the technical terms used in the industry. Overall this is a well presented volume, with an abundance of clear diagrams, and is thus thoroughly recommended.

Charles J. Knill
John F. Kennedy

Aging: A Natural History. By R.E. Ricklefs and C.E. Finch, Scientific American Library, New York, 1995. xi + 210 pp. Price $32.95. ISBN 0-7167-5056-2.

Although aging is an extremely complex and fundamental aspect of life, scientific investigations are gradually transforming our knowledge of its sources and our ability to intervene in its ultimately terminal processes. This volume aims to enlighten its readership to the reasons behind such complexities by discussing the aging patterns of humans and many other species, providing an authoritative treatment of the aging process, drawing on biomedical research and the natural history of animals and plants to describe this 'dreaded' biological phenomenon in fascinating detail.

Contemporary theories of aging and their implications for the future prospect of extending the human life span are presented, all of which have implications for polymeric carbohydrates. Specific topics discussed include genetic mutations, cellular degeneration, body wear and tear, gradual deterioration of the immune system, and environmental causes of aging. Many older people suffer from elevated blood sugar levels which can result in dramatic consequences for how they age. This is due to the loss of insulin effectiveness in promoting muscle glucose uptake. Such increased glucose levels are responsible for a whole host of chemical interactions which can result in the glycation and subsequent cross-linking of long-lived proteins, such as collagen and elastin, causing decreased flexibility and elasticity of the eye lens and connective tissues in the joints, afflictions generally associated with old age. Such phenomena, of course, involve glycoproteins, proteoglycans, and hyaluronic acid.

The desire to attain even greater human life spans continues to grow, and evidence suggests that future biomedical advances will delay and may even eliminate some afflictions associated with advanced age. Indeed, one of the most revolutionary changes in human lifestyles this century has been the gradual increase in human longevity with an ever growing number of individuals receiving their telegrams from Her Majesty The Queen. Three score years and ten is no longer considered to be a ripe old age.

Such aspects of human society raise a number of important issues which impinge on all aspects of our life, such as the medical challenge of improving the quality of life for the elderly, and the economic challenge of supporting an ever increasing population of retired men and women. The ability of society to resolve such issues relies to some extent on an understanding of the aging process.

In conclusion, this is a well written and extremely informative tome that provides many new insights into the aging process, from laboratory and clinical studies, and also confronts the fundamental issues of how environmental factors have differing influences on the genetic bases of aging patterns in different species. It is therefore highly recommended for those interested in a different viewpoint of the processes, deeply associated with the molecules which they research, which are so often forgotten.

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Food Additive Toxicology. Edited by J.A. Magu and A.T. Tu, Marcel Dekker, Inc., New York, 1995. viii + 542 pp. Price $175.00. ISBN 0-8427-9245-9.

Food additives have become an intrinsic part of modern foodstuffs, and if many were banned from use, dramatic changes in our food supply and subsequent eating habits would result. A food additive can be defined as any component (single substance or mixture), other than a basic foodstuff component, that finds its way into a food during any stage of its production, processing, packaging, storage or preparation for consumption. The use of food additives is therefore not a recent application, indeed, alcohol, salt, vinegar, spices and smoke have traditionally been utilised to extend the 'shelf-life' of a wide variety of foodstuffs for hundreds of years. Nevertheless, increasing consumer demand for the development of new, and modification of existing, food products with improved characteristics, e.g. texture, flavour, nutritional quality, etc., has resulted in a dramatic increase in the utilisation of natural and synthetic food additives over the last quarter of a century.

This thoroughly up-to-date volume provides both historical information and the latest toxicological data on various classes of food additives by examining the production, application and safety of numerous compounds used to enhance and preserve the quality of foods. A detailed description of the classes of food additives is initially provided, covering the roles of a variety of additive classes including anticaking and antibrowning agents, curing and drying agents, emulsifiers, enzymes, and fumigants and humectants. In-depth discussions of the hazards and safe usage of additives in food, including food acidulants, antimicrobial agents, food colourings, flavourings, antioxidants, etc., are provided. The roles of incidental and/or unintentional food additives are also discussed.

A comprehensive chapter dealing with the use of