

# **COFFEE: BOTANY, BIOCHEMISTRY AND PRODUCTION OF BEANS AND BEVERAGE**

# **COFFEE**

## **Botany, Biochemistry and Production of Beans and Beverage**

EDITED BY M.N. CLIFFORD AND K.C. WILLSON



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M.N. Clifford

K.C. Willson

## FOREWORD

We live in an era of constantly accelerating scientific and social change brought about by developments in education, technology and modern communication. This is a time of questioning and new perceptions affecting all facets of our daily lives. With increasing frequency issues are being raised which demand answers and new approaches. This increases the responsibility of those involved in determining the future shape of the world of coffee. The dependence of developing countries on income generated from trade in coffee, the emergence of new processing techniques, health implications and questions of quality of coffee in the cup are among the issues related to coffee. The knowledge required to form the basis to resolve these issues for the benefit of the multitudes of coffee drinkers will be generated only through the systematic build up of information and its subsequent evaluation. Science and modern technology provide essential tools for these endeavours.

This book should act as a stimulant to thought and creativity so the issues facing the industry may be fully analysed and a healthy future for coffee secured. It marks a step forward in laying the foundation for coffee's future.

Alexandre F. Beltrão  
Executive Director  
International Coffee Organisation  
London

## PREFACE

We have long been fascinated by coffee and on many occasions bemoaned the lack of a comprehensive text dealing with the varied scientific aspects. With the encouragement of Tim Hardwick of Croom Helm Ltd, we decided to pool our resources and produce just such a multi-author volume.

It has taken over two years and the consumption of some 2,500 litres of coffee brew to complete this task. We sincerely hope that the product will be of value to all scientists and technologists concerned with any stage in the supply of this important beverage, whether they be involved in immediate production or long-term research and development and irrespective of whether they are based in an exporting or an importing country.

However, a text such as this is never perfect — accordingly we will be pleased to have our errors corrected, to hear of other points of view and of new developments.



## LIST OF CONTRIBUTORS

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**Karl Bättig** was born in Switzerland in 1926. After studying in Zürich, Göttingen and Paris he received his MD degree in 1957. From 1957 to 1959 he was visiting scientist at the National Institute of Mental Health, Bethesda. Then he joined the Department of Hygiene and Physiology of Work at the Swiss Federal Institute of Technology in Zürich. His present position there is Professor of Behavioral and Comparative Physiology and Head of the Laboratory of Behavioral Biology.

**Julien Berthaud** has worked since 1970 in the Plant Breeding Department of ORSTOM (Office de la Recherche Scientifique et Technique Outre Mer) in the Ivory Coast. During this period he has been concerned with the genetics of wild African coffee trees and has taken part in several surveys and missions to collect specimens: Central African Republic, 1975; Kenya 1977; Tanzania 1982 and Ivory Coast 1976-1981. He is now studying the genetic diversity of wild coffee trees, their genetic organisation and their use in a coffee breeding programme.

**Melvin G.R. Cannell** obtained his BSc in Agricultural Botany at the University of Reading in 1966. From 1966 until 1971 he was a Research Officer at the Coffee Research Station, Ruiru, in charge of work on crop physiology. In 1971 he obtained his PhD from the University of Reading with a thesis entitled 'Effects of Season and Fruiting on Accumulation and Distribution of Dry Matter in Coffee Trees in Kenya East of the Rift'. From 1971-74 he worked at the Institute of Tree Biology, near Edinburgh, researching on shoot development in trees, and ecophysiology of trees. In 1974 he joined the Institute of Terrestrial Ecology, as a Principal Scientific Officer researching on tree crop physiology. In 1977/78 he worked as a visiting scientist on tree physiology and breeding with the Weyerhaeuser (Forestry) Company, USA. Consultancy interests include Overseas Development Administration (ODA) consultant to the Tea Research Institute of East Africa (1974, 1978) and consultant to the International Council for Research in Agroforestry (1980, 1982).