

Book Reviews

Coffee and Health: Banbury Report 17. Edited by BRIAN MACMAHON and TAKASHI SUGIMURA. New York: Cold Spring Harbor Laboratory. 1984. 259 pages. \$47.50 USA, \$57.00 elsewhere. ISBN 0 87969 217 0.

A conference on this theme was held in October 1983 and was attended by distinguished authorities representing a great variety of disciplines. Sessions were included on the chemistry of coffee, on the relationship of the product to mutagenesis, physiological and behavioural effects produced by coffee and in particular the relationship of the product to human carcinogenesis.

The popularity and prevalence of coffee need no emphasis. In the USA the average national consumption is in excess of 2 cups per day; higher levels of consumption are found in Canada and in areas of Central and South America and Western Europe while the highest *per capita* rate in the world, double that in the USA, is in the Scandinavian nations. Given this pervasive distribution even very minor considerations questioning the safety of the product must be a focus of intense interest to us all.

Papers dealing with the chemistry of coffee stressed the wide variation in the composition and concentration of the bean extract as it is currently consumed. The question of decaffeinated coffee was touched upon and it was concluded that the market in this area was likely to increase in the future. The section on so-called 'coffee correlates' together with the epidemiological complications was one of the best in the book. Here the diversity of such correlates was stressed, attention being given in turn to socioeconomic factors, racial and ethnic differences, religion, smoking, diet, exercise and a plethora of psychosocial parameters.

But the epicentre of the book was the relationship of coffee to human carcinogenesis and the papers presented in this area, although varying in standard, tended to be reassuring. As regards breast cancer there was no evidence that coffee consumption affected the incidence of the disease. With respect to bladder and ovarian cancer too the balance of evidence was to the effect that there was no association. With cancer of the pancreas, however, the situation was less clear and the results reported at the Conference were variable. Obviously this is an area in which much further work is necessary. The book represents an important contribution to a field of great significance and complexity. It should be widely read by all health professionals who have an interest in environmental medicine.

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Genetics of Populations. By PHILIP W. HEDRICK. London: Wadsworth International. 1983. 629 pages. \$45.25. ISBN 0 86720 011 1.

Genetics of Population is a comprehensive textbook which should find a niche in Population Genetics courses at the advanced undergraduate and graduate levels. Beginning with an assessment of the amount and deposition of genetic variation present in natural populations at all levels of genetic organization, Hedrick then derives the relationship expected between gene and genotype frequencies in idealized populations in which no evolutionary forces operate. Mating systems, natural selection, random

genetic drift, migration, and mutation, all operate to alter the genetic constitution of a population and together comprise the evolutionary process. Hedrick discusses in some detail the effect of these forces, both separately and together, on the change of gene frequencies at single loci within and between populations, and illustrates the theoretical treatment with relevant examples from the recent literature. This is followed by a discussion of the extension of population genetics models based on segregation at a single locus to models of variation at two or more loci considered jointly, including an introduction to quantitative genetic theory. The final chapters of the text cover molecular evolution, topics at the interface of population genetics and evolutionary theory, and human population genetics.

Features of this text which enhance its value as a teaching tool are the blending of theory and empirical observation throughout, problems of varying degrees of difficulty at the end of each chapter, and sample computer programmes for the simulation of evolution for a few of the models discussed in the text. Although the approach adopted is necessarily rigorous, understanding of the majority of the concepts discussed requires no more than a knowledge of elementary algebra. I would recommend Hedrick's text to serious students of population genetics, and also as a useful reference to research workers in the field.

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Microbial Development. Edited by RICHARD LOSICK and LUCY SHAPIRO.
 New York: Cold Spring Harbor Laboratory. 1984. 303 pages. Paperback
 \$28.00 (\$33.60 outside U.S.), hardback \$52.00 (\$62.40 outside U.S.).
 ISBN 0 87969 173 5.

This monograph is based on a Cold Spring Harbor meeting on the same theme, and has been converted by editors and contributors into an excellent review volume, brought up-to-date during the year since the meeting was held. Many geneticists will find a great deal that is new in it, and it will be of particular value to those who believe that only eukaryotes present any interesting and difficult developmental problems to the molecular geneticist. Only three of the eleven chapters deal with microbial eukaryotes (specifically yeast and *Dictyostelium*), and the rest bring out the variety and sophistication of developmental systems that are under detailed study in bacteria.

Taking simple binary fission first, *Escherichia coli* has a straightforward growth cycle of cell elongation, symmetrical septum formation and cell division, but this requires the coordinated action of some 45 different genes with no other apparent primary role in cell metabolism. The bacterium *Caulobacter crescentus* is less well known: it alternates two distinct cell types, swarmer cells with a single polar flagellum and stalked cells derived from swarmers which have shed the flagellum and grown a rigid stalk in its place. Remarkably, DNA replication can only occur after the stalk has replaced the flagellum, and the stalked cell then develops a flagellum at the opposite end to the stalk and divides to produce a swarmer and a stalked cell; the new swarmer can then only propagate by first turning into a stalked cell. Some 40 genes have been identified as involved in this differentiation process. *Bacillus subtilis* divides by simple fission in much the same way as *E. coli* under good nutritional conditions (perhaps this also requires 30 or 40 genes, but it has not yet received the detailed and ingenious study given to *E. coli*); but under starvation conditions it produces spores by a novel developmental process which starts with the formation of a very asymmetric septum and has been shown to require the action of about 50 gene loci. The novelties found in *B. subtilis* include the presence of 5 different RNA-polymerase sigma-factors, of which one is apparently specific for transcribing many