sleeping. Throughout most of their lives women experience another well-known long-term periodicity, the menstrual cycle.

It does not require much scientific acumen to discover that our feelings and our performance vary throughout a normal day, and most of us have ideas and hypotheses about such changes, characterizing ourselves and others by such statements as "I'm an early riser" or "He works best late at night." Aside from such obvious rhythms, our lives are characterized by lesser-known ones, for example, alpha rhythms with a frequency of about 10 hertz and daily variations in body temperature, heart rate, and mental alertness.

This book is concerned with many of these tides of life, a subject that should appeal to a wide spectrum of scientists.

Colquhoun has tried to get a small group of experts to describe what is currently known about specific classes of biological rhythms and human performance. One particular emphasis in the book is on measures of actual performance rather than on feelings and moods, not because variations in the latter are any less apparent or impressive, but rather because they are more difficult to quantify and to measure. Another major emphasis of the book is on *human* performance, an emphasis that has both good and bad points.

The book contains seven chapters. The first, by Keith Oatley and B. C. Goodwin, is on "The explanation and investigation of biological rhythms." The other chapters are "Circadian variations in mental efficiency" by W. P. Colquhoun, "Temperament and time of day" by M. J. F. Blake, "Sleep behavior as a biorhythm" by Wilse B. Webb, "A periodic basis for perception and action" by A. J. Sanford, "Menstrual cycles" by June A. Redgrove, and "Industrial work rhythms" by K. F. H. Murrell. Each chapter has an extensive bibliography with, unfortunately, titles of journal articles not given.

As so often happens with collections of articles, there is in this one an unfortunate lack of continuity between the articles, and together they do not entirely cover the field. The lack of continuity is especially noticeable with regard to the first chapter, which describes several very sophisticated statistical techniques for measuring and quantifying biorhythms. None of these techniques is used anywhere in the rest of the book. For all that, each chapter is a thorough, up-to-date review of its particular subject. The overall impression left by the book, however, is that despite a voluminous literature we can still say very little with much assurance about biological rhythms and human performance.

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Tumor Cytogenetics

The Role of Chromosomes in Cancer Biology. PEO C. KOLLER. Springer-Verlag, New York, 1972. xii, 124 pp., illus. $15.30. Recent Results in Cancer Research, 38.

In this rather compact book the author traces succinctly the history of research pertaining to the role of chromosomes in cancer biology and presents cogent recent findings from karyotypic studies, of both induced and spontaneous tumors in animals and cancers in the human, as they bear on the development of tumors and, particularly, on the behavior of cancer cells once a tumor becomes established. The remarkable variability of the cytogenetic findings in cancers, particularly human, both primary and metastatic, is comprehensively covered and illustrated.

The general theme of these discussions is the author's belief (shared by the reviewer) that the visibly recognizable chromosomal changes in human cancer (and leukemia) are secondary phenomena to the neoplastic state and are not the direct cause of the cancer (or leukemia). This theme is developed logically and substantiated with an ample number of studies from the literature and the author's laboratory as well. The role of congenital or hereditary cytogenetic aberrations in cancer causation, Boveri's theory of the role of chromosomes in cancer, the stemline concept of cancer genesis and the clonal evolution of chromosomal aberrations, and the karyotypic findings in so-called precancerous lesions receive special emphasis.

In each chapter appropriate and informative tables and figures are included; the lack of a picture of a metaphase with the Ph^1-chromosome (Philadelphia chromosome) is regrettable, since this chromosomal anomaly is the only consistent and characteristic one established to date for any mammalian malignancy, in this case chronic myelocytic leukemia in human subjects. The chapter dealing with chromosomes and the treatment of cancer is not quite on a par with the others. Not much space is devoted in the book to human acute leukemia, a condition of especial interest because it tends to be as often aneuploid as diploid. A short chapter on cytogenetic methodologies in cancer and leukemia and on recently described techniques for fluorescent staining and banding patterns of chromosomes would have been welcome. These last few statements should not be taken to indicate, however, that the book, though consisting only of 124 pages, is not packed with important information on chromosomes and cancer. It includes an impressive list of selected references, by an author who has devoted much of his scientific work to the unraveling of the riddle of chromosomes and cancer.

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Epidemiological Problems

Geochemical Environment in Relation to Health and Disease. Papers from a conference, Oct. 1971. HOWARD C. HOPPS and HELEN L. CANNON, Eds. New York Academy of Sciences, New York, 1972. 352 pp., illus. Paper, $25. *Annals of the New York Academy of Sciences*, vol. 199.

This book covers the analysis and distribution of trace elements in the geochemical environment, known relationships of health to the geochemical environment, and the methodology and problems of determining causal relations between disease and the geochemical environment.

The first half of the book is devoted to an overview of the analysis and distribution of trace elements in the natural environment and presents trace element data for rocks, soils, waters, and plants. Various factors that influence the availability of trace elements to the successive members of the rock-soil-water-plant-animal cycle, such as solubility, adsorption phenomena, soil-plant interaction, competition among mineral elements relating to adsorption by animals, and aspects of diet are discussed. Diseases or conditions associated with regional or local trace element anomalies are brought in at various points. Problems encountered in the sampling of rocks, soils, waters, and