

BOOK REVIEW

Biochemistry of Chloroplasts. Vols. I and II. Edited by T. W. GOODWIN. Academic Press, 1967.

THESE two volumes contain the papers presented at a N.A.T.O. Study Institute held at Aberystwyth in August 1965. The object of the conference was to review our knowledge of the structure and chemical composition of the chloroplast, the seat of photosynthetic activity, rather than the nature of the reactions concerned in photosynthesis *per se*. By contrast, our knowledge of the chemical structure of mitochondria is considerably more advanced and has added to our understanding of the metabolic processes located there.

The first section of the two volumes is concerned with a discussion of the fine structure, morphogenesis and composition of the plastid. The macromolecular structure is reviewed by Menke, by Muhlethaler and by Kreutz, and the molecular structure by Weier and Benson. Manton discusses the diversity of structures within plastids from plants of different phyla, and pleads for a greater emphasis on the comparative approach in biochemistry. The increasing attention paid in recent years to the lipid and quinonoid constituents of plastids is demonstrated by the detailed discussion of these compounds in the second section. The following section is concerned with the proteins of the chloroplast and in large part with the isolation of fraction I protein from different plant materials. A further section deals with the nucleic acids and provides good evidence that the chloroplast has specific DNA and RNA constituents different from those present in the cytoplasm. The possible function of these constituents in the chloroplast is discussed by Kirk. The classical analysis of the pigments *in vitro* of the chloroplast is reviewed by Strain and the evidence that different forms exist *in vivo* is discussed by French.

The second volume is concerned with biosynthesis in chloroplasts. Sections are devoted to the synthesis of carbohydrates and the synthesis of lipids. Throughout all these papers the question is raised as to how far the synthesis is wholly contained within the chloroplast and derived directly from the prime products of photosynthesis, or alternatively is dependent upon some essential intermediate supplied to the plastid by the cytoplasm. Stumpf raises this question with respect to the supply of acetate to the plastid, and Goodwin with respect to the terpenoid moiety of the plastoquinones. Again the conditions required for the synthesis of sucrose by isolated chloroplasts—only reported in the literature as having been achieved once—are still far from clear. In addition, there are important papers on the biosynthesis of the proteins of the chloroplast, and of the chloroplast pigments.

An additional section reviews our knowledge of photosynthetic phosphorylation and discusses the number of possible sites of photophosphorylation in the plastid. A final section is concerned with the morphogenesis of the plastid.

In this brief review it has not been possible to enumerate all the authors who have contributed to these two volumes. It is sufficient to say that the quality of the contributions is uniformly high and these volumes should not be confused with the heterogeneous sets of original papers, often of unequal standard, which frequently form the printed proceedings of international conferences. Much of the material in this book is brought together for the first time and these volumes will provide a valuable reference book for all those who study chloroplasts, whether their interest is predominantly morphological, chemical or biochemical.