GENERAL INTRODUCTION

Scope and Objectives

Since the end of the Second World War, rapid and revolutionary advances have been made in the biological sciences. In its effect on scientific thought and promise for technological application the growth of biological knowledge during this period is comparable to that of physics and chemistry in the preceding 100 years. To the historian of science the steadily increasing momentum of research activity in the biological sciences in the last thirty years is a phenomenon worthy of detailed study and investigation. The growth of the literature of the biological sciences has been so extensive that a detailed examination of its content is not a practical approach to an understanding of the factors responsible for the overwhelming progress made in these sciences. The student of scientometrics has an obvious role to play in such an investigation because citation counting and analysis provides a precise and tested tool for probing the reasons for the present vigour of biological research and identifying the stimuli sustaining its vigour.

It is generally agreed that the recent spectacular advances in the biological sciences were sparked off by the application of the concepts and methodologies of chemistry and physics to the study of biological processes and phenomena. This new approach altered the very character of biological research, freeing it of empiricism and descriptive documentation, and raising it to the level of research in the physical sciences in respect of the questions asked and the means employed to find answers to them.
Instead of being largely based on accurate and extensive observation, biological research now follows the course of hypotheses being set up and experiments carried out to determine their validity. Besides, the application of physiochemical methods has enabled quantitative measurements to be made in biological studies, a sine qua non for the scientific understanding of a process or phenomenon.

The influence of this new approach has been best exemplified in the progress of biochemistry and the status this subject has attained as a distinctive discipline opening the door to knowledge of the diverse areas of biological science. The application of biochemical concepts and methodology has been most prominent in frontier areas of biological knowledge that have emerged in recent years as points of growth of new research. Of these we have chosen genetics, neuroscience and biophysics for detailed investigation, because all three are new subjects of intensive study and research following new discoveries that have revolutionized scientific thought and established them as scientific disciplines in their own right.

The object of the present work then was to make a quantitative study of the impact of the growth of biochemical knowledge on genetics, neuroscience and biophysics, outstanding examples of the new scientific disciplines that bear the stamp of our times. We have employed the techniques of citation counting and analysis developed in the course of previous work. The studies carried out by the author on the growth of knowledge in the biomedical sciences using the same bibliometric techniques has established their validity and versatility for investigations of this kind. The work is presented in three sections, devoted to each of the subjects selected for this investigation.