Throughout the book there are abundant references, though these end mainly in 1962. The print is of good size, and the book is a pleasure to read.

G. M. Lewis

PROGRESS IN NUCLEIC ACID RESEARCH

Progress in Nucleic Acid Research
Edited by J. N. Davidson and Waldo E. Cohn. Vol. 1. Pp. xiv + 424. 93*s*. Vol. 2. Pp. xiv + 346. 88*s*. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1963.)

THE rapid advance of biochemistry has been accompanied by an increase in both the number and size of journals; if one had to read every paper written in the field, there would be no time left for research work. This is especially true of the central field of nucleic acids; the scientific literature in this field has been growing exponentially since 1947 with a doubling time of about two-and-a-half years. As a result of this rapid growth, specialization has increased greatly, and there is a real danger that the fragmentation of the field will hamper scientific advance. There is, therefore, a great need for publications in which specialists can summarize and critically assess new developments, and this is precisely the main aim of the editors of *Progress in Nucleic Acid Research*. Volume 1 contains eleven articles which cover a large range of subjects. F. J. Bollum discusses the role of primer in DNA polymerase reactions. He draws a careful distinction between two kinds of 'primer'. The first, shown by oligodeoxyribonucleotides for calf thymus polymerase, leads to chain extension; in this case the primer is incorporated into the product and acts as an initiator in a linear condensation polymerization. The second type of priming is the better-known one; here the DNA primer is used as a template and guides the structure of the replica. It is, however, still not clear whether the polymerases extracted from cells are indeed the enzymes which act in DNA replication in the cell. In the case of the *E. coli* polymerase of Kornberg, the polymerization proceeds in only one chemical direction, whereas we know that in the cell both chains of DNA are copied together in one direction. It is conceivable that the polymerases may be enzymes used to repair DNA in the cell and the real replication enzymes remain to be discovered. The fact that many polymerases have an absolute requirement for denatured DNA as a primer may reflect their repair function, and Bollum discusses the difficulties involved in constructing models of replication based on the enzyme experiments.

Two articles deal with RNA synthesis. R. M. S. Smellie gives a useful general review of the subject, and directs attention to a group of enzymes with very curious and as yet unexplained functions. For example, there is an enzyme which is responsible for the incorporation of UMP residues alone, and there are other enzymes which can form homopolymers of adenylic acid. The second article by Hurwitz and August discusses the biochemistry of the DNA primed-RNA polymerase, the enzyme which is responsible for the transcription of DNA into RNA. This article contains an excellent summary of the careful experiments done by Hurwitz and his collaborators. M. Grunberg-Manago writes on polynucleotide phosphorylase. This is a most valuable article, since it collects in one place all the essential findings about this enzyme.

The paper on messenger RNA by F. Lipmann reviews the background of this subject and also discusses the interaction of messenger RNA with ribosomes, and the possible mechanisms of protein synthesis. The details of this process are still not clearly understood.

The review of the coding problem by F. H. C. Crick is a clear analysis of the status of work in this field, and discusses both the genetic studies and the experiments using synthetic polynucleotides. It becomes clear that the genetic code may be cracked, but it is not yet broken, and much further rigorous work will have to be done to provide the definitive codon dictionary.

Bendich and Rosenkranz present "Some Thoughts on the Double-Stranded Model of Deoxyribonucleic Acid"; their main theme is that all is not yet solved. They suggest that DNA structures other than the classical Watson–Crick structure may occur in cells and they direct attention to the possibility that DNA molecules may be linked by amino-acids or small peptides. These ideas run against the main trends in this field, and the evidence on which they are based will have to be very carefully evaluated. They claim that in some viruses and spermatozoa the volume occupied by the DNA, if it were exclusively in the doubled-stranded form, is larger than the volume available. The table illustrating this contention on p. 226 contains much misleading information particularly in the cases of *T*2 and *S*13.

There are three articles on the structure and physical chemistry of nucleic acids. Marmur, Rownd and Schildkraut have written an excellent review of "Denaturation and Renaturation of DNA"; Spirin reviews the structure of RNA and Luzzati writes on the structure of DNA as determined by small angle X-ray scattering. Finally, A. Wacker reviews the work on molecular mechanisms of radiation effects.

The editors have set a high standard in this first volume of the series. They are to be commended for the international character of the book. Above all, they must be congratulated on their powers of persuasion: everybody knows how difficult it is to elicit review articles from busy investigators.

Volume 2 maintains the standards set by the editors in the first volume. It contains a very important article on chemical mutagenesis by D. R. Krieg. We now know that there are major difficulties in trying to identify the nucleotide changes at induced mutational sites. The degeneracy of the genetic code and the possibility that many amino-acid changes will not produce defective proteins make the genetic analysis almost intractable. In addition, we just do not know all the chemical changes produced by mutagens in DNA, and in many cases there is no justification for assuming that the major chemical reaction has anything to do with mutation induction. Kreig's article is very clear and balanced and includes an analysis of all the mutants of the *T*4 r_{II} genes.

The article by Cavalieri and Rosenberg challenges the importance of Watson–Crick base pairing in guiding nucleic acid copying. They propose an alternative scheme in which specificity in copying is given by stacking interactions between bases rather than by hydrogen bonding. The article is speculative.

H. Harris's article centres around the question of the stability of messenger RNA. Must unstable RNA always be called messenger RNA and must messenger RNA always be unstable? Harris emphasizes that there is a nuclear RNA in animal cells which appears to be unstable but does not appear to be transferred into the cytoplasm.

R. Markham writes on plant virus nucleic acids, and he critically reviews the role of the RNA as a messenger, and the reports claiming synthesis of infectious tobacco mosaic virus RNA.

The other articles in the volume deal with chromatography of oligo- and poly-nucleotides (Staholin), the mechanism of action of aza-pyrimidines (Skoda), *s*RNA (Brown) and an analysis of the mechanism of RNase (Witsel).

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