in behavioural responsiveness and physiological tolerance in phytophagous insects are important. Another related area in insect–plant interaction relates to stress-induced changes in host plants on insects and the importance of the combined efforts of drought conditions, nutrient deficiency and air pollution cannot be overemphasized, including variation in plant genotype.

An aspect of uniqueness in the reproductive physiology of some insects relates to sperm transfer mechanisms such as direct transfer and dissociated transfer involving spermatophore trampling by rival males. Of particular interest is the fact that secondary sexual characters are typically absent in species with females and males not contacting each other during sperm transfer, like the water mites. This suggests that female choice does not act on male morphology, unlike in direct species contact where the role of female preferences in male mating success and the evolution of male secondary sexual characters contribute to behavioural ecology studies. Females of dissociated species have the ability to chemically differentiate between groups of males on the basis of their spermatophores – though it cannot prove that females can consistently choose spermatophores of a given male.

The developmental timing and mechanisms of caste determination are discussed in relation to wasps and evidence is presented that the concept of caste cannot be applied to most eusocial vespids. The physiological basis of caste determination has been addressed from an ecological viewpoint. In short, reproductive caste differentiation often occurs before adult eclosion, some females emerging as workers and incapable of producing fertilized eggs, another set of females emerging as potential queens, with dominance contests. Of equal interest is the evolution of social behaviour in burying beetles which coordinate reproduction with the location of a necessary resource that is unpredictable in time and space and reproduction must be coordinated with a mate. Their complex social behaviour in an ecological context focusing on the evolution of extensive biparental care in communal breeding is discussed.

Diverse facets of ecology of arthropods are highlighted in relation to global climate change, impact of fire in forest ecosystem and biodiversity in threatened stream ecosystem, with emphasis on biodiversity. Current focus on global climate change research provides an opportunity to study fundamental ecological processes and spatial dynamics in harsh environments like arctic systems which are strongly heterogeneous, requiring a diverse array of adaptive responses in morphology, behaviour and ecophysiology – all responsible for low species diversity of invertebrates. Interaction of fire with insects can delay or redirect forest succession and can have a significant consequence for forest productivity and biodiversity. Fire has been used in agriculture and range systems and can predispose trees to attack by bark beetles or some wood-boring beetles. Among the most threatened ecosystems on earth are the streams and to be able to maintain and restore biodiversity of stream ecosystems, documentation of the patterns in stream insect biodiversity, identifying the major environmental factors controlling these patterns is essential.

Phenotypic plasticity resulting in adaptive phenotypes depends on the environment during ontogeny. Genetic differentiation and phenotypic plasticity are two phenomena linking phenotype to genotype, besides canalization or developmental homeostasis. High level plasticity involves genetic polymorphism and polyphenism and these should be prime targets for research. A synthesis of ecology and genetics is needed to find out the nature and stability of genetic variation. A combination of evolutionary ecology and genetics will be useful, phenotypic plasticity providing a wonderful way of adapting the phenotype. An equally relevant area for future research relates to colour and habitat usage with reference to spider colonization. It is indicated that true polymorphism tends to occur in forest habitats, reflecting the suggested role of bird predation in the maintenance of colour polymorphisms.

Aspects relating the phylogeny and evolution of host-parasitoid interaction in Hymenoptera, mycetocyte symbiosis, biology of nonfrugivorous tephritid fruit flies, ecology and management of hazelnut pests and malarial parasite development in mosquitoes provide equally useful information relating to agricultural and medical fields. Needless to emphasize, the collection of articles in this volume highlights several emerging trends in the field of Entomology and goes a long way in providing very relevant information on diverse aspects which makes the Annual Review an invaluable compendium.

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Geodynamic Domain in the Alpine Himalayan Tethys. Anshu K. Sinha, F. P. Sassi, D. Papanikolaou, editors. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi 110 015. 440 pp. Price not known.

This book is a collection of 20 papers, mostly presented at the special session of the International Geological Correlation Programme (IGCP) Project-276 on Palaeozoic Geodynamic Domains and their Alpidic Evolution in the Tethys, organized during the 29th International Geological Congress held at Kyoto in Japan in August 1992. The Tethys zone stretches from the Atlas mountains in Algeria through Iran, Himalaya, Trans-Himalaya and Southeast Asia. In the Himalayan context, the terrane north of the Main Central Thrust and south of Indus Suture Zone incorporating the Phanerozoic basins is generally considered as Tethys. However, on a wider frame the term Tethys has acquired a more liberal application and dilution as to be of doubtful utility. This has led to terms like Paleo-Tethys, Neo-Tethys and Proto-Tethys. Ultimately it is uncertain whether the Tethys is a phase or an entity.

