

biological aspects of germination and mobilization of seed reserves and its control. Important agricultural aspects of seed storage and germination, such as malting, preharvest sprouting and seed gene banks are treated in the last chapter.

The reader will appreciate some evidently appealing aspects of the book. Particularly its clear style, and the competent outline of the state of our knowledge which comprises a critical acceptance of what we do not know. The adaptive significance of germination control is rightly stressed and exemplified in phenomena such as seed bank and germination of buried seeds, germination under shade and the development of secondary dormancy, which have a phyto-geographical and phytocoenological impact. The examples in the book are taken equally from both wild species and crop plants. On some points the text could be still more up-to-date and instructive. Thus, the reader entering the era of biotechnologies might expect the problem of improving the quality of seed-storage proteins using genetic engineering to be treated like a realistic goal, or the problem of gene banks using storage of seeds in liquid protein to be dealt with more thoroughly. The role of hormones in breaking seed dormancy might be better demonstrated with the system of mutants deficient in hormone synthesis. The problem of the build-up of some developmental features *e.g.* vernalization requirement during seed ripening, should also be mentioned. However, these are mere trifles inevitable when essentials from such a broad field are to be put together. What prevails is a feeling of a well-balanced general picture.

Each section of the book is provided with a good choice of selected literature (literature is not cited in the text). Numerous tables make the wide scope of information more digestible and make it possible to efficiently demonstrate the given phenomena within plant species.

The monograph is a valuable survey of all aspects of germination to be used in the first place by students and teachers of plant biology at universities. Its broad aspects and critical approach make it also useful for agronomists, horticulturists and those botanists who need to keep abreast of the latest knowledge in the field of germination.

J. KREKULE (*Praha*)

BRIGGS, W. R., JONES, R. L., WALBOT, V. (ed.): ANNUAL REVIEW OF PLANT PHYSIOLOGY. VOL. 37, 1986. — Annual Reviews Inc., Palo Alto 1986. 614 pp., U.S. \$ 34.00.

The well-known series of annual collections of review papers in various fields of plant physiology continues with volume 37 that contains 21 articles prepared by scientists from the U.S.A. (19 authors), the F.R.G., Switzerland and the U.K. (2 each), and Australia, France, Japan and Sweden (1 each). They deal with various levels of organization: molecules (8), organelles and cells (8), tissues to whole plants (2), and populations (2). In addition, in the prefatory chapter the well-known scientist in the fields of water relations, proton pumps, photosynthesis yield and enzymes, N.E. Good, inventor of the series of excellent buffers, tells his memoirs in a really amazing way, and simultaneously expresses some stimulating ideas for future research.

Individual reviews deal with cell polarity, its induction and control (E. Schnepf), plant chemiluminescence and its driving force (activated oxygen), chemiluminescent molecules, scavengers and inhibitors and the respective emission spectra (F. B. Abeles), organization of the endomembrane system in higher plant cells, *i.e.* mainly the endoplasmic reticulum, the Golgi apparatus, various vesicles, vacuoles, plasmalemma, plasmodesmata, nuclear envelope, lipid bodies and microbodies, together with their functions and methods of study (N. Harris), photoregulation of the formation, structure, composition and functions of thylakoid membranes, including also photoregulation of gene expression (J. M. Anderson), vacuolar compartmentation, concerning also osmotic adjustment and partitioning of photosynthates (T. Boller and A. Wiemken), cross-linking of matrix polymers in growing cell walls (S. C. Fry), siderophores, *i.e.* specific ligands produced by microorganisms as scavenging agents in order to combat Fe shortage (J. B. Neilands and S. A. Leong), actinorhizal nodules, their morphology and metabolism (J. D. Tjepkema *et al.*), fructose 2,6-bisphosphate and its role in glycolysis and gluconeogenesis in photosynthetic and nonphotosynthetic tissues (S. C. Huber), responses of gas exchange to air humidity and mesophyll or soil water status (E.-D. Schulze), sterol biosynthesis and its changes induced by enzyme inhibitors (P. Benveniste), NAD(P)H dehydrogenases bound to mitochondria, tonoplast, endoplasmic reticulum, glyoxysomes and plasmalemma (I. M. Møller and W. Lin), distribution of excitation energy in photosynthesis (D. C. Fork and K. Satoh), alterations of gene expression by anaerobiosis, high-temperature, heavy metals, UV radiation and water stress (M. M. Sachs and T.-H. D. Ho), biophysical control of cell growth, among others by water relations (D. Cosgrove), gene regulation by auxin (T. Theologis), structural analysis of plant genes (G. Heidecker and J. Messing), photosynthesis studies using mutants changed in CO₂ fixation or photorespiratory metabolism, ribulose-1,5-bisphosphate carboxylase/oxygenase, photosystems 1 or 2, coupling

factor, chloroplast development and thylakoid ultrastructure, photosynthetic pigments, reactions to inhibitory herbicides, etc. (C. R. Somerville), genes specifying growth substances formation in phytopathogens (R. O. Morris), and synthesis, transport and metabolism of products of nitrogen fixation (K. R. Schubert).

