

Zeitschrift: Archives des sciences et compte rendu des séances de la Société
Herausgeber: Société de Physique et d'Histoire Naturelle de Genève
Band: 42 (1989)
Heft: 1: Archives des Sciences

Artikel: Polarity : from dipoles to biopolarization
Autor: Turian, Gilbert
Bibliographie: References
DOI: <https://doi.org/10.5169/seals-740080>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 08.03.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

REFERENCES

- ABERCROMBIE, M., J. E. M. HEAYSMAN and S. M. PEGRUM (1970). The locomotion of fibroblasts in culture. II. Ruffling. *Exp. Cell Res.* 60: 437-444.
- ACHERMANN, J. (1985). The use of mutants and chimeras to explore the gradients underlying pattern formation in Hydra. *Arch. Sci. Genève* 38: 447-459.
- ACHERMANN, J. and T. SUGIYAMA (1985). Genetic analysis of developmental mechanisms in Hydra. X. Morphogenetic potentials of a regeneration-deficient strain (reg-16). *Dev. Biol.* 107: 13-21.
- ADAMS, A. E. M. and J. R. PRINGLE (1984). Relationship of actin and tubulin distribution to bud growth in wild-type and morphogenetic-mutant *Saccharomyces cerevisiae*. *J. Cell. Biol.* 98: 934-945.
- ADLER, J. (1975). Chemotaxis in bacteria. *Ann. Rev. Biochem.* 44: 341-356.
- (1980). Movement by bacteria: on the mechanism of sensory transduction in bacterial chemotaxis. In *Plant Growth Substances 1979*. Pp. 496-507. F. Skoog (ed.), Springer-Verlag, Berlin. 527 pp.
- ALBANESI, J. P., H. FUJISAKI, J. A. HAMMER III, E. D. KORN, R. JONES and M. P. SHEETZ (1985). Monomeric *Acanthamoeba* myosins. I. Support movement in vitro. *J. Biol. Chem.* 260: 8049-8052.
- ALBERTS, B., D. BRAY, J. LEWIS, M. RAFF, K. ROBERTS and J. D. WATSON (1983). *Molecular Biology of the Cell*. Garland Publ., New York, London. 1146 pp.
- ALCORN, J. L. (1988). The taxonomy of "*Helminthosporium*" species. *Ann. Rev. Phytopathol.* 26: 37-56.
- ALLEN, C. and G. G. BORISY (1974). Structural polarity and directional growth of microtubules of *Chlamydomonas* flagella. *J. Mol. Biol.* 90: 381-402.
- ALLEN, R. D. (1985). New observations on cell architecture and dynamics by video-enhanced contrast optical microscopy. *Ann. Rev. Biophys. Biophys. Chem.* 14: 265-290.
- (1987). The microtubule as an intracellular engine. *Sci. Amer.* 256: 26-33.
- ALLMAN, G. J. (1864). Report on the present state of our knowledge of the reproductive system in the Hydroida. *Rept. British Assoc. Adv. Sci.* 1863: 351-426.
- AMOS, L. A. and A. J. KLUG (1974). Arrangement of subunits in flagellae microtubules. *J. Cell Sci.* 14: 523-549.
- ANDERSON, J. M. (1986). Photoregulation of the composition, function, and structure of thylakoid vesicles. Important tool for the characterization of the photosynthetic membrane. *Physiol. Plant.* 65: 322-330.
- ANDERSON, J. M. and R. D. SOLL (1986). Differences in actin localization during bud and hypha formation in the yeast *Candida albicans*. *J. Gen. Microbiol.* 132: 2035-2047.
- ANDERSON, K. V. (1987). Dorsal-ventral embryonic pattern genes of *Drosophila*. *Trends Genet.* 3: 91-97.
- ANDERSON, K. V., L. BOKLA and C. NÜSSLEIN-VOLHARD (1985). Establishment of dorsal-ventral polarity in the *Drosophila* embryo: the induction of polarity by the *Toll* gene product. *Cell* 42: 791-798.
- ANDERSON, P. W. (1987). The resonating valence bond state in La_2CuO_4 and superconductivity. *Science* 235: 1196-1198.
- ANDERSON, W. L. and J. W. STUCKI (1979). Effect of structural Fe^{2+} on the visible absorption spectra of nontronite suspensions. In *International Clay Conference, 1978*. Pp. 75-83. M. M. Mortland and V. C. Farmer (eds), Elsevier, Amsterdam.
- ANGERER, R. C. and L. M. ANGERER (1983). RNA localization in sea urchin embryos. In *Time, Space, and Pattern in Embryonic Development*. Pp. 101-129. W. R. Jeffery and R. A. Raff (eds), Alan R. Liss, New York. 396 pp.

- ANGERER, R. C. and E. H. DAVIDSON (1984). Molecular indices of cell lineage specification in sea urchin embryos. *Science* 226: 1153-1160.
- ARMBRUSTER, B. L. and M. H. WEISENSEEL (1983). Ionic currents traverse growing hyphae and sporangia of the mycelial water mold *Achlya debaryana*. *Protoplasma* 115: 65-69.
- ARONSON, A. I. and P. FITZ-JAMES (1976). Structure and morphogenesis of the bacterial spore coat. *Bacteriol. Rev.* 40: 360-402.
- ASAKURA, S., G. EGUCHI and T. IINO (1968). Unidirectional growth of *Salmonella* flagella *in vitro*. *J. Molec. Biol.* 35: 227-236.
- ASHKIN, A. (1980). Applications of laser radiation pressure. *Science* 210: 1081-1088.
- ATTARDI, G. and G. SCHATZ (1988). Biogenesis of mitochondria. *Ann. Rev. Cell Biol.* 4: 289-333.
- AUDERSET, G. and H. GREPPIN (1977). Effet de l'induction florale sur l'évolution ultrastructurale de l'apex caulinaire de *Spinacia oleracea* Nobel. *Protoplasma* 91: 281-301.
- AZZONE, G. F., F. BORTOLOTTI and A. ZANOTTI (1978). Induction of electroneutral exchanges of H⁺ with K⁺ in rat liver mitochondria. *FEBS Lett.* 96: 135-140.
- BABLOYANTZ, A. (1977). In Nicolis and Prigogine, 1977.
- BABLOYANTZ, A. and J. HIERNAUX (1974). Models for positional information and positional differentiation. *Proc. Natn. Acad. Sci. U.S.A.* 71: 1530-1531.
- BAJER, A. S. and J. MOLÉ-BAJER (1975). Lateral movements in the spindle and the mechanism of mitosis. In *Molecules and Cell Movement*. Pp. 77-96. S. Inoué and R. E. Stephens (eds), Raven Press, New York.
- BANDURSKI, R. S. (1980). Homeostatic control of concentrations of indole-3-acetic acid. In *Plant Growth Substances 1979*. Pp. 37-49. F. Skoog (ed.), Springer-Verlag, Berlin, Heidelberg. 527 pp.
- BANDURSKI, R. S., A. SCHULZE and D. M. REINECKE (1986). Biosynthetic and metabolic aspects of auxins. In *Plant Growth Substances 1985*. Pp. 83-91. M. Bopp (ed.), Springer-Verlag, Berlin, Heidelberg. 420 pp.
- BANKER, G. A. and A. B. WAXMAN (1987). Hippocampal neurons generate natural shapes in cell culture. In *Intrinsic Determinants of Neuronal Form and Function*. Pp. 61-82. R. J. Lasek and M. B. Black (eds), Alan R. Liss, New York. 591 pp.
- BARBER, J. (1982). Influence of surface charges on thylakoid structure and function. *Ann. Rev. Plant Physiol.* 33: 261-295.
- BARD, A. J. (1980). Photoelectrochemistry. *Science* 207: 139-144.
- BARDEEN, J., L. N. COOPER and J. R. SCHRIEFFER (1957). Theory of superconductivity. *Phys. Rev.* 108: 1175-1204.
- BARLOW, P. W. (1984). Positional control in root development. In *Positional Controls in Plant Development*. Pp. 281-318. P. W. Barlow and D. J. Carr (eds), Cambridge University Press. 502 pp.
- BARROW, J. D. and J. SILK (1980). The structure of the early Universe. *Sci. Amer.* 242: 98-108.
- BARSHALL, H. H. (1975). Proceedings of the 4th International Symposium on Polarization Phenomena in Nuclear Reactions. Zürich, 1975. W. Grübler and W. König (eds), Birkhäuser Verlag, Basel and Stuttgart (1976).
- BARTH, L. G. (1934). The effect of constant electric current on the regeneration of certain hydroids. *Physiol. Zool.* 7: 340-364.
- BARTNICKI-GARCIA, S. (1973). Fundamental aspects of hyphal morphogenesis. In *Microbial Differentiation*. Symp. Soc. Gen. Microbiol. Vol. 23. Pp. 245-267. J. O. Ashworth and J. E. Smith (eds), Cambridge University Press.
- (1981). Cell wall construction during spore germination in Phycomycetes. In *The Fungal Spore*:

- Morphogenetic Controls*. Pp. 533-556. G. Turian and H. R. Hohl (eds), Academic Press, London. 670 pp.
- BARTNICKI-GARCIA, S. and W. J. NICKERSON (1962). *In Romano*, 1966.
- BARTNICKI-GARCIA, S. and E. LIPPMAN (1972). The bursting tendency of hyphal tips of fungi: Presumptive evidence for a delicate balance between wall synthesis and wall lysis in apical growth. *J. Gen. Microbiol.* 73: 487-500.
- (1977). Polarization of cell wall synthesis during spore germination of *Mucor rouxii*. *Exp. Mycol.* 1: 230-240.
- BARTNICKI-GARCIA, S., N. NELSON and E. COTA-ROBLES (1968). Electron microscopy of spore germination and cell wall formation in *Mucor rouxii*. *Arch. Mikrobiol.* 63: 242-255.
- BARTON, J. K. (1986). Metals and DNA: Molecular left-handed complements. *Science* 233: 727-734.
- BAVERSTOCK, K. F. and R. B. CUNDALL (1988). Solitons and energy transfer in DNA. *Nature* 332: 312-313.
- BEDNORZ, J. G. and K. A. MÜLLER (1986). Possible high T_c superconductivity in the Ba-La-Cu-O system. *Z. Phys.* B64: 189-193.
- BEGG, K. J. and W. D. DONACHIE (1977). Growth of *Escherichia coli* cell surface. *J. Bacteriol.* 129: 1524-1536.
- BEHRENS, H. M., M. H. WEISENSEEL and A. SIEVERS (1982). Rapid changes in the pattern of electric current around the root tip of *Lepidium sativum* L. following gravistimulation. *Plant Physiol.* 70: 1079-1083.
- BEISSON, J. and T. SONNEBORN (1965). Cytoplasmic inheritance of the organization of the cell cortex in *Paramecium aurelia*. *Proc. Natl. Acad. Sci. U.S.A.* 53: 275-282.
- BENDER, W., P. SPIERER and D. S. HOGNESS (1983). Chromosomal walking and jumping to isolate DNA from the *Ace* and *rosy* loci and the bithorax complex in *Drosophila melanogaster*. *J. Molec. Biol.* 168: 1-33.
- BENEDEN van, E. (1883). Recherches sur la maturation de l'œuf, la fécondation et la division cellulaire. *Arch. Biol.* 4: 265-638.
- BENOWITZ, L. I. and A. ROUTTENBERG (1987). A membrane phosphoprotein associated with neural development, axonal regeneration, phospholipid metabolism, and synaptic plasticity. *Trends Neurosci.* 10: 527-532.
- BENTLEY, D. and A. TOROIAN-RAYMOND (1986). Disoriented pathfinding by pioneer neuron growth cones deprived of filopodia by cytochalasin treatment. *Nature* 323: 712-715.
- BENTRUP, F. W. (1968). Die Morphogenese pflanzlicher Zellen im elektrischen Feld. *Z. Pflanzenphysiol.* 59: 303-339.
- BEREITER-HAHN, J. and M. VÖTH (1983). The metabolic basis of cell form and structure. In *Cytomechanics*. J. Bereiter-Hahn, O. R. Anderson and W. E. Reif (eds), Springer-Verlag, Berlin 1987.
- BERG, O. G. and P. H. VON HIPPEL (1985). Diffusion-controlled macromolecular interactions. *Ann. Rev. Biophys. Biophys. Chem.* 14: 131-160.
- BERLOT, C. H., J. A. SPUDICH and P. N. DEVROETES (1985). Chemoattractant-elicited increases in myosin phosphorylation in *Dictyostelium*. *Cell* 43: 307-314.
- BERNAL, J. D. (1951). *The Physical Basis of Life*. Routledge and Kegan Paul, London.
- (1967). *The Origin of Life*. Weidenfeld and Nicolson, London.
- BERNIER, G. (1971). Structural and metabolic changes in the shoot apex in transition to flowering. *Can. J. Bot.* 49: 803-819.
- BERNIER, G., J. KINET, A. JACQMARD, A. HAVELANGE and M. BODSON (1977). Cytokinin as a possible component of the floral stimulus in *Sinapsis alba*. *Plant Physiol.* 60: 282-285.

- BERNIER, G., J.-M. KINET and R. M. SACHS (1981). The Physiology of Flowering. Transition to Reproductive Growth. Vol. 2. CRC Press, Boca Raton. Florida.
- BERRIDGE, J. M. (1987). Inositol trisphosphate and diacylglycerol: two interacting second messengers. *Ann. Rev. Biochem.* 56: 159-193.
- BERRY, M. N. (1981). An electrochemical interpretation of metabolism. *FEBS lett.* 134: 133-138.
- BERTIN, J. and J. LOEB (1976). Experimental and theoretical aspects of induced polarization. In *Macroscopic and Microscopic Theories*. Vol. 2, Pp. 251-335. Geopublication Associates, Gebrüder Borntraeger, Berlin, Stuttgart.
- BIER, K. (1954). Über den Einfluss der Königin auf die Arbeiterinnen Fertilität im Ameisenstaat. *Bull. Un. Int. Etud. Insect. Soc.* 1: 7-19.
- BIGELIS, R., J. KEESEY and G. R. FINK (1977). The *his-4* fungal gene cluster is not polycistronic. In *Eukaryotic Genetic Systems*. G. Wilcox (ed.), ICN-UCLA Symp. Vol. 8, pp. 179-187. Academic Press, New York.
- BIGNOLD, L. P. (1987). Amoeboid movement: A review and proposal of a "membrane ratchet" model. *Experientia* 43: 860-868.
- BINDER, L., W. DENTLER and J. ROSENBAUM (1975). Assembly of chick brain tubulin onto flagellar axonemes of *Chlamydomonas* and sea urchin sperm. *Proc. Natn. Acad. Sci. U.S.A.* 72: 1122-1126.
- BISHOP, A. R., D. K. CAMPBELL, P. KUMAR and S. E. TRULLINGER, eds (1987). Nonlinearity in Condensed Matter. Springer-Verlag, Heidelberg. 399 pp.
- BISHOP, W. R. and R. M. BELL (1988). Assembly of phospholipids into cellular membranes: biosynthesis, transmembrane movement and intracellular translocation. *Ann. Rev. Cell Biol.* 4: 579-610.
- BIXON, M. and J. JORTNER (1986). Coupling of protein modes to electron transfer in bacterial photosynthesis. *J. Phys. Chem.* 90: 3795-3800.
- BJORNSTI, M. A., J. A. HOBOT, A. S. KELUS, W. VILLIGER and E. KELLENBERGER (1986). New electron microscopy data on the structure of the nucleoid and their functional consequence. In *Bacterial Chromatin*. Pp. 64-81. C. O. Gualerzi and C. L. Pon (eds), Springer-Verlag, Heidelberg.
- BLAIR, S. S., A. M. MURRAY and J. PALKA (1985). Axon guidance in cultured epithelial fragments of *Drosophila* wing. *Nature* 315: 406-409.
- BLINKS, L. R. (1955). Some electrical properties of large plant cells. In *Electrochemistry in Biology and Medicine*. Pp. 187-212. Schedlovsky (ed.), John Wiley and Sons, New York.
- BLOBEL, G. (1980). Intracellular protein topogenesis. *Proc. Natn. Acad. Sci. U.S.A.* 77: 1496-1500.
- BLOBEL, G. and D. D. SABATINI (1971). Ribosome-membrane interaction in eukaryotic cells. In *Bio-membranes*. Vol. 2, pp. 193-195. L. A. Manson (ed.), Plenum, New York.
- BLOCH, R. (1943). Polarity in Plants. *Bot. Rev.* 9: 261-310.
- (1947). Irreversible differentiation in certain plant cell lineages. *Science* 106: 320-322.
- (1965). Polarity and gradients in plants: A survey. *Encyclopedia of Plant Physiology*. 15 (1): 1-40. W. Ruhland (ed.), Springer-Verlag, New York. 1645 pp.
- BODE, H. R., S. E. FRASER, C. R. GREEN, P. M. BODE and N. B. GILULA (1987). Gap junctions are involved in a patterning process in *Hydra*. In *Genetic Regulation of Development*. Pp. 245-261. W. F. Loomis (ed.), A. R. Liss, New York. 423 pp.
- BODE, P. M. and H. R. BODE (1984). Patterning in *Hydra*. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 213-241. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York, London. 626 pp.
- BOGENMANN, E., M. A. LOCHRIE and M. I. SIMON (1988). Cone cell-specific genes expressed in retinoblastoma. *Science* 240: 76-78.
- BOHRMANN, J. and H. GUTZEIT (1987). Evidence against electrophoresis as the principal mode of protein transport in vitellogenic ovarian follicles of *Drosophila*. *Development* 101: 279-288.

- BOLOUKHERE, M. (1972). Différenciation spatiale et temporelle des chloroplastes d'*Acetabularia mediterranea*. *J. Microsc. (Paris)* 13: 401-416.
- BONHOEFFER, F. and J. HUF (1985). Position-dependent properties of retinal axons and their growth cones. *Nature* 315: 409-410.
- BONNER, J. T. (1973). Development in lower organisms. *Symp. Soc. Gen. Microbiol.* 24: 1-7.
- (1974). On Development. *The Biology of Form*. Harvard Univ. Press, Cambridge, Mass., USA. 282 pp.
- BONNER, W. A. (1972). Origins of molecular chirality. In *Exobiology*. Pp. 170-234. C. Ponnampertuma (ed.), North-Holland, Amsterdam.
- BONNER, W. A., M. A. VAN DORT and M. R. YEARIAN (1975). Asymmetric degradation of D, L-leucine with longitudinally polarized electrons. *Nature* 258: 419-421.
- BOPP, M. (1980). The hormonal regulation of morphogenesis in mosses. In *Plant Growth Substances 1979*. Pp. 351-361. F. Skoog (ed.), Springer-Verlag, Berlin, Heidelberg. 527 pp.
- (1984). Cell pattern and differentiation in bryophytes. In *Positional Controls in Plant Development*. Pp. 157-191. P. W. Barlow and D. J. Carr (eds), Cambridge Univ. Press. 502 pp.
- BORISY, G. G., J. B. OLMSTED, J. M. MARCUM and C. ALLEN (1974). Microtubule assembly in vitro. *Fed. Proc. Fedn. Am. Socs Exp. Biol.* 33: 167-174.
- BORLE, A. D. (1973). Calcium metabolism at the cellular level. *Fed. Proc. Fedn. Am. Socs Exp. Biol.* 32: 1944-1950.
- BORRISS, H. (1934). Beiträge zur Wachstums- und Entwicklungsphysiologie der Fruchtkörper von *Coprinus lagopus*. *Planta* 22: 28-69.
- BORST, P. and D. R. GREAVES (1987). Programmed gene rearrangements altering gene expression. *Science* 235: 658-667.
- BORSTEL VON, R. C. (1957). Nucleocytoplasmic relations in early insect development. In *Beginnings of Embryonic Development*. Pp. 175-199. *Amer. Assoc. Adv. Sci.*, Washington.
- BOSS, A. P. (1987). Star formation. To B or not to B? *Nature* 329: 486-487.
- BOURNE, G. H. (1970). *Division of Labor in Cells*. 2nd ed., Academic Press, New York, London. 296 pp.
- BOVERI, T. (1901). Die Polarität von Oocyte, Ei und Larves des *Strongylocentrotus lividus*. *Zool. Jahrb. Abt. Anat. Ontog. Tiere* 14: 630-653.
- (1910). Die Potenzen der *Ascaris*- Blastomeren bei abgeänderter Furchung. Zugleich ein Beitrag zur Frage qualitativungleicher Chromosomen-Teilung. In *Festschrift f. R. Hertwigs*. Vol. III, pp. 133. Fischer, Jena.
- BOWEN, K. H. (1986). Advanced ceramics. *Sci. Amer.* 255: 147-154.
- BOWER, F. O. (1922). The primitive spindle as a fundamental feature in the embryology of plants. *Proc. Roy. Soc., Edinb.* 43: 1-80.
- (1930). *Size and Form in Plants*. Macmillan, London, 232 pp.
- BRACHET, J. (1957). *Biochemical Cytology*. Academic Press. New York. 516 pp.
- (1967). Biochemical changes during fertilization and early development. In *Cell Differentiation*. Pp. 39-61. A CIBA Foundation symposium. AVS DeReuck and J. Knight (eds), Churchill Ltd, London.
- (1985). *The Cell Cycle*, vol. 1. *Cell Interactions*, vol. 2. Academic Press. New York. 936 pp.
- BRAWLEY, S. H. and K. R. ROBINSON (1985). Cytochalasin treatment disrupts the endogenous currents associated with cell polarization in fucoid zygotes: studies of the role of F-actin in embryogenesis. *J. Cell Biol.* 100: 1173-1184.
- BRAY, D. and P. J. HOLLENBECK (1988). Growth cone motility and guidance. *Ann. Rev. Cell Biol.* 4: 43-61.

- BRAY, D. and J. G. WHITE (1988). Cortical flow in animal cells. *Science* 239: 883-888.
- BRAZIER, M. A. B. (1968). *The Electrical Activity of the Nervous System*. 3rd. ed. Macmillan, New York.
- BREDT, W. (1979). Motility. In *The Mycoplasmas*. Vol. 1, pp. 141-155. M. F. Barile and S. Razin (eds), Academic Press, New York, London.
- BRENNER, S. (1974). The genetics of *Caenorhabditis elegans*. *Genetics* 77: 71-94.
- BRETSCHER, M. S. (1985). The molecules of the cell membrane. *Sci. Amer.* 253: 86-90.
- (1987). How animal cells move. *Sci. Amer.* 257: 44-50.
- BRINKLEY, B. R. (1985). Microtubule organizing centers. *Ann. Rev. Cell Biol.* 1: 145-172.
- BRIX, K., J. KUKULIES and W. STOCKEM (1987). Studies on Microplasmidia of *Physarum polycephalum*. V. Correlation of cell surface morphology, microfilament organization and motile activity. *Proto-plasma* 137: 156-167.
- BRODSKY, F. M. (1988). Living with clathrin: its role in intracellular membrane traffic. *Science* 242: 1396-1401.
- BRODY, S. (1973). Metabolism, cell walls, and morphogenesis. In *Developmental Regulation. Aspects of Cell Differentiation*. Pp. 107-154. S. J. Coward (ed.), Academic Press, New York.
- BROWDER, L. W. (1980). *Developmental Biology*. Saunders College, Philadelphia. 602 pp.
- BROWER, D. L. and T. H. GIDDINGS (1980). In Waaland, 1984.
- BROWN, D., S. HIRSCH and S. GLUCK (1988). An H⁺-ATPase in opposite plasma membrane domains in kidney epithelial cell subpopulations. *Nature* 331: 622-624.
- BROWN, O. and J. CLARK (1966). Fragmentation in *Nocardia corallina*. *J. Gen. Microbiol.* 45: 525-530.
- BRUCCOLERI, R. E., E. HABER and J. NOVOTNY (1988). Structure of antibody hypervariable loops reproduced by a conformational search algorithm. *Nature* 335: 564-568.
- BÜNNING, E. (1952a). Morphogenesis in plants. *Surv. Biol. Prog.* 2: 105-140.
- (1952b). Weitere Untersuchungen über die Differenzierungsvorgänge in Wurzeln. *Z. Bot.* 40: 385-406.
- (1953). *Entwicklungs- und Bewegungsphysiologie der Pflanze*. Springer-Verlag, Berlin. 539 pp.
- (1957). Polarität und inäquale Teilung der pflanzlichen Protoplasten. *Protoplasmatologia* 8(9a). Springer-Verlag, Wien.
- BURDETT, I. D. J. and A. L. KOCH (1984). Shape of nascent and completed poles of *Bacillus subtilis*. *J. Gen. Microbiol.* 130: 1711-1722.
- BURGER, M. M. (1969). A difference in the architecture of the surface membrane of normal and virally transformed cells. *Proc. Natn. Acad. Sci. U.S.A.* 62: 994-1001.
- BURGESS, J. (1985). *An Introduction to Plant Cell Development*. Cambridge Univ. Press. 246 pp.
- BURGESS, T. L. and R. B. KELLY (1987). Constitutive and regulated secretion of proteins. *Ann. Rev. Cell Biol.* 3: 243-293.
- BURNETT, J. H. (1975). *Mycogenetics*. John Wiley and Sons, New York. 475 pp.
- (1976). *Fundamentals of Mycology*. 2nd ed. Edward Arnold, London. 673 pp.
- BURRIDGE, K., K. FATH, T. KELLY, G. NUCKOOLS and C. TURNER (1988). Focal adhesions: trans-membrane junctions between the extracellular matrix and the cytoskeleton. *Ann. Rev. Cell Biol.* 4: 487-525.
- BYERS, B. (1981). Cytology of the yeast life cycle. In *The Molecular Biology of the Yeast Saccharomyces: Life Cycle and Inheritance*. Pp. 59-96. J. N. Strathern, E. W. Jones and J. R. Broach (eds), Cold Spring Harbor, Cold Spring Harbor Laboratory.
- BYERS, B. and L. GOETSCH (1974). Duplication of spindle plaques and integration of the yeast cell cycle. *Cold Spring Harbor Symp. Quant. Biol.* 38: 123-131.

