

I learnt many new facts about gems after reading this book. It is written in a easily readable style. Barring one single equation for the refractive index, the book is non-mathematical. A specialist on diamonds will definitely feel that the important books such as *Physical Properties of Diamond* by Simon and Berman, *Low Pressure Synthetic Diamond – Manufacturing and Applications* by Dischler and Wild, *Properties of Diamond* by T. E. Field, and *Precious Stones* by Bauer should have been included in the bibliography.

I have enjoyed reading this book. At the same time, the author silently conveys the feeling that we have neglected to nurture serious study and research in this important class of materials.

The Geological Society of India is to be complimented for bringing out this book. Some of the gems are studied in the M Sc Materials Science course in view of their applications in lasers and other optoelectronic devices. May be it will be a good idea to introduce in the M Sc course an elective paper on gems. I hope that a second edition of the book (with enlarged portions on synthetic gems, including the active work going on in many laboratories and universities in our country) would be published soon.

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The Freshwater Fishes of the Indian Region. K. C. Jayaram. Narendra Publishing House, Delhi 110 006, India. 1999. 551 pp. Price: Rs. 995.00.

India has a large part of its land mass surrounded by water. It boasts of a long coastline of about 7000 km and has 40 major rivers, not to mention numerous stagnant water bodies like lakes, tanks, and reservoirs. Almost all these water bodies have a variety of fish species living in them. Hence it is not surprising that a large section of the Indian popula-

tion depends on fishes (both freshwater and marine) for its food and livelihood. We have as many as 2500 species of fishes of which about 930 (40% of the total!) are freshwater inhabitants.

Though there have been some studies on the classification of fishes, the first modern, scientific method for classifying fishes of the Indian region was the colossal work by Hamilton-Buchanan on the fishes of the Ganges in 1822. A number of workers in the 19th century, like J. McClelland, Col. W. Sykes, T. C. Jerdon, Blyth and Francis Day contributed to the study of fish taxonomy. Of these, Francis Day's (1875–1878) *Fishes of India* (London) and *Fauna of British India* (Vol. I and II) are very relevant and widely referred to even today.

The foundations of modern-day classification of Indian fishes were laid by the studies of these pioneers. In the 20th century, the studies on the taxonomy of fishes in India were carried on to a large extent by scientists working at the Zoological Survey of India (ZSI). One of the greatest ichthyologists of India in the 20th century was Sunder Lal Hora (1920–1955), who paved the way for a number of other scientists at the ZSI, including K. C. Jayaram to continue their studies on the ichthyofauna of the region. A number of publications have come up since the days of Hora, which deal with the taxonomy of the fishes region-wise and family-wise. With as many as 930 species belonging to about 70 families and 280 genera of freshwater fishes found in the Indian region, it would be an immense amount of work to put this information into one comprehensive book. In 1981, K. C. Jayaram first published his *Handbook on the Freshwater Fishes of India, Pakistan, Bangladesh, Burma and Sri Lanka*. It was an instant success and a welcome addition to the available literature since it was the first comprehensive and handy reference volume, which covered almost all freshwater fish fauna in this region. Talwar and Jhingran (1991) published two very good volumes on *Inland Fishes of India and Adjacent Countries* (Oxford and IBH Publishing Co Pvt Ltd, New Delhi). Subsequently, there have been changes in the classification and renaming of a number of taxa and there was a need for an update of these works.

The book under review is a timely addition to the already available publica-

tions. It caters to the needs of a wide audience, ranging from graduate and undergraduate students and also researchers who need a manual for the identification and taxonomy of fishes. Though titled as a book on freshwater fishes, it also includes a number of estuarine and brackish water species and some that migrate seasonally from the seas to upstream of rivers. In addition to being a revised version of his earlier handbook, this book has information on work done in recent years which have led to renaming and reclassification of some taxa. The arrangement of keys has been done in a very 'user friendly' manner such that one need not have too much prior experience with fish identification to be able to use it. The features used for classification are mostly external morphological ones (body shape, length, depth, presence or absence of spines, barbels, scales, colour of the species, etc.) such that tedious dissections can be avoided as far as possible. At the same time the latest classification criterion has been used in accordance with international conventions of classification of fish taxa.

For a fresh student of fish biology this book is very easy to start off with, since the author begins right from the point of how to use the keys and goes on to provide brief accounts of the method of collection of fish and their preservation after the collection. A beautiful description on how to take meristic measurements and accounts of various features of the fish specimen that can be recorded follow this. And each of these has in addition to the description very clear diagrams, which make understanding of each feature in the fish very easy. And if a student still needs help with meanings of technical terms used in ichthyology, a glossary is provided at the end of the book where each scientific term is arranged alphabetically, with explanations. Here too, at places some descriptions have been supplemented with diagrams of the features. A systematic index is provided at the very beginning of the book where all the genera described in the book have been arranged according to the conventional method of classification into superclass, class, subclass, division, order, suborder, family and genus. A total of 852 species, belonging to 272 genera in 71 families have been included in this book. Although it covers all important taxa found in the region,

some rare species and some of the exotic (introduced species) have not been included by the author. But the author has taken care to incorporate the very latest works done in most of the taxa – e.g. some new descriptions of species, some extended distributions and mis-information which have been noted later – have been added.

