visually keyed to an amino acid; an assortment of amino acid representations; and four formyl methionine units (which, as is now known, appear to act as the initiation points for bacterial protein synthesis). The units are made of heavy cardboard and, with some care, will probably stand up to student use for at least several semesters. Each unit is clearly labeled and is coded by color, and, where appropriate, by a visual symbol coordinate with that of its partner in the process. The amino acids lock into the transfer-RNA units and into each other. In the model, as in nature, the assembly is actually done on the ribosome.

The model, while quite good, is not without flaws. The transfer-RNA chips are differentiated from each other and matched with the appropriate messenger-RNA codon only by a printed symbol, such as a semicircle or a triangle, rather than by a unique fit, which could have been produced by a cut-out. Similarly, there is no unique fit between a transfer-RNA molecule and its corresponding amino acid: one must read the abbreviation printed on each to determine the fit. In only three cases—serine, leucine, and arginine—is degeneracy available; and in each of these cases it is two-fold. Finally, it would seem possible to modify the model somewhat, so that the process of transcription—that is, the formation of the messenger-RNA molecule on the basis of the order of nucleotides in the DNA—could also have been illustrated. Without this step, the messenger-RNA appears too much as a *deus ex machina*.

All in all, it is refreshing to see a good, teachable model issued by a major publisher. The model appears to be useful in high school biology courses and in introductory biology courses in college, and is ready for further improvement in an eagerly awaited second edition.

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CELLS INTO ORGANS, by J. P. Trinkaus. 1969. Prentice-Hall, Inc., Englewood Cliffs, N.J. 237 pp. $3.50 softback, $6.95 hardback.

This is another in the publisher's "Foundations of Developmental Biology" series. It is a book full of informative material; however, though the writing style is good, the author necessarily assumes a great deal of background, and sometimes the going gets rough. The author gives researchers credit by name, date, and summary.

Great emphasis is placed on cell movements in the process of morphogenesis, cell adhesion, gastrulation, and neurulation. There are bibliographies, photographs, and drawings.

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MUSCLES, MOLECULES AND MOVEMENT, by J. R. Bendall. 1969. American Elsevier Publishing Co., Inc., New York. 219 pp. $6.75.

One rarely finds a compact book on one type of tissue in which the physiology, biophysics, and biochemistry pertaining to it are so thoroughly treated. The facts are there, the theory (albeit somewhat controversial) is there, the references are there. It is well illustrated.

The treatise is well presented for the graduate student or for the teacher of undergraduates. Many undergraduate students who wish to pursue the subject to greater depth than is covered in standard texts will find it most useful and comprehensive. It is probably too comprehensive and detailed for those teachers in secondary schools who have to cover biology as a field in one year.

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EVOLUTION

THE PATTERN OF VERTEBRATE EVOLUTION, by L. B. Halstead. 1969. W. H. Freeman & Co., San Francisco. 209 pp. $7.00.

L. B. Halstead is a lecturer in the departments of geology and zoology, University of Reading, and research fellow in the department of oral anatomy, Royal Dental Hospital, London. His book shows clearly the integration of the sciences. His interesting discussion of the original roles and early evolution of tissues, bones, and dentine must be based on the author's researches.

He discusses changes in the light of conditions under which the animal existed, as disclosed by paleontology. Halstead talks about the early vertebrates and gives details and relationships of the tunicates and *Amphioxus*.

This book is not a catalogue of events but a fascinating exploration of some events and the ramifications of these events. It has enriched and amplified greatly my knowledge and understanding of evolution. It says, for example, "The amphibians are frequently given credit for making the great breakthrough in the transition from water to land. Nothing could be farther from the truth. The main interest of any amphibian during the Carboniferous was to stick to life in the wet." The book proceeds to explore this idea.

The description of the radiation of the reptilelike creatures, the function of some of the organs, the advantages in the environments, and evolution of food chains: these are among the topics Halstead focuses on. One that I found interesting was his discussion of the nasal passages of the duckbilled dinosaur. It has been said that the purpose of these passages was to allow the animal to stay under water longer, although how this is accomplished is not clear. These animals were vulnerable and could easily have become extinct long before they did; instead they were quite successful. This book suggests Ostran's idea that these passages increased the olfactory sensitivity and that this was a factor in survival.

Perhaps the last chapters giving the evolution of man are the most interesting. The author relates evolutionary history to the problems in the world today. This is excellent food for thought and ammunition to use in making students think.

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EVOLUTION OF THE VERTEBRATES, by Edwin H. Colbert. 2nd ed., 1969. John Wiley & Sons, Inc., New York. 535 pp. $12.95.

Once in a while, a reference book comes along that is wide-ranging, concise, and readable. *Evolution of the Vertebrates* is such a book. The new edition of this classic work contains updated information, new interpretations of the fossil record, and additional drawings and diagrams. Colbert continues to display his amazing ability to combine an authoritative treatment of complex material with an interesting presentation—a rare gift among scientists.

The book is not meant to be a comprehensive treatment of vertebrate paleontology. Instead, its purpose is to provide a concise summary of the generally accepted evolutionary relationships existing among the vertebrates. This is done admirably. The value of the book, especially to a biology teacher, is that it provides not only the bare essentials for reasonably quick reference, but much helpful and interesting additional information as well.

A teacher without at least some background in vertebrate history may have a little difficulty in seeing the overall relationships between some of the larger vertebrate groups. Numerous diagrams of "family trees" are included, but the task of relating the diagrams to each other may prove somewhat tedious. The teacher may also find some difficulty with terms describing the particular shape or form of a structure, such as a fish scale: diagrams that could alleviate this problem are lacking. (A paleontologist might not need a diagram to illustrate a ganoid scale; others may need to have their memories refreshed.)

There is no question as to the validity of the presentation or usefulness of this text as a reference tool. No biology teacher should be without it.

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