- BYERS, B. and L. GOETSCH (1975). Behavior of spindles and spindle plaques in the cell cycle and conjugation of *Saccharomyces cerevisiae*. *J. Bacteriol.* 124: 511-523.
- CAESAR-TON THAT, T. C., K. HOANG-VAN, G. TURIAN and H. C. HOCH (1987). Isolation and characterization of coated vesicles from filamentous fungi. *Eur. J. Cell Biol.* 43: 189-194.
- CAESAR-TON THAT, T. C., C. ROSSIER, F. BARJA, G. TURIAN and U.-P. ROOS (1988). Induction of multiple germ tubes in *Neurospora crassa* by antitubulin agents. *Eur. J. Cell Biol.* 46: 68-79.
- CAHN, R. S., C. K. INGOLD and V. PRELOG (1966). Specification of molecular chirality. *Angewand. Chem. int. Edn* 5: 385-415.
- CAIRNS-SMITH, A. G. (1982). *The Genetic Takeover and the Mineral Origins of Life*. Cambridge Univ. Press, Cambridge. 477 pp.
- CALVIN, M. (1974). Solar energy by photosynthesis. *Science* 184: 375-381.
- CALZA, R. E., L. A. ECKHARDT, T. DELGUIDICE and C. L. SCHILDKRAUT (1984). Changes in gene position are accompanied by a change in time replication. *Cell* 36: 689-696.
- CAMPBELL, P. (1987). A superconductivity primer. *Nature* 330: 21-24.
- CANO, C. and J. RUIZ-HERRERA (1988). Developmental stages during the germination of *Mucor* sporangiospores. *Exp. Mycol.* 12: 47-59.
- CAPLAN, M. J., J. L. STOW, A. P. NEWMAN, J. MADRI, H. C. ANDERSON, M. G. FARQUHAR, G. E. PALADE and J. D. JAMIESON (1987). Dependence on pH of polarized sorting of secreted proteins. *Nature* 329: 632-635.
- CAPRA, J. D. and A. B. EDMUNDSON (1977). The antibody combining site. *Sci. Amer.* 236: 50-55.
- CARAFOLI, E. (1981). *Mitochondria and Microsomes*. C. P. Lee, G. Schatz and G. Daller (eds), Addison-Wesley Publ., London. 811 pp.
- CARAS, I. W., G. N. WEDDEL, M. A. DAVITZ, V. NUSSENZWEIG and D. W. MARTINS (1987). Signal for attachment of a phospholipid membrane anchor in decay accelerating factor. *Science* 238: 1280-1283.
- CARLIER, M. F., T. HILL and Y. D. CHEN (1984). Interference of GTP hydrolysis in the mechanism of microtubule assembly: an experimental study. *Proc. Natn. Acad. Sci. U.S.A.* 81: 771-775.
- CARLILE, M. J. (1980). From prokaryote to eukaryote gains and losses. In *The Eukaryotic Microbial Cell*. Pp. 1-40. G. W. Gooday, D. Lloyd and A. P. J. Trinci (eds). *Symp. Soc. Gen. Microbiol.* Vol. 30. Cambridge University Press.
- CARR, D. J. (1984). Positional information and plant morphology. In *Positional Controls in Plant Development*. Pp. 349-374. P. W. Barlow and D. J. Carr (eds), Cambridge Univ. Press. 502 pp.
- CARR, N. C. and B. A. WHITTON (1982). *The Biology of Cyanobacteria*. Blackwell, Oxford. 688 pp.
- CARRIGAN Jr., R. A. and W. P. TROWER (1983). *Magnetic Monopoles*. Plenum (eds), New York. 337 pp.
- CASE, M. E. and N. H. GILES (1958). In Fincham *et al.*, 1979.
- (1964). In Fincham *et al.*, 1979.
- CASPAR, D. L. D. (1980). In Kellenberger, 1984.
- CASPAR, D. L. D. and A. KLUG (1962). Physical principles in the construction of regular viruses. *Cold Spring Harbor Symp. Quant. Biol.* 27: 1-24.
- CASTAN, M. R. (1940). Sur le rôle des hormones animales et végétales dans le développement et l'organogénèse des plantes vasculaires. *Rev. Gén. Bot.* 52: 285-404.
- CAVA, R. J., B. BATLOGG, J. J. KRAJEWSKI, F. FARROW, L. W. RUPP Jr, A. E. WHITE, K. SHORT, W. F. PECK and T. KOMETANI (1988). Superconductivity near 30 K without copper: the $\text{Ba}_{0.6}\text{K}_{0.4}\text{BiO}_3$ perovskite. *Nature* 332: 814-816.
- CECH, T. R. (1986). RNA as an enzyme. *Sci. Amer.* 255: 76-84.
- CECH, T. R. and B. L. BASS (1986). Biological catalysis by RNA. *Ann. Rev. Biochem.* 55: 599-629.

- CHANDEBOIS, R. (1979). The dynamics of wound closure and its role in the programming of planarian regeneration. *Develop. Growth Differ.* 21: 195-204.
- CHANGEUX, J. P. (1969). Remarks on the symmetry and cooperative properties of biological membranes. In *Symmetry and Function of Biological Systems at the Macromolecular Level. Nobel Symposium.* Vol. 11: 235-256.
- CHANGEUX, J. P. and J. P. THIERY (1968). In Changeux, 1969.
- CHAUDHARI, P. (1986). Electronic and magnetic materials. *Sci. Amer.* 255: 157-165.
- CHEN, L. B. (1988). Mitochondrial membrane potential in living cells. *Ann. Rev. Cell Biol.* 4: 155-181.
- CHEN, T. H. and L. F. JAFFE (1979). Forced calcium entry and polarized growth of *Funaria* spores. *Planta* 144: 401-406.
- CHENG, T. P. O. and T. S. REESE (1987). Recycling of plasmalemma in chick tectal growth cones. *J. Neurosci.* 7: 1752-1759.
- CHILD, C. M. (1929). The physiological gradients. *Protoplasma* 5: 447-476.
- (1941). *Patterns and Problems of Development.* Univ. of Chicago Press, Chicago. 811 pp.
- CHU, S., J. E. BJORKHOLM, A. ASHKIN and A. CABLE (1986). Experimental observation of optically trapped atoms. *Phys. Rev. Lett* 57: 314-317.
- CHUNG, K. L., R. Z. HAWIRKO and P. K. ISAAC (1965). Cell wall replication in *Saccharomyces cerevisiae*. *Can. J. Microbiol.* 11: 953-957.
- CITI, S., H. SABANAY, R. JAKES, B. GEIGER and J. KENDRICK-JONES (1988). Cingulin, a new peripheral component of tight junctions. *Nature* 333: 272-276.
- CLARKE, K. J., M. E. MCCULLY and N. K. MIKI (1979). A developmental study of the epidermis of young roots of *Zea mays* L. *Protoplasma* 98: 283-309.
- CLARKE-STURMAN, A. J., A. R. ARCHIBALD, I. J. HANCOCK, C. R. HARWOOD, T. MERAD and J. A. HOBOT (1989). Cell wall assembly in *Bacillus subtilis*: partial conservation of polar wall material and the effect of growth conditions on the pattern of incorporation of new material at the polar caps. *J. Gen. Microbiol.* 135: 657-665.
- CLELAND, R. E. (1982). The mechanisms of auxin-induced proton efflux. In *Plant Growth Substances 1982.* Pp. 23-31. P. F. Wareing (ed.), Academic Press, London, New York. 683 pp.
- CLUTTERBUCK, A. J. (1969). A mutational analysis of conidial development in *Aspergillus nidulans*. *Genetics* 63: 317-327.
- COHEN, S. M., G. BRÖNNER, F. KÜTTNER, G. JÜRGENS and H. JÄCKLE (1989). *Distal-less* encodes a homeodomain protein required for limb development in *Drosophila*. *Nature* 338: 432-434.
- COLE, G. T. (1986). Models of cell differentiation in conidial fungi. *Microbiol. Rev.* 50: 94-132.
- CONDEELIS, J. (1983) Rheological properties of cytoplasm: significance for the organization of spatial information and movement. *Modern Cell Biol.* 2: 225-240.
- CONDEELIS, J., A. HALL, A. BRESNICK, V. WARREN, R. HOCK, H. BENNETT and S. OGIHARA (1988). Actin polymerization and pseudopod extension during amoeboid chemotaxis. *Cell Motil. Cytoskel.* 10: 77-90.
- CONKLIN, E. G. (1905). The organization and cell-lineage of the ascidian egg. *J. Acad. Nat. Sci. Philadelphia* 13: 1-119.
- CONRAD, G. W. and S. E. DAVIS (1980). Polar lobe formation and cytokinesis in fertilized eggs of *Ilyanassa obsoleta*. III. Large bleb formation caused by Sr^{2+} , ionophores X537A and A23187, and compound 48/80. *Dev. Biol.* 74: 152-172.
- CONRAD, G. W. and D. C. WILLIAMS (1974). Polar lobe formation and cytokinesis in fertilized eggs of *Ilyanassa obsoleta*. I. Ultrastructure and effects of cytochalasin B and colchicin. *Dev. Biol.* 36: 363-378.

- COOK, F. S. (1959). Generative cycles of protein and transaminase in the growing corn radicle. *Can. J. Bot.* 37: 621-639.
- CORNISH, E. C., M. A. ANDERSON and A. E. CLARKE (1988). Molecular aspects of fertilization in flowering plants. *Ann. Rev. Cell Biol.* 4: 209-228.
- COUNCE, S. J. (1963). Developmental morphology of polar granules in *Drosophila*. *J. Morphol.* 112: 129-145.
- COWDRY, N. H. (1918). *In Bourne*, 1970.
- COWLEY, D. J. (1986). Polar pocket with nonpolar lining. *Nature* 319: 14-15.
- CRAIG, R. and J. MEGERMANN (1977). Assembly of smooth muscle myosin into side-polar filaments. *J. Cell Biol.* 75: 990-996.
- CRICK, F. (1970). Diffusion in embryogenesis. *Nature* 225: 420-422.
- CRICK, F. *et al.* (1976). *In Eigen et al.*, 1981.
- CROSS, F., L. H. HARTWELL, C. JACKSON and J. B. KONPKA (1988). Conjugation in *Saccharomyces cerevisiae*. *Ann. Rev. Cell Biol.* 4: 429-457.
- CULLIS, P. R. and B. DE KRUIJFF (1979). Lipid polymorphism and the functional roles of lipids in biological membranes. *Biochim. Biophys. Acta* 559: 399-420.
- CZAJA, A. T. (1930). Zellphysiologische Untersuchungen in *Cladophora glomerata*. Isolierung, Regeneration und Polarität. *Protoplasma* 11: 601-627.
- (1935). Polarität und Wuchsstoff. *Ber. Deutsch. Bot. Ges.* 53: 197-220.
- DAHL, G., R. EKERDT and M. GRATZL (1979). Models for exocytotic membrane fusion. *Soc. Exp. Biol. Symp.* 33: 349-368.
- DALCQ, A. and J. PASTEELS (1937). Une conception nouvelle des bases physiologiques de la morphogénèse. *Arch. Biol.* 48: 669-710.
- DANIELLI, J. F. (1953). *Cytochemistry*. John Wiley and Sons, New York.
- DANIELS, M. J. and J. M. LONGLAND (1984). Chemotactic behaviour of *spiroplasmas*. *Curr. Microbiol.* 10: 191-194.
- DANIELS, M. J., J. M. LONGLAND and J. GILBART (1980). Aspects of motility and chemotaxis in *spiroplasmas*. *J. Gen. Microbiol.* 118: 429-436.
- D'ARCY THOMPSON, W. (1942). *On Growth and Form*. 2nd ed. Cambridge Univ. Press.
- DARNELL Jr., J. E. (1985). RNA. *Sci. Amer.* 253: 54-64.
- DARNELL, J., H. LODISH and D. BALTIMORE (1986). *Molecular Cell Biology*. Scientific American Books, New York. 1087 pp.
- DAVENAS, E., F. BEAUVAIS, J. AMARA, M. OBERBAUM, B. ROBINZON, A. MIADONNA, A. TEDESCHI, B. POMERANZ, P. FORTNER, P. BELON, J. SAINTE-LAUDY, B. POITEVIN and J. BENVENISTE (1988). Human basophil degranulation triggered by very dilute antiserum against IgE. *Nature* 333: 816-818.
- DAVID, C. N. and T. HOLSTEIN (1985). The head activator, a neuropeptide controls nerve cells differentiation in hydra. *Arch. Sci. Genève* 38: 461-471.
- DAVIDSON, E. H. (1986). *Gene Activity in Early Development*. 3rd ed. Academic Press, New York, London.
- DAVIDSON, E. H., B. R. HOUGH-EVANS and R. J. BRITTEN (1982). Molecular biology of the sea urchin embryo. *Science* 217: 17-26.
- DAVIES, P. C. W. (1980). Antimatter. *The Sciences* 20: 10-13.
- DAVIS, R. E. and J. F. WORLEY (1973). *Spiroplasma*: motile, helical microorganisms associated with corn stunt disease. *Phytopathology* 63: 403-408.
- DAVSON, H. and J. F. DANIELLI (1943). *The Permeability of Natural Membranes*. Cambridge Univ. Press.

- DAWID, I. B. and T. D. SARGENT (1988). *Xenopus laevis* in developmental and molecular biology. *Science* 240: 1443-1448.
- DAWSON, J. H. (1988). Probing structure-function relations in heme-containing oxygenases and peroxidases. *Science* 240: 433-439.
- DE BRABANDER, M., G. GEUENS, R. WILLEBRODS and J. DE MEY (1980). The microtubule nucleating and organizing activity of kinetochores and centrosomes in living PTK2-cells. In *Microtubule and Microtubule Inhibitors*. Pp. 255-268. M. de Brabander and J. de Mey (eds), Elsevier/North-Holland, Amsterdam. 576 pp.
- DEAN, A. J. (1987). Polarized γ -rays from Vela. *Nature* 330: 524.
- DEBYE, P. J. W. (1912). In Eggert and Hock, 1947.
- DEISENHOFER, J., O. EPP, K. MIKI, R. HUBER and H. MICHEL (1984). X-ray structure analysis of a membrane protein complex. *J. Mol. Biol.* 180: 385-398.
- DEISENHOFER, J., H. MICHEL and R. HUBER (1985). The structural basis of photosynthetic light reactions in Bacteria. *Trends Biochem. Sci.* 10: 243-248.
- DE LOTTO, R. and P. SPIERER (1986). A gene required for the specification of dorsal-ventral pattern in *Drosophila* appears to encode a serine protease. *Nature* 323: 688-692.
- DE LOZANNE, A. (1987). Homologous recombination in *Dictyostelium* as a tool for the study of developmental genes. *Methods Cell Biol.* 28: 489-496.
- DE LOZANNE, A. and J. A. SPUDICH (1987). Disruption of the *Dictyostelium* myosin heavy chain gene by homologous recombination. *Science* 236: 1086-1091.
- DE ROBERTIS, E. D. P., F. A. SAEZ and E. M. F. DE ROBERTIS (1979). Cell Biology. 6th ed., W. B. Saunders Co, Philadelphia. 615 pp.
- DEVREOTES, P. N. and S. H. ZIGMOND (1988). Chemotaxis in eukaryotic cells: a focus on leukocytes and *Dictyostelium*. *Ann. Rev. Cell Biol.* 4: 649-686.
- DICKERSON, R. E., H. R. DREW, B. N. CONNER, R. M. WING, A. V. FRATINI and M. L. KOPKA (1982). The anatomy of A-, B-, and Z-DNA. *Science* 216: 475-485.
- DIGBY, J., R. FIRN and S. CARRINGTON (1982). Studies on the differential growth causing tropic curvatures in shoots. In *Plant Growth Substances 1982*. Pp. 519-528. P. F. Wareing (ed.), Academic Press, London, New York. 683 pp.
- DIRAC, P. (1929-1930). In Davis, 1980.
- DMITRIEVA, S. V. and E. G. RODIONOVA (1971). In Kalakoustskii and Agre, 1976.
- DODD, J. and T. M. JESSELL (1988). Axon guidance and the patterning of neuronal projection in vertebrates. *Science* 242: 692-699.
- DOHMEN, M. R. (1983). The polar lobe in eggs of molluscs and annelids: structure, composition, and function. In *Time, Space and Pattern in Embryonic Development*. Pp. 197-220. W. R. Jeffery and R. A. Raff (eds), Alan R. Liss, New York. 396 pp.
- DOHMEN, M. R. and N. H. VERDONK (1979). The ultrastructure and role of the polar lobe in development of molluscs. In *Determinant of Spatial Organization*. Pp. 3-27. S. T. Subtelny and I. R. Konigsberg (eds), Academic Press, New York. 333 pp.
- DONGEN van C. A. M. (1976). The development of *Dentalium* with special reference to the significance of the polar lobe. *Proc. K. Ned. Akad. Wet. Ser. C* 79: 245-255.
- DOOLITTLE, R. F. (1985). Proteins. *Sci. Amer.* 253: 74-83.
- DOONAN, J. H., D. J. COVE and C. W. LLOYD (1988). Microtubules and microfilaments in tip growth: evidence that microtubules impose polarity on protonemal growth in *Physcomitrella patens*. *J. Cell Sci.* 89: 533-540.
- DOTTI, C. G. and G. A. BANKER (1987). Experimentally induced alteration in the polarity of developing neurons. *Nature* 330: 254-256.

- DOUGHTY, M. J. and B. DIEHN (1982). Photosensory transduction in the flagellated alga *Euglena gracilis*. III. Induction of Ca^{2+} -dependent responses by monovalent cation ionophores. *Biochim. Biophys. Acta* 682: 32-43.
- DREW, H. R., M. J. McCALL and C. R. CALLADINE (1988). Recent studies of DNA in the crystal. *Ann. Rev. Cell Biol.* 4: 1-20.
- DRIESCH, H. (1892). Foundations of Experimental Embryology. English transl., Willier and Oppenheimer (eds), 1964.
- DRIEVER, W. and C. NÜSSEIN-VOLHARD (1988). A gradient of *bicoid* protein in *Drosophila* embryos. *Cell* 54: 83-93.
- DRLICA, K. and J. ROUVIÈRE-YANIV (1987). Histonelike proteins of Bacteria. *Microbiol. Rev.* 51: 301-319.
- DROST-HANSEN, W. (1982). The occurrence and extent of vicinal water. In *Biophysics of Water, Proceed. Work. Confer., Cambridge*. Pp. 163-169. F. Franks (ed.), John Wiley and Sons, New York.
- DUCREUX, G. (1979). Positionnement de l'apex et ontogenèse: essai d'analyse ultrastructurale chez *Chara vulgaris* L. *Rev. Algol.* N. S. XIV, 1: 49-62.
- (1984). Experimental modification of the morphogenetic behavior of the isolated sub-apical cell of *Sphacelaria cirrosa* (Phaeophyceae). *J. Phycol.* 20: 447-454.
- DUMONT, J. N. (1972). Oogenesis in *Xenopus laevis* (Daudin). 1. Stage of oocyte development in laboratory maintained animals. *J. Morph.* 136: 153-180.
- DUNN, G. (1980). Cell polarity in *Bacillus subtilis*: statistical analysis of factors influencing the positions of spores in sister sporangia. *J. Gen. Microbiol.* 116: 33-40.
- DUXBURY, T., B. A. HUMPHREY and K. C. MARSHALL (1980). Continuous observations of bacterial gliding motility in a dialysis microchamber: the effects of inhibitors. *Arch. Microbiol.* 124: 169-175.
- DWORKIN, M. and D. EIDE (1983). *Myxococcus xanthus* does not respond chemotactically to moderate concentration gradients. *J. Bacteriol.* 154: 437-442.
- DYE, J. L. and M. G. DEBACKER (1987). Physical and chemical properties of alkalides and electrides. *Ann. Rev. Physic. Chem.* 38: 271-301.
- EDELMAN, G. M. (1976). Surface modulation in cell recognition and cell growth. *Science* 192: 218-226.
- EGGERT, J. and L. M. HOCK, adapt. franç., M. Boll. (1947). *Traité de Chimie Physique*. Tome III. La Réaction Chimique. Dunod, Paris. 374 pp.
- EGIDY von, T. (1987). Interaction and annihilation of antiprotons and nuclei. *Nature* 328: 773-778.
- EIGEN, M., W. GARDINER, P. SCHUSTER and R. WINKLER-OSWATITSCH (1981). The origin of genetic information. *Sci. Amer.* 244: 78-94.
- ELLIOTT, J. P. and P. G. DAWBER (1979). *Symmetry in Physics*. Macmillan, London.
- EMERSON, R. (1955). The biology of water molds. In *Aspects of Synthesis and Order in Growth*. Pp. 171-208. D. Rudnick (ed.), Princeton Univ. Press.
- EMERSON, S. (1966). Quantitative implications of the DNA-repair model of gene conversion. *Genetics* 53: 475-485.
- EMERSON, S. U., K. TOKUYASU and M. I. SIMON (1970). Bacterial flagella: polarity of elongation. *Science* 169: 190-192.
- EMIN, D. (1982). Small polarons. *Physics Today* 35 (6): 34-40.
- EMMONS, S. W. (1987). Mechanisms of *C. elegans* development. *Cell* 51: 881-883.
- ENDE van den, G., A. F. CROES, A. KEMP, G. W. M. BARENDSE and M. KROH (1984). Floral morphogenesis in thin-layer tissue cultures of *Nicotiana tabacum*. *Physiol. Plant.* 62: 83-88.
- ENGELHARDT, H., H. GAUB and E. SACKMANN (1984). Viscoelastic properties of erythrocyte membranes in high-frequency electric fields. *Nature* 307: 378-380.

