

teins with the results of functional experiments.

By their selection of topics, the editors of this book have covered the field of protein synthesis well. They have chosen to emphasize the *Escherichia coli* ribosome, which is understandable because the *E. coli* ribosome has been more intensively studied at the molecular level than have the ribosomes of eukaryotes or even those of other prokaryotes. Occasional chapters (for example I. Smith's "Genetics of the translational apparatus") emphasize other ribosomal systems. Other chapters describe transfer RNA; initiation, elongation, and termination of protein synthesis; inhibitors of protein synthesis; messenger RNA; and ribosomal genetics. As is to be expected with a collection of papers by many authors, the chapters vary enormously. Many are comprehensive reviews of a subject, whereas others, such as the chapter "Primary structure and three dimensional arrangement of proteins within the *E. coli* ribosome," are dated research reports that make no attempt to review the literature accurately or comprehensively.

One aspect of protein synthesis that is gathering increasing interest is the detailed mechanism by which the correct aminoacyl-tRNA is selected. In his chapter, C. Kurland deals with this question and discusses possible selection mechanisms. He describes the two-step process proposed by Ninio (*J. Mol. Biol.* **84**, 297 [1974]) and kinetic proofreading, also a two-step process, proposed by Hopfield (*Proc. Natl. Acad. Sci. U.S.A.* **71**, 4135 [1974]) and discusses his own proposal (Kurland, Rigler, Ehrenberg, and Blomberg, *Proc. Natl. Acad. Sci. U.S.A.* **72**, 4248 [1975]) that tRNA selection is a multistep process driven perhaps by changes in the conformation of the aminoacyl-tRNA that are produced upon tRNA binding. Stimulated by the kinetic proofreading ideas, Thompson and Stone (*Proc. Natl. Acad. Sci. U.S.A.* **74**, 198 [1977]) have recently published results suggesting that a second tRNA selection occurs following initial guanosine triphosphate hydrolysis but before peptidyl transfer. The kinetic proofreading ideas also complement the newly developed concept (Lake, *Proc. Natl. Acad. Sci. U.S.A.* **74**, 1903 [1977]) of a recognition (R) tRNA binding site that provides for an initial codon selection at the R site and for a second checking before entry into the aminoacyl (A) site. Because the location of the R site was suggested by immune electron microscopy and the two-step tRNA selection schemes were

suggested by other data, this recent work demonstrates how approaches discussed in different chapters of the book are being combined into new concepts of protein synthesis.

The book is loaded with ideas that are certain to start connecting with each other in the coming years, and it represents our current, advanced knowledge of protein synthesis. Although the title is ahead of its time, it reveals the spirit and promise of the field.

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North American Prehistory

Amerinds and Their Paleoenvironments in Northeastern North America. Papers from a conference, New York, Feb. 1976. WALTER S. NEWMAN and BERT SALWEN, Eds. New York Academy of Sciences, New York, 1977. vi, 570 pp., illus. Paper, \$35. *Annals of the New York Academy of Sciences*, vol. 288.

The utilization in archeology of techniques and findings from many other fields has resulted in a proliferation of publications aimed at interdisciplinary synthesis. *Amerinds and Their Paleoenvironments in Northeastern North America*, consisting of 43 papers presented at a conference whose purpose was "to synthesize our present knowledge and to point up some of the major problems still awaiting solution," is another such attempt.

A few of the papers consider the natural environment as it may have affected prehistoric people. For example, Edwards and Emery discuss in an interesting way without the use of jargon the archeological potential of the continental shelf. They report new understanding of the dynamic processes acting on the shelf, reconstruct the coastal morphology for two early-Holocene intervals, plot the distribution of mammal and mastodon finds, and discuss possible techniques for underwater archeological surveys, such as the use of dredges with finer mesh than those commonly employed by sea-scallop fishermen, as well as the use of free divers and underwater vessels. In a paper about the Delaware coast, J. C. Kraft also discusses a geomorphological investigation relevant to an archeological problem. He describes the changing coastal zone of Delaware and relates it to the environmental variables for Paleo-Indian, Archaic, and Woodland times. A paper by Foss on the

soils of two Pennsylvania and Virginia archeological sites is a further successful effort at interdisciplinary research, as is the discussion of the *Hirundo* project in central Maine by Sanger, Davis, MacKay, and Borns. Here the archeological sequence of a site 4000 to 5000 years old is placed in the context of vegetational changes revealed by pollen analysis of nearby sites, and river and coastal changes are related to the postglacial rise in sea level.

One of the most important archeological sites recently under investigation in the Northeast is Meadowcroft, a rock shelter southwest of Pittsburgh with basal radiocarbon dates from 12,000 to 16,000 years ago on charcoal associated with undoubted artifacts. A paper by Adovasio, Gunn, Donahue, and Stuckenrath summarizes the sediment stratigraphy and the cultural sequence. The great antiquity of this site provides the occasion for four additional papers on the ever-lively question of the antiquity of human cultures in North America, including one by Stalker that deals entirely with western Canada and thus has little to do with the Northeast. As is customary with early sites, skeptics require unequivocal stratigraphic proof of great antiquity, and in the case of Meadowcroft Haynes calls attention to the possibility that the radiocarbon samples were contaminated with coal fragments and to the anomalous occurrence of hardwood nuts "less than 100 miles from the late Wisconsin ice border." The coal problem is said to be under further investigation, but the Meadowcroft report would have been enhanced by the inclusion of a companion paper considering the likelihood of hardwood nuts in the boreal forest or even tundra that may have prevailed in western Pennsylvania before 12,000 years ago.

Apart from these and a few other honest efforts at interdisciplinary synthesis, most of the papers in the volume are narrow in scope. Several contributions concern glacial geology or vegetation history of particular parts of the Northeast, but their authors have nothing to say about the contemporaneous cultural scene or about the potential effects of ice-lobe fluctuations or vegetational changes on human cultures. Half the paper by Sirkin on vegetational history deals with the Sangamon and the Wisconsin before 20,000 years ago; certainly no archeological sites can claim this antiquity. Other papers deal with specialized topics like statistical pollen analysis, phytolith identification, and radiocarbon dating or are straightforward descriptions of cultural sequences for particular regions (for

example, Long Island, Lower Hudson).

So the result is a mixed success—if an interdisciplinary synthesis was the objective of the conference and the book. The editors and organizers did produce an excellent reference book for North-eastern archeologists, however. The papers summarizing the glacial history or the Paleo-Indian and Archaic sequences provide excellent bibliographies and overviews of research on these subjects. Careful study of the contents of this book could provide the basis for a truly interdisciplinary conference that might accomplish the original goals.

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