

on a limited basis"; "... few studies on the effect of pH. . ."; "Little attention has been paid to the osmotic pressure of the culture media"; and so on. One of the few parameters which have been investigated quite extensively and subsequently incorporated into culture media is the Na/K ratio in the hemolymphs of the intact animals. Possibly to atone for the lack of quantitation noted above, the authors of the various chapters have seized upon this one parameter with fervor, and the hapless reader is subjected to a seemingly endless barrage of Na/K ratios.

Yet despite the inadequacies of the culture media employed, prolonged survival as well as differentiation has often taken place in organ cultures, as has growth for varying lengths of time in cell cultures. N. Le Douarin discusses organ culture methods and media, both liquid and gel, for explants ranging from the eye-antennal disks of *Drosophila* larvae to fragments of gills and intestine from a bivalve, *Barnea candida*. Five chapters are devoted to cell cultures obtained from representatives of the various insect orders and one chapter each to crustaceans, mollusks, and the lower invertebrates (sponges, *Hydra*, and so forth).

The authors of these chapters should be commended on two counts. The references amassed, dating back to the early 1900's, are truly impressive and can well serve as a complete bibliography for the entire field up to the year 1968. Second, technical details for surface sterilization, microsurgery, and the isolation and explantation of cells and organs, given merely a nod in most articles, are quite explicit and readily followed.

On the other hand, most of the authors appear content simply to summarize the results obtained in their particular areas and make little attempt to laud the good and expose the bad. Prior to 1965, there was an unfortunate tendency for investigators to make rather dogmatic statements as well as use considerable imagination in describing their results. Much of this hyperbole has not withstood the test of time, yet the authors voice no word of caution to the unsuspecting reader. Moreover, some rigorous editing could have eliminated much of the redundancy in this book. For instance, almost every chapter has some paragraphs discussing culture media in general before turning to specific media for a particular group of invertebrates.

Three other chapters, devoted to the

disparate subjects of aseptic rearing of insects, electron microscopy, and the morphology and physiology of the cultured cells are all quite thorough and merit attentive reading.

Some one hundred tables are included in the book, most of them listing the components of culture media devised throughout the years and used with varying degrees of success. The photographs are numerous and, on the whole, excellent in quality.

The lag between submission of manuscripts and the date of publication seems to have been inordinately long for this volume. The most recent references are two or three years old, with the exception of one footnote which dates to 1970. Hence readers may well obtain an erroneous impression of the extent of progress in the field. This is particularly true with respect to the establishment of bona fide invertebrate cell lines, a feat once considered remarkable but now becoming increasingly common.

To my knowledge, this is the first treatise devoted solely to a review of invertebrate tissue culture, and I suspect both laymen and specialists in the field will be surprised at the sheer volume of studies involved. But it would have been a much better book had more emphasis been placed on critically assessing these studies.

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Productivity

Fertility of the Sea. A symposium, São Paulo, Dec. 1969. JOHN D. COSTLOW, JR., Ed. Gordon and Breach, New York, 1971. In two volumes. Vol. 1, xii pp. + pp. 1-308, illus. \$19.50. Vol. 2, xii pp. + pp. 309-622, illus. \$14.50.

This collection of symposium papers includes a broad spectrum of topics connected with problems of fertility of the sea: primary plant productivity, food web relations, the inorganic nutrients which in many cases control the level of fertility, and physical oceanographic processes which affect the availability of the nutrient supply. There are also a few papers on pollution, the effects of land drainage on coastal fertility, and possibilities for artificial fertilization.

A large proportion of the symposium consists of reports of original work rather than review articles and is es-

sential information for oceanographers who are working with this kind of problem. Inevitably, however, the papers are quite specific in content and do not cover the whole spectrum of fertility problems as completely as might be desired by the general reader or the beginning student.

Oceanic circulation and processes of vertical mixing and upwelling receive considerable attention. These processes are essential for bringing nutrient-rich deep water up to the surface layer, thus fertilizing plant growth. There are other papers on nutrient-plant relations and primary productivity. Together this group of interrelated topics constitutes about half the book.

