeshna umbrosa and Paltothemis lineatipes are listed, and the general ranges of some of them are briefly stated. — (*Abstracter's Note:* On p. 288. Aeshna grandis should read Archilestes grandis).

(6239) MITCHELL, J., 1987. The Azure Damselfly on Loch Lomondside. *Glasgow Naturalist* 21(3): 357-358. — (Author's address not stated).
The status of Coenagrion puella in the Loch Lomond National Nature Reserve, Scotland, UK is stated. In the Scottish Insect Record Index (Royal Mus. of Scotland), there are no earlier records of this sp. either from Stirlingshire or from Dunbartonshire.

(6240) MULHAUSER, G., P. PRONINI, B. WERFFELI, P. AEBY & B. MULHAUSER, 1987.Les arthropodes de la mouille de la Vraconnaz. *Bull. romand Ent.* 5(2): 61-91. — (With Germ. s.). — (Inst. zool., Univ. Neuchâtel, CH-2000 Neuchâtel).
10 odon. spp. are listed and discussed from the peat moor of the Vraconnaz nr Croix, Switserland. Somatochlora arctica and Sympetrum flaveolum are of some local interest.

(6241) MÜLLER, J., 1987. Nachweis der boreo-alpinen Somatochlora alpestris (Selys, 1840) (Ins. Odonata) im Brockenhochmoor des NSG Oberharz. *Ent. Nachr. Ber.* 31(5): 230-232. — (Pablo-Neruda-Str. 9, DDR-3034 Magdeburg, GDR).
All known records of S. alpestris in the GDR are reviewed, and the biogeographic character of this sp. is briefly discussed.

(6242) NEUMANN, D., 1987. Heinrich Kaiser. 26.5.1941-27.7.1986. *Verh.dt. zool. Ges.* 80: 329-330. — (Author's address not stated).
Obituary, brief biography and exhaustive evaluation of the professional work of Dr H. Kaiser, Professor and Head of the Department of Ecology, University of Aachen, FRG. A portrait is also provided.

(6243) NIEHUIS, M., 1987. Fortpflanzungsnachweis der Kleinen Binsenjungfer (Lestes virens Charpentier) im Bienwald/Vorderpfälzer Tiefland. *Naturschutz Ornithol. Rheinland-Pfalz* 4(4): 904-908. — (Im Vorderen Grossthal 5, D-6743 Albersweiler, FRG).
So far 12 localities of L. virens were on record from the Rhineland-Palatinate (Rheinland-Pfalz) FRG, but no breeding site was known in the province. This has now been discovered at

an artificial pond, a few years old, in Bienwald; it is here described in detail and its odon. fauna is stated.

(6244) NOVELO-GUTIERREZ, R., 1987. Las nayades de Heteragrion albifrons, H. alienum y H. tricellulare (Odonata: Megapodagrionidae); su descripcion y habitos. *Fol. ent. mex.* 73: 11-22. (With Engl. s.). — (Insectario DCBS-DPAA, Univ. Autónoma Metropolitana-Xochimilco, Apdo Postal 23--181, MX-04960 México, D.F.).
The ultimate instar larvae of the 3 spp. are described and figured. Those of H. albifrons Ris and H. tricellulare Calv. are similar, but H. alienum Wllmsn stands somewhat apart. The morphology of the hitherto known megapodagrionid larvae is discussed, and a key to the genera and spp. is provided. Some data are also supplied on the larval habitats and on the emergence.

(6245) PETERS, G., 1987. Atavistische Strukturen im Flügelgeäder von Aeshna grandis und verwandten Arten (Insecta, Odonata, Aeshnidae). *Ent. Abh. Mus. Tierk. Dresden* 51(1): 1-16. (With Engl. & Russ. s's). — (Mus. Naturk., Humboldt Univ., Invalidenstr. 43, DDR-1040 Berlin, GDR).
A. grandis remarkably differs from phylogenetically closely related spp. (A. viridis, juncea serrata, etc.) by accessory veins in the median space of its wings as well as in the anal triangle of the male hindwing. Owing to their morphological imperfectness, the recapitulation of evolutionary outdated patterns, onesided numerical variability and absence of any functional significance these veins have to be qualified as atavistic characters. Notwithstanding the lack of individual or morphogenetical correlation, there is an parallelism in phenomena: the percentage of individuals with atavistic veins in the anal triangle seems to double the distribution pattern (in local populations) of individuals, bearing veins in the median wing space. — In contrast to the situation in A. grandis, the median space crossveins in the wings of Boyeria irene, Caliaeschna microstigma and other "brachytronine" aeshnids can not be interpreted as an atavistic structure. Because of lengthening or (in other spp.) weakness of the wings they are necessary in order to strengthen the wing base. — The atavistic patterns in the (normally 3-celled) anal triangle of male wings in A. cyanea, mixta and affinis are quite different from the corresponding characters in A. grandis, thus confirming their more distant relationship to the latter sp. The reason(s) for the considerably high percentage of wing vein atavisms in some spp. against the near to zero presence of the phenomenon in others remains unknown.

(6246) RYAZANOVA, G.I. & G.A. MAZOKHIN-PROSHNYAKOV, 1987. Prostranstvennoe raspredelenie lichinok Platycnemis pennipes (Pallas) (Odonata, Platycnemididae). — [Spatial distribution in the larvae of Platycnemis pennipes (Pallas) (Odonata, Platycnemididae)]. *Biol. Nauki* 1987 (4): 29-34. — (Russ., with Engl. s.). — (Dept Ent., Fac. Biol. Lomonosow Sta. Univ., Moskow V-234, USSR).
Distribution, movement and spatial interaction patterns in the older instar of P. pennipes are compared with those in Calopteryx splendens. As it appears the behaviour of P. pennipes larvae is to a lesser extent conditioned by intraspecific relationships within the population.

(6247) SCHANOWSKI, A. & R. BUCHWALD, 1987. *4. Sammelbericht (1987) über Libellenvorkommen (Odonata) in Baden Württemberg (Stand: November 1987).* Schutzgemeinschaft Libellen Baden-Württemberg & Deutscher Bund für Vogelschutz Baden Württemberg, Sasbach-Freiburg, 11+38 pp. — (c/ o Dr K. Sternberg, Inst. Biol. I-Zool., Univ. Freiburg, Albertstr. 21a, D-7800 Freiburg Br., FRG).
Compared with the earlier editions (cf. *OA* 2928, 4562, 6201), this is typographically very nicely produced (A4 size, col. frontispiece), but the scope remains the same; this edition covering 67 spp. The preliminary regional Red List was revised by R. Buchwald, B. Höppner, A. Schanowski and K. Sternberg, and it now contains 53 spp., of which 3 are extinct, 13 threatened with extinction, 15 heavily en-

dangered, 15 endangered, and 7 spp. are considered potentially endangered.

(6248) SCHMAHL, E., 1987. Skylge's libellen. *Amoeba, Amsterdam* 1987 (NH): 27. (Dutch). — (Huyghenslaan 73, NL-6824 JE Arnhem).
Notes on the Odon. of the Northsea island of Terschelling, the Netherlands.

