number to proton number ratios (N/Z), (ii) atomic charge and nuclear masses, and (iii) angular momentum. New data emerging from these studies are expected to provide new information about the effective NN interaction, properties of the pairing force, properties of the pure neutron matter at very low densities, nuclear shell structure, neutron–proton pairing, etc. It may also be possible to synthesize the long predicted super heavy elements (SHEs) in the laboratory. The discovery of SHEs will not only test the nuclear structure models but also the predictions of the relativistic quantum chemistry, according to which the velocity of the inner-shell electrons will approach that of light for nuclei with atomic number in the vicinity of 137. This is expected to cause deviations from the periodicity of the chemical properties which is the hallmark of the periodic table for lighter elements. The properties of new exotic nuclei are also of great interest in the field of nuclear astrophysics, as such nuclei are produced in many astrophysical sites. Therefore, we are in an exciting era in the field of nuclear structure physics.

Unfortunately, one misses even a glimpse of it in this book. Perhaps the mandate and level of the school could have been one reason for this. This probably also is the reason for some authors relying too heavily on the material available in standard textbooks[4] for the preparation of their articles. Even then the utility of the book could have been enhanced greatly, if the problems solved together with the lectures were also included (this has been done in chapter 6 only). There are several technical faults in this book, e.g. there are numerous typographical errors, figures in some of the articles are too blurred and captions are illegible, different styles have been used by different authors in the preparation of their articles which diminishes the cohesiveness of the book.

Nevertheless, this book should be useful for students just starting their research work in nuclear structure physics, as it provides a good guide to various techniques used in these studies at one place.

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Genetics and the Extinction of Species. Laura F. Landweber and Andrew P. Dobson (eds). Princeton University Press, 41 William Street, Princeton, New Jersey 08540, USA. 1999. 189 pp. Price: US$ 19.95/£ 12.50 (paper).

Conservation today is a buzzword whose echoes are heard in areas far removed from population biology. Newspapers and magazines carry articles on conservation and biodiversity, some people agitate for conservation while others get agitated by such agitations. Even politicians talk about conservation. This is all to the good, for conservation is an issue with biological, sociological, economic and, therefore, political dimensions, and practicable solutions to problems in conservation biology cannot be found by biologists alone. Yet, there is a flip-side to all of this hype about conservation. Biological inputs into seeking solutions of conservation problems are frequently pushed into the background, while vociferous arguments about human rights and 'mother earth' rhetoric occupy centre stage (Have you ever seen a newspaper article that tried, for example, to educate its readership about random genetic drift or metapopulation dynamics?). Even more unfortunate is the fact that the arguments for conservation are all too often being made by people who combine an impressive passion for conservation, and rhetoric, with an almost equally impressive lack of knowledge of population biology. And even among biological disciplines important to conservation, genetics has gradually been losing visibility, even though it is central to many issues in conservation.

Genetics and the Extinction of Species, an edited volume of eight papers presented at a symposium held at Princeton University in 1996, goes some way toward redressing the marginalization of genetics in conservation issues. As is inevitable in compilations of this kind, several important areas at the intersection of genetics and conservation are not represented. Notably lacking are discussions of genetic techniques for reconstructing the past geographic range of species, the effects of reduced genetic variation on disease susceptibility, and the impact of modern genetic technology on systematics. Yet, the book is, overall, a good and concise compilation of information on many aspects of genetics and demography, and their implications for conservation.

The first chapter by Russell Lande provides a brief summary of what is known about the impact of various anthropogenic, ecological and genetic factors on the probability of a population going extinct. This is a clearly written chapter, although some sections may be difficult to grasp for a reader unacquainted with population ecology and population genetics. Nevertheless, there are some useful messages here for people who are involved in devising conservation strategies. Lande makes the point that it is often initially due to human activities such as agriculture, forest and fishery exploitation, pollution, and introduction of exotic species, that species are pushed towards lower population numbers. Reduced numbers, in turn, lead to a spiral of ecological and genetic effects, such as altering the equilibrium number of occupied patches in a metapopulation or inbreeding depression. Therefore, it is better to focus on identifying and redressing anthropogenic activities that cause initial decline in abundance, rather than to concentrate on the ecological and genetic syndromes associated with low population numbers, because by that time, it would be almost too late. Lande also points out how the standard economic practice of discounting future profits (often by more than 10%) results in overexploitation, often to the verge of extinction of, species with low annual per capita rates of increase (i.e. species with large generation times and/or low fecundity).

