genetically determined drug idiosyncrasies; the gratifyingly successful discovery of the means of preventing Rhesus sensitization at childbirth. In a chapter on genetic counselling, the general principles are well set out, but some of the detail may be criticized. For example the recurrence risk given for non-specific mental retardation, in a table of such risks for common conditions, is wide of the mark if it is severe mental retardation that is implied, and it is usually for severe and not mild retardation that parents ask advice.

This little book strategically placed in the biology section of a school science library may well bring in some good recruits to medicine and medical genetics. It will certainly be found useful by those teaching medical and human biology students.

C. O. CARTER

Cold Spring Harbor Symposia on Quantitative Biology, Vol. XXXV. 1970. (Pp. xxiii + 886; illustrated + tables. \$25.00.) New York: Cold Spring Harbor Laboratory. 1970.

The Cold Spring Harbor Symposia continue to grow in size. Although the intimacy and uniqueness of the meetings may have suffered as a result, this collection of papers from the 1970 symposium on 'Transcription of genetic material' shows that the quality and excitement of the work presented have maintained a high standard. Inevitably much of this work has since been reported in the regular literature of molecular biology. Nevertheless the symposium volume is a most valuable record of the state of the field last summer, comprising nearly one 100 concise and generally lucid reports. A bonus in this volume is an excellent summary by M. Chamberlain. As an *hors d'oeuvres* for potential readers a briefer summary by a Special Correspondent to *Nature* (222, 1093, 1970) may also be recommended.

The volume opens with reports of RNA sequence studies. Such work demonstrates the importance of secondary and tertiary folding of the molecules in the function of ribosomal and transfer RNA, and RNA-bacteriophage messengers. This reminds one how little is yet known about the nature of the signals on DNA which help to determine the sites (and probably the frequency) of initiation of RNA transcription and its termination. The last three years, however, have seen great advances in knowledge of the proteins involved in the control of bacterial transcription. Much of the symposium was devoted to this topic. The recent advances stemmed from the discovery of the *sigma* subunit of RNA polymerase. It now seems likely that *sigma* is required for all RNA initiation events, and that an uninfected bacterium contains only one type of *sigma*

molecule; thus *sigma* is not really a control element. Instead, reversible adaptations of transcription involve additional proteins. Under the control of small molecules (whose concentrations alter in response to the environment) these accessory proteins either permit initiation of RNA synthesis from otherwise 'closed' genes, or repress initiation at previously 'open' sites. The classic *lac* operon is subject to both these types of control; these and other examples are described in this volume.

Further papers explore relatively irreversible changes in transcription patterns, for example in phage-infected or sporulating bacteria. In some cases these involve modification or replacement of various subunits of RNA polymerase; in other cases a completely new polymerase molecule is produced. Either mechanism can switch off the expression of an entire group of genes, and switch on another group, by altering the initiation specificity of the whole population of RNA polymerase molecules.

The termination of RNA molecules is dismissed in several papers. There are probably at least two types of termination in bacteria, respectively dependent on or independent of the accessory protein *rho*. Control of *rho* activity may affect the expression of genes distal to suitable termination sites.

Almost certainly these and other discoveries of 'classical' molecular biology will be very useful in designing studies of the control of genetic expression in higher organisms, both in transient and developmental responses. That this is more than just a pious hope is suggested, happily, by the fact that half of the symposium was directly concerned with higher organisms. Beginning with the dramatic electron micrographs by Miller and his colleagues, visualizing transcription of nucleolar (and bacterial) DNA, the papers on eucaryotic RNA and RNA polymerase epitomize the solid molecular biological groundwork which is being laid down at an increasing pace, and attracting many workers from the bacterial field. Finally comes a series of papers concerned with animal viruses, including tumour viruses. They include two early reports of the reverse transcription phenomenon, RNA-directed DNA synthesis, which has caused much excitement in recent months. These findings were revolutionary in giving substance to a DNA-integration model for the action of RNA tumour viruses, and suggesting new possibilities for gene amplification and certain types of differentiation. The dust shows no signs of settling on the experiments stemming from this discovery. There is still good reason to hope that they will lead to profound contributions from molecular biology to medicine.

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