

RECENT LITERATURE ON LEPIDOPTERA

(Under the supervision of PETER F. BELLINGER)

C. MORPHOLOGY AND CYTOLOGY

- Abbott, Cyril E., "Alike though apart." *Audubon Mag.*, vol. 58: p.21, 1 fig. 1956. Structural convergence of *Dismorphia cubana* and the damselfly *Agrion maculatum*. [P. B.]
- Ammann, Hans, "Die postembryonale Entwicklung der weiblichen Geschlechtsorgane in der Raupe von *Solenobia triquetrella* F. R. (Lep.) mit ergänzenden Bemerkungen über die Entwicklung des männlichen Geschlechtsapparates" [in German]. *Zool. Jahrb., Abt. Anat.*, vol. 73: pp. 337-394, 37 figs. 1954. Description of development of gonads and genital structures in females and young male larvæ. [P. B.]
- Barth, Rudolph, "Das männliche Duftorgane von *Erebus odoratus* L. (Lepidoptera, Noctuidæ)" [in German]. *Zool. Jahrb., Abt. Anat.*, vol. 72: pp. 289-300, 10 figs. 1952. Morphology and histology of scent-producing organ on ♂ hind tibia. [P. B.]
- Barth, Rudolph, "Die Hautdrüsen des Männchens von *Opsiphanes invira isagoras* Fruhst. (Lepidoptera, Brassolidæ)" [in German]. *Zool. Jahrb., Abt. Anat.*, vol. 72: pp. 216-230, 11 figs. 1952. Describes morphology and histology of scent-producing areas on the ♂ abdomen and hindwing. [P. B.]
- Barth, Rudolph, "Maennliche Duftorgane Brasilianischer Lepidopteren. 11. Mitteilung: *Erosia incendiata* Gn. (Epiplemidæ)" [in German; Portuguese summary]. *An. Acad. brasil. Cienc.*, vol. 28: pp. 137-146, 11 figs. 1956. Describes morphology and histology of a scent organ in anal fold of hind wing. [P. B.]
- Barth, Rudolph, "Maennliche Duftorgane Brasilianischer Lepidopteren. 12. Mitteilung: *Illice sexualata* Draudt (Arctiidæ, Lithosiinæ)" [in German; Portuguese summary]. *An. Acad. brasil. Cienc.*, vol. 28: pp. 147-156, 13 figs. 1956. Describes scent organs on both wings of male. [P. B.]
- Bawa, Sukhdev Raj, "Studies on insect spermatogenesis. No. II. Lepidoptera. On the formation of the acrosome and mitochondrial Nebenkern in *Prodenia litura* Fabr. and *Anapheis* sp." *Res. Bull. Panjab Univ.*, no. 45: pp.39-47. 1954.
- Bielewicz, M., "Morphology of the male odoriferous organs in some Noctuidæ of Poland" [in Polish; Russian & English summaries]. *Bull. ent. Pologne*, vol. 22: pp. 330-357, 10 figs. 1952. Discusses the possible biological importance of the ♂ odoriferous organs; gives descriptions and some figures of these. [J. M.]
- Brunold, Elsbeth, "Die Entwicklung des weiblichen Genitalapparates von *Solenobia triquetrella* F. R. (Lepid., Psychidæ) während des Puppenstadiums" [in German]. *Zool. Jahrb., Abt. Anat.*, vol. 75: pp. 581-614, 20 figs. 1957. Detailed description of development of ♀ genitalia, including gonads, ducts, and associated glands. [P. B.]
- Cockayne, E. A., "The chromosome numbers of *Leucania favicolor* Barrett and *Leucania pallens* Linnaeus." *Ent. Rec. & Journ. Var.*, vol. 64: pp. 220-221. 1952. Normally 31 in both spp. [P. B.]
- Day, M. F., "Studies on the digestion of wool by insects. III. A comparison between the tracheation of the midgut of *Tineola* larvæ and that of other insect tissues." *Austral. Journ. sci. Res. B*, vol. 4: pp.64-74, 2 pls. 1951.
- Diakonoff, A., "A note on a peculiar abdominal organ in certain Tortricidæ (Lepidoptera)." *Trans. Roy. ent. Soc. London*, vol. 107: pp. 199-201, 1 pl. 1955. In *Tremophora*; fuction unknown. [P. B.]
- DuPorte, E. Melville, "The median facial sclerite in larval and adult Lepidoptera." *Proc. Roy. ent. Soc. London (A)*, vol. 31: pp. 109-116, 5 figs. 1956. Interprets this sclerite as postclypeus + frons; describes sclerite and associated structures in *Danaus plexippus* (adult only) and *Protoparce quinquemaculata*. [P. B.]
- Dupuis, Claude, "Origine et développement des organes génitaux des mâles d'insectes" [in French]. *Année biol.*, vol. 54: pp. 21-36. 1950. Critical review of work on all insects, concerned mainly with homology and segmental association of various structures. [P. B.]