- EPEL, D. (1977). The program of fertilization. *Sci. Amer.* 237: 129-138.
- (1980). Ionic triggers in the fertilization of sea urchin eggs. In *Growth Regulation by Ion Fluxes. Ann. N. Y. Acad. Sci.* 339: 74-85.
- ESSER, K. and R. BLAICH (1973). Heterogenic incompatibility in plants and animals. *Adv. Genet.* 17: 107-152.
- ESSER, K. and R. KUENEN (1967). *Genetics of Fungi.* Springer-Verlag, Berlin, Heidelberg, New York.
- ETZOLD, H. (1965). Der Polaritytropismus und Phototropismus der Chloronemen von *Dryopteris filix-mas* (L.) Schott. *Planta* 64: 254-280.
- EUTENEUER, U. and J. R. MCINTOSH (1981a). Polarity of some motility related microtubules. *Proc. Natn. Acad. Sci. U.S.A.* 78: 372-376.
- (1981b). Structural polarity of kinetochore microtubules in PtK₁ cells. *J. Cell Biol.* 89: 338-345.
- EUTENEUER, U. and M. H. SCHLIWA (1985a). Evidence for an involvement of actin in the positioning and motility of centrosomes. *J. Cell Biol.* 101: 96-103.
- (1985b, ed. 1986). The function of microtubules in directional cell movement. In *Dynamic Aspects of Microtubule Biology.* D. Soifer (ed.), *Ann. N. Y. Acad. Sci.* 466: 867-886.
- EVANS, M. L. and T. J. MULKEY (1982). Comparative effects of auxin and abscisic acid on growth hydrogen ion efflux and gravitropism in primary roots of maize. In *Plant Growth Substances, 1982.* Pp. 33-42, P. F. Wareing (ed.), Academic Press. London, New York.
- EVANS, M. L., R. MOORE and K.-H. HASENSTEIN (1986). How roots respond to gravity. *Sci. Amer.* 255: 100-107.
- EYAL-GILADI, H. and B. C. FABIAN (1980). Axis determination in uterine chick blastodiscs under changing spatial positions during the sensitive period for polarity. *Develop. Biol.* 77: 228-232.
- FAJANS, K. (1925). II. Die Eigenschaften salzartiger Verbindungen und Atombau. *Z. Kristall.* 61: 18-48.
- FALCONE, G. and W. J. NICKERSON (1959). Enzymatic reactions involved in cellular division of microorganisms. In *Biochemistry of Morphogenesis.* Pp. 65-70. W. J. Nickerson (ed.), Pergamon Press, London. 260 pp.
- FARAGO, P. S. (1974). Polarized electrons. *Endeavour* 33: 143-148.
- FARQUHAR, M. G. (1985). Progress in unraveling pathways of Golgi traffic. *Ann. Rev. Cell Biol.* 1: 447-488.
- FAVRE, D., J. J. THWAITES and N. H. MENDELSON (1985). Kinetic studies of temperature-induced helix hand inversion in *Bacillus subtilis* macrofibers. *J. Bacteriol.* 164: 1136-1140.
- FAWCETT, D. W. (1981). In Rose and Doms, 1988.
- FÈVRE, M. (1979). Glucanases, glucan synthases and wall growth in *Saprolegnia monoica*. In *Fungal Walls and Hyphal Growth. Brit. Mycol. Soc. Symp.* 2: 225-263. J. H. Burnett and A. P. J. Trinci (eds), Cambridge Univ. Press.
- FINCHAM, J. R. S., P. R. DAY and A. RADFORD (1979). *Fungal Genetics.* 4th ed., Blackwell Sci. Publ., Oxford. 636 pp.
- FINKELSTEIN, A. and O. S. ANDERSEN (1981). The gramicidin A channel: a review of its permeability characteristics with special reference to the single-file aspect of transport. *J. Membr. Biol.* 59: 155-171.
- FISCHER, E. (1891). Ueber die Configuration des Traubenzuckers and seiner Isomeren. *Chem. Ber.* 24: 2683-2687.
- FITTING, H. (1949). Über die Umkehrung der Polarität in den Sporenkeimlingen einiger Laubmoose. *Planta* 37: 635-696.
- FLEMING, G. R., J. L. MARTIN and J. BRETON (1988). Rates of primary electron transfer in photosynthetic reaction centres and their mechanistic implications. *Nature* 333: 190-192.

- FLEMING, T. P. and M. H. JOHNSON (1988). From egg to epithelium. *Ann. Rev. Cell Biol.* 4: 459-485.
- FLORES, J. J., W. A. BONNER and G. A. MASSEY (1977). Asymmetric photolysis of (RS)-leucine with circularly polarized ultraviolet light. *J. Am. Chem. Soc.* 99: 3622-3624.
- FOARD, D. E. (1971). The initial protrusion of a leaf primordium can form without concurrent periclinal cell divisions. *Can. J. Bot.* 49: 1601-1603.
- FOARD, D. E., A. H. HABER and T. N. FISHMAN (1965). Initiation of lateral root primordia without completion of mitosis and without cytokinesis in uniseriate pericycle. *Am. J. Bot.* 52: 580-590.
- FORER, A. (1974). In Sheeler and Bianchi, 1987.
- FRANK, F. C. (1953). On spontaneous asymmetric synthesis. *Biochim. Biophys. Acta* 11: 459-463.
- FRANKE, W. W., W. HERTH, W. J. VANDER WOUDE and D. J. MORRE (1972). Tubular and filamentous structures in pollen tubes: possible involvement as guide elements in protoplasmic streaming and vectorial migration of secretory vesicles. *Planta* 105: 317-341.
- FRANKEL, J. (1984). Pattern formation in ciliated protozoa. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 163-196. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York, London. 626 pp.
- FRANKS, F. and S. MATHIAS (1982). *Biophysics of Water*. John Wiley and Sons, New York. 400 pp.
- FRASER, E. S., C. R. GREEN, H. R. BODE and N. B. GILULA (1987). Selective disruption of gap junctional communication interferes with a patterning process in Hydra. *Science* 237: 49-55.
- FREEMAN, G. (1981). The role of polarity in the development of the hydrozoan planula larva. *Wilhelm Roux's Arch.* 190: 168-184.
- (1983). The role of egg organization in the generation of cleavage patterns. In *Time, Space and Pattern in Embryonic Development*. Pp. 171-196. W. R. Jeffery and R. A. Raff (eds), Alan R. Liss, New York. 396 pp.
- FREEMAN, G. and J. W. LUNDELIUS (1982). The developmental genetics of dextrality and sinistrality in the gastropod *Lymnaea peregra*. *Wilhelm Roux's Arch.* 191: 69-83.
- FREEMAN, J. A., J. M. WEISS, G. J. SNIPES, B. MAYES and J. J. NORDEN (1981). Growth cones of goldfish retinal neurites generate DC currents and orient in an electric field. *Soc. Neurosci. Abstr.* 7: 550.
- FREESE, E. (1981). Initiation of bacterial sporulation. In *Sporulation and Germination*. Pp. 1-12. H. S. Levinson, A. L. Sonenshein and D. J. Tipper (eds), Amer. Soc. Microbiol., Washington, D.C. 318 pp.
- FREESE, E. and J. HEINZE (1984). Metabolic and genetic control of bacterial sporulation. In *The Bacterial Spore*. Vol. 2, pp. 101-173. A. Hurst, G. Gould and J. Dring (eds), Academic Press, London.
- FRENCH, V., P. J. BRYANT and S. V. BRYANT (1976). Pattern regulation in epimorphic fields. *Science* 193: 969-981.
- FREY-WYSSLING, A. and K. MÜHLETHALER (1965). *Ultrastructural Plant Cytology*. Elsevier, Amsterdam. 376 pp.
- FRIEDEN, C. (1985). Actin and tubulin polymerization: the use of kinetic methods to determine mechanism. *Ann. Rev. Biophys. Biophys. Chem.* 14: 189-210.
- FRIGERIO, G., M. BURRI, D. BOPP, S. BAUMGARTNER and M. NOLL (1986). Structure of the segmentation gene *paired* and the *Drosophila* PRD gene set as part of a gene network. *Cell* 47: 735-746.
- FROHNHÖFER, H. G. and C. NÜSSLEIN-VOLHARD (1986). Organization of anterior pattern in the *Drosophila* embryo by the maternal gene *bicoid*. *Nature* 324: 120-125.
- FUJIWARA, T. and S. FUKUI (1975). Unidirectional growth and branch formation in a cell of *Agrobacterium tumefaciens*. In *Growth and Differentiation in Microorganisms. NRI Symposia on Modern Biology*. Pp. 55-113. T. Ishikawa, Y. Maruyama and H. Matsumiya (eds), Univ. Park Press, Baltimore, Tokyo.

- FUKUI, Y. and S. YUMURA (1986). Actomyosin dynamics in chemotactic amoeboid movement of *Dictyostelium*. *Cell Motil. Cytoskel.* 6: 662-673.
- FULTON, A. B. (1984). *The Cytoskeleton. Cellular Architecture and Choreography*. Chapman and Hall, New York, London. 80 pp.
- FULTON, C. (1977). Cell differentiation in *Naegleria gruberi*. *Ann. Rev. Microbiol.* 31: 597-626.
- GABAI, V. L. and A. N. GLAGOLEV (1985). Redox-sensing is the basis of photophobic responses in Cyanobacteria. *FEMS Microbiol. Lett.* 30: 125-129.
- GAFFEY, C. T. and L. J. MULLINS (1959). Ion fluxes during action potential in *Chara*. *J. Physiol.* 144: 505-520.
- GALLOWAY, J. (1987). Evolution of helicity. A cause for reflection? *Nature* 330: 204-205.
- GAMOW, G. (1935). In Barrow and Silk, 1980.
- GARAY, R. (1977). In Nicolis and Prigogine, 1977.
- GARCIA-BELLIDO, A. and J. R. MERRIAM (1971). Clonal parameters of tergite development in *Drosophila*. *Dev. Biol.* 26: 264-276.
- GARNER, C. C., R. P. TUCKER and A. MATUS (1988). Selective localization of messenger RNA for cytoskeletal protein MAP2 in dendrites. *Nature* 336: 674-677.
- GAUTHERET, R. J. (1944). Recherches sur la polarité des tissus végétaux. *Rev. Cytol. Cytophysiol. Vég.* 7: 45-217.
- GAY, J. L. and A. D. GREENWOOD (1966). Structural aspects of zoospore production in *Saprolenia ferax* with particular reference to the cell and vacuolar membranes. In *The Fungus Spore; Colston Papers N° 18*. Pp. 95-108. M. F. Madelin (ed.), Butterworths, London.
- GAY, J. L. and M. MARTIN (1971). An electron microscopic study of bud development in *Saccharomyces cerevisiae*. *Arch. Mikrobiol.* 78: 145-157.
- GEHRING, W. J. (1976). Developmental genetics of *Drosophila*. *Ann. Rev. Genet.* 10: 209-252.
- (1984). Homeotic genes and the control of cell determination. In *Molecular Biology of Development*. Pp. 3-22. Alan R. Liss, New York.
- (1985). The molecular basis of development. *Sci. Amer.* 253: 136-146.
- (1987). Homeoboxes in the study of development. *Science* 236: 1245-1252.
- GEIGY, R. (1931). Action de l'ultra-violet sur le pôle germinal dans l'œuf de *Drosophila melanogaster* (castration et mutabilité). *Rev. Suisse Zool.* 38: 187-288.
- GELLERT, M., K. MIZUUCHI, M. H. O'DEA, H. OHMORI and J. TOMIZAWA (1978). DNA gyrase and DNA supercoiling. *Cold Spring Harbor Symp. Quant. Biol.* 43 (1): 35-40.
- GEORGI, H. (1981). A unified theory of elementary particles and forces. *Sci. Amer.* 244: 40-55.
- GERACE, L. and B. BURKE (1988). Functional organization of the nuclear envelope. *Ann. Rev. Cell Biol.* 4: 335-374.
- GERHART, J. and R. KELLER (1986). Region-specific cell activities in amphibian gastrulation. *Ann. Rev. Cell Biol.* 2: 201-226.
- GERHART, J., S. BLACK, R. GIMLICH and S. SCHARF (1983). Control of polarity in the amphibian egg. In *Time, Space and Pattern in Embryonic Development*. Pp. 261-286. W. R. Jeffery and R. A. Raff (eds), A. R. Liss, New York. 396 pp.
- GERHART, J., G. UBBELS, S. BLACK, K. HARA and M. KIRSCHNER (1981). A reinvestigation of the role of the grey crescent in axis formation in *Xenopus laevis*. *Nature* 292: 511-516.
- GERMOND, J. E., B. HIRT, P. OUDET, M. GROSS-BELLARD and P. CHAMBON (1975). Folding of the DNA double helix in chromatin-like structures from simian virus 40. *Proc. Natn. Acad. Sci. U.S.A.* 72: 1843-1847.

- GERSANI, M. (1987). Vessel differentiation along different tissue polarities. *Physiol. Plant.* 70: 516-522.
- GETZOFF, E. D., J. A. TAINER, P. K. WEINER, P. A. KOLLMAN, J. S. RICHARDSON and D. C. RICHARDSON (1983). Electrostatic recognition between superoxide and copper, zinc superoxide dismutase. *Nature* 306: 287-290.
- GEYER-DUSZYNSKA, I. (1959). Experimental research on chromosome elimination in *Cecidomyiidae* (Diptera). *J. Exp. Zool.* 141: 391-447.
- GIERER, A. and H. MEINHARDT (1972). A theory of biological pattern formation. *Kybernetik* 12: 30-39.
- GIESE, A. C. (1979). Cell Physiology. 5th ed., W. B. Saunders Co, Philadelphia. 609 pp.
- GIRBARDT, M. (1969). Die Ultrastruktur der Apikalregion von Pilzhypen. *Protoplasma* 67: 413-441.
- GLAZER, A. N. (1985). Light harvesting by phycobilisomes. *Ann. Rev. Biophys. Biophys. Chem.* 14: 47-77.
- GÖBEL, U., V. SPETH and W. BREDT (1981). Filamentous structures in adherent mycoplasma cells treated with nonionic detergents. *J. Cell Biol.* 91: 537-543.
- GODELAINE, D. *et al.* (1981). In Farquhar, 1985.
- GOLDANSKII, V. I. (1986). Quantum chemical reactions in the deep cold. *Sci. Amer.* 254: 38-44.
- GOLDEN, J. W. and D. R. WIEST (1988). Genome rearrangement and nitrogen fixation in *Anabaena* blocked by inactivation of *xisA* gene. *Science* 242: 1421-1423.
- GOLDMAN, T., R. J. HUGHES and M. M. NIETO (1988). Gravity and antimatter. *Sci. Amer.* 258: 32-40.
- GOLDSMITH, M. H. M. (1969). Transport of plant growth regulators. In *The Physiology of Plant Growth and Development*. Pp. 127-162. M. B. Wilkins (ed.). McGraw-Hill, London. 695 pp.
- (1977). The polar transport of auxin. *Ann. Rev. Plant Physiol.* 28: 439-478.
- GOLDSTEIN, J. L., M. S. BROWN, R. G. W. ANDERSON, D. W. RUSSELL and W. J. SCHNEIDER (1985). Receptor-mediated endocytosis: concepts emerging from the LDL receptor system. *Ann. Rev. Cell Biol.* 1: 1-39.
- GOMER, R. H. and R. A. FIRTEL (1987). Cell autonomous determination of cell-type choice in *Dictyostelium* development by cell cycle phase. *Science* 237: 758-762.
- GONZALEZ, A., L. RIZZOLO, M. RINDLER, M. ADESNIK, D. D. SABATINI and T. GOTTLIEB (1987). Non-polarized secretion of truncated forms of the influenza hemagglutinin and the vesicular stomatitis virus G protein from MDCK cells. *Proc. Natn. Acad. Sci. U.S.A.* 84: 3738-3742.
- GOODAY, G. W. (1974). Control of development of excised fruit bodies and stipes of *Coprinus cinereus*. *Trans. Br. Mycol. Soc.* 62: 391-399.
- (1983). The hyphal tip. In *Fungal Differentiation. A Contemporary Synthesis*. Pp. 315-356. J. E. Smith (ed.), Marcel Dekker, New York, Basel. 624 pp.
- GOODMAN, E. M. (1982). Cell Biology of *Physarum* and *Didymium*. Vol. 2, pp. 101-128. Academic Press, New York.
- GOODWIN, B. C. (1976). Analytical Physiology of Cells and Developing Organisms. Academic Press, London, New York. 249 pp.
- (1977). Mechanics, fields, and statistical mechanisms in developmental biology. *Proc. Roy. Soc. London, Ser. B.* 199: 407-414.
- (1980). Pattern formation and its regeneration in the Protozoa. In *The Eukaryotic Microbial Cell*. Pp. 377-404. G. W. Gooday, D. Lloyd and A. P. J. Trinci (eds), Cambridge Univ. Press.
- GOODWIN, B. C. and S. PATEROMICHELAKIS (1979). The role of electrical fields, ions and the cortex in the morphogenesis of *Acetabularia*. *Planta* 145: 427-436.
- GORBSKY, G. J., P. J. SAMMAK and G. G. BORISY (1987). Chromosomes move poleward in anaphase along stationary microtubules that coordinately disassemble from their kinetochore ends. *J. Cell Biol.* 104: 9-18.

- GORTER, E. and F. GREDEL (1925). On biomolecular layers of lipoids on the chromocytes of the blood. *J. Exp. Med.* 41: 439-443.
- GOSLIN, K., D. J. SCHREYER, J. H. P. SKENE and G. BANKER (1988). Development of neuronal polarity: GAP-43 distinguishes axonal from dendritic growth cones. *Nature* 336: 672-674.
- GOTO, S. (1982). Multilateral budding in the apiculate yeast genera *Hanseniaspora*, *Nadsonia*, *Saccharomyces*, *Wickerhamia*, and *Kloeckera*. *J. Gen. Appl. Microbiol.* 28: 303-310.
- GOTTLIEB, D. (1953). The physiology of the actinomycetes. In *The sixth Intern. Cong. Microbiol., Rome Symp. on Actinomycetales*. Pp. 122-136.
- (1978). *The Germination of Fungus Spores*. Meadowfield. Durham, England. 166 pp.
- GOTTLIEB, T. A., G. BEAUDRY, L. RIZZOLO, A. COLMAN, M. RINDLER, M. ADESNIK and D. D. SABATINI (1986). Secretion of endogenous and exogenous proteins from polarized MDCK cell monolayers. *Proc. Natn. Acad. Sci. U.S.A.* 83: 2100-2104.
- GOY, M. F., M. S. SPRINGER and J. ADLER (1977). Sensory transduction in *Escherichia coli*: role of a protein methylation reaction in sensory adaptation. *Proc. Natn. Acad. Sci. U.S.A.* 74: 4964-4968.
- GOYESSENS, G. (1976). The nucleolar fibrillar centres in various cell types *in vivo* or *in vitro*. *Cell Tiss. Res.* 173: 315-324.
- GRANICK, S. (1957). Speculations on the origins and evolution of photosynthesis. *Ann. N. Y. Acad. Sci.* 69: 292-308.
- GRANT, P. (1978). *Biology of Developing Systems*. Holt-Saunders International Editions, New York. 720 pp.
- GREEN, P. B. (1980). Organogenesis — a biophysical view. *Ann. Rev. Plant Physiol.* 31: 51-82.
- GREEN, P. B. and R. S. POETHIG (1982). Biophysics of the extension and initiation of plant organs. In *Developmental Order: its Origin and Regulations*. Pp. 485-509. S. Subtelny and P. B. Green (eds), A. R. Liss, New York.
- GREENBERG, O. W. and R. N. MOHAPATRA (1987). Cited by Kinoshita, J. (1988). Roll over, Wolfgang? New experiments seek violations of the Pauli exclusion principle. *Sci. Amer.* 258: 19.
- GREPPIN, H. and B. A. HORWITZ (1975). Floral induction and the effect of red and far-red preillumination on the light-stimulated bioelectric response of Spinach leaves. *Z. Pflanzenphysiol.* 75: 243-249.
- GRIFFIN, D. H. (1981). *Fungal Physiology*. John Wiley and Sons, New York. 383 pp.
- GRIFFITHS, G. and K. SIMONS (1986). The *trans* Golgi network: sorting at the exit site of the Golgi complex. *Science* 234: 438-443.
- GRISON, R. and P.-E. PILET (1978). Analyse critique des peroxydases de la racine de Maïs. *Pl. Sci. Lett.* 13: 213-218.
- GROVE, S. N. (1978). The cytology of hyphal tip growth. In *The Filamentous Fungi*. Vol. III. Pp. 28-50. J. E. Smith and D. R. Berry (eds), Edward Arnold, London.
- GROVE, S. N., C. E. BRACKER and D. J. MORRE (1968). Cytoplasmic differentiation in the endoplasmic reticulum — Golgi apparatus — vesicle complex. *Science* 161: 171-173.
- (1970). An ultrastructural basis for hyphal tip growth in *Pythium ultimum*. *Am. J. Bot.* 59: 245-266.
- GRUEN, H. E. (1979). Control of rapid stipe elongation by the lamellae in fruit bodies of *Flammulina velutipes*. *Can. J. Bot.* 57: 1121-1135.
- (1982). Control of stipe elongation by the pileus and mycelium in fruitbodies of *Flammulina velutipes* and other Agaricales. In *Basidium and Basidiocarp: Evolution, Cytology, Function and Development*. Pp. 125-155. K. Wells and E. K. Wells (eds), Springer-Verlag, New York.
- GUBB, D. and A. GARCIA-BELLIDO (1982). In Vinson and Adler, 1977.
- GUBBINS, D. (1987). Mechanism for geomagnetic polarity reversals. *Nature* 326: 167-169.

- GUIDICE, G. (1986). *The Sea Urchin Embryo. A Developmental Biological System*. Springer-Verlag, New York. 246 pp.
- GUNNING, B. E. S. (1981). Microtubules and cytomorphogenesis in a developing organ: the root primordium of *Azolla pinnata*. In *Cytomorphogenesis in Plants. Cell Biology Monogr.* Vol. 8, pp. 301-325. O. Kiermayer (ed.). Springer-Verlag, Wien, New York. 439 pp.
- (1982). The root of the water fern *Azolla*: cellular basis of development and multiple roles for microtubules. In *Developmental Order; Its Origin and Regulation*. Pp. 379-421. S. Subtelny and P. B. Green (eds), Alan R. Liss, New York.
- GUNNING, B. E. S., A. R. HARDHAM and J. E. HUGHES (1978). Pre-prophase bands of microtubules in all categories of formative and proliferative cell division in *Azolla* roots. *Planta* 143: 145-160.
- GURDON, J., T. MOHUN, S. FAIRMAN and S. BRENNAN (1985). All components required for the eventual activation of muscle-specific actin genes are localized in the subequatorial region of an uncleaved amphibian egg. *Proc. Natl. Acad. Sci. U.S.A.* 82: 139-143.
- GUTH, A. H. (1983). In Waldrop, M. M. (1983). The new inflationary Universe. *Science* 219: 375-377.
- GUY, H. R. and F. HUCHO (1987). The ion channel of the nicotinic acetylcholine receptor. *Trends Neurosci.* 10: 318-321.
- HAARER, B. K. and J. R. PRINGLE (1987). Immunofluorescence localization of the *Saccharomyces cerevisiae cdc12* gene product to the vicinity of the 10-nm filaments in the mother-bud neck. *Mol. Cell Biol.* 7: 3678-3687.
- HÄDER, D.-P. (1980). Photosensory transduction chains in procaryotes. In *Photoreception and Sensory Transduction in Aneural Organisms*. Pp. 355-372. F. Lenci and G. Colombetti (eds). Nato Adv. Study Inst. Ser. (Life Sci.). Vol. 33. Plenum Press, New York and London. 422 pp.
- (1982). Gated ion fluxes involved in photophobic responses of the blue-green alga, *Phormidium uncinatum*. *Arch. Microbiol.* 131: 77-80.
- (1987). Photosensory behavior in Procaryotes. *Microbiol. Rev.* 51: 1-21.
- HÄDER, D.-P. and U. BURKART (1983). Optical properties of *Dictyostelium discoideum* pseudoplasmodia responsible for phototactic orientation. *Exp. Mycol.* 7: 1-8.
- HAFEN, E., A. KUROIWA and W. J. GEHRING (1984). Spatial distribution of transcripts from the segmentation gene *fushi tarazu* during *Drosophila* embryonic development. *Cell* 37: 833-841.
- HAIMO, L. T., B. R. TELZER and J. L. ROSENBAUM (1979). Dynein binds to and cross-bridges cytoplasmic microtubules. *Proc. Natn. Acad. Sci. U.S.A.* 76: 5759-5763.
- HALBSGUTH, W. (1953). Über die Entwicklung der Dorsiventralität bei *Marchantia polymorpha* L. *Ber. Deutsch. Bot. Ges.* 91: 696-716. In Bopp, 1984.
- HALL, A. L., A. SCHLEIN and J. CONDEELIS (1988). Relationship of pseudopod extension to chemotactic hormone-induced actin polymerization in amoeboid cells. *J. Cell Biochem.* 37: 285-299.
- HALPERIN, W. (1978). Organogenesis at the shoot apex. *Ann. Rev. Plant Physiol.* 29: 239-262.
- HALVORSON, H. O. (1965). Sequential expression of biochemical events during intracellular differentiation. *Symp. Soc. Gen. Microbiol.* 15: 343-348.
- HÄMMERLING, J. (1936). Studien zum Polaritätsproblem I-III. *Zool. Jahrb. Abt. Allg. Zool. Physiol. Tiere* 56: 439-486.
- (1955). Neuere Versuche über Polarität und Differenzierung bei *Acetabularia*. *Biol. Zentralbl.* 74: 545-554.
- HARADA, Y., A. NOGUCHI, A. KISHINO and T. YANAGIDA (1987). Sliding movement of single actin filaments on one-headed myosin filaments. *Nature* 326: 805-808.
- HARARI, H. (1983). The structure of quarks and leptons. *Sci. Amer.* 248: 48-60.
- HARDHAM, A. R. (1982). Regulation of polarity in tissues and organs. In *The Cytoskeleton in Plant*

