

BOOK REVIEWS

the square root of -1 ! Yet, in this new millennium and the age of supercomputers, we continue to use the orbitals, resonance structures, local descriptors of reactivity and the 'magical arrows' which gently guide the electrons from one bond to another. Perhaps it has to do with the insights offered by Wilson on the method in the madness of chemists! Non-chemists are not privy to such higher forms of thought and creativity. Thus, when one mixes up molecular orbital and valence bond arguments with impunity there are no voices of dissent for a simple reason – the arguments explain the experimental results. Whatever the reasons might be, quantum chemists still have this great challenge of finding and explaining, in McWeeny's words, the 'primitive patterns of understanding'.

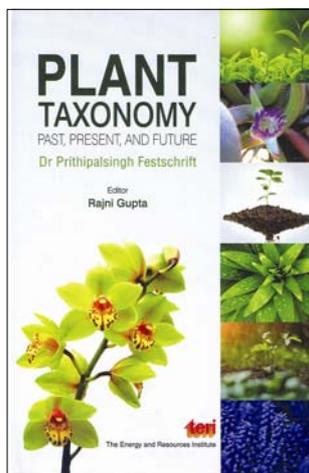
Another important point that the authors make in this book is about the differences in the outlook of the German and American schools which led to the dominance of the latter in the development of the field. Thus, after their key initial contributions, Heitler, London, Hund, Hückel and Born could not carry on in the long run. Whereas the likes of Lewis, Pauling, Mulliken, Van Vleck and Slater helped establish a strong school of quantum chemistry that continues to date. The key difference, as the authors put it, is that in the United States whether a scientist was defined as a chemist or a physicist was just a matter of chance, personal preference, or of institutional affiliation. Consequently, interdisciplinarity was the rule rather than the exception, in stark contrast to the then German academia. This is also evident from the establishment of the Swedish school in Uppsala, thanks to the strong personality of Löwdin and his interdisciplinary outlook. There is an important and clear message here to anyone who is rather dismissive of fields, and even approaches, other than his or her own!

This is a carefully written book, albeit density functionals have been short-changed, and will be a joy to anyone interested in the history of this unique field of research. Perhaps it can be a bit daunting for others. To them, I suggest starting from the last chapter. Although this advice is like asking someone to start from the last chapter of a Sherlock Holmes' novel, thus taking that element of the unexpected away, it may just make you curious enough to dip into the early chapters to learn more about the trials

and tribulations of the early pioneers of quantum chemistry. For teachers and students in a typical chemical bonding course this book should be mandatory reading – one will then get a sense of the grand scale, the key players (apart from the ones that are usually popularized), and the emotional side of what otherwise may seem as a 'dry' subject. For those who have made it a habit to indulge in making slight remarks on quantum chemistry and chemists, this book will hopefully be a sobering wake-up call. At the very least, one will gain respect for names like Erich Armand Hückel and Samuel Francis Boys. Moreover, it will bring a wry smile on the faces of instructors, even today, who attempt to present the theory of the chemical bond with some care and honesty.

SRIHARI KESHAVAMURTHY

*Department of Chemistry,
Indian Institute of Technology Kanpur,
Kanpur 208 016, India
e-mail: srihari@iitk.ac.in*



Plant Taxonomy: Past, Present and Future – Dr Prithipalsingh Festschrift.

Rajni Gupta (ed.). Tata Energy Research Institute (TERI), TERI Press, Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi 110 003. 2012. xxi + 349 pp. ISBN: 978-81-7993-359-6. Price not mentioned.

Taxonomy is truly ancient (hence known as the mother of all branches of biology!), inherently appealing for being proximal to exploring nature and invariably linked to all other branches of biology. The subject is based on certain principles and

established concepts and involves both primary morphological observations and sophisticated experimentation when pursued for enquiring into allied branches for complementary support. The subject gets well synthesized and truly blooms once these are ideally and optimally fulfilled. Unfortunately, the subject has taken a retreat in majority of universities/colleges in undergraduate/postgraduate courses in the last three decades. Its teaching was neglected with curricula reformers almost denying its desired/deserved inclusion in various courses of study. This has resulted in both students and even some professors becoming unaware of both basics and identities of familiar plants. The subject survived in a few scattered universities/colleges where renowned teachers counselling for the subject are part of the faculty inspiring students to understand its grace and glory.

The subject is to be appropriately taught elucidating nuances in divergence/similarity with adequate exposure to field studies to comprehend in its integrity and perspective. Such an exposure can fairly impel students to embrace it by passion and pursue the same as a profession. The present reviewers as biologists still remember as students, running around teachers attempting to know the Latin names (Latinized names) of the collected plants, charmed by character consistency and systemized evolution in nature and in plant groups. No prospective biologist should miss this learning/experience! It is now well realized that taxonomy teaching, research and training have a bearing on documentation, monitoring and conservation of the biological resources of the country. India takes pride in the richness of these resources (as it is one of the 12 mega-biodiversity nations harbouring four of the 39 hot-spots in the world) and is committed as a signatory to the Convention on Biological Diversity (CBD) to conserve it through sustainable utilization. More decentralized approaches of documentation of biodiversity resources are encouraged today to build biological inventories as quickly as possible to recognize their hitherto unknown potential uses. Member countries of CBD, known by Conference of Parties (CoP), affirmed the implementation of biodiversity strategy action plan 2010–2020 to realize 20 Aichi targets.