(6249) SCHMAHL, L., 1987. Kleurvariëteiten bij Ischnura elegans — [Colour phases in Ischnura elegans]. *Amoeba, Amsterdam* 1987 (NH): 17. (Dutch). —)Huyghenslaan 73, NL-6824 JE Arnhem).
Statistical analysis of colour phases in 120 males and 82 females, collected July 8, 1987 at a locality on the Northsea island of Terschelling, the Netherlands, showing the age structure of the population at that particular spot and time.

(6250) SINGER, F., 1987. A physiological basis of variation in postcopulatory behaviour in a dragonfly Sympetrum obtrusum. *Anim. Behav.* 35(5): 1575-1577: — (Bell Mus. nat. Hist., Dept Biol. & Behav. Ecol., Univ. Minnesota, Minneapolis, Minn. 55455, USA).
The logistic regression shows no relationship between local or total male population density and variation in postcopulatory behaviour. This is inconsistent with the hypothesis that males are changing their behaviour in response to the probability of take-over. There is also no correlation between non-contact guarding and female density. This opposes the hypothesis that males use non-contract guarding to take advantage of periods of high female availability. In many insect spp., population density is correlated with ecological factors, such as ambient temperature, radiant energy and wind speed. Unless these factors are measured and analysed, differences in behaviour resulting from physiological constraints may be incorrectly attributed to social factors.

(6251) SRIVASTAVA, V.K. & B.K. SRIVASTAVA, 1987. Male internal genital organs of the damselfly Pseudagrion rubriceps Selys (Odonata: Zygoptera). *Fol. morphol.* 35(3): 265-269, 1 pl excl. — (First Author: Dept Zool., Chaudhary Mahadev Prasad Coll., George Town, Allahabad-211002, India).
The morphology, anatomy and histology of the adult of various stages are described in detail.

(6252) STÖCKEL, G., 1987. Erweitert das Kleine Granatauge (Erythromma viridulum Charp.) (Odonata) sein Areal? *Ent. Nachr. Ber.* 31(3): 133-135. (With Engl. & Russ s's). — (Rudower Str. 22, DDR-2080 Neustrelitz, GDR).
The known records of E. viridulum in the territory of the GDR are reviewed, and it is stated that the sp. is moving its range border in the northward direction.

(6253) STÖCKEL, G., 1987. Nachtrag zu "Erweitert das Kleine Granatauge (Erythromma viridulum Charp.) (Odonata) sein Areal?. *Ent. Nachr. Ber.* 31(4): 175. — (Rudower Str. 22, DDR-2080 Neustrelitz, GDR).
Supplementary records to those in the paper listed in *OA* 6252.

(6254) STÖCKEL, G., 1987. Beobachtungen zur möglichen passiven Verbreitung von Wassermollusken durch Wasserinsekten. *Ent. Nachr. Ber.* 31(6): 279. — (Rudower Str. 22, DDR-2080 Neustrelitz, GDR).
2 records of phoretic attachment of the freshwater migratory lamellibranch Dreissena polymorpha to the exuviae of Gomphus vulgatissimus and Onychogomphus forcipatus are reported.

(6255) UTZERI, C., E. FALCHETTI & R. RAFFI, 1987. Adult behaviour of Lestes barbarus (Fabricius) and L. virens (Charpentier) (Zygoptera, Lestidae). *Fragm. entomol.* 20(1): 1-22. (With Ital. s.). — (Dipt. Biol. Anim. & dell'Uomo, Univ. Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma).
Individual and reproductive behaviour is reported. Reproductive isolation is effected by means of tactile stimuli, and by seasonal and spatial separation of the 2 spp. There is no territoriality, and the face-and-oscillate display (performed by males and females) is considered a sexual behaviour. Oviposition com-

mences always in tandem, but released females also oviposit alone. The earlier a male sizes a female, the longer he keeps her in tandem, releasing her at the time of the day when male density is low. A high density and an early appearance of the males at the waterside might reduce the possibility of females laying unfertilized eggs.

(6256) VAN BUSKIRK, 1987. Density-dependent population dynamics in larvae of the dragonfly Pachydiplax longipennis: a field experiment. *Oecologia* 72: 221-225. — (Dept Zool., Duke Univ., Durham, NC 27706, USA).
Several features of dragonfly population biology suggest that population regulation occurs in the larval stage. This study was designed to determine if density-dependent interactions among larval odon. can affect survival, growth and emergence. First-instar larvae of P. longipennis were raised in outdoor experimental ponds at initial densities of 38, 152, and 608 larvae m^{-2}, under 2 levels of food availability. Food availability was supplemented in half of the pools by volumetric addition of zooplankton every other day. Pools in the low food treatment did not receive the zooplankton supplement. — There was a strong negative effect of density on the mean growth rate survivors, which included both emerging tenerals and individuals overwintering in the larval stage. A higher proportion emerged from low density than high density pools. Metamorphs from high density populations were smaller and emerged slightly later than those from low density, but the absolute number of metamorphs did not differ significantly among density treatments. Food supplementation significantly increased the proportion of overwintering larvae. There were no significant food-by-density interactions, indicating that food and density acted independently on larval population dynamics. Density-dependent mechanisms can clearly contribute to odon. population regulation, especially by controlling the number of larvae which emerge and the average age at reproduction. Population-level responses to density may by a result of interference among larvae.

(6257) VAN BUSKIRK, J., 1987. Influence of size and date on emergence and mating success in a dragonfly, Sympetrum rubicundulum. *Am. Midl. Nat.* 118(1): 169-176. — (Dept Zool., Duke Univ., Durham, NC 27706, USA).
In dragonflies larval density and food supply influence that length of the larval period and size at emergence, but their effects on adult fitness are not well understood. In the present paper the influence of body size at emergence and date of emergence on 2 components of adult fitness (survival and mating success) are reported in a natural population of S. rubicundulum. Survival during the 2-weak maturation period from emergence to breeding was low for both sexes (2-3%). There was no significant change in the mean wing length of the population of males between emergence and breeding, indicating that neither large nor small males experienced a survival advantage during maturation. Once males attained reproductive age (13-16 days) they had high continued survival (mean daily survival: 0.96; expected life span: 37.7 days), which was unrelated to wing length or date of emergence. Similarly, the daily mating success of males was not influenced by wing length or date of emergence. These results suggest that natural variation in traits affected by larval growth rate may have little direct influence on adult fitness in male dragonflies.

(6258) VIJAY, [C], 1987. [Dragonfly — the man's best friend]. *Gorkhapatra, Kathmandu,* issue of Aug. 17, 1 p. (Nepali). — (c/ o M. Mahato, Nat. Hist. Mus., Manjushree Bazar, Swayambhu, Kathmandu, Nepal).
This is a rather exhaustive interview with Mr M. Mahato, the odonatologist of the Nat. Hist. Mus. of Kathmandu, Nepal, published in the principal Nepalese daily. His portrait is also provided. The interview mainly dwells on the economic importance of dragonflies, and Agriocnemis lacteola, Himalagrion exclamationis, Gynacantha bayadera and Cratilla lineata are mentioned as examples of newly discovered additions to the Nepalese fauna.