- Growth and Development*. Pp. 377-403. C. W. Lloyd (ed.), Academic Press, London, New York. 457 pp.
- HAROLD, F. M. (1977). Ion currents and physiological functions in microorganisms. *Ann. Rev. Microbiol.* 31: 181-203.
- (1986). *The Vital Force: A study of Bioenergetics*. W. H. Freeman and Company, New York.
- HAROLD, F. M., J. H. CALDWELL and W. J. A. SCHREURS (1987). Endogenous electric currents and polarized growth of fungal hyphae. In *Spatial Organization in Eukaryotic Microbes*. R. K. Poole and A. P. J. Trinci (eds), special publications of Soc. Gen. Microbiol., Cambridge Univ. Press.
- HARRISON, R. G. (1936). Relations of symmetry in the developing embryo. *Collecting Net* 2.
- HARTWELL, L. H. (1974). *Saccharomyces cerevisiae* cell cycle. *Bacteriol. Rev.* 38: 164-198.
- HASELKORN, R., S. E. CURTIS, J. W. GOLDEN, P. J. LAMMERS, S. A. NIERZWICKI-BAUER, S. J. ROBINSON and N. E. TUMER (1978). Organization and transcription of *Anabaena* genes regulated during heterocyst differentiation. In *Molecular Biology of Microbial Differentiation*. Pp. 261-266. J. A. Hoch and P. Setlow (eds), Amer. Soc. Microbiol., 1985, Washington, D.C.
- HASHIMOTO, C., K. L. HUDSON and K. V. ANDERSON (1988). The *Toll* gene of *Drosophila*, required for dorsal-ventral embryonic polarity, appears to encode a transmembrane protein. *Cell* 52: 269-279.
- HAUPT, W. (1957). Die Induktion der Polarität bei der Spore von *Equisetum*. *Planta* 49: 61-90.
- (1980). Localization and orientation of photoreceptor pigments. Pp. 155-172. Sensory transduction and photobehaviors: final considerations and emerging themes. Pp. 397-404. In *Photoreception and Sensory Transduction in Aneural Organisms*. F. Lenzi and G. Colombetti (eds), Nato Adv. Study Inst. Ser. (Life Sci.). Vol. 33. Plenum Press, New York and London. 422 pp.
- HAYASHIBE, M. (1975). Cytodifferentiation in the cell cycle of yeasts. In *Growth and Differentiation in Microorganisms. NRI Symposia on Modern Biology*. Pp. 165-191. T. Ishikawa, Y. Maruyama and H. Matsumiya (eds), Univ. Park Press, Baltimore, Tokyo.
- HAZEN, R. M. (1988). Perovskites. *Sci. Amer.* 258: 52-61.
- HEGNER, R. W. (1908). Effects of removing the germ-cell determinants from the eggs of some *Chrysomelid* beetles. *Biol. Bull. Woodshole* 16: 19-26.
- HEIDEMANN, S. T. and J. R. MCINTOSH (1980). Visualization of the structural polarity of microtubules. *Nature* 286: 517-519.
- HEINEMANN, U. and W. SAENGER (1982). Specific protein-nucleic acid recognition in ribonuclease T₁-2'-guanylic acid complex: an X-ray study. *Nature* 299: 27-31.
- HEITZ, E. (1940). Die Polarität keimender Moossporen. *Verh. Schweiz Naturforsch. Ges. (Locarno)* 120: 168-170.
- HEJNOWICZ, Z. and A. SIEVERS (1971). In Sievers and Schnepf, 1981.
- HERSKOWITZ, I. (1987). Functional inactivation of genes by dominant negative mutations. *Nature* 329: 219-222.
- HERTEL, R., T. L. LOMAX and R. BRIGGS (1983). Auxin transport in membrane vesicles from *Cucurbita pepo* L. *Planta* 157: 193-201.
- HESLOP-HARRISON, J. (1979). An interpretation of the hydrodynamics of pollen. *Am. J. Bot.* 66: 737-743.
- (1982). Pollen-stigma interaction in the grasses: a brief review. *N. Z. J. Bot.* 17: 537-546.
- HESS, J. F., R. B. BOURRET and M. I. SIMON (1988). Histidine phosphorylation and phosphoryl group transfer in bacterial chemotaxis. *Nature* 336: 139-143.
- HEY, A. J. G., J. H. MERLIN, M. W. RICKETTS, M. T. VAUGHN and D. C. WILLIAMS (1988). Topological solutions in gauge theory and their computer graphic reproduction. *Science* 240: 1163-1168.
- HICKS, J. B., J. N. STRATHERN and I. HERSKOWITZ (1977). In *DNA Insertion Elements, Plasmids and*

- Episomes*. Pp. 457-462. A. J. Bukhari, J. A. Shapiro, S. L. Adhya (eds), Cold Spring Harbor Laboratory, Cold Spring Harbor.
- HILL, T. L. and M. K. KIRSCHNER (1982). Regulation of microtubule and actin filament assembly-disassembly by associated small and large molecules. *Int. Rev. Cytol.* 84: 185-234.
- HILLE, B. (1984). *Ionic Channels of Excitable Membranes*. Sinauer, Sunderland, MA.
- HILLMAN, J. R. (1986). Apical dominance and correlation by hormones. In *Plant Growth Substances 1985*. Pp. 341-349. M. Bopp (ed.), Springer-Verlag, Berlin, Heidelberg, New York. 420 pp.
- HINRICHSEN, R. D., A. BURGESS-CASSLER, B. C. SOLTVEDT, T. HENNESSEY and C. KUNG (1986). Restoration by calmodulin of a Ca^{2+} -dependent K^+ current missing in a mutant of *Paramecium*. *Science* 232: 503-506.
- HIPPEL VON, P. H. and O. G. BERG (1986). On the specificity of DNA-protein interactions. *Proc. Natn. Acad. Sci. U.S.A.* 83: 1608-1612.
- HIRSH, D. (1979). Temperature sensitive maternal effect mutants of early development in *Caenorhabditis elegans*. In *Determinants of Spatial Organization*. Pp. 149-165. S. Subtelny and I. R. Konigsberg (eds), Academic Press, New York. 333 pp.
- HITCHINS, A. D. (1978). Polarity and topology of DNA segregation and septation in cells and sporangia of the bacilli. *J. Can. Microbiol.* 24: 104-112.
- HITCHINS, A. D. and R. A. SLEPECKY (1969). Bacterial sporulation as modified prokaryotic cell division. *Nature* 223: 804-807.
- HO, J. and H. D. MCCURDY (1979). Demonstration of positive chemotaxis to cyclic GMP and 5'AMP in *Myxococcus xanthus* by means of a simple apparatus for generating practically stable concentration gradients. *Can. J. Microbiol.* 25: 1214-1218.
- HOANG-VAN, K. and G. TURIAN (1987). Myosin-like and other proteins associated with clathrin-coated vesicles in growing hyphae of *Neurospora crassa*. *Arch. Sci. Genève* 40: 379-382.
- HODGKIN, A. L. and R. D. KEYNES (1953). The mobility and diffusion coefficient of potassium in giant axons from *Sepia*. *J. Physiol.* 119: 513-528.
- HOHL, H. R. and S. T. HAMAMOTO (1977). Ultrastructural changes during zoospore formation in *Phytophthora parasitica*. *Am. J. Bot.* 54: 1131-1139.
- HOHN, T. H. and J. KATSURA (1977). In Kellenberger, 1984.
- HOLDER, N. (1979). Positional information and pattern formation in plant morphogenesis and a mechanism for the involvement of plant hormones. *J. Theor. Biol.* 77: 195-212.
- HOLLENBECK, P. J. (1988). Kinesin: its properties and possible functions. *Protoplasma* 145: 145-152.
- HONIG, B. H., W. L. HUBBELL and R. F. FLEWELLING (1986). Electrostatic interactions in membranes and proteins. *Ann. Rev. Biophys. Biophys. Chem.* 15: 163-193.
- HOOTMAN, S. R. (1986). Neuroendocrine control of secretion in pancreatic and parotid gland acini and the role of Na^+ , K^+ -ATPase activity. *Int. Rev. Cytol.* 105: 129-181.
- HOREAU, A. (1937). In Anet, F. A. L., S. S. Miura, J. Siegel and K. Mislow (1983). "La coupe du roi" and its relevance to stereochemistry. Combination of two homochiral molecules to give an achiral product. *J. Am. Chem. Soc.* 105: 1419-1426.
- HÖRSTADIUS, S. (1973). *Experimental Embryology of Echinoderms*. Oxford Univ. Press (Clarendon), London, New York.
- HOTTA, Y. and S. OSAWA (1958). In Näf, 1962.
- HOUGHTON, J. E., G. A. O'DONOVAN and J. R. WILD (1989). Reconstruction of an enzyme by domain substitution effectively switches substrate specificity. *Nature* 338: 172-174.
- HOWARD, R. J. (1981). Ultrastructural analysis of hyphal tip cell growth in fungi: Spitzenkörper, cytoskeleton and endomembranes after freeze-substitution. *J. Cell Sci.* 48: 89-103.

- HOWARD, R. J. and J. R. AIST (1980). Cytoplasmic microtubules and fungal morphogenesis: ultrastructural effects of methyl benzimidazole-2-yl carbamate determined by freeze-substitution of hyphal tip cells. *J. Cell Biol.* 87: 55-64.
- HTUN, H. and J. E. DAHLBERG (1988). Single strands, triples, and kinks in H-DNA. *Science* 241: 1791-1796.
- HUDSPETH, A. J. (1983). The hair cells of the inner ear. *Sci. Am.* 248: 42-52.
- HUFFAKER, T. C., J. H. THOMAS and D. BOTSTEIN (1988). Diverse effects of β -tubulin mutations on microtubule formation and function. *J. Cell Biol.* 106: 1997-2010.
- HÜLSKAMP, M., C. SCHRÖDER, C. PFEIFLE, H. JÄCKLE and D. TAUTZ (1989). Posterior segmentation of the *Drosophila* embryo in the absence of a maternal posterior organizer gene. *Nature* 338: 629-632.
- HUNTER, G. J., D. H. ROWITCHAND and R. N. PERHAM (1987). Interactions between DNA and coat protein in the structure and assembly of filamentous bacteriophage fd. *Nature* 327: 252-254.
- HUTKINS, R. W., W. R. ELLEFSON and E. R. KASHKET (1987). Betaine transport imparts osmotolerance on a strain of *Lactobacillus acidophilus*. *Appl. Environ. Microbiol.* 53: 2275-2281.
- HUTTNER, W. B., W. SCHIEBLER, P. GREENGARD and P. DE CAMILLI (1983). Synapsin (protein I), a nerve terminal specific phosphoprotein. III. Its association with synaptic vesicles preparation. *J. Cell Biol.* 96: 1374-1388.
- HUXLEY, H. E. (1963). Electron microscope studies on the structure of natural and synthetic protein filaments from striated muscle. *J. Mol. Biol.* 7: 281-308.
- (1969). The mechanism of muscular contraction. *Science* 164: 1356-1366.
- IINO, T. (1969). Polarity of flagellar growth in *Salmonella*. *J. Gen. Microbiol.* 56: 227-239.
- ILLMENSEE, K. and A. P. MAHOWALD (1974). Transplantation of posterior pole plasm in *Drosophila*. Induction of germ cells at the anterior pole of the egg. *Proc. Natn. Acad. Sci. U.S.A.* 71: 1016-1020.
- INGHAM, P. W. (1988). The molecular genetics of embryonic pattern formation in *Drosophila*. *Nature* 335: 25-34.
- INGHAM, P. W., N. E. BAKER and A. MARTINEZ-ARIAS (1988). Regulation of segment polarity genes in the *Drosophila* blastoderm by *fushi tarazu* and *even skipped*. *Nature* 331: 73-75.
- INGRAM, V. M. (1956). A specific chemical difference between the globins of normal and sickle-cell anemia hemoglobin. *Nature* 178: 792-794.
- INOUE, S. (1967). In Sheeler and Bianchi, 1987.
- INOUE, S. and H. J. SATO (1967). Cell motility by labile association of molecules. *J. Gen. Physiol.* 50: 259-285.
- INOUE, S. and H. RITTER (1975). Dynamics of mitotic spindle organization and function in molecules and cell movement. In *Molecules and Cell Movement*. Pp. 3-10. S. Inoué and R. E. Stephens (eds), Raven Press, New York.
- IRISH, V., R. LEHMANN and M. AKAM (1989). The *Drosophila* posterior-group gene *nanos* functions by repressing *hunchback* activity. *Nature* 338: 646-648.
- ITERSON Van, W., J. F. M. HOENIGER and E. N. Van ZANTEN (1967). Basal bodies of the flagella and particular microtubules in swarms of *Proteus mirabilis*. *Antonie Van Leeuwenhoek* 33: 221-225.
- IZZARD, C. S. (1988). A precursor of the focal contact in cultured fibroblasts. *Cell Motil. Cytoskel.* 10: 137-142.
- JACKSON, W. T. and B. C. DOYLE (1982). Membrane distribution in dividing endosperm cells of *Haemanthus*. *J. Cell Biol.* 94: 637-643.
- JACOB, F., S. BRENNER and F. CUZIN (1963). On the regulation of DNA replication in bacteria. *Cold Spring Harbor Symp. Quant. Biol.* 28: 329-348.
- JACOBS, C. W., A. E. M. ADAMS, P. J. SZANISZLO and J. R. PRINGLE (1988). Functions of microtubules in the *Saccharomyces cerevisiae* cell cycle. *J. Cell Biol.* 107: 1409-1426.

- JACOBS, J. A. (1984). Reversal of the Earth's Magnetic Field. Hilger, Bristol. 230 pp.
- JACOBS, M. and P. H. RUBERY (1988). Naturally occurring auxin transport regulators. *Science* 241: 346-349.
- JAFFE, L. F. (1968). Localization in the developing *Fucus* egg and the general role of localizing currents. *Adv. Morphog.* 7: 295-328.
- (1970). On the centripetal course of development, the *Fucus* egg, and self-electrophoresis. *Dev. Biol. Suppl.* 3: 83-111.
- (1979). Control of development by ionic currents. In *Membranes Transduction Mechanisms*. Pp. 199-231. R. A. Cone and J. E. Dowling (eds), Raven Press, New York.
- (1980). Calcium explosions as triggers of development. In *Growth Regulation by Ion Fluxes. Ann. N.Y. Acad. Sci. U.S.A.* 339: 86-101.
- (1981). The role of ion currents in establishing developmental gradients. In *International Cell Biology 1980-1981*. Pp. 507-511. H. G. Schweiger (ed.), Springer-Verlag, Berlin, Heidelberg, New York. 1033 pp.
- (1986). Ion currents in development: an overview. In *Ion Currents in Development*. Pp. 351-357. R. Nuccitelli (ed.), Alan R. Liss, New York.
- JAFFE, L. F. and R. NUCCITELLI (1974). An ultrasensitive vibrating probe for measuring steady extracellular currents. *J. Cell Biol.* 63: 614-628.
- (1977). Electrical controls of development. *Ann. Rev. Biophys. Bioeng.* 6: 445-476.
- JAFFE, L. A., M. H. WEISENSEEL and L. F. JAFFE (1975). Calcium accumulation within the growing tips of pollen tubes. *J. Cell Biol.* 67: 488-492.
- JAGENDORF, A. T. and E. URIBE (1966). ATP formation caused by acid-base transition of spinach chloroplasts. *Proc. Natn. Acad. Sci U.S.A.* 55: 170-177.
- JAMES, A. M. (1957). The electrochemistry of the bacterial surface. *Prog. Biophys. Biophys. Chem.* 8: 96-142.
- JAMES, C. D. and M. LEFFAK (1986). Replication polarity through the avian alpha-globin locus. *Mol. Cell. Biol.* 6: 976-984.
- JEFFERY W. R. (1982). Calcium ionophore polarizes ooplasmic segregation in ascidian eggs. *Science* 216: 545-547.
- (1983). Messenger RNA localization and cytoskeletal domains in ascidian embryos. In *Time, Space and Pattern in Embryonic Development*. Pp. 241-259. W. R. Jeffery and R. A. Raff (eds), A. R. Liss, New York. 396 pp.
- (1984). Spatial distribution of messenger RNA in the cytoskeletal framework of ascidian eggs. *Dev. Biol.* 103: 482-492.
- JEFFERY, W. R. and S. MEIER (1983). A yellow crescent cytoskeletal domain in ascidian eggs and its role in early development. *Dev. Biol.* 96: 125-143.
- JEFFERY, W. R. and R. A. RAFF (1983). *Time, Space and Pattern in Embryonic Development*. Alan R. Liss, New York. 396 pp.
- JENNINGS, D. H. (1986). Morphological plasticity in Fungi. In *Plasticity in Plants*. D. H. Jennings and A. J. Trewavas (eds), *Symp. Soc. Exper. Biol.* 40: 329-346.
- JOHNSON, B. F. (1965). Autoradiographic analysis of regional cell wall of yeasts, *Schizosaccharomyces pombe*. *Exp. Cell Res.* 39: 613-624.
- JOHNSON, B. F., G. B. CALLEJA, B. Y. YOO, M. ZUKER and I. J. McDONALD (1982). Cell division: key to cellular morphogenesis in fission yeast, *Schizosaccharomyces pombe*. *Intern. Rev. Cytol.* 75: 167-208.
- JOHNSON, L. V., M. L. WALSH, B. J. BOCKUS and L. B. CHEN (1981). Monitoring of relative

- mitochondrial membrane potential in living cells by fluorescence microscopy. *J. Cell Biol.* 88: 526-535.
- JOHNSON, M. H. and H. P. M. PRATT (1983). Cytoplasmic localizations and cell interactions in the formation of the mouse blastocyst. In *Time, Space and Pattern in Embryonic Development*. Pp. 287-312. W. R. Jeffery and R. A. Raff (eds), Alan R. Liss, New York. 396 pp.
- JOHNSON, M. H. and C. A. ZIOMEK (1981a). The foundation of two distinct cell lineages within the mouse morula. *Cell* 24: 71-80.
- (1981b). Induction of polarity in mouse 8-cell blastomeres: specificity, geometry and stability. *J. Cell Biol.* 91: 303-308.
- JOHNSON, M. H. *et al.* (1984). In Davidson, 1986.
- JOHNSON, R. G. (1987). Proton pumps and chemiosmotic coupling as a generalized mechanism for neurotransmitter and hormone transport. In *Cellular and Molecular Biology of Hormone- and Neurotransmitter-containing Secretory Vesicles*. R. G. Johnson Jr. (ed.). *Ann. New York Acad. Sci.* 493: 162-177.
- JORAN, A. D., B. A. LELAND, P. M. FELKER, A. H. ZEWAIL, J. J. HOPFIELD and P. B. DERVAN (1987). Effect of exothermicity on electron transfer rates in photosynthetic molecular models. *Nature* 327: 508-511.
- JUNGE, W. (1977). Membrane potentials in photosynthesis. *Ann. Rev. Plant Physiol.* 28: 503-536.
- KACZMAREK, L. W. and I. B. LEVITAN, eds (1987). *Neuromodulation. The Biochemical Control of Neuronal Excitability*. Oxford Univ. Press.
- KAHLWEIT, M. (1988). Microemulsions. *Science* 240: 617-621.
- KALAKOUTSKII, L. V. and N. S. AGRE (1976). Comparative aspects of development and differentiation in Actinomycetes. *Bacteriol. Rev.* 40: 469-524.
- KALLIO, P. and J. LEHTONEN (1981). Nuclear control of morphogenesis in *Micrasterias*. In *Cytomorphogenesis in Plants. Cell Biology Monogr.* Vol. 8, pp. 191-213. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 439 pp.
- KALTHOFF, K. (1983). Cytoplasmic determinants in dipteran eggs. In *Time, Space, and Pattern in Embryonic Development*. Pp. 313-348. W. R. Jeffery and R. A. Raff (eds), Alan R. Liss Inc. New York. 396 pp.
- KAMIYA, N. (1981). Physical and chemical basis of cytoplasmic streaming. *Ann. Rev. Plant Physiol.* 32: 205-236.
- KANER, R. D. and A. G. MACDIARMID (1988). Plastics that conduct electricity. *Sci. Amer.* 258: 60-65.
- KARP, G. and N. J. BERRILL (1981). *Development*. 2nd ed. McGraw-Hill, New York.
- KARPLUS, M. and J. A. MCCAMMON (1986). The dynamics of proteins. *Sci. Amer.* 254: 30-39.
- KATAOKA, H. (1975). Phototropism in *Vaucheria geminata*. II. The mechanism of bending and branching. *Plant Cell Physiol.* 16: 439-448.
- KATCHALSKI, E. (1969). Preparation and properties of enzymes immobilized in artificial membranes. In *Symmetry and Function of Biological Systems at the Macromolecular Level. Nobel Symp.* 11: 283-304.
- KATCHALSKI-KATZIR, E., J. RISHPON, E. SAHAR, R. LAMED and Y. I. HENIS (1985). Enzyme diffusion and action on soluble and insoluble substrate biopolymers. *Biopolymers* 24: 257-277.
- KATO, Y. (1957). Experimental studies on rhizoid-differentiation of certain ferns. *Phyton (Buenos Aires)* 9: 25-40.
- KAY, C. J., I. ERICSON, P. GARDESTRÖM, J. M. PALMER and I. M. MÖLLER (1985). Generation and purification of submitochondrial particles of different polarities from plant mitochondria. *FEBS Lett.* 193: 169-174.

- KAY, R. R. and K. A. JERMYN (1983). A possible morphogen controlling differentiation in *Dictyostelium*. *Nature* 303: 242-244.
- KELL, D. G. (1987). Forces, fluxes and the control of microbial growth and metabolism. *J. Gen. Microbiol.* 133: 1651-1665.
- KELLENBERGER, E. (1966). Control mechanisms in bacteriophage morphopoiesis. In *Principles of Biomolecular Organisation*. Pp. 192-226. A CIBA Found. Symp., G. E. W. Wolstenholme and M. O'Connors (eds), Churchill, London.
- (1980). Control mechanisms in the morphogeneses of bacteriophage heads. *BioSystems* 12: 201-223.
- (1984). Form determination of subcellular biological structures as for example viruses. *Helvetica Physica Acta* 57: 188-201.
- KELLY, R. B. (1985). Pathways of protein secretion in Eukaryotes. *Science* 230: 25-32.
- KELVIN, L. (1904). Baltimore Lectures. Clay, London.
- KEMP, J. C., G. D. HENSON, C. T. STEINER, I. S. BEARDSLEY and E. R. POWELL (1987). The optical polarization of the sun measured at a sensitivity of parts in ten million. *Nature* 326: 270-273.
- KEMPF, C. *et al.* (1982). In Attardi and Schatz, 1988.
- KENDE, H. and G. GARDNER (1976). Hormone binding in plants. *Ann. Rev. Plant Physiol.* 27: 267-290.
- KENDREW, J. C., R. E. DICKERSON, B. E. STRANDBERG, R. G. HART, D. R. DAVIES, D. C. PHILLIPS and V. C. SHORE (1960). Structure of myoglobin. A three-dimensional Fourier synthesis at 2 Å resolution. *Nature* 185: 422-427.
- KENDRICK-JONES, J., E. M. SZENTKIRALYI and A. G. SZENT-GYORGYI (1976). Regulatory light chains in myosins. *J. Mol. Biol.* 104: 747-775.
- KENYON, C. (1988). The nematode *Caenorhabditis elegans*. *Science* 240: 1448-1453.
- KENNEDY, M. B. (1988). Synaptic memory molecules. *Nature* 335: 770-772.
- KIERMAYER O. (1981). Cytoplasmic basis of morphogenesis in *Micrasterias*. In *Cytomorphogenesis in Plants. Cell Biol. Monogr.* Vol. 8, pp. 147-189. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 439 pp.
- KILMARTIN, J. V. (1984). Microtubules and actin filaments during the yeast cell cycle. In *Molecular Biology of the Cytoskeleton*. Pp. 185-192. G. G. Borisy, D. W. Cleveland and D. G. Murphy (eds). Cold Spring Harbor. Cold Spring Harbor Laboratory. 512 pp.
- KILMARTIN, J. V. and A. E. M. ADAMS (1984). Structural rearrangements of tubulin and actin during the cell cycle of the yeast *Saccharomyces*. *J. Cell Biol.* 98: 922-933.
- KING, J. *et al.* (1978). In Kellenberger, 1984.
- KIRCHHOFF, H., U. BOLDT, R. ROSENGARTEN and A. KLEIN-STRUCKMEIER (1987). Chemotactic response of a gliding mycoplasma. *Curr. Microbiol.* 15: 57-60.
- KLAR, A. J. L. (1987). Differentiated parental DNA strands confer developmental asymmetry on daughter cells in fission yeast. *Nature* 326: 466-470.
- KLEIN, P. S., T. J. SUN, C. L. SAXE III, A. L. KIMMEL, R. L. JOHNSON and P. N. DEVREOTES (1988). A chemoattractant receptor controls development in *Dictyostelium discoideum*. *Sciences* 241: 1467-1472.
- KLUG, A. (1969). Point groups and the design of aggregates. In *Symmetry and Function of Biological Systems at the Macromolecular Level. Nobel Symp.* 11: 425-436.
- KLUG, A., A. JACK, M. A. WISWAMITRA, O. KENNARD, Z. SHAKKED and T. A. STEITZ (1979). A hypothesis on a specific sequence-dependent conformation of DNA and its relation to the binding of the *lac*-repressor protein. *J. Molec. Biol.* 131: 669-680.
- KNECHT, D. A. and W. F. LOOMIS (1988). Developmental consequences of the lack of myosin heavy chain in *Dictyostelium discoideum*. *Develop. Biol.* 128: 178-184.

