quately reflect mood shifts, then it is hard to justify their use as a measure of enduring personality structure.

Despite these reservations, many clinicians continue to find the MMPI useful as a measure of impairment and disturbance and as an index of treatment needs, readiness for treatment, and even benefit from treatment. In any event, one of the main reasons why it is possible for three automated commercial MMPI interpretation systems to sustain themselves financially is that a great deal is known about the distribution and correlates of the clinical scales both individually and in profile. And though the shortcomings of the MMPI are known, the answers to the technical and conceptual problems are not yet fully known. For the foreseeable future it will continue to be far easier to offer profound criticisms of this and other such instruments than profound insights enabling them to be constructively revised.

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Neuroendocrinology

Brain-Pituitary-Adrenal Interrelationships. Proceedings of a symposium, Cincinnati, Ohio, June 1972. Z. BRODISH and E. S. REDGATE, Eds. Karger, New York, 1973. xii, 340 pp., illus. $45.30.

The editors of this symposium consider that the pituitary-adrenal system has been overshadowed by other concerns in endocrinology. They hope to attract attention to the present status and future possibilities of research on this system. The result is a volume that should be of interest to those actively engaged in neuroendocrine research.

The first third of the symposium is devoted to an assessment of assays for adrenocorticotropic hormone (ACTH) and corticotropin-releasing factors (CRF). Much useful technical detail is given. Until recently radioimmunoassays were the most sensitive method for detecting ACTH. But radioimmunoassays may pick up both biologically active and biologically inactive material, and the results have to be treated with caution. Better bioassays and a competitive binding assay will, one hopes, solve this problem. A bioassay using isolated adrenal cells has been refined to give a sensitivity of 1 picogram and an excellent index of precision ($\lambda = 0.03$). A competitive binding assay is described in which the natural target organ protein is used as the receptor, although the precision of this method needs to be improved. The development of a sensitive and precise assay for CRF is a more formidable problem since the variability of the pituitary has to be added to that of the ACTH assay. Methods for measuring CRF both in vivo and in vitro are described.

Other contributors present a mixture of review and new data concerning the control of ACTH, but there is little consideration of the adrenal gland other than as a source of steroids to feed back on the control of ACTH.

Only two classes of nonmammalian vertebrates are considered. Reptiles, if they can be judged by the lizards, show both similarities to and differences from the mammals. The teleost fishes, as might be expected, are different since hypothalamic nerve fibers penetrate the adenohypophysis and may be involved in the direct control of pituitary cells. There are enormous areas of brain-pituitary-adrenal physiology to be investigated in the lower vertebrates. It is to be hoped that some of the technical advances reported here will find application to these organisms.

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Air Chemistry

Chemistry of the Lower Atmosphere. S. I. RASOOL, Ed. Plenum, New York, 1973. xii, 336 pp., illus. $22.50.

Mention of the subject *atmospheric chemistry* often brings a rapid response: "you mean smog." While it is true that atmospheric chemistry is important to such problems, there is a lot more to it than urban air pollution. Specifically, as editor Rasool points out, there are serious questions regarding man's impact on the natural evolutionary processes of the whole atmosphere. The basic science of atmospheric chemistry as a multidiscipline is practiced and taught by a relatively small but growing number of scientists. The repertoire of the atmospheric chemist includes not only such obvious topics as measurement of air composition, but also the role of chemistry in atmospheric processes (for example, light absorption and emission and cloud nucleation), cycles of atmospheric substances, the reactions of gases in the atmosphere (including those producing particulate matter), and trends in the chemical processes and properties of the atmosphere. A chief goal of air chemistry is to provide a basic understanding of atmospheric processes on all spatial scales and of how man influences them.

Because of the breadth of this emerging subject, it is natural to limit the focus to the lower atmosphere (the layer of air including the troposphere and stratosphere extending approximately to 30 kilometers of altitude), in or below which man and all life normally exist. Even so, it is apparent that the subject is still too large for this volume, in which only a few selected topics are treated.

The chapter by H. R. Pruppacher reviews the chemical properties and physicochemical processes of cloud and ice nuclei, showing the difficulties and inconsistencies of interpretation of measurements of the latter. R. D. Cadle covers the subject of particulate matter in the troposphere and lower stratosphere. G. M. Hidy surveys the processes that remove gases and particles from air, with strong emphasis on theoretical aspects. The global sulfur cycle—one of the dominant natural cycles influencing air composition and one which is being changed by human activity—is treated in considerable detail by J. P. Friend. S. H. Schneider and W. W. Kellogg consider the role of air chemistry in climate change, including both direct effects on radiation and a more complex variety of important feedback mechanisms. The carbon dioxide cycle is surveyed by C. D. Keeling from the point of view of reservoir models. While there is much more to atmospheric chemistry than these topics, the six chapters complement each other and provide more coherence than is normally found with many different authors.

Because of the high quality of what is included I hesitate to criticize Rasool's book on the grounds that it doesn't cover all aspects of lower atmospheric chemistry. To be sure, the cycles of carbon monoxide, hydrocarbons, nitrogen compounds, and other substances could have been added, as could a variety of other topics such as measurement of air composition and a summary of human influences. My only real criticisms are that the references in some (but not all) chapters seem skimpy and that there is no author