(6259) WEIDLICH, M., 1987. Die 1. Entomologische Schlaubetalexkursion des Biologischen

Museums Beeskow. *Ent. Nachr. Ber.* 31(1): 44-45. — (Biol. Mus. Beeskow, Frankfurter Str. 23, Postfach 64-05, DDR-1230 Beeskow, GDR).
Ophiogomphus serpentinus is recorded from the Schlaubetal, Distr. Frankfurt/Oder, GDR.

(6260) WUST, E., 1987. Die Libellen des Schulbiotopes in den alten Rüttenen. *Voralberger Oberland* 1987 (4): 132-139. — (Weinberggasse 4, A-6800 Feldkirch).
The odon. fauna (19 autochthonous spp.) of a secondary pond nr Feldkirch, Vorarlberg prov. Austria is described and discussed.

(6261) ZHAO, X. (CHAO, H.-f.) & J. XU, 1987. Descriptions of a new genus and species of gomphid dragonfly reared from nymph in Fujian province, with notes on allied species (Gomphidae: Onychogomphinae). *J. Fujian agric. Coll.* 16(4): 259-266. (Chin., with very exhaustive Engl. s.). — (Inst. Biol. Control., Fujian Agric. Coll., Fuzhou, Fujian, P.R. China).
Orientogomphus Chao gen. n. is defined, and Onychogomphus circularis Sel. (= Heterogomphus naninus Förster syn. n., O. earnshawi Fraser and O. aemulus Lieft. are transferred to it. The type sp. (here described and figured) is Orientogomphus armatus Chao & Xu sp. n. (holotype ♂, allotype ♀, paratypes of both sexes: Shaxian Co., Fujian, P.R. China, 15-V--1987, all reared). The types are in the Insect Coll. Biol. Control Res. Inst., FAC. Fuzhou: Type Cat. No. 035.

1988

(6262) ASAHINA, S., 1988. [Odonatological works published in 1987. (International publications)]. *Gekkan Mushi* 204: 16-19.(Jap.). — (Takadanoba 4-4-24, Shin-juku-ku, Tokyo, 160, JA).
Highlights of odonatological literature published in 1987, mostly by the S.I.O. The non--periodical literature is not considered.

(6263) BEUKEBOOM, L.W., 1988. Two new records of Somatochlora flavomaculata from the Netherlands (Odonata: Corduliidae). *Ent. Ber., Amst.* 48(5): 82-85. — (Dept Biol., Univ. Rochester, Rochester, NY 14627, USA).
Following a 9-yr period of apparent absence of this sp. in the Netherlands, it has been taken (1982) in the province of Drente and on the Northsea island of Vlieland. The records probably refer to immigrants, and the autochthony of this sp. in the Netherlands is uncertain.

(6264) BUSSLER, H., 1988. Zweiter Beitrag zur Dytisciden- und Hydrophilidenfauna Nordbayerns (Col., Dytiscidae, Hydrophilidae). *NachrBl. bayer. Ent.* 37(1): 5-10. (With Engl. s.). — (Unterdallersbach 3, D-8805 Feuchtwangen, FRG).
25 odon. spp. were recorded from the man--made "Altmühlsee" (lake), central Franconia, Germany, of which Ischnura pumilio is the only one mentioned.

(6265) CAMPBELL, J.M., 1988. An atlas of Oxfordshire dragonflies. *Occ. Pap. Oxfordshire Mus.* 12:1-40. — (Oxfordshire Mus., Fletcher's House, Woodstock, Oxon OX7 1SP, UK).
This is an essentially updated and revised edition of the work listed in *OA* 5334. The number of spp. known to occur in Oxfordshire, UK remains unchanged (28), but the coverage of records (with some exceptions in the county border areas) is significantly improved and the taxonomic nomenclature is "updated". It is also emphasized that in the intervening period (since 1983), the increase was noticed of a number of spp., such as Sympetrum sanguineum, Anax imperator and Aeshna mixta. Among those still unrecorded, but tentatively expected is Ischnura pumilio.

(6266) CARVALHO, A.L., 1988. Sobre a ontogenia das larvas de Coryphaeschna perrensi (McLachlan, 1987), e implicaçoes filogenéticas (Odonata: Aeshnidae). *Resum. XV. Congr. brasil. Zool.*, Curitiba, p. 133. — (Dep. Ent., Mus. Nac., Univ. Fed. Rio de Janeiro, Quinta da Boa Vista, BR-20970 Rio de Janeiro, R.J.).
Under laboratory conditions, there are 14

larval instars in C. perrensi, the older instars lasting relatively long (3 months). This and some morphological features the sp. has in common with C. ingens and C. viriditas. In Castoraeschna the larval development is also slow, which could point towards close phylogenetic relationship of the 2 genera.

(6267) CARVALHO, A.L., 1988. Notas sobre a odonatofauna da regiao de Restingas em Maricá, RJ (Insecta: Odonata). *Resum. XV. Congr. brasil. Zool.*, Curitiba, p. 134. — (Dep. Ent., Mus. Nac., Univ. Fed. Rio de Janeiro, Quinta da Boa Vista, BR-20970 Rio de Janeiro, R.J.).
About 30 spp. were recorded from Restinga de Maricá, Rio de Janeiro, Brazil. The more interesting of these are mentioned.

(6268) CEDHAGEN, T., 1988. Migration hos trollsländan Hemianax ephippiger iakttagen i Israel. — Migration of Hemianax ephippiger (Burmeister, 1839) (Odonata, Aeshnidae) observed in Eilath, Israel. *Ent. Tidskr.* 109(1): 46-48. (Swed., with Engl. s.). — (Dept Zool., P.O. Box 25059, S-400 31 Göteborg).
The swarm was observed on March 12, 1986, but no dragonflies were seen during the preceding week. Along a 2 km beach (8 km SW of Eilath) at least 25.000 individuals were estimated. They were either resting on walls or flying slowly around, without a common direction. Next day the swarm disappeared. The remaining individuals, however, were very active and did not exhibit a slow and drowsy flight as on the previous day.

(6269) CH[ALUPSKY], J., 1988. Cervené Wážky. *Vesmir* (Czechoslovakia) 67: 116. (Czech). — (Dept Parasitol., Charles Univ., Viničná 7, CZ-12844 Prague-2).
Czech translation of the femous Japanese "Aka Tombo" song of Rofu Miki (1889-1964), based on the Engl. translation by K. Inoue (included in the papers of the Sixth Int. Symp. Odonatol., Chur, 1981) and on a Polish translation by S. Mielewczyk (published in *Notul. odonatol.* 1 (1982): 147).

