In Thelypteridaceous genera with n = 36 and multiples, 12 was chosen as the base number although it could equally well be 9 (or 3, 4, 6, or 18!).

The literature references for Lycopodiaceae are seriously confused. I have not been able to check them all, but in the first ten pages I found 10 errors, all referring to counts by Löve & Löve! A count of *Lycopodium selago* was omitted from the book as stated in the introduction p. xi. Later on page 4 the same reference was used for *Lycopodium clavatum*.

I have only examined here Lycopodiaceae s. lat. in detail, but random samples from the rest of the book leave little hope that it is better.

In conclusion it should be said that this book does not meet the need we have for a modern compilation. There are too many omissions, misquotations, misstatements, and misjudgements to be excused, and as a result we still have to check all the same references as before. It is feared that this book will have a harmful influence on future work on the Pteridophyta. It should never have been published.

Benjamin Øllgaard

Sybenga, J. 1975: *Meiotic configurations. A source of information for estimating genetic parameters*. 251 pp. Springer-Verlag, Berlin, Heidelberg, New York. ISBN 3-540-07347-7, 0-387-07347-7. Price DM 68:– (clothbound).

The present volume is the first of a planned series of monographs on theoretical and applied genetics from Springer's publishing house. Several branches of genetics covered by the series are of interest to many plant taxonomists, for example evolutionary genetics, population genetics, ecological genetics, biometrical genetics and cytogenetics.

Sybenga's book is devoted to the quantitative analysis of observations on meiotic configurations with emphasis on their bearing on recombination. The author presents numerous mathematical formulae, diagrams and photomicrographs to help the reader to obtain the maximum amount of information from the slides.

For practical reasons the analysis of crossing-over is dealt with first. Observations at different levels of resolution are taken into account, ranging from direct and exact determination of number and location of chiasmata and of the chromatids involved in specified chromosomes, to indirect estimation of recombination from bivalent number. In the latter case the chiasma frequency can only be inferred from the number of "bound" chromosome arms. The effects at different meiotic stages of structural and numerical deviations are analysed in detail.

Analysis of chromosome pairing is largely dependent on the availability of satisfactory models, since it is rarely possible to observe actual pairing direct. A number of such models are described and applied to various cases, and their merits and shortcomings discussed.

The last part of the book is devoted to the analysis of chromosome orientation and segregation.

The cytogeneticist, or the taxonomist using cytogenetic methods, will certainly gain much from a study of Sybenga's book. Not only will it enable more relevant conclusions to be drawn from the observations but I am also convinced that the researcher will actually see more than before on his slides, after he has been made more aware of the meaning of the microscopically observable features of meiotic configurations.

Anna Weimarck

Cramer, J.(ed.): *Bibliotheca Lichenologica*. A series of original papers and reprints of books on lichens.

1. Hannemann, B. 1973: *Anhangsorgane der Flechten*. Ihre Strukturen und ihre systematische Verteilung. IV + 123 pp., 3 tables, 181 drawings and microphotographs. J. Cramer, Lehre, Germany. Price DM 50:– (paperbound as the following volumes).

2. Awasthi, D. D. 1975: *A monograph of the lichen genus Dirinaria*. IV + 108 pp., 16 distribution maps, 59 figures in 15 plates. Gantner Verlag, Vaduz, Liechtenstein. ISBN 3-7682-5452-6. Price DM 40:–.

3. Wunder, H. 1974: *Schwarzfrüchtige, saxicole Sippen der Gattung Caloplaca (Lichenes, Teloschistaceae) in Mitteleuropa, dem Mittelmeergebiet und Vorderasien*. II + 186 pp., 9

plates. J. Cramer, Lehre. ISBN 3-7682-0924-5. Price DM 40:–.