- Ehnbom, Kjell, "Studies on the central and sympathetic nervous system and some sense organs in the head of neuropteroid insects." *Opusc. ent.*, suppl. no. 8: 162 pp., 142

- figs. 1948. Study of 17 spp. of Trichoptera, some 155 spp. of Lepidoptera (25 families), *Sialis*, & 7 spp. of Neuroptera. The work is comparative throughout, and notable for a number of correlations of potential phylogenetic value. The intermediate position of the Micropterygidae between Trichoptera and Lepidoptera is strongly supported. Some reorganization of family placements in the Lepidoptera may be desirable, if the details presented here can be supported by other lines of evidence. [P. B.]
- Frizzi, G., "L'eteropicnosi come indice di riconoscimento dei sessi in *Bombyx mori* L." [in Italian]. *Ricerca scient.*, vol. 18: pp. 119-123. 1948. Outlines a method for determining the sex of larvae cytologically, based on the appearance of the heteropycnotic sex chromosomes. [P. B.]
- Gofferjé, Paul, "Duftschuppen bei Tagfalterlingen. Eine mikroskopische Studie" [in German]. *Mikrokosmos*, vol. 43: pp. 136-138, 7 figs. 1954. Figures of scent scales of some common European butterflies (Pieridae, Lyncanidae, Satyridae). [P. B.]
- Graham, M. R. W. de V., "Postural habits and colour-pattern evolution in Lepidoptera." *Trans. Soc. Brit. Ent.*, vol. 10: pp. 217-232, 4 pls., 4 figs. 1950. Traces evolution of posture from 'stegopterous' position of primitive families and Trichoptera; relates contrast between exposed and concealed wing areas (Oudemans' rule) to need for cryptic coloration only on exposed parts. Concludes that primitive ground color was dark, since concealed areas are dark in primitive forms; therefore, in contrast to Schwanwitsch and others, regards light elements of wing pattern as the morphologically significant elements. [P. B.]
- Hannemann, Hans Joachim, "Zur funktionelle Anatomie des männlichen Kopulationsapparates von *Argynnis paphia* (L.)" [in German]. *Zool. Anz.*, vol. 152: pp. 266-274, 3 figs. 1954. Describes morphology and detailed function of ♂ genitalia. [P. B.]
- Hannemann, Hans Joachim, "Zur Muskelfunktion der weiblichen Genitalsegmente von *Argynnis paphia* (L.) (Lep.)" [in German]. *Zool. Anz.*, vol. 153: pp. 149-154, 2 figs. 1954. Describes musculature of ♀ abdomen, especially of posterior segments, and its function. [P. B.]
- Hannemann, Hans Joachim, "Über ptero-tarsale Stridulation und einige andere Arten der Lauterzeugung bei Lepidopteren" [in German]. *Deutsche ent. Zeitscher., N. F.*, vol. 3: pp. 14-27, 16 figs. 1956. Describes stridulatory organs on forewing and tarsus in *Pemphigostola synemonistis* (Agaristidae), *Thecophora fovea* (Noctuidae), and (from the literature) 2 other agaristids, and the presumed sound-producing organ of the forewing of *Samcova* sp. (and other Chrysauginae). Discusses sound production without major anatomical modifications in *Parnassius*, *Vanessa*, *Dionychopus* (Arctiidae), and some Saturniidae. Describes modifications in wings causing unusual sounds in flight in *Nyctipao hieroglyphica* (Noctuidae), *Hecatesia* (Agaristidae), and *Ageronia* (Nymphalidae). [P. B.]
- Hannemann, Hans Joachim, "Die Kopfmuskulatur von *Micropteryx calthella* (L.) (Lep.). Morphologie und Funktion" [in German]. *Zool. Jahrb., Abt. Anat.*, vol. 75: pp. 177-205, 18 figs. 1956. Gives a detailed description of head morphology in *M. calthella*, including exoskeleton, muscles, & alimentary tract. Structurally the head is like that of an orthopteroid insect. Operation of mouthparts in feeding is described; the 5-jointed maxillary palpi 'shovel' pollen grains into the preoral cavity. [P. B.]
- Heims, Adalbert, "Über die Kutikulamuster der Wachsmotte *Galleria mellonella*" [in German]. *Roux Archiv Entwickl.*, vol. 148: pp. 538-568, 14 figs. 1956. Study of fine structure of cuticle in larva, pupa, and adult. [P. B.]
- Henke, K., "Die Hauptformen der Gliederungsvorgänge in der Entwicklung der Insektenflügel" [in German]. *Zool. Anz., Suppl. Bd. no. 16 (Verhandl. deutschen Zoologen 1951 in Wilhelmshaven)*, pp. 42-62, 6 figs. 1952. General discussion of development of venation, tracheæ, nerves, scales, pattern, etc. in wings of insects, especially *Ephestia*; *Bombyx*, *Lymantria*, & *Philosamia* also mentioned. [P. B.]
- Henke, Karl, "Die Musterbildung der Versorgungssysteme im Insektenflügel" [in German]. *Biol. Zentrabl.*, vol. 72: pp. 1-51, 16 figs. 1953. General account of the development of the pattern of venation (including extensions of body cavity, tracheal system, and nerves) in insect wings, and of factors determining this pattern. Lepidoptera studied include *Ephestia*, *Ptychopoda*, *Fumea*, & *Philosamia*. [P. B.]