In their chapter on plant conservation and genetics, Kent Holsinger *et al.* combine some basic theory with a review of some case studies to argue that depletion of genetic variation in plant populations is mostly a consequence and not a cause of a decline in numbers. This is an important point that many conservationists not familiar with population genetics often ignore. Basically, alleles that are rare in a population do not contribute significantly to additive genetic variance. Therefore, they are not often important to the short-term evolvability of the population. Similarly, rare alleles that are not already strongly favoured by selection (if so, they would not be rare) are likely to be lost relatively rapidly (i.e. in tens of generations), even from moderate-sized populations. Therefore, they cannot be expected to contribute to the long-term evolvability and persistence of populations either. Moreover, populations small enough to face significant threat of extinction due to genetic effects like inbreeding depression are already under much greater threat of extinction due to ecological effects such as demographic stochasticity or environmental catastrophe. Indeed the relationship between range size and genetic variability breaks down for small populations, although the two have been seen to be correlated when data from abundant species are examined. Holsinger *et. al.* also highlight two important, and relatively less well known, examples where changes in the genetic structure of plant populations can threaten their long-term persistence. Loss of self-incompatibility alleles can doom isolated populations to extinction through enforced sterility, and almost did so in the case of *Hymenopsis acaulis*, the rare lakeside daisy in Illinois. On the other end of the breeding structure spectrum, gene flow from neighbouring common related species can drive rare species to extinction by excessive hybridization. This is what appears to be happening on Catalina island, off the southern California coast, where a rare species of mountain mahogany, *Cercocarpus traskiae*, has been brought to the brink of extinction by hybridization with a widespread congener *C. betuloides* var *blancheae*.

The role that captive breeding in zoos plays in conservation is often overshadowed by the greater publicity given to attempts at habitat preservation. Yet for many species, already highly endangered, captive breeding is the only feasible. conservation strategy in the near future. Captive breeding is perhaps also the conservation strategy most closely intertwined with population genetics. The key problem here is to organize breeding among a relatively small number of individuals in a manner so as to maximize the retention of genetic variation. The logic here is that some day it may be possible to reintroduce captive bred populations into the wild and, therefore, one should try to ensure that their genetic composition is as similar as possible to their wild ancestors. Kathryn Rodríguez-Clark summarizes the different breeding strategies used in zoos, and reviews the few empirical studies that have been conducted to examine whether commonly used mean kinship-based strategies retain heterozygosity better than random mating or other breeding programmes, and also whether retention of neutral genetic variation is correlated with retention of adaptive genetic variation, a very important issue on which very little data exist. The available data suggest that mean kinship-based breeding strategies do tend to reduce the rate of loss of heterozygosity at marker loci, but the broader question of the impact of such heterozygosity on the long-term evolutionary potential of the population is not as yet satisfactorily answered.

Two chapters by William Amos, and by Paul Harvey and Helen Steers take up some issues regarding the use of phylogenetic reconstruction in conservation. Amos points out some of the potential pitfalls in using microsatellites and other genetic markers to draw inferences about genetic diversity, genetic distance and phylogeny. He draws a useful distinction between the conservation implications of two separate genetic problems in small populations that are often confounded, namely loss of genetic variation and inbreeding depression. The use of heterozygosity versus other measures of genetic diversity such as number of alleles at a locus are also discussed, as are newer methods of estimating heterozygosity as well as various biases inherent in the use of microsatellite data for studies of genetic variation. Harvey and Steers focus on a new approach to inferring population dynamic history from present genetic variation using current patterns of genetic relatedness among individuals in a population. Such techniques are important because knowing the past dynamic history of a population can be very relevant to planning conservation strategies. A currently small population that has been increasing in numbers from an even smaller size in the past obviously needs to be treated differently from one that is declining in numbers. The technique is based on using relatedness information to construct genealogies within the population, that can then be visualized as plots of the log number of lineages over time: the shape of such a plot allows inferences about past population dynamics to be drawn. However, there are several problems with this approach that are also discussed by the authors. Recombination, selection and slow rate of change of DNA sequences (such as that found for chromosomal DNA) can cause severe problems because they invalidate assumptions underlying the model on which the technique is based. Still, this is a useful approach to an important problem and one hopes that further work will provide more robust versions of this technique.

An interesting contrast to chapters dealing with broad conceptual issues is provided by two case studies of endangered Hawaiian birds. Rebecca Cann and Leslie Douglas describe how avian malaria contributed to the decline and extinction of many species making up the lowland avifauna in the Hawaiian islands. Even though the problem was recognized in the 1960s, most conservationists continued to focus on habitat destruction, competition from introduced species and predation as the principal culprits. This sad story serves to underline the importance of a multi-disciplinary approach to conservation issues: early involvement of epidemiologists with ecologists could perhaps have helped slow down this wholesale decimation of lowland Hawaiian avifauna. Leonard Freed presents evidence suggesting that the degree of host and habitat specialization, levels of disease immunity and life history traits such as clutch size and number of broods per year have interacted with factors such as habitat destruction, competition, predation and disease to produce observed patterns of extinction and endangerment among Hawaiian honeycreepers. This study is a good example of how the comparative approach can be useful in conservation biology.

The final chapter by Laura Landweber is a sort of 'Jurassic Park' revisited in which she discusses how techniques for extracting DNA from long dead individuals such as fossils, mummies and museum specimens can be very helpful in conservation. The ability to amplify DNA from hairs, droppings, etc. can be useful in the genetic study of endangered populations where collecting blood samples may not be feasible. Similarly, genetic variation in extinct populations can be studied by accessing DNA from museum specimens. Such information may help understand some of the causes of extinction. Moreover, extensive museum collections from different historical periods can allow one to do time course studies on genetic variation, at least for some species.