4. Jürging, P. 1975: *Epiphytische Flechten als Bioindikatoren der Luftverunreinigung, dargestellt an Untersuchungen und Beobachtungen in Bayern*. II + 164 pp., 43 maps, diagrams and tables. Gantner Verlag, Vaduz. ISBN 3-7862-0964-4. Price DM 50:–.

5. De Wit, T. 1976: *Epiphytic lichens and air pollution in the Netherlands*. 115 pp., 114 maps, diagrams and tables. Gantner Verlag, Vaduz. ISBN 3-7682-1059-6. Price DM 60:–.

The various series of botanical works issued by the publisher J. Cramer during the last few decades have included several papers on lichens. *"Dissertationes Botanicae"* is a collection of theses for the Ph.D. degree. Some of them deal with lichenology, viz. No. 4, G. Eigler, *Studien zur Gliederung der Flechtengattung Lecanora* (1969), No. 9, K. Kalb, *Flechtengesellschaften der vorderen Ötztaler Alpen* (1970) and No. 17, V. Wirth, *Silikatflechten-Gemeinschaften im ausseralpinen Zentraleuropa* (1972). The upsurge of interest in lichens during the last few years has resulted in a special series *"Bibliotheca Lichenologica"*.

Anhangsorgane der Flechten is an account of the morphology of the appendix organs of lichens and an effort to use these in taxonomy. The paper has been presented as a Ph.D. thesis at the Free University of Berlin under Professor J. Poelt. The authoress has devoted much attention to the terminology of rhizines, hairs, holdfasts, etc. including a detailed survey of the extensive literature. Many of these organs attach the lichen to its substrate, whereas others have no apparent function.

The terms met with in previous works, for instance by Lindau and Frey, have often been used in different senses. Instead of defining the existing terms the authoress has sometimes preferred to create new ones, such as "Rhizopten", "Rhizohyphen" and "Lichenorhizen". In the reviewer's opinion, the result of this procedure is that the present complex terminology has become still more chaotic.

The concluding chapters contain a comprehensive survey of the lichen system with a discussion of the availability of the appendix organs as auxiliary taxonomic characters.

The majority of the lichen species now referred to the genus *Dirinaria* have mostly been recognized as a subgenus or section of *Physcia*. With the delimitation given in the monograph by Dr D. D. Awasthi (Lucknow, India) it seems to be a well-defined genus in the Physciaceae.

26 species are recorded. 4 species and 4 varieties or forms are described as new. A great many taxa have been recombined. The author has been successful in finding material suitable for lectotypification of all relevant taxa except *D. applanata* and *D. confluens*. In these two cases neotypes have been proposed.

The accepted taxa are fully described together with fairly detailed lists of specimens seen. The taxonomic revision is preceded by brief general chapters on history, morphology, chemistry, ecology, etc.

Dirinaria is a pantropical genus extending to eastern North America, South Africa, eastern Australia and Japan. No species occur in Europe. Distribution maps are provided for all 26 species.

The cosmopolitan genus *Caloplaca* (incl. *Blastenia*) is one of the largest lichen genera including about 500–600 species. Some groups have been studied recently but like many other genera of crustose lichens it is badly in need of a monographic revision.

The present study by Dr H. Wunder was initiated by Professor J. Poelt and has been used as Ph.D. thesis at the Free University Berlin. It has a limited scope treating mainly the *Caloplaca variabilis* group, i.e., saxicolous species (mainly on calcareous rocks) with black apothecia. 8 species are recognized and described in detail, some of them with varieties. The author has seen about 1,600 collections from the major Herbaria in Europe, but only a selected number of stations are quoted.

The numerous taxa described by various authors have been carefully checked. Lectotypes have been selected in almost all cases, and no less than 22 species and 26 varieties are placed in synonymy. Some taxa are recombined. The well known species *C. variabilis* has been neotypified as no type material referable to Persoon has been traced. 3 species described by Hue and probably belonging to this group have been omitted as no types were available in Paris (PC). In the experience of the reviewer most of Hue's

material, even from his last years, can be found in PC. However, this requires a personal visit to the Paris Herbarium and a good portion of patience and luck.