- Henke, Karl, & Heinz-Joachim Pohley, "Zur rhythmischen Natur des Adersystems im Insektenflügel" [in German]. *Nachr. biol.-phys.-chem. Abt. Akad. Wiss. Göttingen*, 1953: pp. 23-33, 4 figs. Analysis of the control of venation pattern in hindwing of *Ephestia*, studied by effects of X-ray damage to wing rudiment in larva. [P. B.]

- Heslop-Harrison, J. W., "Facts concerning *Heodes virgaureæ* L. and some other 'Coppers.'" *Ent. Rec. & Journ. Var.*, vol. 68: p. 231. 1956. Haploid chromosome number 24 in some European *Lycæniæ*. [P. B.]
- Hinton, H. E., "On the structure, function, and distribution of the prolegs of the Panorpoidea, with a criticism of the Berlese-Imms theory." *Trans. Roy. ent. Soc. London*, vol. 106: pp. 455-545, 1 pl., 31 figs. 1955. Survey of structure of prolegs and functionally similar organs in Diptera, Lepidoptera, and related orders, with observations on correlation of larval structure and habits. Regards prolegs as adaptive modifications which have arisen independently in many groups and which are not serially homologous with the thoracic legs; rejects Berlese-Imms theory that endopterygote larvæ are prematurely hatched embryos retaining, to a greater or lesser degree, the continuous series of segmental appendages of "myriapod" ancestors. [P. B.]
- Hirschler, Jan, "Die Organisation des männlichen Geschlechtszellenverbandes von *Macrothylacia rubi* L. (Lepidoptera). (Ein methodischer Versuch)" [in German]. *Zool. Jahrb., Abt. Anat.*, vol. 73: pp. 229-275, 3 pls., 15 figs. 1953. Structure and development of testicular units of *M. rubi*. [P. B.]
- Jarvis, F. V. L., "Sexual differences in the compound eyes of butterflies." *Ent. Rec. & Journ. Var.*, vol. 67: pp. 185-188. 1955. Reports ♂ eye appreciably larger, with about 50% more facets, in *Colias*, *Apatura*, & *Argynnis*; records some other spp. with little or no sexual difference. Notes on visual powers & behavior of butterflies. [P. B.]
- Jarvis, F. V. L., "Abnormal development in *Colias hyale* (L.) (Lep. Pieridæ)." *Entomologist*, vol. 89: pp. 39-41, 8 figs. 1956. Describes asymmetry from larva to adult in one specimen. [P. B.]
- Koyama, Nagao, "Studies on the compound eyes of the bombycid moths." *Journ. Shinsu Univ.*, vol. 4, no. 2: pp. 97-144, 7 pls., 16 figs. 1954. Comparison of eye structure in *Bombyx mandarina* and in various strains of *B. mori*. The domesticated species is degenerate in some respects. [P. B.]
- Larchenko, K. I., "Regularities of the insect ontogenesis" [in Russian; English summary]. *Ent. Obozrenie*, vol. 35: pp. 510-517. 1956. Summary of studies on the origin, development, and function of blood cells and fat body in insects; the experimental material includes Lepidoptera. [P. B.]
- Lipp, Christine, "Beitrag zur somatischen Cytologie der Schmetterlinge" [in German]. *Chromosoma*, vol. 7: pp. 1-13. 1955. Study of chromosomes and chromosome pairing at mitosis in somatic cells of *Ephestia kühniella*, *Samia cynthia*, *Macrothylacia rubi*, *Pieris brassicæ*. [P. B.]
- Lorković, Z., "L'accouplement artificiel chez les lépidoptères et son application dans les recherches sur la fonction de l'appareil génital des insectes" [in French, German summary]. *Physiol. comp. œcol.*, vol. 3: pp. 313-319, 3 figs. 1953. Demonstrates, using hand-pairing, that considerable portions of the male valves may be removed without interfering with successful copulation. This indicates that the complex variation in male genital armature in insects may be of little functional significance. Describes technique and suggests some applications. [P. B.]
- Marcus, Harry, "Über Sinnesorgane bei Articulaten" [in German]. *Zeits. wiss. Zool.*, vol. 159: pp. 225-254, 34 figs. 1956. Includes brief description of antennal hygroreceptors of *Herse cingulata* & *Diana* [sic! i.e. *Agraulis*] *vanillæ*. [P. B.]
- Martignoni, Mauro E., "Die submikroskopische Textur der peritrophischen Membran von *Peridroma margaritosa* (Haw.) (Noctuidæ, Lepidoptera)" [in German; English summary]. *Mitt. schweiz. ent. Ges.*, vol. 25: pp. 106-110, 1 fig. 1952. Describes structure of lamellæ of peritrophic membrane as revealed by electron microscope. [P. B.]
- Nüesch, Hans, "Die Morphologie des Thorax von *Telea polyphemus* Cr. (Lepid.)—II. Nervensystem" [in German]. *Zool. Jahrb., Abt. Anat.*, vol. 75: pp. 615-642, 7 figs. 1957. Description of thoracic nervous system, with special reference to muscle innervation; innervation of mesothorax approaches pattern in lower insects most closely, metathorax and especially prothorax being aberrant. [P. B.]
