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BOOK REVIEW

Elements d'écologie appliquée by F. RAMADE, McGraw-Hill 2 ème édition, 576 pp. (**Elements of Applied Ecology,** 2nd edition.)

This book bears a subtitle, 'Action de l'homme sur la biosphère' (Action of Man on the Biosphere), which implies that it applies not only to students of universities but also to the administrators, jurists, urbanists, managers, and other assorted people conscious of their role in the management of the biosphere. The author, a professor of zoology and ecology at the University of Paris Sud (Orsay), explains how his book was written from his course notes.

The different chapters, illustrated with numerous diagrams, graphs, maps, idiograms and photographs, deal with general concepts, definitions, and phenomena involved in the biosphere, using instances from various areas of the world. In the introduction (5 pages), the author shows how France has filled up the gap in the protection of Nature and legislation for this purpose.

The first part (148 pages) of this book deals with the structure and functioning of the biosphere and its interactions with the human species. In Chapter I are shown the main concepts in ecology such as biosphere, biotopes, ecosystems, the biome, nutritional chains, and the cycles of carbon and oxygen, as well as photosynthesis, energy, ecological pyramid, and the productivity of ecosystems. It is also shown how the present situation has arisen from modifications which have occurred during various geological periods. Chapter II starts with a description of the evolution of man's action on the 'milieu naturel' since *Homo habilis* appeared. Until the nineteenth century, agrarian civilization was characterized by the utilization of biodegradable materials with the result that the material cycle was not disturbed. With the dawn of the seventeenth century human society was transformed into a technological one, and the human ecosystem became more and more disturbed, which had the effect of reducing the diversity of biocoenoses, disrupting the material cycle and modifying the energy flow (coal, oil, and energy input into agriculture). The first part ends with the history of demography and prospective development of the human population. A recall on elementary notions of population dynamics is given.

The second part (285 pages) deals with pollution of the biosphere. It is shown how pollution was of concern through the centuries, and how it is increasing with the intensification of energy production and the accompanying urbanisation. Therefore, a classification of types of pollution is given: physical pollution (radiation, thermal, noise and infrasounds), chemical pollution, biological pollution, and aesthetic nuisance, followed by a description of the circulation of polluting materials within the biosphere, and ways in which these materials are incorporated into biomass and accumulate in the trophic chains. In the next chapters, different types of pollution are illustrated: air pollution by carbon, sulphur, nitrogen, aerosols and lead with its effect on macro- and micro-climate as well as the consequences on species and biocoenoses; soil pollution, which, with the development of agricultural techniques, affects energy flow and the material cycle in agroecosystems, particularly the ones of phosphorus and nitrogen with the use of industrial fertilizers.

The problem of pesticides is related within the compass of 41 pages. According to the author, this problem is an illustration of the ecological disasters which the inconsiderate use of a new technology can lead to. After a classification of insecticides and their ways of action, the author demonstrates their advantages and then their drawbacks: lack of selectivity, and dispersion over the ecosystems. Their effects, from the ecological point of view, may be classified into two categories: demo-ecological (a pesticide concentration causes the same percentage of mortality in populations whatever the size of population in a given area; moreover, pesticides concentrate through the trophic chain and act on birth-rate, fecundity, and egg viability), and biocoenotic (disappearance of plants and animals feeding on the latter, upsurge of species whose density was low before pesticide treatments and the parallel disappearance of competitive species; in this way a break of biological equilibrium occurs). At the end of the chapter, the author explains biological control methods: the ones influencing mortality (predators, parasites, and pathogens), and those influencing birth-rate (sterilants, pheromones, etc.). The problem of pollution of fresh and marine waters is specifically a matter of lack of dissolved oxygen. This type of pollution consists of: organic (microorganisms, and fermentable organic matter), chemical (lead, mercury, nitrogen, phosphates, hydrocarbons, cleaning products, pesticides, polychlorophenyls, and phenols), insoluble materials, and thermal pollution.

The third part (93 pages) deals with the overexploitation of natural resources and the limits of the biosphere. It is shown how vegetation has been destroyed since Neolithic times, with numerous instances from all over the world. The soil is altered by salts, lateritisation and erosion. Fauna is exterminated through three processes: game shooting, modification or destruction of their habitats, and introduction of competitive species by man, Man's action has existed since the Pleistocene, by the destruction of great mammals surviving the Tertiary period. Examples of species that have disappeared are given, particularly regarding the nineteenth century hecatomb. The present causes of defaunation is the result of trade in animal products, game shooting, and deforestation. Marine fauna is becoming exhausted by overfishing certain species. The last chapter is devoted to Nature preservation for the safeguard of animal and plant genetical pool, environmental diversity, physical and moral health, and cultural, aesthetic and educational reasons.

The book ends with references (13 pages), a glossary (2 pages), and a content and taxonomical index (15 pages).

As far as entomology is concerned in this book, nearly all instances come from crop pest species. Vectors of human and animal diseases are practically missing.

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