The above brief contents of reviews and names of their authors show that, as usually, important and up-to-date topics are dealt with by excellent specialists in the respective fields. Both the author and subject indexes enable a rapid orientation in the broad content of this volume. As a supplement, cumulative indexes of contributing authors and chapter titles of volumes 29 to 37 are given.

Z. ŠESTÁK (*Praha*)

LARCHER, W., HÄCKEL, H., SAKAI, A. (ed.): DIE NICHTPARASITÄREN KRANKHEITEN. 5. TEIL. Meteorologische Pflanzenpathologie. Witterung und Klima als Umweltfaktoren. Kälte und Frost. (Handbuch der Pflanzenkrankheiten. Band I, 7. Auflage, 5. Lieferung). — Verlag Paul Parey, Berlin—Hamburg 1985. 326 S. 184 Abb. Geb. 248,— DM.

Das von Paul Sorauer 1874 begründete Handbuch der Pflanzenkrankheiten ist das grundlegende und massgebende Standardwerk der Phytopathologie und des Pflanzenschutzes. Der 5. Teil des ersten Bandes erscheint nach einer 50jährigen Pause in der 7. Auflage und bringt im ersten Abschnitt einen Überblick über das Klima als Umweltfaktor der Pflanze. Es werden die Zusammensetzung der Atmosphäre, Luftdruck, Temperatur, Wind, Hoch- und Tiefdruckgebiete, der Energiehaushalt von Erdoberfläche und Atmosphäre und das Klima auf der Erde behandelt. Ein kurzes Kapitel über Messung von meteorologischen Parametern ist angeschlossen. Im zweiten Abschnitt des Bandes werden das Auftreten und Verhüten von Kälte und Frost, deren Auswirkungen auf die Pflanzen und die Ausbildung von Resistenzen behandelt. Kälte und Frost werden als Belastungsfaktoren analysiert und die durch diese Faktoren verursachten Beeinträchtigungen der Lebensvorgänge der Pflanzen dargestellt. Die Mechanismen der Entstehung von Frostresistenz und Massnahmen zur Abhärtung der Pflanzen werden beschrieben. Die Perspektiven der Tiefkühlkonservierung von Pflanzenmaterial werden erörtert. Das Buch schliesst mit einem ausführlichen Literaturverzeichnis und einem Sachregister. Es ist sehr sorgfältig zusammengestellt und gedruckt worden und ist reich illustriert (inkl. Buntaufnahmen von Erkrankungssymptomen). Das Buch ist für Phytopathologen, Pflanzenphysiologen und -züchter, Ökologen, Land- und Forstwirte und Mitarbeiter auf dem Gebiet des Naturschutzes bestimmt.

INGRID TICHÁ (*Praha*)

MARSHALL, B., WOODWARD, F. I. (ed.): INSTRUMENTATION FOR ENVIRONMENTAL PHYSIOLOGY. (Society for Experimental Biology Seminar Series 22.) — Cambridge University Press, Cambridge — London — New York — New Rochelle — Melbourne — Sydney 1985. 242 pp. Hardcover £ 17.50, US \$ 34.50.

The field of environmental physiology research is largely dependent on the development of associated instrumentation. Recent advances in microelectronics, widespread availability of microprocessors, inexpensive computers and battery-operated data loggers resulted in miniaturization of sensors, instruments and equipments and have a profound effect on the improvement of scientific measurement techniques in laboratories and mainly in terrain. This development and progress in instrumentation was a topic of the Annual Conference of the Environmental Physiology Group of the Society for Experimental Biology held at the University of Hull on April 6—8, 1983. The general papers presented at this conference are published in the volume reviewed.

The introductory chapter "Measurement — A game of Snakes and Ladders" written by Prof. J. L. Monteith is an overview of the development of instrumentation in the last thirty years. The next five chapters "Radiation" (J. E. Sheehy), "The measurement of carbon dioxide in air" (P. G. Jarvis and A. P. Sandford), "Water vapour measurement and control" (W. Day), "The measurement of temperature" (C. J. Bell and D. A. Rose) and "The measurement of wind speed" (J. Grace) deal with the measurement of major environmental variables. The second group of chapters is concerned with physiological measurements on plants. They are entitled "The measurement and control of air and gas flow rates for the determination of gaseous exchanges of living organisms" (S. P. Long and C. R. Ireland), "Remote site recording" (F. I. Woodward), "The effective use of microprocessors in a scientific environment" (C. Pinches), "Porometry" (K. J. Parkinson), "Instruments for measuring plant water potential and its components".