(6270) CHAO, H.-f., 1988. *Recent advances on the classification of Chinese gomphid dragonflies (Odonata: Gomphidae).* Engl. summary of a (Chin.) paper presented in the session on Insect Taxon. & Faunal Studies of the Chin. Ent. Soc., Fuzhou, July, 1988. — (Biol. Control Res. Inst., Fujian Agric. Coll., Fuzhou, Fujian P.R. China).
[Verbatim text]. In 1930, Needham published a book titled "A manual of the dragonflies of China". He recorded 50 spp. in 12 gen. of the Gomphidae. He did not divide the family into subfamilies. His genera, such as Gomphus and Onychogomphus are large and heterogeneous. — In 1953-55, Chao published (in Chinese) a series of 5 articles dealing with the classification of the Chinese Gomphidae. He recorded 101 spp. and sspp. in 26 gen. of 3 subfam. (Gomphinae, Hageniinae, Ictinogomphinae) and placed the Epigomphinae of previous authors into Gomphinae. — Recently, the work on the Gomphidae classification has been very active both in China and elsewhere. Based on the number and arrangement of cells in the anal triangle as well as other composite characters, Chao (1984) established a new subfamily Onychogomphinae, for the reception of several gen. removed from Gomphinae. Carle & Cook (1984) divided the family into 2 tribes, Gomphini and Octogomphini. Both systems of classification had been adopted by Davies & Tobin (1985). However, they expressed the idea that "their popularity has yet to be tested". Carle (1986) had made even more detailed classification of the family into 8 sections, 8 subfam. and 23 tribes. It is clear that there exists much controversy with regard to the suprageneric classification of the family. A rather conservative system of classification into 4 subfam. has been adopted in the present revisionary study of Chinese fauna. — With regard to the generic level of classification, great changes have taken place in recent years. These are most evident in Gomphus Leach and Onychogomphus Sel. In 1984, Chao published a monotypic gen. Shaogomphus for the reception of a new sp., lieftincki. In 1985, when Asahina established the new gen. Asiagomphus, he transferred many spp. (including personatus Sel. from SE Asia) from the former Gomphus into his new genus. At the same time

he left postocularis Sel. (Japan), p. epophthalmus Sel., schmidti Asahina (both from NE China and E. Siberia, and others together with vulgatissimus (L.) (Europe) in Gomphus (s. str.), the last one being the type sp. of the genus. In 1986 Carle divided Gomphus into several subgenera, with G. personatus Sel. as the type sp. of his new subgen. Apatogomphurus. At the same time Carle questioned if Shaogomphus lieftincki should be a synonym of Gomphus postocularis Sel. (Japan), or G. chancae Bartenef (U.S.S.R.) (a synonym of schmidti Asahina, according to Asahina 1985) or G. schmidti Asahina (NE China). These spp. are certainly congeneric with lieftincki but much smaller in size. The size of the gen. Stylurus Needham in China has been increasing very rapidly in recent years. Besides new additions, several spp. have been transferred from the former Gomphus into this genus. Eventually, through splitting and transferring, the gen. Gomphus becomes a dumping place for the reception of a few spp. which have not been well investigated. A study of the actual specimens of Gomphus vulgatissimus (L.) at the SIO International Odonata Research Institute, Gainesville, Florida has revealed that the anterior hamulus is forked apically. This is the type sp. of Gomphus Leach. It seems desirable that the scope of the genus should be redefined. It seems questionable if there is any Chin. sp. referable to Gomphus (s. str.). — Onychogomphus Sel. is another very large and heterogeneous genus, consisting of more than 70 spp., widely distributed in Palaearctic, Ethiopian and Indo-australian regions. Laidlaw (1922) grouped the Oriental spp. into 4 sections: 3 of them were later raised to genera, viz. Lamelligomphus Fraser, 1922, Nepogomphus Fraser, 1934 and Paragomphus Cowley, 1934. The systematic status of the fourth section which contains circularis Sel., 1894, remains much disputed for a long time. Needham (1930) and Chao (1953, 1954) treated Lamelligomphus as a synonym of Onychogomphus. Recently, Chao (1987) erected Orientogomphus for the reception of a new sp., armatus, reared from larva in Fujian province. He transferred circularis Sel. (= Heterogomphus naninus Förster, 1905) and its 2 other cogeners into his new genus. Carle (1986) divided Onychogomphus into 2 subgen., with the erection of a new subgen. Nychogomphus. He also pointed out that those spp. that Chao (1954) put in Onychogomphus should be transferred to Lamelligomphus and many Indian spp. that Fraser (1934) put in Onychogomphus should go to Nychogomphus. He considered that none of the Chinese or Indian spp. are referable to the nominate subgen. Onychogomphus. A preliminary study of the male anal app. and the penile structures of Chinese spp. has revealed that they differ quite significantly from those of Onychomphus forcipatus (L.) which is the type sp. of Onychogomphus Sel. It is evident that generic transfers and new groupings of the Chinese Onychogomphus complex should be made. — Up to the present, there are 139 spp. of gomphid dragonflies known to occur in China. Some of them have not yet been published. Among them, 97 spp. in 19 gen. belong to Gomphinae, 31 spp. in 11 gen. to Onychogomphinae, 5 spp. in 1 gen. to Hageniinae and 6 spp. in 3 gen. belong to Lindeniinae (= Ictinogomphinae). Judging from the fact that the gomphid fauna have not been throughly explored in many provinces, the author is optimistic to estimate that the total number of spp. will exceed 150.

(6271) *CONTACTBLAD NEDERLANDSE LIBELLENONDERZOEKERS* — [Newsletter of the Netherlands Dragonfly Workers]. No. 15 (March, 1988). (Dutch) — (c/o Miss K. Verspui, Westerkade 27 bis, NL-3511 HC Utrecht).

Retaining the traditional cover, with the issue the lay-out and the editorial policy of the newsletter were changed and improved. It became a general policy to publish also small scientific papers relative to the Netherlands fauna. — The announcement and the program of the 13th Colloquium of Dutch Dragonfly workers (Utrecht, Apr. 2, 1988) were prepared by *H. Verhaar*, while *R. Geene* reports on the "Third International Student Camp on Odonatology" (Giethoorn, the Netherlands, 1987), the objective of which was the study of Aeshna viridis and the results of which will be presented in detail at a later date. In addition to the list of

membership mutations, a note on the activities of the Netherlands Youth Dragonfly Research Group, and a (commercial, but odonatological) advertisement, there are book reviews of the volumes listed in *OA* 6031 (P.L. Miller) and 6023 (G.W. Jansen), by resp. *K. Verspui* and *H. Verhaar*, and the traditional list of faunistically or phenologically noteworthy records, compiled by *M. Verdonk. H. Verhaar* is summarising the paper by E. Schmidt on the nomenclature of some European taxa, published originally in *Adv. Odonatol.* 3 (1987): 135-145. — The following are the original articles, representing extensive summaries of the papers presented at the 12th Colloquium of Dutch Dragonfly workers (Nijmegen, 1987): *Leuven R.S.E.W., J.A.M. Vanhemelrijk, M.M.J. Maenen & G. van der Velde:* The acidification of the Netherlands surface waters and its impact on the odonate fauna (pp- 3-5); — *Huijs, L., H. Peters & E. Clerx:* Landscape ecology research in the Overasseltse and Hartertse moorlands (5-6); and *Krüner, U., J. Hermans & H. van Buggenum:* Dragonflies of the German-Netherlands border area: Tevereneerheide, Brunssumerheide and the Schinveldse Forests (6-7; for a book on this subject cf. *OA* 6026, 6027).

