

population of cells. The greatest advances have been made in understanding neurohypophyseal hormone biosynthesis, which now appears to occur along the classical lines of protein synthesis, through the formation of a macromolecular prohormone.

More conventional but no less exciting aspects of neuroendocrinology are covered in the remaining portions of the book. Schally and D. H. Coy report their own studies and those from other laboratories on structure-activity relations of LHRH, the chemical structure of which was elucidated by the Schally laboratory in 1971. In addition to the intrinsic biological interest of these relations, structural analogs with increased activity may have therapeutic benefit in infertility (already demonstrated for several analogs); antagonistic analogs have a potential for regulation of fertility, including contraceptive control. Products effective either by nasal insufflation or through absorption over long periods of time have been developed. One of the most unexpected findings is that powerful stimulating analogs may actually inhibit or impede fertility.

W. Vale and collaborators present a summary of an extensive study of analogs of LHRH, TRH, and somatostatin. One interesting point is that analogs of somatostatin that have different potencies with respect to the inhibition of growth hormone, insulin, and glucagon secretion have been developed. One such compound, [D-Cys¹⁴]-somatostatin, has, compared with somatostatin itself, potency of 270, 10, and 310 percent respectively to block secretion of growth hormone, insulin, and glucagon. F. Labrie and collaborators summarize their systematic studies of the molecular mechanism of hypophysiotropic hormone action on the pituitary and the mode of interaction of hypothalamic hormones, with peripheral organ feedback effects.

J. C. Porter and collaborators report data on the concentration of hypophysiotropic factors in rat portal-vessel blood obtained by a technique Porter popularized. They show that stimulation of the brain leads to release of LHRH together with an increase in plasma levels of LH. Similar studies in the monkey by J. D. Neill and collaborators suggest that at the time of ovulation there is an increase in portal-vessel levels of LHRH and that castration leads to an increase in hypophyseal portal blood levels, direct evidence of feedback control of hypothalamic hormone secretion.

A view at variance with the traditional view that the direction of flow of the hy-

pophyseal portal blood is from hypothalamus to anterior pituitary is restated in the chapter by Porter and collaborators and is supported by the authors' measurement of the concentration of adenohypophyseal and neurohypophyseal hormones in blood removed from the long portal veins. They write, "Hormones from the pars distalis, pars intermedia, and pars nervosa are transported retrograde in the pituitary stalk." Thus "a mechanism exists whereby posterior pituitary hormones can reach in high concentrations the anterior pituitary." Further, "retrograde blood flow in the pituitary stalk provides a means of delivering pituitary hormones to the hypothalamus." The functional significance of high hormone levels in the hypothalamus, the result of retrograde flow, is unknown.

Knowledge of some of the other hypophysiotropic hormones is reviewed. Uncertainties about the chemistry of corticotropin-releasing factor, still obscure after more than two decades of work, are recorded by M. Saffran. The identity of the physiological prolactin-inhibitory factor is still unknown. In this case there are too many potential candidates, including dopamine, norepinephrine, and gamma-aminobutyric acid, all of which inhibit prolactin secretion. Of these, dopamine seems the most likely. Its presence in hypophyseal portal blood has been demonstrated by Barnea and collaborators, but, as is pointed out by Porter and collaborators in this volume, the concentration does not correspond to the functional state of prolactin secretion.

The final chapters of the volume deal with clinical applications of the releasing hormones: the elucidation of the interaction of LHRH and ovarian hormones in the control of the menstrual cycle (S. S. C. Yen and collaborators), the role of TRH in the regulation of TRH and prolactin secretion (A. G. Frantz), and the use of somatostatin for the study of the role of regulatory hormones in the control of carbohydrate homeostasis and its potential use in the therapy of diabetes (J. E. Gerich). Each of the clinical chapters is timely and well written and provides a level of conceptualization far more satisfying than is usual in primary publications.

The summary chapter by R. Gorski once again emphasizes the neurological aspects of neuroendocrinology. Although this volume will be the most valuable to active workers in the field, it will expand the horizons of any person interested in physiological regulation, brain function, and peptides. In common with

its two predecessors the volume is in essence a progress report, and it records a staggering list of advances. The NIH can rest assured that it has supported a winning subject.

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Effects of Wind

Plant Response to Wind. J. GRACE. Academic Press, New York, 1977. xii, 204 pp., illus. \$19.25. *Experimental Botany*, vol. 13.

Considering the large amount of work that has been devoted to the understanding and control of wind effects on plants, it is surprising that we have had to wait so long for an adequate description and evaluation of the subject within the covers of a single book. In this timely monograph, Grace introduces to the botanical investigator the physical concepts and techniques for studying plant response to wind and reviews our present knowledge about wind effects. Grace himself has made significant contributions to the subject through his studies of wind effects on leaf photosynthesis and water relations.

The book contains five chapters and a valuable list of more than 550 references. The text is lucid, excellently printed, and well illustrated. There are only a few, typographical errors, mostly fairly obvious. More significant, the index contains several incorrect page references and is incomplete.

The first chapter considers the nature, measurement, and control of air flow. The section on instrumentation includes outlines of advanced techniques of laser-Doppler and pulsed-wire anemometry and a comment on their possible application to studies of heat and mass transfer in leaf canopies. In considering the use of windbreaks to vary the wind for studies of plant response, the author points out the confounding of the effects of wind reduction with those of other environmental variables and makes a strong plea for more studies using the controlled environment of wind tunnels to complement field studies.