- Obraztsov, Nicholas S., "Some considerations about an abdominal organ in certain Tortricidæ moths." *Lepid. News*, vol. 10: pp. 153-156, 1 fig. 1957.
- Ogata, Masami, "Studies on the male genitalia of Japanese Hesperiidæ (Lepidoptera)" [in Japanese; English summary]. *Trans. Kansai ent. Soc.*, vol. 15, part 1: pp. 27-33; part 2: pp. 34-47; 40 figs. 1950. Comparative study of some 30 genera; genitalia and their musculature are described, and the homologies of their parts determined. [P. B.]

- Ogata, Masami, Yoshio Okada, Hiromu Okagaki, & Atuhiro Sibatani, "Male genitalia of Lepidoptera: morphology and nomenclature. III. Appendages pertaining to the tenth somite." *Ann. ent. Soc. Amer.*, vol. 50: pp. 237-244, 13 figs. 1957. Structures include dorsal scaphium (with uncus and socii) and ventral gnathos (with cochlear and brachia). Variations in different families are discussed. [P. B.]
- Okagaki, Hiromu, Atuhiro Sibatani, Masami Ogata & Yoshio Okada, "Male genitalia of Lepidoptera: morphology and nomenclature. II. Morphological significance of sacculus and furca." *Ann. ent. Soc. Amer.*, vol. 48: pp. 430-442, 2 pls. 1956. Sacculus developed from valva, coordinate with a shift of the valva relative to the juxta. The furca is a special development of the sacculus in some Geometridæ. [P. B.]
- Patočka, Jan, "Morphologische und systematische Bemerkungen über *Hyphantria cunea*" [in Czech; Russian & German summaries]. *Biología*, Bratislava, vol. 10: pp. 37-51, 9 figs. 1955. On the morphology of *H. cunea*. [J. M.]
- Piepho, Hans, "Determinationsvorgänge in der Entwicklung der Schmetterlinghaut" [in German]. *Nachr. biol.-phys.-chem. Abt. Akad. Wiss. Göttingen*, 1947: pp. 27-29. On the controlling influence of differential cell division on epidermal differentiation in developing *Galleria*. [P. B.]
- Pohley, Heinz-Joachim, "Untersuchungen über differentielle Zellteilungen und somatischen Mutationen am Schuppenkleid der Mehlmotte *Ephestia kühniella* Z." [in German]. *Biol. Zentralbl.*, vol. 72: pp. 577-598, 14 figs. 1953. Description and discussion of scale development on wings and its relation to endomitosis (resulting in polyploid cells). [P. B.]
- Pohley, Heinz-Joachim, "Driefachbildungen bei *Ephestia kühniella*" [in German]. *Naturwissenschaften*, vol. 43: pp. 42-43, 1 fig. 1956. Reduplication of symmetry axes of hind wing resulting from experimental injury to Anlage. [P. B.]
- Presser, Bruce D., & Charles W. Rutschky, "The embryonic development of the Corn Earworm, *Heliothis zea* (Boddie) (Lepidoptera, Phalaenidæ)." *Ann. ent. Soc. Amer.*, vol. 50: pp. 133-164, 17 pls. 1957. Detailed and well illustrated description from fertilization to hatching, with precise chronology. [P. B.]
- Risler, H., "Kernvolumenänderungen in der Raupenepidermis von *Ptychopoda seriata*" [in German]. *Zeitschr. Naturf.*, vol. 3b: pp. 129-131. 1948. An increase in volume takes place in the epidermal nuclei before each molt; this precedes mitosis, which takes place at the time of molting, and is therefore not the result of somatic polyploidy. A polyploid series, however, appears to exist in the epidermal nuclei of mature larvæ. [P. B.]
- Sattel, Margret, "Die Grösse der Tracheen-Innenflächen von Seidenspinnerraupe in Abhängigkeit von der Körpergrösse" [in German]. *Zeitschr. Vergl. Physiol.*, vol. 39: pp. 89-101, 7 figs. 1956. In larval development in *Bombyx mori* the (internal) surface area of the tracheal system increases in proportion to the increasing mass of the larva. [P. B.]
- Schmidt, Edmond L., "Observations on the subcuticular layer in the insect integument." *Journ. Morph.*, vol. 99: pp. 211-226, 3 pls. 1956. Demonstrates muco- or glyco-protein layer between epidermis and cuticle, perhaps serving to fasten them together, in *Hyalophora cecropia* and other insects. [P. B.]
- Schneider, Dietrich, & Karl-Ernst Kaissling, "Der Bau der Antenne des Seidenspinners *Bombyx mori* L. I. Architektur und Bewegungsapparat der Antenne sowie Struktur der Cuticula" [in German]. *Zool. Jahrb., Abt. Anat.*, vol. 75: pp. 287-310, 26 figs. 1956. Describes structure of antenna, associated muscles, and fine structure of cuticle. [P. B.]
- Schwanwitsch, B. N., "Color-pattern in Lepidoptera" [in English; Russian summary]. *Ent. Obozrenie*, vol. 35: pp. 530-546, 77 figs. 1956. Review of the author's work on this subject. The pattern elements of prototypes and representatives of many groups of Lepidoptera are described and figured. There are some remarks on cryptic patterns, especially stereomorphism (imitation of a 3-dimensional background by markings on a flat surface) and the cryptic effect of reflection of the green of vegetation from wing surfaces. [P. B.]