The intricate relations of the remainder of the food web receive much less comprehensive attention. There is documentation of cases in which fertile regions, particularly in areas of upwelling, support a large biomass of herbivores and carnivores, including bottom fauna in deep water, but the details of the relationships are not spelled out. There are few papers devoted specifically to fishes or other pelagic carnivores or to bathypelagic food webs. The knotty problem of animal productivity is largely neglected.

This is not intended to be a critical comment, but merely an account of what the reader can expect to find. A volume of original papers is not expected to be a comprehensive treatment of a topic as broad as this one, and the papers that are here will stand as a worthwhile contribution to science. The fact that two years elapsed between the symposium and publication is unfortunate but not as serious a flaw as it would be in a volume of reviews, and in the meantime the collection profited from excellent editorial work.

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Books Received

Annual Review of Pharmacology. Vol. 12. Henry W. Elliott, Ronald Okun, and Robert George, Eds. Annual Reviews, Palo Alto, Calif., 1972. xii, 528 pp. \$10.

Aphasia, Apraxia and Agnosia. Clinical and Theoretical Aspects. Jason W. Brown. Thomas, Springfield, Ill., 1972. x, 310 pp., illus. \$14.50.

Atlas of Protein Spectra in the Ultraviolet and Visible Regions. Donald M. Kirschenbaum, Ed. IFI/Plenum, New York, 1972. xii, 290 pp. \$25.

Biology of Brackish Water. Adolf Remane and Carl Schlieper. Schweizerbart'sche, Stuttgart; Wiley-Interscience, New York, ed. 2, 1972. x, 327 pp. + fold-out charts. \$21.75. Die Binnengewässer, vol. 25.

Biomembranes. Vol. 2, Proceedings of a symposium, Gatlinburg, Tenn., Apr. 1971. Lionel A. Manson, Ed. Plenum, New York, 1971. xiv, 302 pp., illus. \$19.50.

Chemical Quantitative Analysis. A New Approach. Sibilla E. Kennedy, Esther B. Sparberg, and Frances S. K. Sterrett. Harper and Row, New York, 1972. xxii, 362 pp., illus. Paper, \$6.

Electron Spin Relaxation in Liquids. A NATO Advanced Study Institute, Spåind, Norway, Aug. 1971. L. T. Muus and P. W. Atkins, Eds. Plenum, New York, 1972. xiv, 538 pp., illus. \$29.50.

L'Engagement Social du Scientifique. Conférences du Cinquantenaire de la Faculté des Sciences Université de Montréal. Jean-Jacques Salomon, André Des-Marais, and Jean Dorst. Presses de l'Université de Montréal, Montreal, 1971 (U.S. distributor, International Scholarly Book Services, Portland, Ore.). 102 pp., illus. Paper, \$3.

The Enzymes. Vol. 6, Carboxylation and Decarboxylation (Nonoxidative), Isomerization. Paul D. Boyer, Ed. Academic Press, New York, ed. 3, 1972. xx, 678 pp., illus. \$31.50; by subscription, \$26.75.

Essentials of Educational Measurement. Robert L. Ebel. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1972. xvi, 622 pp., illus. \$9.95. Prentice-Hall Education Series.

Formation of Visual Images. Studies of Stabilized Retinal Images. V. P. Zinchenko and N. Yu. Vergiles. Translated from the Russian edition (Moscow, 1969) by Basil Haigh. Consultants Bureau, New York, 1972. x, 58 pp., illus. Paper, \$15.

Fundamentals of College Chemistry. Jesse H. Wood, Charles W. Keenan, and William E. Bull. Harper and Row, New York, ed. 3, 1972. xii, 564 pp., illus. \$11.95.