- KOCH, A. L. (1985). Bacterial wall growth and division or life without actin. *Trends Biochem. Sci.* 10: 11-14.
- (1988). Biophysics of bacterial walls viewed as stress-bearing fabric. *Microbiol. Rev.* 52: 337-353.
- KOCH, A. L. and I. D. J. BURDETT (1986). Normal pole formation during total inhibition of wall synthesis of *Bacillus subtilis*. *J. Gen. Microbiol.* 132: 3441-3449.
- KONDEPUDI, D. K. and G. W. NELSON (1985). Weak neutral currents and the origin of biomolecular chirality. *Nature* 314: 438.
- KONDOR-KOCH, C., R. BRAVO, S. D. FULLER, D. CUTLER and H. GAROFF (1985). Exocytotic pathways exist to both the apical and basolateral cell surface on the polarized epithelial cell MDCK. *Cell* 43: 297-306.
- KOOP, H.-U. and O. KIEMAYER (1980). Protoplasmic streaming in the giant unicellular green alga *Acetabularia mediterranea* II. Differential sensitivity of movement systems to substances acting on microfilaments and microtubuli. *Protoplasma* 102: 295-306.
- KORN, E. D., M. A. L. ATKINSON, H. BRZESKA, J. A. HAMMER III, G. JUNG and T. J. LYNCH (1987). Structure-function studies on the *Acanthamoeba* myosin isoenzymes. *J. Cell Biochem.* suppl. 11B: 146.
- KORN, L. J. and C. YANOFSKY (1976). Polarity suppressors defective in transcription termination at the attenuator of the tryptophan operon of *Escherichia coli* have altered rho factors. *J. Mol. Biol.* 106: 231-241.
- KOSHLAND, D. E. (1987). Evolution of catalytic function. *Cold Spring Harbor Symp. Quant. Biol.* 52: 1-7.
- KOSHLAND, D. E., T. J. MITCHISON and M. W. KIRSCHNER (1988). Polewards chromosome movement driven by microtubule depolymerization *in vitro*. *Nature* 331: 499-504.
- KREFFT, M., L. VOET, J. H. GREGG, H. MAIRHOFFER and K. L. WILLIAMS (1984). Evidence that positional information is induced to establish the prestalk-prespore pattern in *Dictyostelium discoideum* aggregates. *EMBO J.* 3: 201-206.
- KREIS, T. E., V. J. ALLAN, R. MATTEONI and W. C. HO (1988). Interaction of elements of the Golgi apparatus with microtubules. *Protoplasma* 145: 1563-1569.
- KRISCH, A. D. (1987). Collision between spinning protons. *Sci. Amer.* 257: 32-40.
- KRON, S. J. and J. A. SPUDICH (1986). Fluorescent actin filaments move on myosin fixed to a glass surface. *Proc. Natn. Acad. Sci. U.S.A.* 83: 6272-6276.
- KROPP, D. L. (1986). Electrophysiological properties of *Achlya* hyphae: ionic currents studied by intracellular potential recording. *J. Cell Biol.* 102: 1209-1216.
- KRUIJFF de, B. (1987). Polymorphic regulation of membrane lipid composition. *Nature* 329: 587-588.
- KRYDER, M. H. (1987). Data-storage technologies for advanced computing. *Sci. Amer.* 257: 73-81.
- KUNKEL, J. G. (1986). Dorsoventral currents are associated with vitellogenesis in cockroach ovarioles. In *Ionic Currents in Development*. Pp. 165-172. R. Nuccitelli (ed.), Alan R. Liss, New York.
- KUTSCHERA, U. and W. R. BRIGGS (1987). Differential effect of auxin on *in vivo* extensibility of cortical cylinder and epidermis in pea internodes. *Plant. Physiol.* 84: 1361-1366.
- LAI, E. Y., S. P. REMILLARD and C. FULTON (1984). Tubulin and actin: yin-yang gene expression during *Naegleria* differentiation. In *Molecular Biology of the Cytoskeleton*. Pp. 257-266. G. G. Borisy, D. W. Cleveland and D. B. Murphy (eds), Cold Spring Harbor Laboratory. 512 pp.
- LALLIER, R. (1975). Animalization and vegetalization. In *The Sea Urchin Embryo*. Pp. 473-509. G. Czihak (ed.), Springer-Verlag, Berlin and Heidelberg.
- LALOË, F. and J. H. FREED (1988). The effects of spin in gases. *Sci. Amer.* 258: 70-77.
- LANG, A. (1980). Inhibition of flowering in long-day plants. In *Plant Growth Substances 1979*. Pp. 310-322. F. Skoog (ed.), Springer-Verlag, Berlin, Heidelberg. 527 pp.

- LANGMUIR, I. (1917). In Bourne, 1970.
- LARPENT, J.-P. (1966). Caractères et déterminismes des corrélations d'inhibition dans le mycélium jeune de quelques champignons. *Ann. Sci. Nat.* 7: 1-130.
- LARSEN, A. and P. SYPHERD (1974). In Stewart and Rogers, 1978.
- LATORRE, R., O. ALVAREZ, X. CECCHI and C. VERGARA (1985). Properties of reconstituted ion channels. *Ann. Rev. Biophys. Biophys. Chem.* 14: 79-111.
- LAUFER, J. S., P. BAZZICALUPO and W. B. WOOD (1980). Segregation of developmental potential in early embryos of *Caenorhabditis elegans*. *Cell* 19: 569-577.
- LAWRENCE, P. A. (1970). Polarity and patterns in the postembryonic development of insects. *Adv. Insect Physiol.* 7: 197-265.
- LAZAROW, P. B. and Y. FUJIKI (1985). Biogenesis of peroxisomes. *Ann. Rev. Cell Biol.* 1: 489-530.
- LAZOWSKI, K. (1986). Light induced polarity of *Amoeba proteus*. *Acta Biol. Hung.* 37: 119.
- LEAR, J. D., Z. R. WASSERMAN and W. F. DEGRADO (1988). Synthetic amphiphilic peptide models for protein ion channels. *Science* 240: 1177-1181.
- LEE, J. S. *et al.* (1983). Cited by Evans *et al.*, 1986.
- LEE, T. D. (1988). Symmetries, Asymmetries, and the World of Particles. Univ. of Washington Press, Seattle. 66 pp.
- LEFEBVRE, P. A. and J. L. ROSENBAUM (1986). Regulation of the synthesis and assembly of ciliary and flagellar proteins during regeneration. *Ann. Rev. Cell Biol.* 2: 517-546.
- LEHNINGER, A. L. (1965). The Mitochondrion: Molecular Basis of Structure and Function. W. A. Benjamin, New York. 263 pp.
- (1975). Biochemistry. 2nd ed., Worth, New York.
- (1982). Principles of Biochemistry. Worth, New York. 1011 pp.
- LENHOFF, H. M. and P. TARDENT (1985). From Trembley's polyps to new directions in research on Hydra. Proc. Symp. Honor. Abraham Trembley (1710-1784). *Arch. Sci. Genève* 38: 243-471.
- LENHOFF, H. M., C. RUTHERFORD and H. D. HEATH (1969). Anomalies of growth and form in Hydra: polarity, gradients, and a neoplasia analog. In *Neoplasms and Related Disorders of Invertebrates and Lower Vertebrate Animals*. *Nat. Cancer Inst. Monogr.* 31: 709-737.
- LERNER, R. A. and A. TRAMONTANO (1988). Catalytic antibodies. *Sci. Amer.* 258: 42-50.
- LEVINE, M. (1988). Molecular analysis of dorsal-ventral polarity in *Drosophila*. *Cell* 52: 785-786.
- LEVY, J., J. J. R. CAMPBELL and T. H. BLACKBURN (1973). Introductory Microbiology. John Wiley and Sons, New York. 684 pp.
- LEWIS, J. (1981). Simpler rules for epimorphic regeneration: the polar co-ordinate model without polar co-ordinates. *J. Theor. Biol.* 88: 371-392.
- LINDENMAYER, A. (1984). Positional and temporal control mechanisms in fluorescence development. In *Positional Controls in Plant Development*. Pp. 461-486. P. W. Barlow and D. J. Carr (eds), Cambridge University Press. 502 pp.
- LINTILHAC, P. M. (1984). Positional controls in meristem development: a caveat and an alternative. In *Positional Controls in Plant Development*. Pp. 83-105. P. W. Barlow and D. J. Carr (eds), Cambridge Univ. Press. 502 pp.
- LIPMANN, F. (1946). In *Currents in Biochemical Research*. Pp. 137-148. D. E. Green (ed.), Interscience, New York.
- LISSOUBA, P. and G. RIZET (1960). In Fincham *et al.*, 1979.
- LITTLE, W. A. (1988). Experimental constraints on theories of high-transition temperature superconductors. *Science* 242: 1390-1395.

- LIU, L. F. and J. C. WANG (1978). *Micrococcus luteus* DNA gyrase: Active components and a model for its supercoiling of DNA. *Proc. Natn. Acad. Sci. U.S.A.* 75: 2098-2102.
- (1987). Supercoiling of the DNA template during transcription. *Proc. Natn. Acad. Sci. U.S.A.* 84: 7024-7027.
- LLOYD, C. W. (1987). The plant cytoskeleton. *Ann. Rev. Plant. Physiol.* 38: 119-139.
- LOCKE, M. (1960). The cuticular pattern in an insect — the intersegmental membranes. *J. Exp. Biol.* 37: 398-406.
- LOEB, J. (1970). Note on induced polarization models. *Geoexploration* 8: 105-112.
- LOHS-SCHARDIN, M. L. (1982). *Dicephalic* — a *Drosophila* mutant affecting polarity in follicle organization and embryonic patterning. *Wilhelm Roux's Arch.* 191: 28-36.
- LOHWAG, H. (1941). Anatomie der Asco- und Basidiomyceten. *Handbuch der Pflanzenanatomie.* Bd. 4 (2), Abt. 2, Teilbd. 3C, Borntraeger, Berlin, 572 p.
- LOMBARDI, T., R. MONTESANO, A. WOHLWEND, M. AMHERDT, J.-D. VASSALLI and L. ORCI (1985). Evidence for polarization of plasma membrane domains in pancreatic endocrine cells. *Nature* 313: 694-696.
- LOOMIS, W. F. (1982). The Development of *Dictyostelium discoideum*. Academic Press, New York, London. 551 pp.
- (1986). *Developmental Biology*. Macmillan, New York. 405 pp.
- LOW, M. G. and A. L. SALTIEL (1988). Structural and functional roles of glycosyl-phosphatidylinositol in membranes. *Science* 239: 268-275.
- LOWE, M. A., S. C. HOLT and B. I. EISENSTEIN (1987). Immunoelectron microscopic analysis of elongation of type 1 fimbriae in *Escherichia coli*. *J. Bacteriol.* 169: 157-163.
- LUND, E. J. (1923). Electrical control of organic polarity in the egg of *Fucus*. *Bot. Gaz.* 76: 288-301.
- (1947). *Bioelectric Fields and Growth*. University of Texas Press, Austin. 391 pp.
- LUND, E. J. and W. A. KENYON (1927). Relation between continuous bioelectrical currents and cell respiration. *J. Exp. Zool.* 44: 333-357.
- LUZATTI, V., T. GULIK-KRZYWICKI and A. TARDIEU (1968). Polymorphism of lecithins. *Nature* 218: 1031-1034.
- LYNCH, G. and M. BAUDRY (1984). The biochemistry of memory: a new and specific hypothesis. *Science* 224: 1057-1063.
- MACCLURE, B. A. and T. GUILFOYLE (1989). Rapid redistribution of auxin-regulated RNAs during gravitropism. *Science* 243: 91-93.
- MACDERMOTT, A. J. (1986). Distinguishing true chirality from its accidental imitators. *Nature* 323: 16-17.
- MACDONALD, P. M. and G. STRUHL (1988). *Cis*-acting sequences responsible for anterior localization of *bicoid* mRNA in *Drosophila* embryos. *Nature* 336: 595-598.
- MACGREGOR, R. B. and G. WEBER (1986). Estimation of the polarity of the protein interior by optical spectroscopy. *Nature* 319: 70-73.
- MACWILLIAMS, H. K. (1983). *Hydra* transplantation phenomena and the mechanism of *Hydra* head regeneration. II. Properties of the head activation. *Develop. Biol.* 96: 239-257.
- MADDOX, J. (1987). Physicists about to hi-jack DNA? *Nature* 324: 11.
- MAGNUS, W. (1906). Uber die Formbildung der Hutpilze. *Arch. Biontologie* 1: 85-158.
- MAHLER, H. R. and E. H. CORDES (1969). *Biological Chemistry*. 5th ed. Harper and Row, New York, London. 872 pp.
- MAHOWALD, A. P., C. D. ALLIS, K. M. KARRER, E. M. UNDERWOOD and G. L. WARING (1979). Germ

- plasm and pole cells of *Drosophila*. In *Determinants of Spatial Organization*. Pp. 127-146. S. Subtelny and I. R. Konigsberg (eds), Academic Press, New York.
- MALACINSKI, G. M. (1984). Axis specification in amphibian eggs. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 435-456. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York. 626 pp.
- MALECH, H. L., R. K. ROOT and J. I. GALLIN (1977). Structural analysis of human neutrophil migration. Centriole, microtubule, and microfilament orientation and function during chemotaxis. *J. Cell Biol.* 75: 666-693.
- MANACHÈRE, G., J.-C. ROBERT, R. DURAND, J.-P. BRET and M. FÈVRE (1983). Differentiation in the Basidiomycetes. In *Fungal Differentiation. A Contemporary Synthesis*. Pp. 481-514. J. E. Smith (ed.), Marcel Dekker, New York, Basel. 624 pp.
- MANN, A. K. and H. PRIMAKOFF (1983). Origins of life. In Rubenstein *et al.*, 1983.
- MARCIANO-CABRAL, F. (1988). Biology of *Naegleria* spp. *Microbiol. Rev.* 52: 114-133.
- MARCUM, B. A., R. D. CAMPBELL and J. ROMERO (1977). Polarity reversal in nerve-free Hydra. *Science* 197: 771-772.
- MARGOLIASH, E., S. FERGUSON-MILLER, D. L. BRAUTIGEN and A. H. CHAVIANO (1982). Structure-Function Relationships of Proteins. R. Markham and R. W. Horne (eds), North Holland, Amsterdam.
- MARGOLIS, R. L. and L. WILSON (1978). Opposite end assembly and disassembly of microtubules at steady state in vitro. *Cell* 13: 1-8.
- MARKS, J. and J. S. HYAMS (1985). Localization of F-actin through the cell division cycle of *Schizosaccharomyces pombe*. *Eur. J. Cell Biol.* 39: 27-32.
- MARMÉ, D. (1977). Phytochrome: Membranes as possible site of primary action. *Ann. Rev. Plant Physiol.* 28: 173-198.
- MARSHALL, N. J. (1988). A unique colour and polarization vision system in mantis shrimps. *Nature* 333: 557-560.
- MASON, S. F. (1983). Handedness from symmetry and a stereochemical *coupe du roi*. *Nature* 305: 12-13.
- (1985). Origin of biomolecular chirality. *Nature* 314: 400-401.
- MATLIN, K. S. (1986). Ammonium chloride slows transport of the influenza virus hemagglutinin but does not cause mis-sorting in a polarized epithelial cell line. *J. Biol. Chem.* 261: 15172-15178.
- MATSUOKA, H., S. MATSUMOTO, M. KINOSHITA and S. YAMADA (1988). Effective stage in the cell cycle for control of the budding direction of *cdc* mutants of *Saccharomyces cerevisiae* using electric stimulus. *Biochim. Biophys. Acta* 971: 255-265.
- MATTHEW, J. B. (1985). Electrostatic effects in Proteins. *Ann. Rev. Biophys. Biophys. Chem.* 14: 387-417.
- MAYO, J. S. (1986). Materials for information and communication. *Sci. Amer.* 255: 551-557.
- MCCLAY, D. R., G. W. CANNON, G. M. WESSEL, R. D. FINK and R. B. MARCHASE (1983). Patterns of antigenic expression in early sea urchin development. In *Time, Space, and Pattern in Embryonic Development*. Pp. 157-169. In W. R. Jeffery and R. A. Raff (eds), 396 pp. A. R. Liss Inc., New York.
- MCDANIEL, C. N. (1984a). Shoot meristem development. In *Positional Controls in Plant Development*. Pp. 319-347. P. W. Barlow and D. J. Carr (eds), Cambridge University Press. 502 pp.
- (1984b). Competence, determination, and induction in plant development. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 393-412. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York, London. 626 pp.
- MCINTOSH, J. R. (1984). Mechanisms of mitosis. *Trends Biochem. Sci.* 9: 195-198.
- MCINTOSH, J. R. and U. EUTENEUER (1984). Tubulin hooks as probes for microtubule polarity: an

- analysis of the method and an evaluation of data on microtubule polarity in the mitotic spindle. *J. Cell Biol.* 98: 525-533.
- McKERRACHER, L. J. and I. B. HEATH (1987). Cytoplasmic migration and intracellular organelle movement during tip growth of fungal hyphae. *Exp. Mycol.* 11: 79-100.
- McLAUGHLIN, D. J. (1973). Ultrastructure of sterigma growth and basidiospore formation in *Coprinus* and *Boletus*. *Can. J. Bot.* 51: 145-150.
- (1977). Basidiospore initiation and early development in *Coprinus cinereus*. *Amer. J. Bot.* 64: 1-16.
- McLEOD, K. J., R. C. LEE and H. P. EHRLICH (1987). Frequency dependence of electric field modulation of fibroblast protein synthesis. *Science* 236: 1465-1469.
- McROBBIE, S. J. (1986). Chemotaxis and cell motility in the cellular slime molds. *CRC Crit. Rev. Microbiol.* 13: 335-375.
- McWEENEY, R. (1986). Back to the valence bond. *Nature* 323: 666-667.
- MEINHARDT, H. (1982). *Models of Biological Pattern Formation*. Academic Press, London, New York. 230 pp.
- (1984). Models for pattern formation during development of higher organisms. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 47-72. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York, London. 626 p.
- MEINHARDT, H. and A. GIERER (1974). Application of a theory of biological pattern formation based on lateral inhibition. *J. Cell Sci.* 15: 321-346.
- MEIRING, W. J. (1987). Nuclear β -decay and the origin of biomolecular chirality. *Nature* 329: 712-714.
- MELLMAN, I., R. FUCHS and A. HELENIUS (1986). Acidification of the endocytic and exocytic pathways. *Ann. Rev. Biochem.* 55: 663-700.
- MELTON, D. A. (1987). Translocation of a localized maternal mRNA to the vegetal pole of *Xenopus* oocyte. *Nature* 328: 80-82.
- METRAUX, J.-P. and L. TAIZ (1979). Transverse viscoelastic extension in *Nitella*. II. Effect of acid ions. *Plant Physiol.* 63: 657-659.
- MICKOLS, W., M. F. MAESTRE and I. TINOCO (1987). Differential polarization microscopy of changes in structure in spermatocyte nuclei. *Nature* 328: 452-454.
- MILLER, A. L. and N. A. R. GOW (1989). Correlation between profile of ion-current circulation and root development. *Physiol. Plant.* 75: 102-108.
- MILLER, J. H. and R. H. GREANY (1976). Rhizoid differentiation in fern spores: experimental manipulation. *Science* 193: 687-689.
- MILLER, J. H. and A. R. BASSEL (1980). Effects of caffeine on germination and differentiation in spores of fern *Onoclea sensibilis*. *Physiol. Plant.* 50: 213-220.
- MILLER, J. S., A. J. EPSTEIN and W. M. REIFF (1988). Molecular/organic ferromagnets. *Science* 240: 40-47.
- MITCHELL, P. (1961). Coupling of phosphorylation to electron and hydrogen transfer by a chemi-osmotic type of mechanism. *Nature* 191: 144-148.
- (1966). *Chemiosmotic Coupling in Oxidative and Photosynthetic Phosphorylation*. Glynn Research, Bodmin.
- (1981). From black-box bioenergetics to molecular mechanics: vectorial ligand-conduction mechanisms in biochemistry. In *Chemiosmotic Proton Circuits in Biological Membranes*. In Honor of Peter Mitchell. V. P. Skulachev and P. C. Hinkle (eds), Addison-Wesley Publ., Massachusetts. 633 pp.
- MITCHISON, J. M. (1970). Physiological and cytological methods for *Schizosaccharomyces pombe*. In *Methods Cell Physiol.* 4: 131-165. D. M. Prescott (ed.). Academic Press, New York.

- MITCHISON, T. J. (1988). Microtubule dynamics and kinetochore function in mitosis. *Ann. Rev. Cell Biol.* 4: 527-549.
- MITCHISON, T. J. and M. W. KIRSCHNER (1984). Dynamic instability of microtubule growth. *Nature* 312: 237-242.
- MIYATA, M., T. KANBE and K. TANAKA (1985). Morphological alterations of the fission yeast, *Schizosaccharomyces pombe* in the presence of aculeacin A: spherical wall formation. *J. Gen. Microbiol.* 131: 611-621.
- MIYATA, H., M. MIYATA and B. F. JOHNSON (1986). Patterns of extension growth of the fission yeast, *Schizosaccharomyces pombe*. *Can. J. Microbiol.* 32: 528-530.
- MÖLLER, I. M. (1988). The organization of biological membranes. *Physiol. Plant.* 73: 153-157.
- MONEY, N. P. and C. BROWNLEE (1987). Structural and physiological changes during sporangial development in *Achlya intricata* Beneke. *Protoplasma* 136: 199-204.
- MONOD, J. (1970). *Le Hasard et la Nécessité*. Seuil, Paris.
- MOOR, H. (1967). Endoplasmic reticulum as the initiator of bud formation in yeast (*S. cerevisiae*). *Arch. Mikrobiol.* 57: 135-146.
- MOORE, D. (1981). Evidence that the NADP-linked glutamate dehydrogenase of *Coprinus cinereus* is regulated by acetyl-CoA and ammonium levels. *Biochim. Biophys. Acta* 661: 247-254.
- (1984). Positional control of development in fungi. In *Positional Controls in Plant Development*. Pp. 107-135. P. W. Barlow and D. J. Carr (eds), Cambridge Univ. Press. 502 pp.
- MOORE, T. A., D. GUST, P. MATHIS, J.-C. MIALOCQ, C. CHACHATY, R. V. BENSASSON, E. J. LAND, D. DOIZI, P. A. LIDDELL, W. R. LEHMAN, G. A. NEMETH and A. L. MOORE (1984). Photodriven charge separation in a carotenoporphyrin-quinone triad. *Nature* 307: 630-632.
- MOOSEKER, M. S. (1985). Organization, chemistry, and assembly of the cytoskeletal apparatus of the intestinal brush border. *Ann. Rev. Cell Biol.* 1: 209-241.
- MORAWETZ, H. (1988). Studies of synthetic polymers by nonradiative energy transfer. *Science* 240: 172-176.
- MORGAN, T. H. (1904). *Regeneration*. Macmillan, New York.
- (1927). *Experimental Embryology*. Columbia University Press, New York.
- MORGAN, T. H. and G. B. SPOONER (1909). The polarity of the centrifuged egg. *Arch. Entwickl. Mech. Org.* 28: 104-117.
- MORI, Y., K. MATSUMOTO, T. UEDA and Y. KOBATAKE (1986). Spatio-temporal organization of intracellular ATP content and oscillation patterns in response to the blue light by *Physarum polycephalum*. *Protoplasma* 135: 31-37.
- MORRE, D. J., A. O. BRIGHTMAN, L.-Y. WU, R. BARR, B. LEAK and F. L. CRANE (1988). Role of plasma membrane redox activities in elongation growth in plants. *Physiol. Plant.* 73: 187-193.
- MORRIS, N. R., J. A. WEATHERBEE, J. GAMBINO and L. G. BERGEN (1984). Tubulins of *Aspergillus nidulans*: genetics, biochemistry and function. In *Molecular Biology of the Cytoskeleton*. Pp. 211-222. G. G. Borisy, D. W. Cleveland and D. B. Murphy (eds). Cold Spring Harbor Laboratory. 512 pp.
- MORSE, D. E. and C. YANOFSKY (1969). Polarity and the degradation of mRNA. *Nature* 224: 329-331.
- MOSEBACH, G. (1943). In *Näf*, 1962.
- MOSHER, H. S. and J. D. MORRISON (1983). Current status of asymmetric synthesis. *Science* 221: 1013-1019.
- MOTT, N. F. (1987). Superconductivity ceramics: Is there an explanation? *Nature* 327: 185-186.
- MULKEY, T. J. and M. L. EVANS (1981). Geotropism in corn roots: evidence for its mediation by differential acid efflux. *Science* 212: 70-71.