(6272) CORBET, P.S., 1988. Ninth International Symposium of Odonatology, Madurai, India, 18-23rd January, 1988. *Antenna* 12(2): 65. — (The Old Manse, 45 Lanark Rd, Edinburgh, EH14 1TL, Scotland, UK).
A rather detailed report, by one of the most involved participants.

(6273) COUNCIL OF EUROPE, 1988. *Convention on the conservation of European wildlife and natural habitats: List of animal species added to the Appendices to the Bern Convention* (Standing Committee, 6th meeting, December 1987). Secretariat Memorandum, prepared by the Directorate of Environment and Local Authorities, T-PVS (88)5: 1-13. Strasbourg (Eng. & Fr.). — (Bern Convention Secretariat, Council of Europe, B.P. 431 R6, F-67006 Strasbourg-Cedex).
So far no Odon. were listed in Appendix II of the Bern Convention. The following spp. were now entered: Calopteryx syriaca, Sympecma braueri, Coenagrion freyi, C. mercuriale, Aeshna viridis, Stylurus flavipes, Gomphus graslinii, Ophiogomphus cecilia, Lindenia tetraphylla, Cordulegaster trinacriae, Oxygaster curtisi, Macromia splendens, Brachythemis fuscopalliata, Leucorrhinia albifrons, L. caudalis, and L. pectoralis.

(6274) EDA, S., 1988. Chronicle of Japanese ecology in 1987, with supplemental notes of 1986. *Nature & Insects* 23(3): 23-31. (Jap., with Engl. title). — (3-4-25 Sawamura, Matsumoto, Nagano, 390, JA).
[Abstract not available.] Cf. *OA* 5838.

(6275) FERREIRA, N., Jr, A.L. CARVALHO & J.L. NESSIMIAN, 1988. Estudo comparativo entre as formas imaturas de cinco espécies do género Erythrodiplax Brauer (Odonata: Libellulidae). *Resum. XV Congr. brasil. Zool.*, Curitiba, p. 135. — (Dept. Zool., Inst. Biol., Univ. Fed. Rio de Janeiro, BR-21940 Ilha do Fundao, R.J.).
The larval morphology of E. umbrata, connata, anomala, juliana and ochracea was studied. Some interspecific distinctive characters are mentioned.

(6276) GEREND, R., 1988. Faunistik und Ökologie von Lestes dryas Kirby, 1890 in Luxemburg (Insecta: Odonata) *Paiperlek* 9(4): 49-56. (With Engl. s.). — (35 rue de Hellange, L-3487 Dudelange).
During 1987, 20 new localities of L. dryas were discovered in Luxembourg. The habtats are described and the habitat-preference is discussed (shallow, astatic well-vegetated ponds with Juncus and Carex). — This is one of the few important papers on the ecology of this sp.

(6277) GÖCKING, C., J. THIERY & P. VAHLE, 1988. *Erlebter Frühling '88. Die Libelle. Unterrichtshilfe.* Naturschutzjugend im DBV, Stuttgart. II+8 pp. — (Available from: Naturschutzjugend im DBV, Königstr. 74, D-7000 Stuttgart-70, GFR).
A brief outline of dragonfly biology and conservation problematics, intended as an aid for the use in primary schools.

(6278) *GRACILE.* [Newsletter of Odonatology]. Published by the Kansai Research Group of Odonatology, Osaka, No. 39 (March 1, 1988). — (c/o K. Tani, 129 Jizo-cho, Nara, 630 JA).
Tseuda, S. & A. Kitagawa: Odonata of southeast Asia collected by the late Mr M.I. Iwasaki. Part 2. Odonata of North Sumatra, Indonesia (pp. 1-5); — *Muraki, A.:* In search of Macromia urania and Macromia ishidai in Ishigakiu Island, Okinawa Prefecture (6-11); — *Katatani, N.:* On the endoparasite found in Stylurus nagayanus (11); — *Inoue, K.:* A case of oviposition of Indolestes peregrinus in mud (12-13); — *Tsuda, S. & T. Yamamoto:* Capture of Ictinogomphus pertinax in Osaka Prefecture (13-14); — *Anaze, N.:* Report on the survey trip of the two species of Trigomphus in Mie Prefecture (14-18); — *Nishu, S.:* Report of the survey trip on the Odonata fauna of Awaji Island, Hyogo Prefecture (2) in summer (19-24); — *Inoue, K.:* Report on the survey trip on the odonate fauna of Awaji Island, Hyogo Prefecture (3) in autumn (25--32); — *Azuma, T.:* Report on the survey trip for Sympetrum species in Aonogahara, Hyogo Prefecture (33); — *Nishu, S.:* Ictinogomphus pertinax found in Akasi Park (34); — *Okada, S.:* Dragonfly cords of the Japanese syllabary (35-36).

(6279) JACOBS, W. & M. RENNER, 1988. *Biologie und Ökologie der Insekten.* Fischer, Stuttgart--New York. X+690 pp., 1201 figs incl. — [ISBN 3-437-20352-5]. — Hard cover (12x19 cm). — Price: DM 68,-. — (Available from the SIO Sales Dept, Bilthoven).
This is the second, essentially revised, updated and enlarged edition of the original lexicon that was authored by W. Jacobs (1974), and about which the Nobel prize laureate Karl Ritter von Frisch stated, how happy he would have been if such a work had been available in his young years. The concise encyclopedic text presents old and new information on achievements in Entomology, with emphasis on behaviour, functional morphology, systematics, physiology and ecology, and on the European taxa (incl. the more important spp.). The Odon. are adequately dealt with, and the bibliography contains close to 1600 references.

(6280) *JOURNAL OF THE BRITISH DRAGONFLY SOCIETY,* Vol. 4, No. 1 (April, 1988). — (c/o Mrs J. Silsby, 1 Haydn Ave., Purley, Surrey, CR2 4AG, UK).
Jarzembowski, E.A.: British dragonflies in the latter part of the age of dinosaurs (pp. 1-8); — *Kemp, R.G.K.:* Is Gomphus vulgatissimus (L.) exclusively a riverine species in the British Isles? (8-9); — *Brooks, S.J.:* Exotic dragonflies in north London (9-12); — *Rippey, I. & B. Nelson:* Odonata in the north of Ireland 1986/87 (13-19); — *Gabb, R.:* English names for dragonflies (19-21); — *Brooks, S.J.:* [Book review] Dragonflies, by P.L. Miller (22-23).

(6281) JURZITZA, G., 1988. Ein seltenes Bilddokument: Sperma-Auffüllung bei Aeshna juncea (Linnaeus 1758) (Odonata: Aeshnidae). *Ent. Ztschr.* 98(9): 127-128. — (Reinmuthstr. 27, D-7500 Karlsruhe-21, FRG).
A note on sperm transfer in Aeshna juncea, with a photograph (Tespe/Oberelbe, E of Hamburg, 4-X-1987).