- Stabenau, Reinhart, "Über die Entwicklung der Versonschen Drüsen bei den Schmetterlingsraupen" [in German]. *Nachr. biol.-phys.-chem. Abt. Akad. Wiss. Göttingen*, 1952: pp. 7-14, 21 figs. Describes development of Verson's (epidermal) glands of *Bombyx mori* larvæ and compares it with setal development. [P. B.]
- Strenger, Anneliese, "Die funktionelle und morphologische Bedeutung der Nähte am Insektenkopf" [in German]. *Zool. Jahrb. Abt. Anat.*, vol. 72: pp. 468-521, 18 figs.

1952. Gives detailed description of head structure in *Cossus cossus*, as part of a study of functional determination of head form in insects. [P. B.]
- Takami, T., "Studies on the yolk cell in *Bombyx mori* IV. Granular staining in the albuminous yolk globules." *Exper. Cell Res.*, vol. 9: pp. 568-571, 1 fig. 1955.
- Taylor, J. Sneyd, "Notes on the proboscis in Lepidoptera." *Ent. Rec. & Journ. Var.*, vol. 69: pp. 25-29, 53-58. 1957. Very brief descriptive notes for some 150 spp. in 22 families. [P. B.]
- Tchou-Su, & Chang-Ko, "Dissociation expérimentale des rythmes cinétiques sur la mitose amphimixique dans l'oeuf récemment fécondé de *Bombyx mori*" [in French]. *Science Record*, China, vol. 2: pp. 327-330. 1949. Cyanide treatment blocks chromosome movement but not division of centrioles, which become dissociated from the spindle. [P. B.]
- Toll, S., "Studies on species of the family Coleophoridae. I. Taxonomic importance of copulatory apparatus" [in Polish; English summary]. *Bull. ent. Pologne*, vol. 19: pp. 174-195, 79 figs. 1949. Detailed morphology and nomenclature of genitalia of Coleophoridae. [P. B.]
- Varley, G. C., "Dorsal and abdominal organs in certain adult Tortricidae (Lep.)" *Ent. mo. Mag.*, vol. 92: pp. 107-108, 5 figs. 1956. Dorsal pits on 1st & 2nd abdominal segments reported in pupae and adults of some spp. of 'Cacæcia'. [P. B.]
- Wolsky, Alexander, "The analysis of eye development in insects." *Trans. N. Y. Acad. Sci.*, vol. 18: pp. 592-596, 2 figs. 1956. Effects of injury to differentiation center in anlage of compound eye of *Ephestia* & *Bombyx*. [P. B.]
- Zacwilichowska, K., "The sensible nervous system and the sense organs of the Naked Clothes-moth caterpillar *Tineola bisselliella* Hummel." *Bull. intern. Polska Akad. Umiej.*, 1949: pp. 337-365, 18 figs. 1950. Describes distribution of some organs (setae, 'prickles', pores, cones, chordotonal organs) and their innervation, in great detail. [P. B.]

D. VARIATION and GENETICS

- Ae. Shigeru Albert, "Hybrids between *Colias eurytheme* and *C. interior* (Pieridae)." *Lepid. News*, vol. 10: pp. 45-46, 2 figs. 1956.
- Barajon, Mario, "Gen. *Siona* Dup. (= *Schistostege* Hb.) (Lep. Geometridae)" [in Italian]. *Atti. Soc. ital. Sci. Nat.*, vol. 91: pp. 125-126, 1 fig. Aug. 1952. Names aberration of *S. decussata*. [P. B.]
- Baynes, E. S. A., "A gynandromorph of *Bupalus piniarius* L." *Ent. Rec. & Journ. Var.*, vol. 64: p. 290. 1952.
- Berger, L. A., "Formes mélanienues de lépidoptères" [in French]. *Lambillionea*, vol. 55: pp. 93-94, 2 figs. 1955. Photos of melanic forms of *Argynnis selene* & *Pseudopanthera macularia*. [P. V.]
- Bowden, S. R., "Hybrids within the European *Pieris napi* L. species group." *Proc. Trans. south London ent. nat. Hist. Soc.*, 1954-55: pp. 135-159, 2 pls. 1956. Reports on numerous hybrid crosses, involving also *xavescens*, *adalwinda*, & *neobryoniae*. *P. napi* & *P. bryoniae* appear to be distinct spp. but capable of gene interchange; crosses between individuals from same locality apparently more difficult to obtain than those between British *napi* & (European) *bryoniae*. Status of other races still unsettled; success of crosses appears to vary with origin of parents. [P. B.]
- Bowden, S. R., & N. T. Easton, "Diapause and death: further observations on imaginal development in *Pieris hybrids* (Lep.)" *Entomologist*, vol. 88: pp. 174-178, 204-210. 1955. In hybrids of *P. napi* & *P. bryoniae*, mechanism controlling duration of diapause is upset in ♀, with resulting early or late emergences & some crippling of adults. ♂ not affected. [P. B.]