Chapters 2 through 4 deal with the physical concepts and physiological processes associated with wind response. Grace has avoided undue emphasis on the derivation of the mathematical equations underlying the con-

cepts, referring the reader instead to the appropriate sources for fuller details. He has chosen to deal in succeeding chapters with the response to wind of single leaves, whole plants, and finally crops. Although this approach is logical and undoubtedly has merit, it invites overlap, repetition, and fragmentation of the subject. Grace has skillfully minimized the first two problems, but some readers may question the wisdom of splitting the description of the important exchange processes, with some exchange processes described in a discussion of the single leaf (pp. 45–54) and some described in a discussion of the canopy (pp. 91–103). Again there would be some advantage in bringing together the important discussion of the effect of wind on water use, which is based largely on the theoretical and modeling work of J. L. Monteith and D. M. Gates on single leaves (pp. 61–69), and the discussion of the complex question of water use by sheltered plants, which is well handled in the section on the physiology of sheltered crops (pp. 130–135). Descriptions of various mechanically induced injuries and adaptations are present in all four chapters and collectively form a valuable compilation of both the well-recognized and some little-known physical effects of wind.

The final chapter, on ecological aspects of wind, will be of interest primarily to botanists concerned with the contribution of wind to the zonation of vegetation in mountain and coastal regions. In relation to the space allowed for the other topics discussed in the book, this topic is dealt with rather fully. The chapter also includes a short résumé of the effect of topography on wind flow that would be more appropriately included in the first chapter. On the other hand, some discussion of the ecological importance of wind dispersal of pollen and plant pathogens, and of insect fallout and concentration in sheltered zones, would be a useful addition to this chapter.

The author's holistic approach is commendable: possibly information in addition to the physics of particle movement could have been given on wind erosion, especially considering that the single major reason for windbreak use around the world is to control soil blow and its consequences. For example, recent experiments suggest that airborne soil particles can act as direct inoculating agents for certain plant pathogens. Only passing mention is made of the differential response to shelter shown by cultivars of a given species, in spite of the increasing evidence for this and the possibility of breeding plants with physiological and

morphological features that can exploit still further the shelter benefit. Again only one example of shelter affecting crop quality is mentioned, although several are known from the Russian literature.

Aside from these fairly minor omissions and the organizational problems, the author has succeeded in his objectives and has produced a readable, coherent, sound book. He rejects the widely held view that conservation of water is the main benefit of shelter; instead he musters and analyzes the factors responsible for the shelter effect while acknowledging that their actions and interactions are still imperfectly understood.

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Mass Movement Phenomena

Rockslides and Avalanches. Part 1, Natural Phenomena. BARRY VOIGHT, Ed. Elsevier, New York, 1978. xviii, 834 pp., illus. \$98. Developments in Geotechnical Engineering, 14A.

The purpose of this book is to provide a standard reference for studies of natural mass movement phenomena, especially rockslides and avalanches. The 25 papers by 32 authors are of two types, descriptive and analytic, and the best papers are both, although in varying proportions. Some of the descriptions are new and, in those cases where they are superimposed upon previous descriptions of the same rockslide, will be permanent references to important details of the slides. In this category are descriptions of several classic slides: the Elm, Sherman, and Huascarán avalanches, the Frank, Gros Ventre, Madison Canyon, Mayunmarca, and Blackhawk rockslides, and the Heart Mountain thrust sheet. These chapters are necessary reading for students of landslides. The mechanical analyses are generally unoriginal, although they provide direction for new field observations, as they should. The book thus represents a heartening acceleration of a fundamental change in geology from arm-waving speculation to application of basic science.

I was delighted with the chapter by K. J. Hsü on Albert Heim's classic description and mechanical analysis of the avalanche at Elm, Switzerland. In many ways Heim's approach is reflected in the best papers in the book. But Hsü's chapter is not simply a translation of Heim from the German; rather, Hsü has freely

interjected his own ideas to produce a classic in its own right. Voight's study of the Gros Ventre slide in Wyoming technically is probably the most thorough analysis of a large slide, clearly presenting the detective work required to decipher the feeble record of even a historic event. Besides, Voight livens up dry observation and theory with anecdotes, such as the predictions of impending disaster by "Uncle Billy," a bear hunter whose cabin turned out to be directly in the path of the slide. The most clever applications of mechanical analysis are by G. Plafker and G. E. Ericksen, who describe the 1970 Huascarán avalanche in Peru. Using aerial photography, for example, they measured the lengths of mud-free shadows of large rocks to determine the trajectories and launching sites of boulders that rained down upon the community of Huashau. These and other data indicate that parts of the avalanche were traveling at speeds of up to 1000 kilometers an hour.

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Anticonvulsants. Julius A. Vida, Ed. Academic Press, New York, 1977. xiv, 638 pp., illus. \$59. Medicinal Chemistry, vol. 15.

An Atlas of Mammalian Chromosomes. Vol. 10. T. C. Hsu and Kurt Benirschke. Springer-Verlag, New York, 1977. Unpagged. Loose-leaf, \$29.80. To order this book circle No. 373 on Readers' Service Card

Atlas of Neonatal Electroencephalography. Sarah S. Werner, Janet E. Stockard, and Reginald G. Bickford. Raven, New York, 1977. xii, 212 pp. \$65.

Bioconversion. Fuels from Biomass. E. E. Robertson. Franklin Institute Press, Philadelphia, 1977. 72 pp., illus. Paper, \$6.50.

Biosocial Bases of Criminal Behavior. Sarnoff A. Mednick and Karl O. Christiansen, Eds. Gardner Press, New York, 1977 (distributor, Halsted [Wiley], New York). xx, 298 pp. \$22.95.

Chance, Cause, Reason. An Inquiry into the Nature of Scientific Evidence. Arthur W. Burks. University of Chicago Press, Chicago, 1977. xvi, 694 pp. \$27.50.

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