Histological Typing of Odontogenic Tumours, Jaw Cysts, and Allied Lesions. J. J. Pindborg and I. R. H. Kramer in collaboration with H. Torloni. World Health Organization, Geneva, 1971 (U.S. distributor, American Public Health Association, Washington, D.C.). 44 pp. + plates + 150 slides, boxed. \$12. With slides, \$50. International Histological Classification of Tumours, No. 5.

Integral Matrices. Morris Newman. Academic Press, New York, 1972. xviii, 226 pp. \$14. Pure and Applied Mathematics, vol. 45.

Joseph Fourier 1768-1830. A Survey of His Life and Work, Based on a Critical Edition of His Monograph on the Propagation of Heat, Presented to the Institut de France in 1807. I. Grattan-Guinness in collaboration with J. R. Ravetz. M.I.T. Press, Cambridge, Mass., 1972. xii, 516 pp., illus. \$20.

Laboratory Manual of General Biology. Clinton F. Schonberger. Saunders, Philadelphia, ed. 3, 1972. viii, 412 pp., illus. Paper, \$5.50.

Lead. Airborne Lead in Perspective. National Research Council Division of

Medical Sciences. National Academy of Sciences, Washington, D.C., 1972. xii, 330 pp., illus. Paper, \$6.50. Biologic Effects of Atmospheric Pollutants.

Modern Oxide Materials. Preparation, Properties and Device Applications. A school, Birmingham, England, Apr. 1971. B. Cockayne and D. W. Jones, Eds. Academic Press, New York, 1972. viii, 316 pp., illus. \$12.50.

Molecular Spectroscopy. Modern Research. A symposium, Sept. 1970. K. Narahari Rao and C. Weldon Mathews, Eds. Academic Press, New York, 1972. xiv, 422 pp., illus. \$25.

Multiple Sclerosis and Me. M. H. Greenblatt. Thomas, Springfield, Ill., 1972. xii, 74 pp., illus. \$5.75.

Myasthenia Gravis. A conference, Dec. 1970. William S. Fields, Ed. New York Academy of Sciences, New York, 1971. 386 pp., illus. \$26. *Annals of the New York Academy of Sciences*, vol. 183.

Mycoplasmataceae. A Bibliography and Index 1852-1970. C. H. Domermuth and J. G. Rittenhouse. Virginia Polytechnic Institute and State University, Blacksburg, 1971. iv, 136 pp. Paper. Research Division Bulletin 61.

New Horizons in Astronomy. John C. Brandt and Stephen P. Maran. Freeman, San Francisco, 1972. xii, 496 pp. + plates. \$12.50. A Series of Books in Astronomy and Astrophysics.

Organophosphorus Chemistry. Vol. 3. A Review of the Literature Published between July 1970 and June 1971. S. Trippett, senior reporter. Chemical Society, London, 1972. xii, 304 pp., illus. £7. A Specialist Periodical Report.

Orientation. Sensory Basis. A conference, Feb. 1971. Helmut E. Adler, Ed. New York Academy of Sciences, New York, 1971. 408 pp., illus. Paper, \$27. *Annals of the New York Academy of Sciences*, vol. 188.

Our Chemical Environment. J. Calvin Giddings and Manus M. Monroe, Eds. Canfield, San Francisco, 1972. xiv, 368 pp., illus. Paper, \$4.95.

Particulate Models. Their Validity and Application. A workshop, Boulder, Colo., Aug. 1970. I. H. Blifford, Jr., Ed. National Center for Atmospheric Research, Boulder, Colo., 1971. viii, 294 pp., illus. Paper. NCAR Technical Note NCAR-TN/Proc-68.

Partition of Cell Particles and Macromolecules. Distribution and Fractionation of Cells, Mitochondria, Chloroplasts, Viruses, Proteins, Nucleic Acids, and Antigen-Antibody Complexes in Aqueous Polymer Two-Phase Systems. Per-Åke Albertsson. Wiley-Interscience, New York, ed. 2, 1972. 324 pp. + plates. \$17.