- MULKEY, T. J., K. M. KUZMANOFF and M. L. EVANS (1981). Correlations between proton-efflux patterns and growth patterns during geotropism and phototropism in maize and sunflower. *Planta* 152: 239-241.
- MÜLLER, W., A. MITZE, J. WICKHORST and H. MEIR-MENGE (1977). Polar morphogenesis in early hydroid development: action of caesium, of neurotransmitters and of an intrinsic head activator on pattern formation. *Wilhelm Roux's Arch.* 182: 311-328.
- MÜLLER-STOLL, W. R. (1952). Über Regeneration and Polarität bei *Enteromorpha*. *Flora* 139: 148-180.
- NÄF, U. (1962). Developmental physiology of lower Archegoniates. *Ann. Rev. Plant Physiol.* 13: 507-532.
- NAJIM, L. and G. TURIAN (1979). Conidiogenous loss of structuro-functional polarity in the hyphal tips of *Sclerotinia fructigena*. *Eur. J. Cell Biol.* 20: 24-27.
- NAKAZAWA, S. (1956). The latent polarity in *Equisetum* spore. *Bot. Mag.* 69: 506-509.
- (1959). Mitochondria diminution in hypertrophied *Equisetum* spores. *Bot. Mag. Tokyo* 72: 23-26.
- (1960). Nature of protoplasmic polarity. *Protoplasma* 52: 274-294.
- NAKAZAWA, S. and Y. YAMAZAKI (1982). Cellular polarity in root epidermis of *Gibasis geniculata*. *Naturwiss.* 69: 396-397.
- NASMYTH, K. and D. SHORE (1987). Transcriptional regulation in the yeast life cycle. *Science* 237: 1162-1170.
- NEEDHAM, J. (1942). *Biochemistry and Morphogenesis*. Cambridge Univ. Press.
- NEFF, N. F., J. H. THOMAS, P. GRISAFI and D. BOTSTEIN (1983). Isolation of the β -tubulin gene from yeast and demonstration of its essential function *in vivo*. *Cell* 33: 211-219.
- NELSON, D. D., G. T. FRASER and W. KLEMPERER (1987). Does ammonia hydrogen bond? *Science* 238: 1670-1674.
- NELSON, D. R. (1986). Quasicrystals. *Sci. Amer.* 255: 33-41.
- NELSON, W. J. and P. VESHNOCK (1986). Dynamics of membrane-skeleton (fodrin) organization during development of polarity in Madin-Darby canine kidney epithelial cells. *J. Cell Biol.* 103: 1751-1765.
- (1987). Ankyrin binding to $(\text{Na}^+ + \text{K}^+)\text{ATPase}$ and implications for the organization of membrane domains in polarized cells. *Nature* 328: 533-536.
- NEUHAUS, J. M., M. WANGER, T. KEISLER and A. WEGNER (1983). Treadmilling of actin. *J. Muscle Res. Cell Motil.* 4: 507-527.
- NEWCOMB, E. H. and H. T. BONNETT Jr. (1965). Cytoplasmic microtubule and wall microfibril orientation in root hairs of radish. *J. Cell Biol.* 27: 575-589.
- NEWTON, A., N. OHTA, E. HUGUENEL and L.-S. CHEN (1985). Approaches to the study of cell differentiation in *Caulobacter crescentus*. In *Molecular Biology of Microbial Differentiation*. Pp. 267-276. J. A. Hoch and P. Setlow (eds), Amer. Soc. Microbiol., 1985, Washington, D.C.
- NICHOLLS, D. G. (1982). *Bioenergetics: An Introduction to the Chemiosmotic Theory*. Academic Press, London, New York. 190 pp.
- NICHOLSON, H., W. J. BECKTEL and B. W. MATTHEWS (1988). Enhanced protein thermostability from designed mutations that interact with α -helix dipoles. *Nature* 336: 651-656.
- NICKERSON, W. J. (1963). Molecular basis of form in yeasts. *Bacteriol. Rev.* 27: 305-324.
- NICKERSON, W. J. and G. FALCONE (1956). Identification of protein disulfide reductase as a cellular division enzyme in yeasts. *Science* 124: 722-723.
- NICOLIS, G. and I. PRIGOGINE (1977). *Self-Organization in Nonequilibrium Systems. From dissipative structures to order through fluctuations*. Wiley-Interscience Publ., New York, London. 491 pp.
- NIENBURG, W. (1924). Die Wirkung des Lichtes auf die Keimung der Equisetumspore. *Ber. Deutsch. Bot. Ges.* 42: 95-99.

- NIEUWKOOP, P. D. (1977). Origin and establishment of embryonic polar axes in amphibian development. *Curr. Top. Develop. Biol.* 11: 115-132.
- NIGGLI, V. and M. M. BURGER (1987). Interaction of the cytoskeleton with the plasma membrane. *J. Membr. Biol.* 100: 97-121.
- NORTH, G. (1985). Mutants without mutations. *Nature* 313: 635.
- NOUGARÈDE, A. (1967). Experimental cytology of the shoot apical cells during vegetative growth and flowering. *Int. Rev. Cytol.* 21: 203-351.
- NOVAK, B. and F. W. BENTRUP (1972). An electrophysiological study of regeneration in *Acetabularia mediterranea*. *Planta* 108: 227-244.
- NOZERAN, R. (1984). Integration of organismal development. In *Positional Controls in Plant Development*. Pp. 375-401. P. W. Barlow and D. J. Carr (eds), Cambridge Univ. Press. 502 pp.
- NUCCITELLI, R. (1978). Ooplasmic segregation and secretion in the *Pelvetia* egg is accompanied by a membrane-generated electrical current. *Dev. Biol.* 62: 13-33.
- (1983). Transcellular ion currents: Signals and effectors of cell polarity. In *Modern Cell Biology*. Vol. 2: *Spatial Organization of Eukaryotic Cells*. Pp. 451-481. J. R. McIntosh (ed.), Alan R. Liss, New York. 451 pp.
- (1984). The involvement of transcellular ion currents and electric fields in pattern formation. In *Pattern Formation. A Primer in development Biology*. Pp. 23-46. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York. 626 pp.
- (1988). Physiological electric fields can influence cell motility, growth, and polarity. *Adv. Cell Biol.* 2: 213-233.
- NUCCITELLI, R., M.-M. POO and L. F. JAFFE (1977). Relations between amoeboid movement and membrane-controlled electrical currents. *J. Gen. Physiol.* 69: 743-763.
- NÜSSLEIN-VOLHARD, C. (1979). Maternal effect mutations that alter the spatial coordinates of the embryo of *Drosophila melanogaster*. In *Determinants of Spatial Organization*. Pp. 185-211. S. Subtelny and I. R. Konigsberg (eds), Academic Press, New York. 333 pp.
- NÜSSLEIN-VOLHARD, C. and E. WIESCHAUS (1980). Mutations affecting segment number and polarity in *Drosophila*. *Nature* 287: 795-801.
- NÜSSLEIN-VOLHARD, C., H. G. FROHNHÖFER and R. LEHMANN (1987). Determination of anteroposterior polarity in *Drosophila*. *Science* 238: 1675-1681.
- OJHA, M. and G. TURIAN (1971). Interspecific transformation and DNA characteristics in *Allomyces*. *Mol. Gen. Genetics*. 112: 49-59.
- (1985). Intracellular adenylate pools and protein degradation during zoosporangial differentiation in *Allomyces arbuscula*. *Physiol. Plant.* 63: 93-98.
- OKUN, L. B., M. B. VOLOSHIN and V. I. ZAKHAROV (1984). Electrical neutrality of atoms and grand unification models. *Phys. Lett.* 138B: 115-120.
- OLAH, G. M. and O. R. REISINGER (1981). Ontogenesis and ultrastructure of spore walls in higher Basidiomycetes. In *The Fungal Spore: Morphogenetic Controls*. Pp. 131-149. G. Turian and H. R. Hohl (eds). Academic Press, London, New York.
- OLIVER, J. M. and R. D. BERLIN (1982). Mechanisms that regulate the structural and functional architecture of cell surfaces. *Int. Rev. Cytol.* 74: 55-94.
- OLSON, L. W. (1984). *Allomyces* — a different fungus. *Opera Bot.* 73: 1-96.
- OLSON, R. A. and H. G. DUBUY (1937). The role of growth substance in the polarity and morphogenesis of *Fucus*. *Am. J. Bot.* 24: 611-615.
- ORCI, L., J.-D. VASSALLI and A. PERRELET (1988). The insulin factory. *Sci. Amer.* 259: 50-61.
- OSTERHOUT, W. J. V. (1922). Injury, Recovery, and Death in Relation to Conductivity and Permeability. J. B. Lippincott, Philadelphia.

- OSTROUMOVA, T. and L. BELOUSOV (1971). Determination of morphological polarity in embryogenesis of hydroid polyps (in Russian). *Z. Obsch. Biol.* 32: 323-331.
- OTT, D. W. and R. M. BROWN (1974a). Developmental cytology of the genus *Vaucheria*. I. Organization of the vegetative filament. *Br. phycol. J.* 9: 111-126.
- OTT, D. W. and R. M. BROWN, Jr. (1974b). Developmental cytology of the genus *Vaucheria*. II. Sporogenesis in *V. fontinalis*. *Br. phycol. J.* 9: 333-351.
- OTWINOWSKI, Z., R. W. SCHEVITZ, R.-G. ZHANG, C. L. LAWSON, A. JOACHIMIAK, R. Q. MARMORSTEIN, B. F. LUISI and P. B. SIGLER (1988). Crystal structure of *trp* repressor/operator complex at atomic resolution. *Nature* 335: 321-329.
- PADDON-ROW, M. N., E. COTSARIS and H. K. PATNEY (1986). The synthesis of rigid norbornylogs for the purpose of studying orbital interactions through bonds. *Tetrahedron* 42: 1779-1788.
- PAGANO, R. E. *et al.* (1986). *In Year Book 86*, Carnegie Institution, Washington, 1987.
- PALEVITZ, B. A. (1982). The stomatal complex as a model of cytoskeletal participation in cell differentiation. In *The Cytoskeleton in Plant Growth and Development*. Pp. 345-376. C. W. Lloyd. Academic Press, London, New York. 457 pp.
- PALEVITZ, B. A. and P. K. HEPLER (1974). The control of the plane of division during stomatal differentiation in *Allium*. I. Spindle reorientation. *Chromosoma* 46: 297-326.
- PALL, M. L. (1977). Cyclic AMP and the plasma membrane potential in *Neurospora crassa*. *J. Biol. Chem.* 252: 7146-7150.
- PALMER, J. D. (1983). Chloroplast DNA exists in two orientations. *Nature* 301: 92-93.
- PANGANIBAN, A. T. and D. FIORE (1988). Ordered interstrand and intrastrand DNA transfer during reverse transcription. *Science* 241: 1064-1069.
- PARSONS, D. F. (1986). High voltage electron microscopy. A. P. Somlyo (ed.), *Ann. N. Y. Acad. Sci.* 483: 158-159.
- PASTEELS, J. (1938). Recherches sur les facteurs initiaux de la morphogénèse chez les amphibiens anoures. I. Résultats de l'expérience de Schultze et leur interprétation. *Arch. Biol.* 49: 629-667.
- (1951). Centre organisateur et potentiel morphogénétique chez les batraciens. *Bull. Soc. Zool. Fr.* 76: 231-270.
- PASTEUR, L. (1884). *Dissymétrie Moléculaire*. Œuvres de Pasteur. Tome Premier. V.-R. Pasteur (ed.), Masson et Cie, Paris, 1922.
- PAULING, L. (1960). *The Nature of the Chemical Bond*. 3rd ed., Cornell Univ. Press, Ithaca, N.Y.
- PAULING, L., H. A. ITANO, S. J. SINGER and I. C. WELLS (1949). Sickle-cell anemia, a molecular disease. *Science* 110: 543-548.
- PAYNE, G. S. and R. SCHEKMAN (1985). A test of clathrin function in protein secretion and cell growth. *Science* 230: 1009-1014.
- PAZNOKAS, J. L. and P. S. SYPHERD (1975). Respiratory capacity, cyclic adenosine 3',5'-monophosphate, and morphogenesis in *Mucor racemosus*. *J. Bacteriol.* 124: 134-139.
- PEARSE, B. M. F. and M. S. BRETSCHER (1981). Membrane recycling by coated vesicles. *Ann. Rev. Biochem.* 50: 85-101.
- PEIFER, M., F. KARCH and W. BENDER (1987). The bithorax complex: control of segmental identity. *Genes Develop.* 1: 891-898.
- PELECH, S. (1989). Cellular security. How anti-cancer genes turn off tumors. *The Sciences*, January/February: 38-44.
- PERUTZ, M. F. (1978). Electrostatic effects in proteins. *Science* 201: 1187-1191.
- PHARIS, R. P. (1978). Interaction of native and exogenous plant hormones in the flowering of woody plants. In *Regulation of Developmental Processes in Plants*. H. R. Schütte and D. Gross (eds), Halle, Saale.

- PICKETT-HEAPS, J. D. (1974). Plant microtubules. In *Dynamic Aspects of Plant Ultrastructure*. Pp. 219-253. A. W. Robards (ed.), McGraw-Hill, Maidenhead, Berks, UK.
- (1983). Morphogenesis in Desmids: our present state of ignorance. In *Modern Cell Biology. Spatial Organization of Eukaryotic Cells*. Vol. 2, pp. 241-258. J. R. McIntosh (ed.), Alan R. Liss, New York. 582 pp.
- PICKETT-HEAPS, J. D., D. H. TIPPIT and K. R. PORTER (1982). Rethinking mitosis. *Cell* 29: 729-744.
- PICTON, J. M. and M. W. STEER (1985). The effects of ruthenium red, lanthanum, fluorescein isothiocyanate and trifluoperazine on vesicle transport, vesicle fusion and tip extension in pollen tubes. *Planta* 163: 20-26.
- PIEPHO, H. (1955). In Vinson and Adler, 1987.
- PIERSON, E. S. (1988). Rhodamine-phalloidin staining of F-actin in pollen after dimethylsulphoxide permeabilization. *Sex. Plant Reprod.* 1: 83-87.
- PIERSON, E. S., J. DERKSEN and J. A. TRAAS (1986). Organization of microfilaments and microtubules in pollen tubes grown *in vitro* or *in vivo* in various angiosperms. *Eur. J. Cell Biol.* 41: 14-18.
- PILET, P.-E. (1961). Gradients de croissance et problèmes auxiniques. II. Etats statique et dynamique. *Bull. Soc. Bot. Suisse* 71: 25-40.
- (1977). Growth inhibitors in growing and geostimulated maize roots. In *Plant Growth Regulation*. Pp. 115-128. P.-E. Pilet (ed.) Springer-Verlag, Berlin.
- (1985). Some physiological properties of protoplasts from gravireacting maize roots. Pp. 226-235. In *The Physiological Properties of Plant Protoplasts*. P.-E. Pilet (ed.), Springer-Verlag, Berlin. 283 pp.
- PILET, P.-E., M. C. ELLIOT and M. M. MALONEY (1979). Endogenous and exogenous auxin in the control of root growth. *Planta* 146: 405-408.
- PIMENTEL, G. C. and A. L. MCCLELLAN (1960). *The Hydrogen Bond*. Freeman, San Francisco.
- PINTO DA SILVA, P. (1972). Translational mobility of the membrane intercalated particles of human erythrocyte membranes, pH dependent reversible aggregation. *J. Cell Biol.* 53: 777-787.
- PLUNKETT, B. E. (1961). The change of tropism in *Polyporus brumalis* tips and effect of directional stimuli on pileus differentiation. *Ann. Bot. N.S.* 25: 206-223.
- POGGIO, T. and C. KOCH (1987). Synapses that compute motion. *Sci. Amer.* 256: 42-48.
- POHL, H. A. (1978). *Dielectrophoresis*. Cambridge University Press.
- (1981). Natural electrical RF oscillation from cells. *J. Bioenerg. Biomembrane* 13: 149-169.
- POLLARD, T. D. (1983). Measurement of rate constants for actin filament elongation in solution. *Anal. Biochem.* 134: 406-412.
- (1984). Calcium Regulation in Biological Systems. *Proc. Takeda Sci. Found Symp. Biosci.*, 1983. Academic, Tokyo.
- POLLITT, N. S. and M. INOUE (1988). Synthesis of an *Escherichia coli* protein carrying a signal peptide mutation causes depolarization of the cytoplasmic membrane potential. *J. Bacteriol.* 170: 2051-2055.
- POOL, R. (1989). Quantum chaos: enigma wrapped in a mystery. *Science* 243: 893-895.
- PORTER, K. R. and M. A. BONNEVILLE (1973). *Fine Structure of Cells and Tissues*. 4th ed., Lea and Febiger.
- PRAT, H. (1948 and 1951). Histo-physiological gradients and plant organogenesis. Parts I and II. *Botanical Rev.* 14: 603-643; 17: 693-746.
- PRENTKI, P. and H. M. KRISCH (1984). *In vitro* insertional mutagenesis with a selectable DNA fragment. *Gene* 29: 303-313.
- PRIGOGINE, I. (1972). La thermodynamique de la vie. *La Recherche* 24: 547-562.
- PRINGLE, J. R., K. COLEMAN, A. ADAMS, S. LILLIE, B. HAARER, C. JACOBS, J. ROBINSON and C. EVANS

- (1985). Cellular morphogenesis in the yeast cell cycle. In *Molecular Biology of the Cytoskeleton*. Pp. 193-209. G. G. Borisy, D. W. Cleveland and D. B. Murphy (eds), Cold Spring Harbor Laboratory, 512 pp.
- PRINGLE, J. R., S. H. LILLIE, A. E. M. ADAMS, C. W. JACOBS, B. K. HAARER, K. G. COLEMAN, J. S. ROBINSON, L. BLOOM and R. A. PRESTON (1986). Cellular morphogenesis in the yeast cell cycle. *UCLA Symp. Mol. Cell. Biol.* 33: 47-80.
- PRIVÉ, G. G., U. HEINEMANN, S. CHANDRASEGARAN, L. S. KAN, M. L. KOPKA and R. E. DICKERSON (1987). Helix geometry, hydration and G·A mismatch in a B-DNA decamer. *Science* 238: 498-504.
- PROBINE, M. C. and R. D. PRESTON (1962). Cell growth and the structure and mechanical properties of the wall in internodal cells of *Nitella opaca*. Mechanical properties of the wall. *J. Exp. Bot.* 13: 11-127.
- PTASHNE, M. (1986). Gene regulation by proteins acting nearby and at a distance. *Nature* 322: 697-701.
- PUGSLEY, E. T. and M. SCHWARTZ (1985). Export and secretion of proteins by bacteria. *FEMS Microbiol. Rev.* 32: 3-38.
- QUATRANO, R. S. (1973). Separation of processes associated with differentiation of two-celled *Fucus* embryos. *Dev. Biol.* 30: 209-213.
- (1978). Development of cell polarity. *Ann. Rev. Plant Physiol.* 29: 487-510.
- QUIOCHO, F. A., J. S. SACK and N. K. VYAS (1987). Stabilization of charges on isolated ionic groups sequestered in proteins by polarized peptide units. *Nature* 329: 561-564.
- RACKER, E. (1957). In Lehninger, 1982.
- RACUSEN, R. H. (1979). Plant biochemistry. What's new in plant physiology? *Physiol. Plant.* 10: 21-24.
- RAFF, R. A. (1983). Localization and temporal control of expression of maternal histone mRNA in sea urchin embryos. In *Time, Space, and Pattern in Embryonic Development*. Pp. 65-86. W. R. Jeffery and R. A. Raff (eds), Alan R. Liss, Inc. New York.
- RAPER, J. R. (1966). Genetics of Sexuality in Higher Fungi. Ronald Press, New York. 283 pp.
- RAPER, K. (1940). Pseudoplasmodium formation and organization in *Dictyostelium discoideum*. *J. Elisha Mitchell Sci. Soc.* 56: 241-282.
- RAPER, K. B. and D. I. FENNELL (1965). The Genus *Aspergillus*. Williams and Wilkins, Baltimore.
- RAPPAPORT, R. and B. N. RAPPAPORT (1974). Establishment of cleavage furrows by the mitotic spindle. *J. Exp. Zool.* 189: 189-196.
- RAYLE, D. L. and R. E. CLELAND (1977). Control of plant cell enlargement by hydrogen ions. *Curr. Topics Dev. Biol.* 11: 187-214.
- REBAGLIATI, M. R. and D. A. MELTON (1987). Antisense RNA injections in fertilized frog eggs reveal an RNA duplex unwinding activity. *Cell* 48: 599-605.
- REBAGLIATI, M. R., D. L. WEEKS, R. P. HARVEY and D. A. MELTON (1986). Identification and cloning of localized maternal RNAs from *Xenopus* eggs. *Cell* 42: 769-777.
- REEVE, W. J. D. (1981). Cytoplasmic polarity develops at compaction in rat and mouse embryos. *J. Embryol. Exp. Morphol.* 62: 351-367.
- REIF, W.-E. (1984). Pattern regulation in shark dentitions. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 603-621. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York. 626 pp.
- REIJNDERS, A. F. M. (1979). Developmental anatomy of *Coprinus*. *Persoonia* 10: 383-424.
- REISS, H.-D. and W. HERTH (1978). Visualization of the Ca²⁺-gradient in growing pollen tubes of *Lilium longiflorum* with chlorotetracycline fluorescence. *Protoplasma* 97: 373-377.
- RICE, S. (1975). Conjectures on the structure of amorphous solid and liquid water. *Fortsch. Chem. Forschung* 60: 109-200.

- RICE, T. M. (1988). Clues from copper-free samples. *Nature* 332: 780.
- RICHMOND, D. V. and R. J. PRING (1971). The effect of benomyl on the fine structure of *Botrytis fabae*. *J. Gen. Microbiol.* 66: 79-94.
- ROBERSON, R. W. and M. S. FULLER (1988). Ultrastructural aspects of the hyphal tip of *Sclerotium rolfsii* preserved by freeze substitution. *Protoplasma* 146: 143-149.
- ROBERTS, R. L., B. BOWERS, M. L. SLATER and E. CABIB (1983). Chitin synthesis and localization in cell division cycle mutants of *Saccharomyces cerevisiae*. *Mol. Cell. Biol.* 3: 922-930.
- ROBERTS, W. M., J. HOWARD and A. J. HUDSPETH (1988). Hair cells: transduction, tuning, and transmission in the inner ear. *Ann. Rev. Cell Biol.* 4: 63-92.
- ROBERTSON, J. D. (1959). The ultrastructure of cell membranes and their derivatives. *Biochem. Soc. Symp.* 16: 3-43. Cambridge Univ. Press.
- ROBERTSON, N. F. (1965). The mechanism of cellular extension and branching. In *The Fungi*. Vol. I, pp. 613-623. G. C. Ainsworth and A. S. Sussman (eds), Academic Press, New York.
- ROBINSON, K. R. and R. CONE (1980). Polarization of fucoïd eggs by a calcium ionophore gradient. *Science* 207: 77-78.
- ROBINSON, K. R. and C. McCAIG (1980). Electrical fields, calcium gradients, and cell growth. In *Growth Regulation by Ion Fluxes*. H. L. Leffert (ed.), *Ann. N.Y. Acad. Sci.* 339: 132-138.
- RODGERS, D. W., R. H. CREPAU and S. J. EDELSTEIN (1987). Pairings and polarities of the 14 strands in sickle cell hemoglobin fibers. *Proc. Natn. Acad. Sci. U.S.A.* 84: 6157-6161.
- RODRIGUEZ-BOULAN, E. and M. PENDERGAST (1980). Polarized distribution of viral envelope proteins in the plasma membrane of infected epithelial cells. *Cell* 20: 45-54.
- ROMANO, A. H. (1966). Dimorphism. In *The Fungi*. Vol. II, pp. 181-209. G. C. Ainsworth and A. S. Sussman (eds), Academic Press, New York.
- ROMANOVICZ, D. K. (1981). Scale formation in flagellates. In *Cytomorphogenesis in Plants. Cell Biology Monographs*. Vol. 8. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 439 pp.
- ROOS, U.-P. (1987). Probing the mechanisms of mitosis with *Dictyostelium discoideum*. *Methods Cell Biol.* 28: 261-279.
- ROOS, U.-P. and G. TURIAN (1977). Hyphal tip organization in *Allomyces arbuscula*. *Protoplasma* 93: 231-247.
- ROOS, U.-P., M. DE BRABANDER and R. NUYDENS (1986). Cell shape and organization of F-actin and microtubules in randomly moving and stationary amebae of *Dictyostelium discoideum*. *Cell Motil. Cytoskel.* 6: 176-185.
- ROSE, A. H. (1968). *Chemical Microbiology*, 2nd ed. Butterworths, London. 312 pp.
- ROSE, K. J. and R. W. DOMS (1988). Regulation of protein export from the endoplasmic reticulum. *Ann. Rev. Cell Biol.* 4: 527-588.
- ROSEN, W. G. *et al.* (1964). In Sievers and Schnepf, 1981.
- ROSENE, H. F. and E. J. LUND (1953). Bioelectric fields and correlation in plants. In *Growth and Differentiation in Plants*. Pp. 219-252. W. Loomis (ed.), Univ. of Iowa Press.
- ROSENGARTEN, R. and H. KIRCHHOFF (1988). Energetic aspects of the gliding motility of Mycoplasmas. *Curr. Microbiol.* 16: 247-252.
- ROSIN, I. V., J. HORNER and D. MOORE (1985). Differentiation and pattern formation in the fruit body cap of *Coprinus cinereus*. In *Developmental Biology of Higher Fungi*. Pp. 333-351. D. Moore, L. A. Casselton, D. A. Wood and J. C. Frankland (eds), Cambridge Univ. Press. 615 pp.
- ROTH, M. G., D. GUNDERSEN, N. PATIL and E. RODRIGUEZ-BOULAN (1987). The large external domain is sufficient for the correct sorting of secreted or chimeric influenza virus hemagglutinins in polarized monkey kidney cells. *J. Cell Biol.* 104: 769-782.