- Bryk, Felix, "*Papilio rex alinderi* fa. *holmi* (forma nova) (Lepidoptera). Ein kleiner Beitrag zur Frage des heterotropen Mimetismus" [in German]. *Ent. Tidskr.*, vol. 74: pp. 46-50. 1953. New female form from Mt. Elgon, in overlap zone of the two danaid models of *P. rex*... [P. B.]
- Burns, John M., "Problems in zoological polymorphism." *Sci. Monthly*, vol. 82: pp. 75-84, 4 figs. 1956. Excellent review article, including Lepidoptera.
- Cockayne, E. A., "The major perineural defect in *Saturnia pavonia* L." *Ent. Gaz.*, vol. 1: pp. 223-224, 1 pl. 1950. Describes and figures mutant lacking veins in outer part of wings and with modified pattern. [P. B.]

- Cockayne, E. A., "The probable genetic relationship of three forms of *Apamea remissa* Hb., *Apamea oblonga* Haw., and *Celena leucostigma* Hb." *Ent. Gaz.*, vol. 1: pp. 97-98. 1950. Believes that in each species two named forms are respectively homozygous and heterozygous for same mutant gene. [P. B.]
- Cockayne, E. A., "Aberrations of British Lepidoptera." *Ent. Gaz.*, vol. 6: pp. 3-6, 1 pl. 1955. Describes and names aberrations in *Ægeriidae*, *Hepialidae*, *Cossidae*; discusses variation of *Hepialus humuli*. [P. B.]
- Crotch, W. J. B., "Hybrid races of the genus *Philosamia*." *Ent. Rec. & Journ. Var.*, vol. 66: pp. 165-166. 1954. Describes products of crosses between his hybrid "reversa" & *P. advena*, between 2 "reversa", & between "reversa" & *P. canningi*. [P. B.]
- Dowdeswell, W. H., "Isolation and adaptation in populations of the Lepidoptera." *Proc. Roy. Soc. London (B)*, vol. 145: pp. 322-329, 5 figs. 1956. On variation in spot number in *Maniola jurtina* in small isolated populations; these, especially on the smaller Scilly Isles, differ strongly in spot number frequency, while mainland populations are virtually uniform in this respect. [P. B.]
- Eisner, C., "Parnassiana nova. II. *Archon apollinus* Herbst" [in German]. *Zool. Meded., Leiden*, vol. 33: pp. 49-53. 1954. Describes several new "forms". [A. D.]
- Eisner, C., "Parnassiana nova. III. Einige neue Formen in der Familie Parnassiidae" [in German]. *Zool. Meded., Leiden*, vol. 33: pp. 55-57. 1954. Describes several new "forms". [A. D.]
- Eisner, C., "Parnassiana nova. IV. Kritische Revision der Gattung *Parnassius* (Fortsetzung 2)" [in German]. *Zool. Meded., Leiden*, vol. 33: pp. 127-156, 1 pl. 1955. Describes several new "forms". [A. D.]
- Eisner, C., "Parnassiana nova. V. Nomina collectiva" [in German]. *Zool. Meded., Leiden*, vol. 33: pp. 177-179. 1955. Gives a list of "collective names" used by Banghaas, Bryk, and himself to name forms in Parnassiidae. [A. D.]
- Federley, Harry, "Kreuzungsversuche mit Lepidopteren" [in German]. *Zeitschr. Lepid.*, vol. 3: pp. 1-32, 2 pls., 6 figs. 1953. Review of his experiments of many years in crossing spp. of Lepidoptera (*Pygæra*, *Cerura*, *Dicranura*, *Drepana*, *Epicnaptera*, *Sphingidae*). Gives examples of various types of chromosome behavior (pairing complete, incomplete, or absent) & infertility, as well as such abnormalities as intersexes & sex-limited effects. [P. B.]
- Fischer, E., "Ein neuer Schwärmer-Hybrid. *Celerio hippophæus* ♂ × *Pergesa porcellus* = hybrid *benzi* Fisch." [in German]. *Ent. Nachrichtenbl.*, Burgdorf, vol. 3: p. 40. 1949. Describes & names hybrid. [P. B.]
- Ford, E. B., "The study of organic evolution by observation and experiment." *Endeavor*, vol. 15: pp. 149-152, 7 figs. 1956. Includes discussion of bearing of his studies on *Maniola jurtina* and Sheppard's on *Panaxia dominula* on evolutionary theory. [P. B.]
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- Kawazoe, Akito, "On a gynandromorph of *Neozephyrus taxila japonicus* Murray." *Trans. lepid. Soc. Japan*, vol. 6: p. 31, 2 figs. 1955. ♀ with ♂ color & markings on one pair of wings. [P. B.]
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- Kettlewell, H. B. D., "A resumé of investigations on the evolution of melanism in the Lepidoptera." *Proc. Roy. Soc. London (B)*, vol. 145: pp. 297-303. 1956. Industrial melanism in British moths is to be explained by selective advantage of melanics because of more cryptic coloration on sooty, lichen-free tree trunks. It is suggested that melanic forms of some moths found in Scottish pine forests may carry same genes and may be similarly favored. [P. B.]