The perusal of the book brings out that many of the contributions do not conform to the basic theme of Palaeozoic geodynamic domains and their alpidic evolution in the Tethys.

The book unfolds with a review of broad geodynamic aspects of the Himalaya and adjacent areas with an emphasis on terrane concept (Sinha). It is followed by a paper which highlights some events in Ladakh during Cretaceous–Cenozoic time involving oceanic

islands in collision and selective subduction (Sinha and Mishra).

The base of Panjal volcanic belt is interpreted as a thrust and so also of the succeeding Permo-Triassic sequence (Patel and Jain), contrary to the prevalent view that it is a transgressive phase and the plane a profound unconformity as is the case in the entire Himalayan belt during the Permian. The authors present a model for crustal shortening across the Tethyan sedimentary zone. The mapping of (litho) stratigraphic units through remote sensing has enabled the morphostructural division of the Zanskar–Spiti basin with the Zanskar segment showing the maximum deformation and the Spiti the least (Prasad *et al.*). This study however, provides only a broad framework.

Lower Tertiary formations of Northwest Himalaya form the topic of two contributions particularly with regard to biostratigraphic sequences and paleogeographic significance (Mathur) and faunal communities (Juyal). The focus is on the occurrence of faunal elements of Maastrichtian–Lutetian and a significant transgressive phase commencing by late Maastrichtian and a regressive phase in Ypresian–early Lutetian. The faunal communities from the Kakara–Subathu (Maastrichtian–lower Lutetian) lived along the shoreline.

The tectonic evolution of the Permo-Carboniferous and Tertiary coal basins of India was controlled by dynamic processes that were in operation and a remote connection with plate tectonics is implied (Mukherjee). The coal basins of course are not even remotely related to the Tethys.

The archaeological remains that dot the Lower Swat Valley of NWFP of Pakistan have been found to be directly related to geological, lithological and geomorphological conditions that prevailed in this part of Indian plate (Di Florio *et al.*). This actually falls in the realm of Late Holocene social activity rather than Palaeozoic geodynamic domain.

China is covered by three separate papers. The one on Yunan refers to the discovery of Early Triassic deposits which provides an extension of life of Palaeotethys from Late Permian to Early Middle Triassic (Fang Nianqiao *et al.*).

The Yunan Province with its characteristic Triassic, Jurassic–Cretaceous and Palaeocene sedimentary formations with distinct evaporite facies have suffered Indosinian, Yanshanian and Himalayan deformations, the last one being instrumental for metallogenesis in the basin (Xiao Rongge *et al.*).

The Tibet–Sanjiang sector in the Southwest China constitutes the eastern Tethyn Orogen (Yang *et al.*). Their tectonic framework pushes the Eurasia–Gondwana boundary to northern margin of the North Tibet Terrane along Lancangjiang suture. This delineation based on chemical data of volcanic rocks appears least convincing.

The continent of Europe from the Pyrenees to the Urals is covered by 9 papers. The Pyrenees represent an orogenic chain of Alpine age with a Hercynian basement (Carreras *et al.*). The Pyrenean deformations are overprinted on the Hercynian basement resulting in translations, rotations and tilting. The Variscan belt of Europe evolved due to Palaeozoic convergence of Gondwana and Laurasia and contains distinct magmatic episodes with signatures related to a sequence of events (Bonin). The evolution of Carboniferous–Permian basins in the Western Carpathians coincides with the collision events of Variscan orogeny and based on basin analysis two events are identified (Vozarova and Vozar). Though the western Carpathian was created mainly during Alpine orogeny, the variscan elements are still preserved (Grecula).

The Palaeozoic basement of Bulgaria is shown as a mosaic of Gondwana and Peri-Gondwana terranes, and the migration of Moesian and Balkan terranes during different periods has caused diverse palaeoclimatic conditions (Yanev). The Palaeozoic evolution of Calabrian–Peloritan arc of Italy during Cambro-Ordovician to upper Carboniferous time has undergone stages of extensional accretionary and compressional tectonics (Acquafredda *et al.*). The terrane of Northeast Hungary bears evidence of the opening of a Red Sea type young oceanic basin during Middle Triassic and the development of distinct sedimentary facies (Kovacs). In the Great Gaucasus, the Pre-Alpine crystalline core of Pre-Upper Palaeozoic basement is highly heterogeneous and has influenced variable tectonic development (Somin). Sandwiched between East European platform of Russian plate and west-Siberian plate, the Ural mountain represents a collisional orogen with a diversity of structures (Kazantsev *et al.*).

The book contains a broad spectrum of papers on Palaeozoic geodynamic domains from Atlantic Coast of Europe to Pacific Coast of China and thus provides a glimpse of tectonic features related to Alpidic evolution and serves as a reference volume.

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