- ROWELL, J. M. (1986). Photonic materials. *Sci. Amer.* 255: 125-134.
- RUBENSTEIN, E., W. A. BONNER, H. P. NOYES and G. S. BROWN (1983). Supernovae and life. *Nature* 306: 118.
- RUBERY, P. H. (1980). The mechanism of transmembrane auxin transport and its relation to the chemiosmotic hypothesis of the polar transport of auxin. In *Plant Growth Substances 1979*. Pp. 50-60. F. Skoog (ed.), Springer-Verlag, Berlin, Heidelberg. 527 pp.
- (1981). Auxin receptors. *Ann. Rev. Plant Physiol.* 32: 569-596.
- RUBERY, P. H. and A. R. SHELDRAKE (1974). Carrier-mediated auxin transport. *Planta* 118: 101-121.
- RUBINO, S., M. FIGHETTI, E. UNGER and P. CAPPUCCINELLI (1984). Location of actin, myosin and microtubular structures during directed locomotion of *Dictyostelium* amoebae. *J. Cell Biol.* 98: 382-390.
- RUBINSTEIN, B. and A. L. STERN (1986). Relationship of transplasmalemma redox activity to proton and solute transport by roots of *Zea mays*. *Plant Physiol.* 80: 805-811.
- RUNNSTRÖM, J. (1975). Integrating factors. In *The Sea Urchin Embryo*. Pp. 646-670. G. Czihak (ed.), Springer-Verlag, Berlin, Heidelberg.
- RUOSLAHTI, E. and M. D. PIERSCHBACHER (1987). New perspectives in cell adhesion: RGD and integrins. *Science* 238: 491-497.
- SABATINI, D. D., E. B. GRIEPP, E. J. RODRIGUEZ-BOULAN, W. J. DOLAN, E. S. ROBBINS *et al.* (1983). Biogenesis of epithelial surface polarity. In *Modern Cell Biology. Spatial Organization of Eukaryotic Cells*. Vol. 2, pp. 419-450. J. R. McIntosh (ed.), Alan R. Liss, New York. 582 pp.
- SACHS, T. (1978). Pattern differentiation in plants. *Differentiation* 12: 65-73.
- (1981). Polarity changes and tissue organization in plants. In *Cell Biology 1980-81*. Pp. 489-496. H. G. Schweiger (ed.), Springer-Verlag, Berlin.
- (1984). Axiality and polarity in vascular plants. In *Positional Controls in Plant Development*. Pp. 193-224. P. W. Barlow and D. J. Carr (eds), Cambridge University Press. 502 pp.
- (1986). Cellular patterns determined by polar transport. In *Plant Growth Substances 1985*. Pp. 231-235. M. Bopp (ed.), Springer-Verlag, Berlin. 420 pp.
- SAENGER, W. (1984). Principles of Nucleic Acid Structure. Springer-Verlag, New York.
- SAGER, R. In J. L. Marx (1986). The yin and yang of cell growth control. *Science* 232: 1093-1095.
- SAIER, M. H. and G. R. JACOBSON (1984). The Molecular Basis of Sex and Differentiation: A comparative Study of Evolution, Mechanism, and Control in Microorganisms. Springer-Verlag, New York, Berlin. 216 pp.
- SALEMME, F. R. (1988). Structural polymorphism in transmembrane channels. *Science* 241: 145 + 230.
- SALI, D., M. BYCROFT and A. R. FERSHT (1988). Stabilization of protein structure by interaction of α -helix dipole with a charged side chain. *Nature* 335: 740-743.
- SALISBURY, F. B. and C. W. ROSS (1985). Plant Physiology. 3rd ed., Wadsworth Publ., Belmont, California. 540 pp.
- SANDE Van de, J. H., N. B. RAMSING, M. W. GERMANN, W. ELHORST, B. W. KALISCH, E. V. KITZING, R. T. PON, R. C. CLEGG and T. H. JOVIN (1988). Parallel stranded DNA. *Science* 241: 551-557.
- SANDER, K. (1984). Embryonic pattern formation in insects: basic concepts and their experimental foundations. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 245-268. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York, London. 626 pp.
- SANGER, J. M. and J. W. SANGER (1980). Banding and polarity of actin filaments in interphase and cleaving cells. *J. Cell Biol.* 86: 568-575.
- SARGENT, M. G. (1978). Surface extension and the cell cycle in prokaryotes. In *Advances in Microbial Physiology*. Vol. 18, pp. 106-176. A. H. Rose and J. G. Morris (eds), Academic Press, London.

- SASSEN, M. M. A. (1964). In Sievers and Schnepf, 1981.
- SAVAGE, B. D. and J. S. MATHIS (1979). In Rubenstein *et al.*, 1983.
- SCHAAP, P. (1986). Regulation of size and pattern in the cellular slime molds. *Differentiation* 33: 1-16.
- SCHALLER, H. C. (1973). Isolation and characterisation of a low molecular weight substance activating head and bud formation in *Hydra*. *J. Embryol. Exp. Morph.* 29: 27-38.
- SCHALLER, H. C. and H. BODENMÜLLER (1981). Isolation and amino acid sequence of a morphogenetic peptide from hydra. *Proc. Natn. Acad. Sci. U.S.A.* 78: 7000-7004.
- SCHATZ, G. (1987). Signals guiding proteins to their correct locations in mitochondria. *Eur. J. Biochem.* 165: 1-6.
- SCHEKMAN, R. (1985). Protein localization and membrane traffic in yeast. *Ann. Rev. Cell Biol.* 1: 115-143.
- SCHERR, G. H. and R. H. WEAVER (1953). The dimorphism phenomenon in yeasts. *Bacteriol. Rev.* 17: 51-92.
- SCHIFFMANN, E. (1982). Leukocytes chemotaxis. *Ann. Rev. Physiol.* 44: 553-568.
- SCHLEGEL, W., B. P. WINIGER, P. MOLLARD, P. VACHER, F. WUARIN, G. R. ZAHND, C. B. WOLLHEIM and B. DUFY (1987). Oscillations of cytosolic Ca^{2+} in pituitary cells due to action potentials. *Nature* 329: 719-721.
- SCHLEIP, W. (1929). Die Determination der primitiven Entwicklung. Akad. Verlag, Leipzig.
- SCHLIWA, M. (1986). The Cytoskeleton. Springer-Verlag Berlin, Heidelberg, 325 pp.
- SCHLIWA, M., K. B. PRYZWANSKY and U. EUTENEUER (1982). Centrosome splitting in neutrophils: an unusual phenomenon related to cell activation and motility. *Cell* 31: 705-717.
- SCHLIWA, M., K. B. PRYZWANSKY and G. G. BORISY (1983). Tumor promoter-induced centrosome splitting in human polymorphonuclear leukocytes. *Eur. J. Cell Biol.* 32: 75-85.
- SCHMID, A. M. M., M. A. BOROWITZKA and B. E. VOLCANI (1981). Morphogenesis and biochemistry of diatom cell wall. In *Cytomorphogenesis in Plants. Cell Biology Monogr.* Vol. 8, pp. 63-97. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 439 pp.
- SCHMIDT, J. M. and M. P. STARR (1982). Ultrastructural features of budding cells in a prokaryote belonging to morphotype IV of *Blastocaulis-Planctomyces* group. *Curr. Microbiol.* 7: 7-11.
- (1984). Unidirectional polar growth of cells of *Seliberia stellata* and aquatic seliberia-like bacteria revealed by immunoferritin labeling. *Arch. Microbiol.* 138: 89-95.
- SCHMIEDEL, G. and E. SCHNEPF (1980). Polarity and growth of caulonema tip cells of the moss *Funaria hygrometrica*. *Planta* 147: 405-413.
- SCHNEPF, E. (1981). Polarity and gradients in tip growing plant cells. In *International Cell Biology 1980/1981*. Pp. 483-488. H. G. Schweiger (ed.), Springer-Verlag. Berlin, Heidelberg, New York.
- (1982). Morphogenesis in moss protonemata. In *The Cytoskeleton in Plant Growth and Development*. Pp. 321-344. C. W. Lloyd (ed.), Academic Press, London. 457 pp.
- (1986). Cellular polarity. *Ann. Rev. Plant. Physiol.* 37: 23-47.
- SCHÖNKNECHT, G., R. HEDRICH, W. JUNGE and K. RASCHKE (1988). A voltage-dependent chloride channel in the photosynthetic membrane of a higher plant. *Nature* 336: 589-592.
- SCHRANK, A. R. (1945). Changes in electrical polarity in the *Avena* coleoptile as an antecedent to hormone action in geotropism response. *Plant Physiol.* 20: 133-136.
- SCHROER, T. A., S. T. BRADY and R. B. KELLY (1985). Fast axonal transport of foreign synaptic vesicles in squid axoplasm. *J. Cell Biol.* 101: 668-572.
- SCHROER, T. A., B. J. SCHNAPP, T. S. REESE and M. P. SHEETZ (1988). The role of kinesin and other soluble factors in organelle movement along microtubules. *J. Cell Biol.* 107: 1785-1792.

- SCHUHMAN, E. and F. BERGTER (1976). Mikroskopische Untersuchungen zur Wachstumskinetik von *Streptomyces hygroscopicus*. *Z. Allg. Mikrobiol.* 16 (3): 201-215.
- SCHUSTER, F. L. (1965). Ultrastructure and morphogenesis of solitary stages of true slime molds. *Protistologica* 1: 49-62.
- SCHUSTER, F. L. and R. TWOMEY (1983). Calcium regulation of flagellation in *Naegleria gruberi*. *J. Cell Sci.* 63: 311-326.
- SCHWARTZ, G. J., J. BARASCH and Q. AL-AWQATI (1985). Plasticity of functional epithelial polarity. *Nature* 318: 368-371.
- SCHWEIGER, H. G. and S. BERGER (1981). Pattern formation in *Acetabularia*. In *Cytomorphogenesis in Plants. Cell Biology Monogr.* Vol. 8, pp. 119-145. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 439 pp.
- SCHWEMMLER, W. (1987). Endocytobionts and mitochondria as determinants of leafhopper egg cell polarity. In *Endocytobiology III. Ann. N.Y. Acad. Sci.* 503: 496-514. J. J. Lee and J. F. Frederik (eds). 590 pp.
- SCOTT, M. P. and P. H. O'FARRELL (1986). Spatial programming of gene expression in early *Drosophila* embryogenesis. *Ann. Rev. Cell Biol.* 2: 49-80.
- SEAGULL, R. W. and I. B. HEATH (1979). The effects of tannic acid on the *in vivo* preservation of microfilaments. *Eur. J. Cell Biol.* 20: 184-188.
- SEGALL, A., M. J. MARHAN and J. R. ROTH (1988). Rearrangement of the bacterial chromosome: forbidden inversions. *Science* 241: 1314-1322.
- SEIDEL, F. (1961). Entwicklungsphysiologische Zentren im Eisystem der Insekten. *Zool. Anz. Suppl.* 24: 121-142.
- SEIFRIZ, W. (1935). The structure of protoplasm. *Bot. Rev.* 1: 18-36.
- (1936). Protoplasm. McGraw-Hill Book Co., 21-25. New York.
- (1938). Recent contributions to the theory of protoplasmic structure. *Science* 88:
- SENN, A. and P.-E. PILET (1980). Isolation and some physiological properties of maize root protoplasts. *Z. Pflanzenphysiol.* 100: 299-310.
- SERRANO, R. (1988). Structure and function of proton translocating ATPase in plasma membranes of plants and fungi. *Biochim. Biophys. Acta* 947: 1-28.
- SETTERFIELD, G. and S. T. BAYLEY (1961). Structure and physiology of cell walls. *Ann. Rev. Plant Physiol.* 12: 35-62.
- SHAPIRO, L. (1985). Generation of polarity during *Caulobacter* cell differentiation. *Ann. Rev. Cell Biol.* 1: 173-207.
- SHAPIRO, L., N. AGABIAN-KESHISHIAN and I. BENDIS (1971). Bacterial differentiation. *Science* 173: 884-892.
- SHARP, P. A. and D. EISENBERG (1987). The evolution of catalytic function. *Science* 238: 729-731.
- SHEELER, P. and D. E. BIANCHI (1987). Cell and Molecular Biology. 3rd ed., John Wiley and Sons, New York. 704 pp.
- SHEETZ, M. P. and J. A. SPUDICH (1983). Movement of myosin-coated structures on actin cables. *Cell Motil. Cytoskel.* 3: 485-489.
- SHIMONY, A. (1988). The reality of the quantum world. *Sci. Amer.* 258: 36-43.
- SHULMAN, R. G. (1983). NMR spectroscopy of living cells. *Sci. Amer.* 248: 76-83.
- SIEVERS, A. (1963a). In Sievers and Schnepf, 1981.
- (1963b). In Sievers and Schnepf, 1981.
- (1965). In Sievers and Schnepf, 1981.
- (1967). In Sievers and Schnepf, 1981.

- SIEVERS, A. and E. SCHNEPF (1981). Morphogenesis and polarity of tubular cells with tip growth. In *Cytomorphogenesis in Plants. Cell Biol. Monogr.* Vol. 8, pp. 265-299. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 439 pp.
- SIEVERS, A. and W. HENSEL (1982). The nature of graviperception. In *Plant Growth Substances 1982*. Pp. 497-506. P. F. Wareing (ed.), Academic Press, London, New York. 683 pp.
- SIGLER, P. B. (1988). Acid blobs and negative noodles. *Nature* 333: 210-212.
- SILVERA, I. F. and J. WALRAVEN (1982). The stabilization of atomic hydrogen. *Sci. Amer.* 246: 56-64.
- SIMKISS, K. (1974). Calcium translocation by cells. *Endeavour* 33 (120): 119-123.
- SIMONCINI, L., M. L. BLOCK and W. J. MOODY (1988). Lineage-specific development of calcium currents during embryogenesis. *Science* 242: 1572-1575.
- SIMONS, K. and S. D. FULLER (1985). Cell surface polarity in epithelia. *Ann. Rev. Cell Biol.* 1: 243-288.
- SINGER, S. J. (1971). The molecular organization of biological membranes. In *Structure and Function of Biological Membranes*. Pp. 145-222. L. I. Rothfield (ed.), Academic Press, New York.
- SINGER, S. J. (1974). The molecular organization of membranes. *Ann. Rev. Biochem.* 43: 805-833.
- SINGER, S. J. and G. L. NICOLSON (1972). The fluid mosaic model of the structure of cell membranes. *Science* 175: 720-731.
- SINGER, S. J. and A. KUPFER (1986). The directed migration of eukaryotic cells. *Ann. Rev. Cell Biol.* 2: 337-365.
- SINNOTT, E. W. (1960). *Plant Morphogenesis*. McGraw-Hill, New York. 550 pp.
- SKULACHEV, V. P. (1980). Integrating functions of biomembranes. Problems of lateral transport of energy, metabolites and electrons. *Biochim. Biophys. Acta* 604: 297-320.
- (1981). The proton cycle: history and problems of the membrane-linked energy transduction, transmission, and buffering. In *Chemiosmotic Proton Circuits in Biological Membranes*. In Honor of Peter Mitchell. Pp. 3-46. V. P. Skulachev and P. C. Hinkle (eds), Addison-Wesley Publ., Massachusetts. 633 pp.
- SLACK, J. M. W. (1976). Determination of polarity in the amphibian limb. *Nature* 261: 44-46.
- (1985). From Egg to Embryo. Determinative Events in Early Development. P. W. Barlow, P. B. Green and C. C. Wylie (eds). *Developmental and Cell Biology Series* 13. Cambridge Univ. Press. 241 pp.
- (1987a). Morphogenetic gradients — past and present. *Trends Biochem. Sci.* 12: 200-204.
- (1987b). We have a morphogen! *Nature* 327: 553-554.
- SLAYMAN, C. L. and C. W. SLAYMAN (1962). Measurement of membrane potentials in *Neurospora*. *Science* 136: 876-877.
- SLEIGHT, A. W. (1988). Chemistry of high-temperature superconductors. *Science* 242: 1519-1527.
- SMALL, J. V. (1981). Organization of actin in the leading edge of cultured cells: influence of osmium tetroxide and dehydration on the ultrastructure of actin meshworks. *J. Cell Biol.* 91: 695-705.
- SMITH, G. M. (1955). *Cryptogamic Botany. Algae and Fungi*. Vol. I. 2nd ed., McGraw-Hill, Tokyo, New York. 546 pp.
- SMITH, H. and D. GRIERSON, eds (1982). *The Molecular Biology of Plant Development. Botanical Monogr.* Vol. 18. Blackwell Scientific Publ., Oxford, London. 617 pp.
- SMITH, S. J. (1988). Neuronal cytomorphology: the actin-based motility of growth cones. *Science* 242: 708-715.
- SOLL, D. R. (1985). *Candida albicans*. In *Fungal Dimorphism: With Emphasis on Fungi Pathogenic for Humans*. Pp. 167-195. P. J. Szanislo (ed.), Plenum Press, New York.
- (1987). The regulation of cellular differentiation in the dimorphic yeast *Candida albicans*. *BioEssays* 5: 5-11.

- SOLOMON, F. (1979). Detailed neurite morphologies of sister neuroblastoma cells are related. *Cell* 16: 165-169.
- SOMMER, J. M., P. D. NATHAN and A. NEWTON (1986). Spatial organization of membrane domains and polar morphogenesis in *Caulobacter crescentus*. *Abstr. Ann. Meet. Amer. Soc. Microbiol.* P. 179.
- SONG, P.-S. (1980). Primary photophysical and photochemical reactions: theoretical background and general introduction. In *Photoreception and Sensory Transduction in Aneural Organisms*. Pp. 189-210. F. Lenci and G. Colombetti (eds), NATO Adv. Stud. Inst. Series A: Life sciences, Vol. 33. Plenum Press, New York, London.
- SÖRENSEN, A. H. and E. UGGERHOJ (1987). Particle production in crystals. *Nature* 327: 558-559.
- SPEKSNIJDER, J., M. MULDER, M. DOHMEN, W. HAGE and J. BLUEMINK (1985). Animal-vegetal polarity in the plasma membrane of a molluscan egg: a quantitative freeze-fracture study. *Dev. Biol.* 108: 38-48.
- SPENGLER, S. J., S. STASIAK and N. R. COZZARELLI (1985). The stereostructure of knots and catenanes produced by phage γ integrative recombination: implications for mechanism and DNA structure. *Cell* 42: 325-334.
- SPERBER, D., K. DRANSFELD, G. MARET and M. H. WEISENSEEL (1981). Oriented growth of pollen tubes in strong magnetic fields. *Naturwiss.* 68: 40-41.
- SPRATT, N. J. and H. HASS (1960). Integrative mechanisms in the development of chick embryo. *J. Exp. Zool.* 145: 97-137.
- STACKEBRANDT, E., W. LUDWIG, W. SCHUBERT, F. KLINK, H. SCHLESNER, T. ROGGENTIN and P. HIRSCH (1984). Molecular genetic evidence for early evolutionary origin of budding peptidoglycan-less eubacteria. *Nature* 307: 735-737.
- STADLER, D. R. and A. M. TOWE (1963). Recombination of allelic cysteine mutants in *Neurospora*. *Genetics* 48: 1323-1344.
- STAHL, E. (1885). Einfluss der Beleuchtungsrichtung auf die Teilung der Equisetumsporen. *Ber. Deutsch. Bot. Ges.* 3: 334-340.
- STANLEY, H. E., J. TEIXEIRA, A. GEIGER and R. L. BLUMBERG (1981). Interpretation of the unusual behavior of H₂O and D₂O at low temperature: are concepts of percolation relevant to the "puzzle of liquid water"? *Physica* 106A: 260-277.
- STEEGE, D. A. and D. G. SÖLL (1979). Suppression. In *Biological Regulation and Development. Gene Expression*. Vol. 1, pp. 433-485. R. F. Goldberger (ed.), Plenum Press, New York, London. 558 pp.
- STEER, M. W. (1988). The role of calcium in exocytosis and endocytosis in plant cells. *Physiol. Plant.* 72: 213-220.
- STEINBERGER, R. and F. H. WESTHEIMER (1951). Metal ion-catalyzed decarboxylation: a model for an enzyme system. *J. Am. Chem. Soc.* 73: 429-435.
- STEINER, A. M. (1967). Action spectra for polarotropism in germlings of a fern and a liverwort. *Naturwiss.* 54: 497-498.
- STEWART, R. (1987). *Dorsal*, an embryonic polarity gene in *Drosophila*, is homologous to the vertebrate proto-oncogene, *c-rel*. *Science* 238: 692-694.
- STEWART, P. R. and P. J. ROGERS (1978). Fungal dimorphism: A particular expression of cell wall morphogenesis. In *The Filamentous Fungi*. Vol. 3, pp. 164-196. J. E. Smith and D. R. Berry (eds), Edward Arnold, London.
- (1983). Fungal dimorphism. In *Fungal Differentiation. A Contemporary Synthesis*. Pp. 267-313. J. E. Smith (ed.), Marcel Dekker, New York, Basel. 624 pp.
- STOSSEL, T. P., C. CHAPONNIER, R. M. EZZELL, J. H. HARTWIG, P. A. JANMEY, D. J. KWIATKOWSKI, S. E. LIND, D. B. SMITH, F. S. SOUTHWICK, H. L. YIN and K. S. ZANER (1985). Nonmuscle actin-binding proteins. *Ann. Rev. Cell Biol.* 1: 353-402.

- STREIBLOVA, E. (1981). Fission. In *Yeast Cell Envelopes: Biochemistry, Biophysics and Ultrastructure*. Vol. 2, pp. 79-92. W. N. Arnolds (ed.), CRC Press, Boca Raton, Florida.
- STREIBLOVA, E. and A. WOLF (1972). Cell wall growth during the cell cycle of *Schizosaccharomyces pombe*. *Z. Allg. Mikrobiol.* 12: 673-684.
- STUECKELBERG, E. C. G. (1938). In Weinberg, 1981.
- STUMP, R. F., K. R. ROBINSON, R. L. HAROLD and F. M. HAROLD (1980). Endogenous electrical currents in the water mold *Blastocladiella emersonii* during growth and sporulation. *Proc. Natn. Acad. Sci. U.S.A.* 77: 6673-6677.
- STURTEVANT, A. H. (1923). Inheritance of direction of coiling in *Limnaea*. *Science* 58: 269-270.
- SÜDHOF, T. C., F. LOTTSPREICH, P. GREENGARD, E. MEHL and R. JAHN (1987). A synaptic vesicle protein with a novel cytoplasmic domain and four transmembrane regions. *Science* 238: 1142-1144.
- SUGRUE, S. P. and E. D. HAY (1981). Response of basal epithelial cell surface and cytoskeleton to solubilized extracellular matrix molecules. *J. Cell Biol.* 91: 45-54.
- SULSTON, J. E., E. SCHIERENBERG, J. G. WHITE and J. N. THOMSON (1983). The embryonic cell lineage of the nematode *Caenorhabditis elegans*. *Dev. Biol.* 100: 64-119.
- SUMPER, M. (1984). Pattern formation during embryogenesis of the multicellular organism *Volvox*. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 197-212. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York. 626 pp.
- SYCH, A. (1982). In Bopp, 1984.
- TAIZ, L. (1984). Plant cell extension: regulation of cell wall mechanical properties. *Ann. Rev. Plant Physiol.* 35: 585-657.
- TAIZ, L., J.-P. METRAUX and P. A. RICHMOND (1981). Control of cell expansion in the *Nitella* internode. In *Cytomorphogenesis in Plants. Cell Biology Monogr.* Vol. 8, pp. 231-263. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 439 pp.
- TAKEUCHI, Y., J. SCHMID, J. H. CALDWELL and F. M. HAROLD (1988). Transcellular ion currents and extension of *Neurospora crassa* hyphae. *J. Membr. Biol.* 101: 33-41.
- TANFORD, C. (1978). The hydrophobic effect and the organization of living matter. *Science* 200: 1012-1018.
- TANNENBAUM, J. (1978). Approaches to the molecular biology of cytochalasin action. In *Cytochalasins Biochemical and Cell Biological Aspects*. S. W. Tannenbaum (ed.), North-Holland, Amsterdam.
- TARDENT, P. (1963). Regeneration in the Hydrozoa. *Biol. Rev.* 38: 293-333.
- TARTAR, V. (1962). Morphogenesis in *Stentor*. *Adv. Morphogen.* 2: 1-26.
- TARTAKOFF, A. M. and P. VASSALLI (1977). Plasma cell immunoglobulin secretion: arrest is accompanied by alterations of the Golgi complex. *J. Exp. Med.* 146: 1332-1345.
- TAUTZ, D. (1988). Regulation of the *Drosophila* segmentation gene *hunchback* by two maternal morphogenetic centres. *Nature* 332: 281-284.
- TAYLOR, D. L. and J. S. CONDEELIS (1979). Cytoplasmic structure and contractility in amoeboid cells. *Int. Rev. Cytol.* 56: 57-144.
- TAYLOR, D. L., J. HEIPLE, Y.-L. WANG, E. J. LUNA, L. TANASUGARN, J. BRIER, J. SWANSON, M. FECHHEIMER, P. AMATO, M. ROCKWELL and G. DALEY (1982). Cellular and molecular aspects of amoeboid movement. *Cold Spring Harbor Symp. Quant. Biol.* 46: 101-111.
- TEISSIER, G. (1931). Etude expérimentale du développement de quelques hydres. *Ann. Sci. Nat. Bot. Zool.* 14: 5-60.
- TEKNIEPE, B. L., J. M. SCHMIDT and M. P. STARR (1982). Immunoferritin labeling shows de novo synthesis of surface components in buds of a prokaryote belonging to morphotype IV of *Blastocaulis-Planctomyces* group. *Curr. Microbiol.* 7: 1-6.