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- Komárek, Oldřich, "Einige neue und bemerkenswerte Funde von Lepidopteren aus der Tschechoslowakei" [in Czech; Russian & German summaries]. *Biológia*, Bratislava, vol. 8: pp. 527-532, 3 figs. 1953. A new "form" of *Parnassius apollo* is described and figured, from environs of Dobsiná in Central Slovakia. [J. M.]
- Komárek, Oldřich, "Die Charakteristik der Populationen der *Zygæna carniolica* Scop. in Böhmen" [in German; Czech introduction & Russian summary]. *Acta Soc. ent. Cechoslovenia*, vol. 51: pp. 197-218, 7 figs. 1955. Discusses variability of *Z. carniolica* from NE Bohemia; continuation of two papers published in 1952 in same periodical. [J. M.]
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- Kühn, A., & A. Engelhaaf, "Zur chemischen Polyphänie bei *Ephestia kühniella*" [in German]. *Naturwissenschaften*, vol. 42: pp. 634-635, 1 fig. 1955. On chemical effects of an eye-color mutant gene. [P. B.]
- Loritz, J., "Sur quelques formes de *Zerynthia hypsipyle* Schulzens (= *hypermnestra* Scopoli = *polyxena* Schiffermüller) du littoral des Alpes-Maritimes" [in French]. *Bull. Soc. ent. Mulhouse*, 1956: pp. 1-4, 1 pl. 1956. Notes on some forms of *Z. hypsipyle* (Papilionidæ) on French Riviera. [P. V.]
- Narbel-Hofstetter, Marguerite, "La cytologie des *Luffia* (Lépid. Phych.): le croisement de l'espèce parthenogénétique avec l'espèce bisexuée" [in French]. *Rev. suisse Zool.*, vol. 63: pp. 203-208, 1 pl. 1956. Parthenogenetic ♀ of *L. ferchaultella* will mate with ♂ of *L. lapidella*; sperm penetrates egg but does not fuse with egg nucleus and takes no part in development. [P. B.]
- Owen, D. F., "The relationship between environment and coloration in *Eumemis semele* L. (Lep. Satyridæ)." *Ent. Gaz.*, vol. 5: pp. 43-46, 6 figs. 1954. Forms which are pale beneath, therefore concealing, are dominant in chalk habitats, but in heath habitats (dark background) pale and dark forms are equally common. Suggests that heath colonies are relatively recent and not adjusted to the habitat and that contamination from neighboring populations will prevent complete establishment of either optimal form. [P. B.]
- Pijáček, Josef, "Nigristiké tvary *Celerio euphorbiae* L. (Lep. Sphingidæ)" [in Czech]. *Acta Rer. nat. Distr. ostraviensis*, vol. 10: pp. 167-169, 1 pl. 1949. Figures some examples of melanistic forms of *C. euphorbiae*. [J. M.]

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- Slaby, Otto, "Über die Erscheinung der sogenannten polymorphischen Populationen der *Zygena ephialtes* L. in der Slowakei" [in Czech; German summary]. *Acta Musei Silesiae*, vol. 3: pp. 41-54, 1 col. pl. 1954. Describes 2 new "forms" of *Z. e. pannonica* from Slovakia. [J. M.]
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- Tams, W. H. T., "A new aberration of the Early Grey." *Ent. Gaz.*, vol. 2: p. 208, 1 pl. 1951. Names pale form of *Dichoma areola*. [P. B.]
- de Togni, Angelina, "Su alcuni *Parnassius apollo* L. del Parco Nazionale del Gran Paradiso" [in Italian; Latin summary]. *Acta pontif. Acad. Scient.*, vol. 13: pp. 97-111, 2 pls. 1949. Study of variation in 28 specimens of *P. a. pedemontanus*. [P. B.]
- Williams, Harold B., "*Boarmia repandata* L., and ab. *conversaria* Hb. *Boarmia repandata* L., ab. *mendeli* ab. nov." *Ent. Gaz.*, vol. 1: pp. 36-39. 1950. Presents evidence from breeding that first-named aberration is heterozygous; names the distinctive homozygote. [P. B.]
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F. BIOLOGY AND IMMATURE STAGES

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- Apple, J. W., "Corn Borer development and control on canning corn in relation to temperature accumulation." *Journ econ. Ent.*, vol. 45: pp. 877-879. 1952. Sum of daily temperatures above 50° F. used to determine the time of hatching of eggs of *Pyrausta nubilalis*. [W. C.]
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- Borisova, K. IA, "Parasites of principal species of Lepidoptera which are harmful to trees along the central course of the Ural River" [in Russian]. *Trudy Zool. Inst. Akad. Nauk SSSR*, vol. 16: pp. 427-456. 1954. [Not seen.]
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- Buckwell, P., "Quelques chenilles et papillons nouveaux de la région d'Ifrane" [in French]. *Bull. Soc. Sci. nat. phys. Maroc*, vol. 34: pp. 350-356. 1955. Descriptions of the larvæ and ethological notes on some Moroccan Lepidoptera: *Xylomania punge-leri*, *Xylena lunifera* (Noctuidæ); *Dendrolimus pini atlantica* (Lasiocampidæ); *Phigalia* sp. and *Nychiodes* sp. (Geometridæ). [P. V.]