Capacity building in taxonomy in all the concerned areas has become a major

objective, which includes promoting and reviving its teaching in all universities and colleges. A book at this juncture from a college covering varied aspects of taxonomy is truly a contribution for the avowed cause. The book focuses on both customary and modern topics providing a state-of-the-art on the subject. Most of the topics are authored by teachers who can understand students better than anybody. Nomenclature is a significant aspect of plant taxonomy that brings in more systemized naming and thereby documentation of biological resources and has been elaborately discussed in chapter 2. The diverse concepts of species, the process and modes of speciation and the impact of climate change and species under threat are presented in chapter 4. A connected topic on phylogeny (the pattern of descent) and phylogenetic relationships and thereby evolutionary histories are presented in chapter 9. These chapters give adequate background in weighing characters, assessing classifications and recognizing/ignoring novelties/freaks by the taxonomy practitioners. Chapter 7 deals with indigenous knowledge and biopiracy, and has greater relevance as the country has enriched knowledge systems and also 550 tribal communities who have their own understanding of the plant resources. There is a possibility that patents can be granted on indigenous knowledge and this is to be safeguarded from IPR legislations. A well-detailed presentation on the subject is indeed apt to bring in awareness. Taxonomists, as other subject specialists, should grow adopting new methods and tools in finer evaluation of characters and groupings, but not at the cost of ignoring fundamentals of the subject itself.

Among the modern topics, the importance of DNA bar-coding (identities based on uniqueness in a standardized sequence in the DNA) used for identification between individuals in a species and between species, advantages/limitations and future prospects therein are deliberated in chapter 5. Molecular markers offer numerous advantages over phenotype-based methods in diversity evaluation of plants. This is due to their stability and detectable ability regardless of growth, development and differentiation. Both DNA-based and protein-based molecular markers using PCR-based and non-PCR-based techniques are deliberated in chapter 14. The significance of

plant taxonomy for managing genetic resources is dealt with in chapter 6. The chapter on herbaria and data information systems (chapter 8) should have been more comprehensive and requires updating on inventory strengths in various herbaria as the figures cited are less. The kind of computerized data/information the herbaria hold also needs a review. With advancement in technology, effective biodiversity information networks are being planned by members of the COP to promote access to material generated by taxonomists throughout the world. Majority countries also plan to network and link all herbaria for faster flow and dissemination of information.

In chapter 15 on E-flora, the future of floristic documentation, the databases connected to floras, keys for identification, virtual herbaria (that contain specimen images) and live plant photos have been deliberated. This is truly useful to all taxonomists since it is realized that effective exchange of material and information enhances not only the pace but the quality of documentation. Most of this information concerns web-based taxonomic resources.

The reviewers have also noticed two chapters – one, on ethnobotanical Noah's ark and the other, on plants of Delhi, scientific names and their meaning (chapters 1 and 3) that have attempted to present the genesis and meaning of botanical names. These could have been dispensed with as the focus is merely to provide true meaning to botanical names or this could have been summarized as a section of chapter 2 under nomenclature. The publication should have achieved its completeness had it included/introduced chapters such as the subject significance (its relevance to allied fields of biology), principles (that include major and minor categories of classification), classification systems (artificial/natural/phylogenetic systems), existing/evolving systems of classification, plant identification (the procedures of plant description and further identification using herbaria and literature), field herbaria techniques (collection procedures, specimen preparation and preservation, and herbaria building), the distinctions in floristics and revisions and the connected literature. Though we have standard literature on the cited topics, their summation with appropriate citing of classical literature would have brought many desired topics together. These are in fact the subject areas that

are greatly neglected in teaching. When authors are as many as topics of a subject, to bring out a book in a uniform tone, language and quality is difficult and it becomes more obvious when they violate guidelines and the contours of presentation. Festschrifts often suffer from this vulnerability. A little more reorganization of existing chapters (to bring in natural linkage of chapters to readership) and inclusion of a few more, which may happen in future editions, can earn the book a permanent citing in taxonomy literature.

M. SANJAPPA^{1,*}

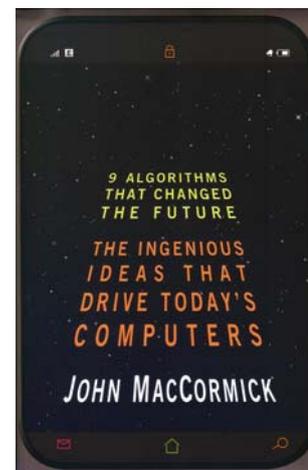
P. VENU²

¹*Botanical Garden,
University of Agricultural Sciences,
GKVK,*

Bangalore 560 065, India

²*Central National Herbarium,
Botanical Survey of India,
Howrah 711 103, India*

**e-mail: sanjappam@ymail.com*



9 Algorithms that Changed the Future: The Ingenious Ideas that Drive Today's Computers. John MacCormick. Princeton University Press, 41 William Street, Princeton, NJ08540, USA. 2012. x + 219 pp. Price: US\$ 27.95/£19.95.

This is an interesting book with an alluring title, meant for readers who do not know any computer science, but are enthusiastic to know about how computers do all the remarkable things that they actually do. The author has handpicked nine path-breaking ideas which are found