Physical Science. F. Bueche. Worth, New York, 1972. xvi, 428 pp., illus. \$9.95.

Physiology and Biochemistry of Tobacco Plants. T. C. Tso. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1972. xvi, 394 pp., illus. \$24.50.

Phytochemical Ecology. A symposium, Englefield Green, England, Apr. 1971. J. B. Harborne, Ed. Academic Press, New York, 1972. xiv, 272 pp., illus. \$15. Annual Proceedings of the Phytochemical Society, No. 8.

Race and Intelligence. The Fallacies behind the Race-IQ Controversy. Ken Richardson, David Spears, and Martin Richards, Eds. Penguin, Baltimore, 1972. 206 pp., illus. Paper, \$1.45.

Readings in Physical Anthropology. Thomas W. McKern, Ed. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1972. viii, 360 pp., illus. Paper, \$4.95.

Recent Advances in Plant Nutrition. A colloquium, Tel-Aviv, Mar. 1970. R. M. Samish, Ed. Gordon and Breach, New York, 1972. 2 vols. Vol. 1, xxvi pp. + pp. 1-342, illus. Vol. 2, xvi pp. + pp. 343-736, illus. The set, \$24.50.

Remote Measurement of Pollution. A working group, Norfolk, Va., Aug. 1971. National Aeronautics and Space Administration, Washington, D.C., 1971 (available from National Technical Information Service, Springfield, Va.). vi, 254 pp., illus. Paper, \$3.

The Scientific Feeding of Chickens. Harry W. Titus and James D. Fritz. Interstate, Danville, Ill., ed. 5, 1972. xii, 336 pp., illus. \$9.50.

Sentences Children Use. Paula Menyuk. M.I.T. Press, Cambridge, Mass., 1972. xiv, 166 pp., illus. Paper, \$1.95. Reprint of the 1969 edition.

Solid State Electronic Devices. Ben G. Streetman. Prentice-Hall, Englewood Cliffs, N.J., 1972. xvi, 464 pp., illus. \$13.95. Prentice-Hall Series in Solid State Physical Electronics.

Studies in Dyadic Communication. A conference, College Park, Md., Apr. 1968. Aron Wolfe Siegman and Benjamin Pope, Eds. Pergamon, New York, 1972. x, 336 pp., illus. \$13.50. Pergamon General Psychology Series.

The Surveillance and Prediction of Volcanic Activity. A Review of Methods and Techniques. Unesco, Paris, 1971 (U.S. distributor, Unesco Publications Center, New York). 166 pp., illus. Cloth, \$22; paper, \$14. Earth Sciences, vol. 8.

Therapy in the Ghetto. Political Impotence and Personal Disintegration. Barbara Lerner. Johns Hopkins University Press, Baltimore, 1972. xviii, 222 pp. \$8.95.

Thermal Characteristics of the Moon. John W. Lucas, Ed. M.I.T. Press, Cambridge, Mass., 1972. xiv, 340 pp., illus. \$15. Progress in Astronautics and Aeronautics, vol. 28.

Thin Films. K. D. Leaver and B. N. Chapman. Wykeham, London; Springer-Verlag, New York, 1971. viii, 112 pp., illus. Paper, \$4.40. Wykeham Science Series.

Things to Come. Thinking About the Seventies and Eighties. Herman Kahn and B. Bruce-Briggs. Macmillan, New York, 1972. x, 262 pp., illus. \$6.95.

Till. A symposium, Columbus, Ohio, May 1969. Richard P. Goldthwait, Ed., assisted by Jane L. Forsyth, David L. Gross, and Fred Pessl, Jr. Ohio State University Press, Columbus, 1972. xii, 402 pp., illus. \$20.

Toward a Critical Sociology. Norman Birnbaum. Oxford University Press, New York, 1971. xvi, 422 pp. \$10.95.

The V. D. Story. Stewart M. Brooks. Littlefield, Adams, Totowa, N.J., 1972. 162 pp., illus. Paper, \$1.95.