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- Chapman, John A., "Towards an insect ecology." *Canad. Ent.*, vol. 87: pp. 172-175. 1955. General discussion, without specific reference to Lepidoptera. [E. G. M.]
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- Cleu, H., "Melitæa deione Hb., *Gypsochroa renitidata* Hb. et la biocénose du *Linaria striata* DC. dans les Cévennes médianes" [in French]. *Rev. franç. Lépid.*, vol. 15: pp. 3-11, 2 figs. 1955. Observations on the larvæ of these species (Nymphalidæ, Geometridæ) living on *L. striata*; *M. didyma* and *Glossotrophia asellaria isabellaria* (Geometridæ) also reared on this plant. Descriptions and differences are given for the larvæ and pupæ of *M. deione* and *M. didyma*. [P. V.]
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- Franz, Elli, "Pappelschwärmer" [in German]. *Natur und Volk*, vol. 85: pp. 212-214, 2 figs. 1955. *Amorpha populi*; figures egg and adults in copula. [P. B.]
- Fullaway, David L., "Biological control of cactus in Hawaii." *Journ. econ. Ent.*, vol. 47: pp. 696-700. 1954. Reports successful control by introduction of *Cactoblastis cactorum* and cochineal insect. [P. B.]
- Geering, Q. A., & A. F. H. Baillie, "The biology of Red Bollworm, *Diparopsis watersi* (Roths.) in northern Nigeria." *Bull. ent. Res.*, vol. 45: pp. 661-681, 1 pl., 7 figs. 1954. Devoted mainly to annual cycle of activity. [P. B.]
- Gershenzon, S. M., "On the specificity of viruses of polyhedral disease in insects" [in Russian]. *Mikrobiologiya*, vol. 24: pp. 90-98. 1955. Lepidoptera. [Not seen.]
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- Grunin, K. IA, "Parasites of principal species of Lepidoptera which are harmful to trees along the central course of the Ural River" [in Russian]. *Trudy zool. Inst. Akad. Nauk SSSR*, vol. 16: pp. 427-456. 1954. [Not seen.]
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- Heslop-Harrison, Yolande, "Biological flora of the British Isles. *Nymphæa* L. em. Sm. (nom. conserv.)" *Journ. Ecol.*, vol. 43: pp. 719-734, 3 figs., 1 map. 1955. Only *Hadena oleracea* recorded as feeding on *N. alba* in Britain. [P. B.]
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- Lozina-Lozinskii, L. K., "Role of feeding in the development and multiplication of the Bollworm (*Chloridea obsoleta* Fabr.)" [in Russian]. *Trudy vses. ent. Obschch.*, vol. 44: pp. 3-61. 1954. [Not seen.]
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- of the host. *Apanteles* and *Glypta* markedly retarded growth of host larvæ, as did *Meteorus* after the fourth host instar. *Apanteles* and *Glyta* parasitism inhibited the development of male gonads in the host larva, making recognition of the sexes difficult. The practical effects of these phenomena on determining sex, larval instar, and parasite incidence of wild populations are noted. [E. M.]
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- Miller, William E., "Notes on the life cycles of three parasites of the Pitch Twig Moth." *Ohio Journ. Sci.*, vol. 55: pp. 317-319. 1955. Hymenopterous parasites of *Petrova comstockiana*. [P. B.]
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- Narayanan, E. S., & R. P. Chaudhuri, "Studies on *Stenobracon deese* (Cam.), a parasite of certain lepidopterous borers of graminaceous crops in India." *Bull. ent. Res.*, vol. 45: pp. 647-659, 6 figs. 1954. Experiments with *Chilo zonellus* and *Corycyra cephalonica* as hosts; the former is a normal host in the field. [P. B.]
- Olalquiaga Fauré, Gabriel, "Insect pest problems in Chile." *FAO Plant Protect. Bull.*, vol. 3: pp. 65-70. 1955. Remarks on insect enemies of all types of crops, including numerous Lepidoptera. [P. B.]
- Painter, Reginald H., "Insects on corn and teosinte in Guatemala." *Journ. econ. Ent.*, vol. 48: pp. 36-42. 1955. Records 9 spp. of Lepidoptera (Noctuidæ, Pyraustidæ, Crambidæ, Epipaschiidæ); notes on the biology of *Laphygma frugiperda* and *Diatraea saccharalis*, with records of some parasites. [P. B.]
- Palmén, E., "Hatching of *Acentropus niveus* (Oliv.) (Lep., Pyralidæ) in the brackish waters of Tvärminne, S. Finland." *Ann. ent. fennici*, vol. 19: pp. 181-186, 2 figs., 1 map. 1953. The hatching moths were captured quantitatively by means of a funnel trap. The seasonal course of hatching in 1952 and 1953 is demonstrated in a diagram. [W. H.]
- Patočka, Jan, "The Fir Budworm *Epiblema nigricana* and its ecology." *Acta Soc. zool. Bohemoslovenica*, vol. 14: pp. 77-96, 44 figs. 1950. Gives data on life history, morphology, distribution and control by natural enemies. [J. M.]
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