(6282) JURZITZA, G., 1988. *Welche Libelle ist das? Die Arten Mittel- und Südeuropas.* Franckh, Stuttgart (Kosmos Naturführer). 192 pp. — [ISBN3-440-05846-8]. — Price DM 30.—. — (Author Reinmuthstr. 27, D-7500 Karlsruhe--21, GFR).
In a way this booklet is a kind of a milestone in the development of illustration and presentation of odonatological "utilitarian" identification literature, directed at the widest general readership, therefore it seems in order using this opportunity to give a brief outline of the development of illustration in the commercially published identification works. — (1) While, by any standards, the Selysian monographs are exceptionally poorly illustrated, it was long before Selys (not considering the prelinnaean literature) that various workers adopted col. figs of mounted specimens as an aid in their taxonomic works. T. de Charpentier (1840) produced the first monograph on the European Odon., illustrated throughout with hand-coloured lithographs. In Britain, he was followed by W.F. Evans (1845), whose illustrations were considered of "such historic interest" that C. Longfield repub-

lished them in her classical book (1937, 1949). Among the continental workers, the peculiar, little known monograph of H. Buchecker (1876) should be mentioned, while the famous illustrations of R. Tümpel (1901, 1907, 1922) were republished in Russia by G.G. Yakobson & V.L. Bianki (1905). [For details on various editions of this work cf. E. Schmidt, 1957, *Ent. Ztschr.* 67: 202-214]. In Japan, M. Nami's (1901-1904) plates are by far the most beautiful, though they were only recently made available to the general public by S. Asahina (1984; *OA* 4924). No similar, exclusively odonatological work from Japan is known to the Abstracter but the dragonfly plates in the monumental insect work of S. Matsumura (1933) are certainly worth mentioning. The plates of W.J. Lucas (1900, 1930) remained almost unsurpassed, but this tradition survived through C.O. Hammond (1977, 1983, 1985; *OA* 2062, 4311, 5393), J. d'Aguilar et al. (1985, 1986; *OA* 5041, 5650) and R.R. Askew (1988), until today, not mentioning inferior attempts such as e.g. by L. Chopard (1948), or often excellent figs of single taxa in technical papers. Neither in Japan, nor in North America did this kind of illustration of regional monographs ever gain ground. — (2) With the appearance of photography, the photographic representation of mounted specimens never really replaced colour drawings. A few attempts were made by e.g. J.-z. Sui & H.-g. Sun (1984; *OA* 5487, black-and-white) in China, A. Vega Ortega (1980; *OA* 5969) in Spain, and (partly) by A. Pinratana et al. (1987; *OA* 6178) in Thailand. The Japanese, with great success, developed their own style and technique of photography of freshly killed specimens, which reached a superb level in the works of K. Inoue (1979; *OA* 2562) and, above all, in K. Hamada & K. Inoue (1985; *OA* 5245). By the development of special techniques in black-and-white photography of larval specimens (J.G. Needham & M.J. Westfall, 1955; *OA* 1266), the Americans contributed a unique aspect to odon. photography. — (3) The main line of "evolution", however, was developed in Europe, where H. Schiemenz (1953) was the first to adopt colour paintings of spp. in their natural environment as an illustration and identification aid in his taxonomic work. Needless to say this approach requires considerable artistic skills, observation abilities and profound knowledge of ecology and behaviour. Almost simultaneously appeared the classical work of P.-A. Robert (1953, 1958). The quality of his illustrations often surpasses the information that could be presented in a field photograph. The European present-day literature largely follows the paths of Robert, substituting his paintings by col. field photographs. — (4) In 1970, the late H. Itzerott stated to the Editor of *Odonatologica* that his figs in *Mitt. Pollichia* 3 (1961): 169-180 were the first col. field photographs ever published of dragonflies in Germany, though set "field" phot. did appear earlier (e.g. in the 1953 ed. of H. Löns's famous dragonfly book). The first proper attempt to use field photographs for identification purposes was made by H. Bechtel (1965) in his minuscule volume, followed by O.R. Strub & I.E. Siegenthaler (1976; *OA* 1563) in their regional work though some of the photographs in these books are still set. — (5) The slim volume by G. Jurzitza (1978; *OA* 2121, 2565) was the first in the "new generation" of field-photography-based dragonfly field guides. It was followed in Europe by the books of I. Pecile (1984; *OA* 4870), B. Gibbons (1986; *OA* 5549), A. McGeeney (1986; *OA* 5566), H. Bellmann (1987; *OA* 6111) and A. Sandhall (1987; *OA* 6153), in the Canary Islands by M. Baez (1985; *OA* 5370; mostly set), and in New Zealand by R.J. Rowe, (1987; *OA* 5951). Reference should be made at this place also to e.g. the excellent work of S. Ishida & J. Hamada (1973; *OA* 583) and to the small booklet of K. Sternberg (1987; *OA* 6054), but none of these is complete for the region covered. — Many more books with excellent illustrations were published, but there the emphasis either is not on the taxonomic identification and/or recognition of species, or they are not concerned solely with dragonflies. It is amazing that North America did so far contribute nothing to this type of dragonfly literature, though an excellent volume is expected soon to come off the press. — (6) With such a comprehensive volume of works on the market, it is perhaps surprising, though

not really unexpected, that with his recent work Professor Jurzitza still managel to find an own, original approach. The size (11x18 cm) and the binding (soft, heavy plastic jacket) make the book the first real field guide, adapted for outdoor use. With its scope ("Germany", i.e. central Europe and a good sample of the westmediterranean fauna) the coverage is larger than in the somewhat comparable work of Bellmann, and the arrangement follows habitats rather than systematics, as was also the case in his 1978 book. The author is one of the outstanding odonatologists and dragonfly photographers
combined, which is also apparent from the concise and well organized text, though many of the (German) photographs were published earlier. This also is the first book of its kind to use proper infraspecific nomenclature, where appropriate. — The introductory chapters on classification, palaeontology, morphology, ecology, behaviour, conservation and photography, are followed by concise pictorial keys (in part generic) to adults and larvae. In the "descriptive" part, each sp. is shown with its main field recognition features, whenever possible photographs of similar spp. are given on opposite pages, and both sexes are illustrated in spp. with pronounced sexual dimorphism. Each sp. is dealt with on a separate page and (standardized) information is provided on wing span measurements, characters distinguishing it from similar spp., on conservation status, phenology, habitat, behaviour, on larval habitat & life history, and, where appropriate, brief notes are appended on nomenclature, systematic position, general distribution, on morphological or other peculiarities, etc. — There are very few (printing) errors, though a few are unavoidable in any book, e.g. on p. 8, with reference to Anisoptera and Anisozygoptera, the term "Unterfamilie" should read "Unterordnung". — To a beginner, the book is certainly selfsufficient and will enable him/her to identify any sp. to be encountered in central Europe.

(6283) KETELAAR, R., 1988. Libellen, hun voorkomen en behoud in laagvenen. — [Dragonfly occurrence and conservation in the low level bogs]. *Trias* 17(1): 8-10. (Dutch). — (Melis Stokelaan 14, Uitgeest, NL).
The wetlands under discussion are defined as moors from which, for economic reasons, the peat has been removed (from the 16th cent. onwards), and which are particularly abundant in the western Netherlands. A list is given of the characteristic spp., and Coenagrion armatum, Aeshna isosceles, A. viridis and Ladona fulva are briefly discussed.