The author explicitly states that the group does not constitute a natural unit. In addition, he also treats two species from the *ferruginea* group, which normally have rusty-red apothecia sometimes changing to blackish-brown or black.

The influence of polluted air on the lichen vegetation has been studied for more than a century. The literature on this topic has been exceedingly abundant during the last few decades. A comprehensive survey of the various kinds of research carried out in this field was presented in 1973 under the title of *"Air pollution and lichens"* (ed. Ferry et al.). Cf. review in Bot. Notiser 1974 p. 155.

Many years ago Arnold (*Zur Lichenenflora von München,* 1891–1901) drew attention to the fact that various species of lichens are lacking or are on the decline in the central parts of Munich. The recent work by Dr P. Jürging (Lehrstuhl für Landschaftsökologie, München) gives a broad account of the "air hygienic" situation in the Munich area during the past decade. Following Sernander's classical terminology he has distinguished several zones, viz. "Flechtenwüste", "Innere Kampfzone", "Mittlere Kampfzone", "Äussere Kampfzone" and "Normalzone". His map from 1968 has been followed up by later studies from 1973–1974 showing that certain species of foliose lichens recorded as extinct have reappeared owing to improved air conditions in the central part of the city. The map from 1968 should be compared with maps showing the precipitation of dust and the emission of sulphur dioxide in the same area and at the same time.

Fumigation experiments were performed in nature using some of the most important pollutants, viz. SO_2, HCl, HF, NH_3 and CO. The techniques used and the damage caused to the relevant lichen species are discussed in some detail.

The author has studied the behavior of certain epiphytic lichen species in areas with varying pollution. He has mainly chosen foliose lichens that are sensitive to varying extents, e.g., *Anaptychia ciliaris, Evernia prunastri, Hypogymnia physodes, Lobaria pulmonaria, Xanthoria parietina* and several species of *Parmelia, Physcia* and *Ramalina*. It is remarkable that he draws very little attention to *Lecanora conizaeoides,* otherwise known as the most resistant lichen in polluted areas. The reason is that he seems to consider *L. conizaeoides* to be an ecological modification of *L. varia* caused by the special conditions in urban areas.

Holland is known as one of the most polluted areas in Europe. This fact has been noted in various works, not the least by Dr J. J. Barkman, the eminent specialist in the sociology of epiphytic mosses and lichens. One of his students, Dr T. De Wit, (Rijksinstituut voor Natuurbeheer, Leersum, Holland) has published a thesis which gives a comprehensive survey of the present relation of air pollution to lichen vegetation in this country.

A large number of species of epiphytic lichens on trees throughout the Netherlands have been listed using a 5 km square grid as a basis. Distribution maps of 20 lichen species are given. Comparison with data from around 1950 reveals a decline almost everywhere in the country. The area between Rotterdam and Amsterdam has become especially impoverished.

As in the preceding work results of fumigation experiments are presented. In addition to the gases used by Dr Jürging, Dr De Wit has also used C_2H_4, O_3 and a combination of SO_2 and O_3. Even low concentrations of these air pollutants cause significant morphological damage to the lichen species investigated.

Ove Almborn

Brodo, I. M. & Hawksworth, D. L. 1977: *Alectoria and allied genera in North America.* Opera Botanica 42. Stockholm. 164 pp., 1 + 67 figures and distribution maps. ISBN 91-546-0211-1. ISSN 0078-5237. Price SKr 87:– (libraries SKr 145:–).

The first attempt to provide a monograph on the North American species of the lichen genus *Alectoria* was made by Howe (1911) who accepted 10 species. Du Rietz (in a preliminary *Synopsis Lichenum,* 1926) recognized 19 species all over the world. In the following decades Gyelnik, Räsänen, Motyka and others (all notori-