The systematic accounts of genera have been arranged according to their known phylogenetic affinities. The orders Osteoglossiformes and Clupeiformes have been dealt with first, followed by the other orders like the Cypriniformes, Siluriformes and the orders belonging to the superorder Protacanthopterygii, Cyclo-squamata and Acanthopterygii. Each account begins with the salient features of the superclass given in brief along with the distribution of the group and the number of the orders described. A key for identifying each order follows this. Once that is done, a more elaborate description of each order has been provided along with the families covered within each order. Again within each family, a set of diagnostic features for that family is given along with the range of distribution and the number of genera belonging to that family. Elaborate descriptions of each genus are given, including information on the naming of the genus, its diagnosis, distribution and the number of species of the given genus. At places the author has also given additional information on the importance of a genus in terms of commercial value and life-history patterns like migration and spawning habits and also peculiar feeding habits which give interesting additional information about the genus. For groups where there have been ambiguities in the placement or their naming, the author has carefully added them as remarks or as footnotes. A description of each genus is concluded with a list of species belonging to that genus along with its range of distribution. At least one figure of a representative species of the genus is given and this is followed by a key to the species. The most impressive feature of the book is the excellent quality of these diagrams and figures, which makes identification so much easier. The diagrams are very clear and have legends wherever new or peculiar features have been depicted. It would be too much to ask for to have further descriptions of each species and still want it to remain an easy refer-

ence single volume handbook! But an elaborate description of each species is hardly a requirement for most researchers and fieldworkers who want an identification of their fresh specimens in the field itself. One feature, which is lacking in this book though, is the absence of fin formulae for species. A useful feature, which could have been added in this volume, would have been a description of the fin formula and how it is prepared, which is important for every fish biologist.

A very comprehensive bibliography wraps up the volume (more than 650!) covering almost all work done so far on Indian fish species as well as relevant works done in other regions. It would be very useful for further reading if any researcher needs additional information on specific taxa or topics. This book is a must for every student of ichthyology to possess as a ready reference to fish identification.

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Levels of Selection in Evolution. L. Keller (ed.). Monographs in Behavior and Ecology. Princeton University Press, 41 William Street, Princeton, NJ 08540, USA. 1999. 272 pp. Price: US \$ 59.50.

The quest for immortality was what drove Medea to kill her sons. 'I will make your children immortal', said Hera, 'if you lay them on the sacrificial altar in my temple¹.' Medea, the daughter of King Aetes, had magical powers, which she used to help Jason bring back the Golden Fleece to Corinth. Medea bore Jason two sons, but he later rejected her in favour of Glauce, daughter of King Creon. Medea murdered Glauce by gifting her poisoned garments which burst into flames when she wore them. The conflagration also killed King Creon and many others in the palace. Zeus fell in love with Medea for her angry, retaliatory spirit and attempted to seduce her but she repulsed all his

advances. Grateful Hera, wife of Zeus, promised immortality to Medea's sons, and Medea herself sped away in a chariot drawn by winged serpents.

The quest for immortality is at the centre of all theory and investigation of evolution by natural selection. It is the basis of Orgel and Crick's selfish DNA and Dawkins' selfish genes. Although evolution also occurs by random genetic drift and by fixation of neutral alleles, it is the driving force of natural selection which largely confers immortality or death. Although the 'survival of the fittest' is a tautology, it is only the fittest who are on the road to immortality.

For decades, the long-standing debate in evolutionary biology has concerned the units of selection. What is the level at which selection acts? Does it act at the level of codon, gene, individual, kin, group, species, clade, lineage and so on? Which level is really 'visible' to the force of natural selection? This has led to the distinction between replicators and vehicles^{2,3} and replicators versus interactors⁴. A replicator (which may include both genetic and non-genetic cultural elements such as memes) must possess the general criteria of longevity, fecundity and fidelity and must pass on its structure directly in replication, while an interactor is an entity that directly interacts as a cohesive whole with its environment in such a way that replication is differential⁴. In this sense, sections of DNA or genes are replicators while the individual organism is an interactor. For Dawkins, 'the unit of selection [in the sense of a replicator] must be a unit that is potentially immortal'^{5,6}, i.e. for a replicator to be a unit of selection it should have low levels of change due to mutation or recombination. In this sense, a non-clonally, sexually reproducing organism can never be a unit of selection because it can never exactly reproduce itself (sexually reproducing eukaryotic organisms pay the cost of sex, whereby only 50% of the genome is transmitted to each offspring), and can therefore never achieve immortality. This then is the paradox of the individual. Can this paradox be resolved only if the individual is considered as a vehicle for the self-promoting, immortality-seeking replicators that it contains?

The discovery of a variety of selfish elements in the nuclear and cytoplasmic genome that engage in intragenomic conflict, gives credence to this approach.