(6284) KRÜNER, U., J.T. HERMANS & H.J.M. VAN BUGGENUM, 1988. De libellen (Odonata) van de Teverenerheide, Brunssummerheide en de Schinveldse bossen. — Dragonflies of the Teverenerheide, the Brunssummerheide and the Schinveldse Bossen (South Limburg, NL). *Natuurh. Maandbl.* 77(5): 83-94. (Dutch, with Engl. & Germ. s's). — (First Author: Geldener Str. 39, D-4050 Mönchengladbach-4, FRG).
Abridged journal edition of a privately published monograph, German and Dutch editions of which are listed in *OA* 6026 and 6027, resp.

(6285) LARSSON, J.I.R., 1988. On the taxonomy of the genus Systenostrema Hazard & Oldacre, 1975 (Microspora, Thelohaniidae), with description of two new species. *Syst. Parasitol.* 11(1): 3-17. — (Dept Zool., Univ. Lund, Helgonavägen 3, S-223 62 Lund).
Systenostrema alba sp. n. and S. candida sp. n. are described and figured from larvae of resp. Aeshna grandis and Libellula quadrimaculata (Sjödiken, Sweden).

(6286) MACHADO, A.B.M., P.A.R. MACHADO, A.C. BRAZ & E.R. MACHADO, 1988. Fauna odonatológica de reserva de Peti-Cemig, Minas Gerais. *Resum. XV. Congr. brasil. Zool.*, Curitiba, p. 136. — (Dep. Zool., Inst. Cien. Biol., Univ. Fed. Minas Gerais, C.P. 2486, BR-31270 Minas Gerais).
80 spp. were recorded (here not listed) from the Reserve, representing 38.8% of the Minas Gerais fauna; 6 of these (named) are new for the state. Also included are 2 new Heteragrion spp., one of which appears already extinct in the Reserve. The biogeographic composition

of the fauna is briefly analysed.

(6287) MAHATO, M., 1988. Epiophlebia ko yak yhalak. — [A note on Epiphlebia]. *News Bull. nat. Hist. Mus., Kathmandu* 3(1/2): 15-16. (Nepali). — (Nat. Hist. Mus., Manjushree Bazar, Swayambhu, Kathmandu, Nepal).
The morphological peculiarities and the systematic position of the genus are briefly stated and the chronicle of the discovery and research of E. laidlawi are presented.

(6288) *MARTINIA*. Bulletin de liaison des Odonatologues de France, No. 7 (Apr., 1988). — (c/o J.-L. Dommanget, 7 rue Lamartine, F-78390 Bois d'Arcy).
Dommanget, J.-L.: Editorial (p. 1); — *Duval, B. & J.-L. Pratz:* Un appel pour les odonates du Département du Loiret (2); — *Lett, J.-M.:* Sur la présence d'Ophiogomphus cecilia (Fourcroy, 1785) dans le Loir-et-Cher (41) et dans l'Allier (03) (Odonata Anisoptera: Gomphidae) (3-4); — *Rochat, C.:* Observation de quelques odonates dans les Pyrénées-Orientales (66) et l'Aude (11) (5-6); — *Manach, A.:* Quelques araignées prédatrices de libellules (7-9): — [Annonce] *David, J. & G. Gelinaud:* Atlas "Odonates du Massif Armoricain" (10); — *Brunel, C., M. Duquef & L. Gavory:* Les odonates de Picardie (2ème note) (11-16); — *Papazian, M.:* A propos de Ceriagrion tenellum (de Villers, 1789) observé en Corse (Odonata Zygoptera: Coenagrionidae) (17-18); — *Dutreix, C.:* Observations sur les odonates de la Loire-Atlantique (44). L'Erdre: affluent de la Loire (19-21); — *Gavory, L.:* Présence de Leucorrhinia pectoralis (Charpentier, 1825) en Picardie (Odonata Anisoptera: Libellulidae) (22); — *Dommanget, J.-L.:* Etat d'avancement de l'Inventaire Cartographique National (Programme "INVOD") (23-29); — Analyses d'ouvrages: "Trollslandor i Europa" par A. Sandhall; "Dragonflies par P.L. Miller (30-31); — *Machet, P.:* Nouvelles philatéliques (32).

(6289) MEIER, C., 1988. Verbreitungsatlas der Libellen der Schweiz — Atlas de distribution des Libellules de Suisse: 1. Nachtrag, 1985-1987 (Odonata). *Opusc. zool. flumin.* 22: 1-8. (With Engl. s.). — (Riedweg, Ch-8606 Werrikon).
With reference to the work listed in *OA* 6135, a corrective note is supplied in Leucorrhinia caudalis; new, briefly annotated records presented for 21 spp., and some of the previously published data are confirmed for 16 spp. that are considered of particular interest in Switzerland.

(6290) MENDEL, H., 1988. *Provisional atlas of Suffolk dragonflies, incorporating the recorder's pack for 1988.* Ipswich Borough Council & Suffolk Naturalists' Soc., Ipswich. 50 pp. — (Author: 56 Carlford Close, Martlesham Heath, Ipswich, IP5 7TB, UK).
This is a "working edition" of the Atlas, sent to all regional recorders with the request to return it with their annotations, whereupon the 1989 edition will be supplied. The present work, by the official Suffolk Dragonfly Recorder, gives general instructions to the recorders, along with the distribution maps of 22 spp. so far known from this East Anglian county of England, UK.

(6291) NARAOKA, H., 1988. Ecological observations of a large damselfly, Cercion plagiosum Needham (Coenagrionidae, Odonata). (2). Mating behavior. *Gekkan Mushi* 206: 20-23. (Jap., with Engl. title). — (Fukunoda, Itayanagi-machi, Kitatsugaru-gun, Aomori, 038-36, JA).
[Abstract not available]. For pt 1 cf. *OA* 5852.

(6292) *NEWSLETTER [OF THE] BRITISH DRAGONFLY SOCIETY*, No. 13 (Spring, 1988). — (c/o Mrs J. Silsby, 1 Haydn Ave., Purley, Surrey, CR2 4AG, UK).
The issue contains 22 news sections. Several of these are concise reports of various field meetings, listing a number of records. Of particular interest is the list of spp. noted in July 1987 on the Isle of Rhum *(W. Nelson).* "The special sighting section", compiled by *A. Paine,* and which commenced in No. 12 (cf. *OA* 6142) contains a number of interesting records relative to unusual emergence, unusual dates and the behaviour. — (*Abstracter's Note:* In a communication to the Editor of *Odonatologica,* dated Apr.14, 1988, Mr R.

Merritt expressed his concern for a better documentation of records accepted in the last mentioned section).

(6293) PAVETT, M., 1988. A day out at Aberdulais. *Bull. amat. Ent. soc.* 47(358): 17-18. — (Author's address not stated).
6 odon. spp., incl. Calopteryx virgo and Cordulegaster boltoni (also larva), are recorded (8-VII-1986) from the canal and/or the Neath R., between the Aberdulais Basin and Glyneath, UK.