Overall, the book is interesting and informative. The coverage of material is also rather balanced: both the benefits and pitfalls of genetic techniques in conservation are emphasized and discussed, and theory, techniques and case studies are all covered. The book will perhaps be most beneficial to conservation biologists who come from more of a natural history/ecology background, because it highlights many genetic processes and techniques that they need to be aware of, but often are not, and also provides a good bibliography. Conservationists without a reasonable background in biology may find the book pitched a little too high for them. Even so, some of the simple take-home messages are emphasized in clear, non-technical language and these will be of use to resource managers, policy-makers and the like. The book would also be useful as supplementary reading material for courses in conservation biology and its availability in paperback form makes it relatively affordable.

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Plant Systematics – Theory and Practice. Gurcharan Singh. Oxford & IBH Publishing Co Pvt Ltd, 66 Janpath, New Delhi 110 001. 1999. 359 pp. Price: Rs 160.

The book is an update on the subject of plant systematics (chapters 1–10) over some five standard books that have appeared since 1950s, followed by a descriptive, illustrated account of 27 common families of flowering plants (chapter 11). The coverage is comprehensive.

The late P. H. Davis had once mentioned to me that he was against a new edition of the excellent book then in wide circulation of which he was the first author[1] because, with so much new information from very diverse fields to be handled, two authors could no longer do justice to the subject. The book under review, attempting such a handling, offers too much for the student, and too little for researchers.

On the one hand, botany and systematic botany in particular, is hardly the first choice of the general stream of students. Undergraduate/post-graduate teaching should aim at inculcating an appreciation of the variations in nature, more as an outdoor exercise than an indoor one. This should expose the students to the riches of plant life and instil in them an abiding interest in plants even if they do not specialize further in botany.

A good illustration of such a teaching aid is the eminently readable and stimulating book by Jeffrey[2], a title not listed in the references section. The problem-solving approach is truly original and gripping, in the course of which the conventionally inscrutable taxonomic technicalities fit in as answers to a felt need (I had an intention to produce a tropical version of this book about which the author was agreeable, but not the publishers!).

On the other hand, India – the home of a considerable share of the planet's green cover – really needs a fair number of competent systematists. Consequently, the dated colonial *Floras* are still largely the basic reference for plant inventories, in spite of swarms of new publications. Data on endemic threatened/endangered/extinct plants fed into the international database are a serious disservice[3].

This situation underscores the urgent need of monography, the core of taxonomic research. And the massive herbarium collections now largely idling across the country will then be used to study the plant wealth of the country. Summarizing my views on the teaching of, and research in, plant taxonomy since the 1970s, I have pointed out that Indian plant taxonomy, having drifted out of the international taxonomic endeavour, has been undergoing inbreeding, resulting in loss of vitality[4].

An Indian (tropical) textbook should aim at correcting this anomaly by stressing on indigenous priorities, namely the specific regional contributions to world botany among which is the first-hand knowledge of plants and their conservation, which no one else can provide. It is this thrust that is generally lacking in the book. It may be necessary to skip subjects in which world centres are better equipped: nomenclatural intricacies, electronic devices and phylogeny[5] among others, belong here. The steady influx of new techniques (computers, internet, etc.) should not be confused with better taxonomy. They are merely tools that can be used for organizing data but not a substitute. We get out of these techniques what we put into them, not more. They do not provide any new information; they help us organize our data more efficiently.

A specialty of the book is in fact, chapter 11, with descriptions of families and some included species, and illustrations and floral diagrams. However, these do not meet the requirements indicated earlier and are not inspiring. The structure of the book is conventional, and the close similarity, even verbal, to any title it hopes to supersede, is obvious.

Some minor slips and antiquities may be mentioned. (i) Herbarium methodology: use of glue for mounting specimens (p. 73) or use of vasculum (p. 60) are not the best; (ii) theoretical: Hutchinson's system (pp. 142–148) being listed among phylogenetic systems is untenable (the late B.G.L. Swamy would insist on the qualificative *putative* to precede several of the systems); (iii) nomenclatural: *Adhatoda vasica* (p. 300), *Peristrophe bicalyculata* (p. 301), *Phyllanthus niruri* (p. 311) are no longer considered as the correct names; (iv) taxonomy: *Nymphaea pubescens* Willd. (not *pubescence*!) (p. 45) and *N. nouchali* Burm.f are different plants; (v) periodicals: *Journal of the Arnold Arboretum* ceased publication several years ago, and *Systematic Botany* is not published from New York (p. 78).

These are minor failings, understandable when a single author handles such a vast subject in a mere 359 pages. On the positive side, the methodical organization of so much information from such diverse fields, with emphasis on modern techniques, is commended. Updating of lit-