(6294) PUJOL-LUZ, J.R. & N.D. SANTOS, 1988. Notas sobre larvas e imagos do género Dythemis Hagen, 1861 (Odonata: Libellulidae). *Resum. XV Congr. brasil. Zool.*, Curitiba, p. 137. — (Dep. Ent., Mus. Nac., Univ. Fed. Rio de Janeiro, Quinta da Boa Vista, BR-20970 Rio de Janeiro, R.J.).
On the basis of the larval structural features the genus is divided into 2 groups, viz. (1) D. constricta, cannacrioides, williamsoni, alcebiadesi and schuberti, and (2) d. fugax, velox, rufinervis, sterilis, multipunctata, nigrescens, and maya.

(6295) SAMWAYS, M.J., 1988. *Man, insects and ethics.* Inaugural Lecture, Univ. Natal, Pietermaritzburg. II+10 pp. — ISBN 0-86980-604-1. — (Dept Zool. & Ent., Univ. Natal. P.O. Box 375, Pietermaritzburg-3200, RSA).
Contains a brief reference to the Odon.

(6296) SAUER, F., 1988. *Sauers Naturführer: Wasserinsekten nach Farbfotos erkannt.* Fauna Verlag, Karlsfeld. 160 pp. [ISBN 3-923010-08--7]. — Paperback, price DM 28,-. — (Publishers: Eichenweg 3, D-8047 Karlsfeld, FRG).
Next to Plecoptera, Trichoptera, Chironomidae, Culicidae and Hemiptera, the booklet includes photographs and descriptions of 63 Europ. Odon. (16 spp. also as larvae). There are some errors in the spelling of taxonomic names. The phot. are good, but often show only partial portraits, which will make recognition difficult or impossible (e.g. Aeshna juncea/A. subarctica). The descriptive notes are often too brief, but information is presented also on phenology and distribution.

(6297) *SELYSIA.* Newsletter of the Societas Internationalis Odonatologica and the U.S. National Office, Vol. 17, No. 1 (March 1, 1988). — (c/o D.M. Johnson, Dept Biol. Sci., East Tennessee St. Univ., Box 23590 A, Johnson City, Tennessee 37614-0002, USA).
In addition to various (in part commercial) announcements, the following are the major signed articles: *Daigle, J.J.:* 1987 North American Odonatological Symposium (p. 1); — *Suzuki, K.:* Imizu Hills dragonfly habitat endangered (2-3); — *Daigle, J.J.:* 1987 U.S.A. collecting trips (3); — *Johnson, D.M.:* IX International Symposium of Odonatology (4-5); — X International Symposium of Odonatology (5). — There are also Congratulations to Prof. P.S. Corbet on his election to the fellowship of the Royal Society of Edinburgh (p. 1), and Condolences to Dr J. Belle and Dr G. Beatty on the loss of their wives, Maria (May 23, 1987) and Alice (Nov. 22, 1987), resp. — In addition to mutations in the SIO membership list (p. 6), the issue also contains the Minutes of the SIO Madurai Business Meeting, Jan. 20, 1988 (by *D.M. Johnson*, pp. 7-8). [The Minutes contain 2 unfortunate errors: (item 9): "H. Wolda (Leiden)" should read "J. van Tol (Leiden)", (item 18): "South Africa, Iran and China" should read "Bophuthatswana, Southern Africa and Taiwan, China].

(6298) SIVA-JOTHY, M.T., 1988. Sperm "repositioning" in Crocothemis erythraea, a libellulid dragonfly with a brief copulation. *J. Insect Behav.* 1(2): 235-245. — (Dept Zool., Univ. Oxford, South Parks Rd, Oxford, OX1, 3PS, UK).
An evaluation of sperm ejaculate quantity is given, and penis structure and the change in the quantity of the sperm stored by the female with successive copulations are described. It is suggested that in this sp. the males do not remove rival sperm, but reposition it away from the "strategic area" in the female storage organs in order to gain sperm precedence.

(6299) SMOCK, L.A., 1988. Life histories, abun-

dance and distribution of some macroinvertebrates from a South Carolina, USA coastal plain stream. *Hydrobiologia* 157: 193-208. — (Dept Biol., Virginia Commonwealth Univ., Richmond, VA 23284, USA).
Life histories, densities and distribution patterns of the most abundant macroinvertebrates are reported for a low-gradient, second-order, blackwater stream (Cedar Creek, Congaree Swamp National Monument, Richland Co.), incl. 6 odon. spp. Epitheca cynosura, Calopteryx dimidiata and Enallagma divagans were univoltine. Recruitment of first instars began in June and continued through Aug. Most E. cynosura overwintered in the final or F-1 instar, while most C. dimidiata overwintered as F-1 or F-2 instars. The instars in which E. divagans overwintered were much more variable. Emergence of E. cynosura and C. dimidiata was completed by May, while that of E. divagans was completed by June. Boyeria vinosa, Gomphus lividus and Macromia georgina were all semivoltine with 2-year life histories. Adult emergence was probably completed by late spring/early summer for these spp. First instar recruitment occurred in Nov. and Dec. for B. vinosa, in Aug. through Dec. for M. georgina, and throughout the summer and fall for G. lividus. Weighted densities of all spp. except G. lividus were typically 0.1-0.5/m^2 at times other than during first instar recruitment. G. lividus was the most abundant odon. in Cedar Creek, with an annual mean weighted density of 2.9/m^2 at the upstream site. Some degree of habitat partitioning among the 6 spp. was noted. C. dimidiata and B. vinosa were found almost exclusively on snags at the upstream and downstream sites while G. lividus was found only in the sandy sediments at those 2 sites. E. divagans, E. cynosura and M. georgina were found only in the mud sediments at all 3 sites.

(6300) VAN DER POL, H., 1988. Natuur in de stad. — [Nature in the city]. *Wijde Blik* 4(4): 6-14. (Dutch). — (Dinkel 33, Huizen, NL).
14 odon. spp. are listed from an experimental park in the city of Huizen nr Hilversum, the Netherlands. Of some interest are Erythromma viridulum, Ischnura pumilio and Anaciaeschna isosceles.

(6301) WAAGE, J.K., 1988. Confusion over residency and the escalation of damselfly territorial disputes. *Anim. Behav.* 36: 586-595. — (Program Ecol. & Evol. Biol., Brown Univ., Province, RI 02912, USA).
Territorial contests among male Calopteryx maculata normally involve one or a few short (4-10 s) pursuits of an intruder by the resident. However, in a 3-year sample of 2005 bouts, 18.5% involved escalated, spiralling aerial chases that were significantly longer, some lasting several hours. These escalations usually occurred when 2 males shared the same territory but were rare in contests with intruders or with neighbouring territorial males. Escalations were most probably due to situations in which two males accidentally became residents in the same territory. This removed the "residency" asymmetry that appears to settle most territorial disputes in these damselflies. Using moving territories (oviposition sites), the "confusion over residency" hypothesis for escalation was tested experimentally. Bouts between males on adjacent, equally sized sites were escalated significantly in duration and intensity when their territories were merged. These experiments also showed that 2 alternative hypotheses, the "male aggressiveness" and "valuable resource" hypothesis, were not important general explanations of the escalation of contests.