- TELZER, R. B. and L. T. HAIMO (1981). Decoration of spindle microtubules with dynein: evidence for uniform polarity. *J. Cell Biol.* 89: 373-378.
- THALLER, C. and G. EICHELE (1987). Identification and spatial distribution of retinoids in the developing chick limb bud. *Nature* 327: 625-628.
- THIEL, R., W. J. A. SCHREURS and F. M. HAROLD (1988). Transcellular ion currents during sporangium development in the water mold *Achlya bisexualis*. *J. Gen. Microbiol.* 134: 1089-1097.
- THOMAS, L., K. HARTUNG, D. LANGOSCH, H. REHM, E. BAMBERG, W. W. FRANKE and H. BETZ (1988). Identification of synaptophysin as a hexameric channel protein of the synaptic vesicle membrane. *Science* 242: 1050-1053.
- TICKLE, C. (1980). Development in Mammals. Vol. 4, pp. 101-137. M. H. Johnson (ed.), North-Holland, Amsterdam.
- TIROSH, R., N. LIRON and A. OPLATKA (1980). A proposal for the molecular basis of cytoplasmic streaming. In *Cell Motility: Molecules and Organization*. S. Hatano, H. Ishikawa and H. Sato (eds), University Park Press.
- TOKUNAGA, M., K. SUTOH, C. TOYOSHIMA and T. WAKABAYASHI (1987). Location of the ATPase site of myosin determined by three-dimensional electron microscopy. *Nature* 329: 635-638.
- TRAINOR, F. R., J. R. CAIN and L. E. SHUBERT (1976). Morphology and nutrition of the colonial green alga *Scenedesmus*: 80 years later. *Bot. Rev.* 42: 5-25.
- TRAN THANH VAN, M. (1973). Direct flower neof ormation from superficial tissue of small explants of *Nicotiana tabacum* L. *Planta* 115: 87-92.
- TREMBLEY, A. (1744). Mémoires pour servir à l'histoire d'un genre de polypes d'eau douce, à bras en forme de cornes. Verbeek. Leyde.
- TREVILLYAN, J. M. and M. L. PALL (1979). Control of cyclic adenosine 3', 5'-monophosphate levels by depolarizing agents in fungi. *J. Bacteriol.* 138: 397-403.
- TREWAVAS, A. J., R. SEXTON and P. KELLY (1984). Polarity, calcium and abscission: molecular bases for developmental plasticity in plants. *J. Embryol. Exp. Morph.* 83 (suppl.): 179-195.
- TRINCI, A. P. J. (1974). A study of the kinetics of hyphal extension and branch initiation of fungal mycelia. *J. Gen. Microbiol.* 81: 225-236.
- (1978a). Wall and hyphal growth. *Science Progress* 65: 75-99.
- (1978b). The duplication cycle and vegetative development in molds. In *The Filamentous Fungi Developmental Mycology*. Vol. III, pp. 132-163. J. E. Smith and D. R. Berry (eds), Edward Arnold, London.
- (1979). The duplication and branching in fungi. In *Fungal Walls and Hyphal Growth*. Pp. 319-358. J. H. Burnett and A. P. J. Trinci (eds), Cambridge University Press, London.
- TRINKAUS, J. P. (1984). Cells Into Organs. The Forces that Shape the Embryo. 2nd ed., Prentice-Hall, Englewood Cliffs, NJ.
- TRYBUS, K. M. and S. LOWEY (1987). Subunit exchange between smooth muscle myosin filaments. *J. Cell Biol.* 105: 3021-3030.
- TURIAN, G. (1952). Caroténoïdes et différenciation sexuelle chez *Allomyces*. *Experientia* 8: 302.
- (1958). Recherches sur les bases cytochimiques et cytophysiologiques de la morphogenèse chez le champignon aquatique *Allomyces*. *Rev. Cytol. Biol. Végét.* 19: 243-272.
- (1962). Problèmes de différenciation chez une moisissure expérimentale, l'*Allomyces*. *Arch. Sci. Genève* 15: 229-258.
- (1963). Synthèse différentielle d'acide ribonucléique et différenciation sexuelle chez l'*Allomyces*. *Develop. Biol.* 6: 61-72.
- (1969). Différenciation Fongique. Masson, Paris. 144 pp.

- TURIAN, G. (1972). Maintien de l'élongation végétative par répression catabolique dans l'apex hyphal de *Neurospora crassa*. *C. R. Acad. Sci.* 275: 1371-1374.
- (1975). Differentiation in *Allomyces* and *Neurospora*. *Trans. Br. Mycol. Soc.* 64: 367-380.
- (1976a). Reducing power of hyphal tips and vegetative apical dominance in fungi. *Experientia* 32: 989-991.
- (1976b). Spores in Ascomycetes, their controlled differentiation. In *The Fungal Spore. Form and Function*. Pp. 715-788. D. J. Weber and W. H. Hess (eds), John Wiley and Sons, New York, London. 895 pp.
- (1978a). The "Spitzenkörper", centre of the reducing power in the growing hyphal apices of two septomycetous fungi. *Experientia* 34: 1277-1279.
- (1978b). Sexual morphogenesis in the Ascomycetes. In *The Filamentous Fungi. Developmental Mycology*. Vol. III, pp. 315-333. J. E. Smith and D. R. Berry (eds), Edward Arnold, London. 464 pp.
- (1979). Cytochemical gradients and mitochondrial exclusion in the apices of vegetative hyphae. *Experientia* 35: 1164-1166.
- (1981a). Low pH in fungal bud initials. *Experientia* 37: 1378-1379.
- (1981b). Decreasing pH-gradient toward the apex of germinating pollen tubes. *Bot. Helv.* 91: 161-167.
- (1983). Concepts of fungal differentiation. In *Fungal Differentiation. A Contemporary Synthesis*. Pp. 1-18. J. E. Smith (ed.), Marcel Dekker, New York and Basel. 624 pp.
- (1985a). Polarizing processes for germ tube outgrowth from monilioid fungal spores (*Neurospora* conidial model). *Proc. Indian Acad. Sci. (Plant Sci.)* 94: 165-173.
- (1985b). Another model of cell polarity: the outgrowing fungal spore. *Arch. Sci. Genève* 38: 419-426.
- (1988). Polarité de croissance-différenciation des hyphes fongiques (modèles). *Cryptogamie, Mycol.* 9: 239-249.
- TURIAN, G. and D. E. BIANCHI (1972). Conidiation in *Neurospora*. *Bot. Rev.* 38: 119-154.
- TURIAN, G. and T. C. CAESAR (1987). Multipolar germination of conditionally-produced conidia in an "amycolial" mutant of *Neurospora crassa*. *J. Gen. Appl. Microbiol.* 33: 543-545.
- TURIAN, G. and M. OJHA (1987). Disruption of the bipolar gametangial segregation by anticytoskeletal chemicals in *Allomyces*. *Bot. Helv.* 97: 357-360.
- TURIAN, G., T. C. TON-THAT and R. ORTEGA PEREZ (1985). Acid tip linear growth in Fungi: requirements for H^+ / Ca^{2+} inverse gradients and cytoskeleton integrity. *Bot. Helv.* 95: 311-322.
- TURIAN, G., T. C. CAESAR and C.-L. GEISSLER (1988). Polarity effectors of germ tube outgrowth in conidia of *Neurospora crassa*. *Bot. Helv.* 98: 133-145.
- TURING, A. M. (1952). The chemical basis of morphogenesis. *Phil. Trans. Roy. Soc. London, B*, 237: 37-72.
- UBBELS, G. A. and T. G. BROM (1984). Cytoskeleton and gravity at work in the establishment of dorso-ventral polarity in the egg of *Xenopus laevis*. *Adv. Space Res.* 4: 9-12.
- URRY, D. W. (1971). In Salemme, 1988.
- UYEDA, T. Q. P. and M. FURUYA (1985). Cytoskeletal changes visualized by fluorescence microscopy during amoeba-to-flagellate and flagellate-to-amoeba transformations in *Physarum polycephalum*. *Protoplasma* 126: 221-232.
- VAI, M., L. POPOLO and L. ALBERGHINA (1987). Effect of tunicamycin of cell cycle progression in budding yeast. *Exper. Cell Res.* 171: 448-459.
- VAITUZIS, Z. and R. N. DOETSCH (1969). Motility tracks: technique for quantitative study of bacterial movement. *Appl. Microbiol.* 17: 584-588.

- VALE, R. D. (1987). Intracellular transport using microtubule-based motors. *Ann. Rev. Cell Biol.* 3: 347-378.
- VALE, R. D., T. S. REESE and M. P. SHEETZ (1985a). Identification of a novel force-generating protein, kinesin, involved in microtubule-based motility. *Cell* 42: 39-50.
- VALE, R. D., J. M. SCHOLEY and M. P. SHEETZ (1986). Kinesin: possible biological roles for a new microtubule motor. *Trends Biochem. Sci.* 11: 464-468.
- VALE, R. D., B. J. SCHAAP, T. S. REESE and M. P. SHEETZ (1985b). Organelle, bead, and microtubule translocations promoted by soluble factors from the squid giant axon. *Cell* 40: 559-569.
- VALLEE, R. B., J. S. WALL, B. M. PASCHAL and H. S. SHPETNER (1988). Microtubule-associated protein 1C from brain is a two-headed cytosolic dynein. *Nature* 332: 561-563.
- VARNUM-FINNEY, B., VOSS, E. and D. R. SOLL (1987). Frequency and orientation of pseudopod formation of *Dictyostelium discoideum* amoebae chemotaxing in a spatial gradient: further evidence for a temporal mechanism. *Cell Motil. Cytoskel.* 8: 18-26.
- VELTMAN, M. J. G. (1986). The Higgs boson. *Sci. Amer.* 255: 88-94.
- VERHOEVEN, J. W., M. N. PADDON-ROW, N. S. HUSH, H. OVERING and M. HEPPENER (1986). Through-bond charge transfer interaction and photoinduced charge separation. *Pure Appl. Chem.* 58: 1285-1290.
- VERNER, K. and G. SCHATZ (1988). Protein translocation across membranes. *Science* 241: 1307-1313.
- VIAMONTES, G. I., L. J. FOCHTMANN and D. L. KIRK (1979). Morphogenesis in *Volvox*: analysis of critical variables. *Cell* 17: 537-550.
- VINCENT, J.-P., G. F. OSTER and J. C. GERHART (1986). Kinematics of gray crescent formation in *Xenopus* eggs: the displacement of subcortical cytoplasm relative to the egg surface. *Dev. Biol.* 113: 484-500.
- VINSON, C. R. and P. N. ADLER (1987). Directional non-cell autonomy and the transmission of polarity information by the *frizzled* gene of *Drosophila*. *Nature* 329: 549-551.
- VINSON, C. R., S. CONOVER and P. N. ADLER (1989). A *Drosophila* tissue polarity locus encodes a protein containing seven potential transmembrane domains. *Nature* 338: 263-264.
- VÖCHTING, H. (1878). Über Organbildung im Pflanzenreich. Max Coehen, Bonn. 258 pp.
- (1884). Über Organbildung im Pflanzenreich. Vol. 2. Emil Strauss, Bonn.
- (1892). Über Transplantation am Pflanzenkörper. Verlag H. Laupp'schen Buchhandlung, Tübingen.
- VUJICIC, R. and M. MUNTANJOLA-CVETKOVIC (1973). A comparative ultrastructural study on conidium differentiation in the Cladosarum-like mutant 22B of *Aspergillus aureolatus*. *J. Gen. Microbiol.* 79: 45-51.
- WAALAND, S. D. (1984). Positional control of development in algae. In *Positional Controls in Plant Development*. Pp. 137-156. P. W. Barlow and D. J. Carr (eds), Cambridge University Press. 502 pp.
- WÄCHTERS-HÄUSER, G. (1988). Before enzymes and templates: theory of surface metabolism. *Microbial Rev.* 52: 452-484.
- WADA, A. (1976). The α -helix as an electric macro-dipole. *Adv. Biophys.* 9: 1-63.
- WADDINGTON, C. H. (1962). *New Patterns in Genetics and Development*. Columbia University Press, New York, 271 pp.
- WAGNER, E. (1977). Molecular basis of physiological rhythms. *Soc. Exp. Biol. Symp.* 31: 33-70. Cambridge University Press.
- WAGNER, E. and B. G. CUMMING (1970). Beta-cyanine accumulation, chlorophyll content and flower initiation of *Chenopodium rubrum* as related to endogenous rhythmicity and phytochrome action. *Can. J. Bot.* 48: 1-18.

- WALD, G. and R. HUBBARD (1957). In Hubbard, R. (1976). 100 years of rhodopsin. *Trends Biochem. Sci.* 1: 154-158.
- WALKER, J. (1987). The secret of a microwave oven's rapid cooking action is disclosed. *Sci. Amer.* 256: 98-102.
- WALLACE, B. A. and K. RAVIKUMAR (1988). The gramicidin pore: crystal structure of cesium complex. *Science* 241: 182-187.
- WALSCH, C. (1984). Synthesis and assembly of the cytoskeleton of *Naegleria gruberi* flagellates. *J. Cell Biol.* 98: 449-456.
- WALTER, P. and V. R. LINGAPPA (1986). Mechanism of protein translocation across the endoplasmic reticulum membrane. *Ann. Rev. Cell Biol.* 2: 499-516.
- WANG, A. H.-J., G. J. QUIGLEY, F. J. KOLPAK, G. VANDER MAREL, J. H. VAN BOOM and A. RICH (1981). Left-handed double helical DNA: variations in the backbone conformation. *Science* 211: 171-176.
- WANG, J. C. and G. N. GIAEVER (1988). Action at a distance along a DNA. *Science* 240: 300-304.
- WARDLAW, C. W. (1952). *Phylogeny and Morphogenesis*. Macmillan, London. 536 pp.
- (1955). *Embryogenesis in Plants*. Methuen & Co. Ltd. London. 381 pp.
- WARMAN, J. M. (1987). Photosynthesis: a quantum jump for chemistry. *Nature* 327: 462-464.
- WARMAN, J. M., M. P. DE HASS, M. N. PADDON-ROW, E. COTSARIS, N. S. HUSH, H. OEVERING and J. W. VERHOEVEN (1986). Light-induced giant dipoles in simple model compounds for photosynthesis. *Nature* 320: 615-616.
- WARREN WILSON, J. and P. M. WARREN WILSON (1984). Control of tissue patterns in normal development and regeneration. In *Positional Controls in Plant Development*. Pp. 225-280. P. W. Barlow and D. J. Carr (eds), Cambridge Univ. Press. 502 pp.
- WARRICK, H. M. and J. A. SPUDICH (1987). Myosin structure and function in cell motility. *Ann. Rev. Cell Biol.* 3: 379-421.
- WARSHEL, A. (1987). What about protein polarity? *Nature* 330: 15-16.
- WARSHEL, A. and S. T. RUSSELL (1984). Calculations of electrostatic interactions in biological systems and in solutions. *Q. Rev. Biophys.* 17: 283-422.
- WASIELEWSKI, M. R., M. P. NIEMCZYK, W. A. SVEC and E. B. PEWITT (1985). Dependence of rate constants for photoinduced charge separation and dark charge recombination on the free energy of reaction in restricted-distance porphyrin-quinone molecules. *J. Am. Chem. Soc.* 107: 1080-1082.
- WASSERMAN, S. A., J. H. WHITE and N. R. COZZARELLI (1988). The helical repeat of double-stranded DNA varies as a function of catenation and supercoiling. *Nature* 334: 448-450.
- WATKINSON, S. C. (1979). Growth of rhizomorphs, mycelial strands, coremia and sclerotia. In *Fungal Walls and Hyphal Growth*. Pp. 93-113. J. H. Burnett and A. P. J. Trinci (eds), Cambridge University Press.
- WATSON, J. D. (1970). *Molecular Biology of the Gene*. 2nd. W. A. Benjamin, New York. 662 pp.
- WATSON, J. D. and F. H. C. CRICK (1953). Molecular structure of nucleic acid. A structure for deoxyribose nucleic acid. *Nature* 171: 737-738.
- WATTS, D. J. (1987). Cell polarity and differentiation in cellular slime molds. In *Spatial Organization in Eukaryotic Microbes*. Pp. 57-78. R. K. Poole and A. P. J. Trinci (eds). Special publications of Soc. Gen. Microbiol., vol. 23. IRL Press, Oxford. 140 pp.
- WEBER, K. and M. OSBORN (1985). The molecules of the cell matrix. *Sci. Amer.* 253: 92-102.
- WEBSTER, G. (1971). Morphogenesis and pattern formation in hydroids. *Biol. Rev.* 46: 1-46.
- WEETE, J. D. (1974). *Fungal Lipid Biochemistry. Monographs in Lipid Research*. Vol. 1. Plenum Press. New York, London. 393 pp.
- WEGNER, A. (1976). Head to tail polymerization of actin. *J. Biol. Mol.* 108: 139-150.

- WEIJ Van der, H. G. (1932). Der Mechanismus des Wuchsstofftransportes. *Rec. Trav. Bot. Neerl.* 29: 380-496.
- (1934). Der Mechanismus des Wuchsstofftransportes II. *Rec. Trav. Bot. Neerl.* 31: 810-857.
- WEIJER, C. J. and A. J. DURSTON (1985). Influence of cAMP and hydrolysis products on cell type regulation in *Dictyostelium discoideum*. *J. Embryol. Exp. Morph.* 86: 19-37.
- WEINBERG, S. (1977). *The First Three Minutes: a Modern View of the Origin of the Universe*. A. Deutsch (ed.), London. 188 pp.
- (1981). The decay of the proton. *Sci. Amer.* 244: 52-63.
- WEIR, J. R. (1911). Untersuchung über die Gattung *Coprinus*. *Flora N.S.* 3: 263-320.
- WEISENBERG, R. C. (1972). Microtubule formation *in vitro* in solutions containing low calcium concentrations. *Science* 177: 1104-1105.
- WEISENBERG, R. C., G. G. BORISY and E. W. TAYLOR (1968). The colchicine-binding protein of mammalian brain and its relation to microtubules. *Biochemistry* 7: 4466-4479.
- WEISENSEEL, M. H. (1979). Induction of polarity. In *Encyclopedia of Plant Physiology. New series*, vol. 7, pp. 485-505. W. Haupt and M. E. Feinleib (eds), Springer-Verlag, Berlin, New York.
- WEISENSEEL, M. H. and R. M. KICHERER (1981). Ionic currents as control mechanism in cytomorphogenesis. In *Cytomorphogenesis in Plants. Cell Biology Monogr.* Vol. 8, pp. 379-400. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 439 pp.
- WEISENSEEL, M. H., R. NUCCITELLI and L. F. JAFFE (1975). Large electrical currents traverse growing pollen tubes. *J. Cell Biol.* 66: 556-567.
- WEISENSEEL, M. H., A. DORN and L. F. JAFFE (1979). Natural H⁺ ion currents traverse growing roots and hairs of barley (*Hordeum vulgare* L.). *Plant Physiol.* 64: 512-518.
- WEISS, P. (1939). *Principles of Development*. Holt, New York.
- WEISSKOPF, V. F. (1969). The role of symmetry in nuclear, atomic and complex structures. In *Symmetry and Function of Biological Systems at the Macromolecular Level. Nobel Symp.* 11: 35-39.
- WENT, F. W. (1941). Polarity of auxin transport in inverted *Tagetes* cuttings. *Bot. Gaz.* 103: 386-390.
- WENT, F. W. and K. V. THIMANN (1937). *Phytohormones*. Macmillan, New York.
- WENT, F. W. and R. WHITE (1939). Experiments on the transport of auxin. *Bot. Gaz.* 100: 465-484.
- WESSELS, J. G. H. (1986). Cell wall synthesis in apical hyphal growth. *Int. Rev. Cytol.* 104: 37-79.
- WESSELS, J. G. H., J. J. M. DONS and O. M. H. DE VRIES (1985). Molecular biology of fruit body formation in *Schizophyllum commune*. In *Developmental Biology of Higher Fungi*. Pp. 485-497. D. Moore, L. A. Casselton, D. A. Wood and J. C. Frankland (eds), Cambridge University Press. 615 pp.
- WESTERHOFF, H. V. (1985). Cell metabolism: organization in the cell soup. *Nature* 318: 106.
- WETTSTEIN von, D. (1953). Beeinflussung der Polarität und undifferenzierte Gewebebildung aus Moossporen. *Z. Bot.* 41: 199-226.
- (1965). Die Induktion und experimentelle Beeinflussung der Polarität bei Pflanzen. In *Handbuch der Pflanzenphysiologie*. XV/1, pp. 275-330. A. Lang (ed.), Springer-Verlag, Berlin, Heidelberg.
- WEYL, H. (1929). In Weinberg, 1981.
- WHALEY, W. (1975). The Golgi apparatus. In *Cytomorphogenesis in Plants. Cell Biology Monographs*. Vol. 2. O. Kiermayer (ed.), Springer-Verlag, Wien, New York. 190 pp.
- WHITAKER, D. M. (1940). Physical factors of growth. *Growth* 4 (suppl.): 75-90.
- WHITE, P. R. (1934). Potentially unlimited growth of excised tomato root tips in a liquid medium. *Plant Physiol.* 9: 585-600.

- WHITE, J. A. and J. G. SCANDALIOS (1988). Molecular biology of intracellular protein trafficking. *Physiol. Plant.* 74: 397-408.
- WHITEHOUSE, H. L. K. (1949). Multiple allelomorph heterothalms in the fungi. *New Phytol.* 48: 212-244.
- WHITTAKER, J. R. (1973). Segregation during ascidian embryogenesis of egg cytoplasmic information for tissue-specific enzyme development. *Proc. Natn. Acad. Sci. U.S.A.* 70: 2096-2100.
- WHITTAKER, J. R. (1979). Cytoplasmic determinants of tissue differentiation in the ascidian egg. In *Determinants of Spatial Organization*. Pp. 29-52. S. Subtelny and I. R. Konigsberg (eds), Academic Press, New York. 333 pp.
- WHITTENBURY, R. and A. G. MCLEE (1967). *Rhodospseudomonas palustris* and *Rh. viridis* photosynthetic budding bacteria. *Arch. Mikrobiol.* 59: 324-334.
- WICKNER, W. T. and H. A. LODISH (1985). Multiple mechanisms of protein insertion into and across membranes. *Science* 230: 400-407.
- WIEDMANN, M., T. V. KURZCHALIA, E. HARTMANN and T. A. RAPOPORT (1987). A signal sequence receptor in the endoplasmic reticulum membrane. *Nature* 328: 830-833.
- WIESCHAUS, E. and R. RIGGLEMAN (1987). Autonomous requirements for the segment polarity gene *Armadillo* during *Drosophila* embryogenesis. *Cell* 49: 177-184.
- WIGGLESWORTH, V. B. (1966). Hormonal regulation of differentiation in insects. In *Cell Differentiation and Morphogenesis*. Pp. 180-209. W. Beermann (ed.), North-Holland Publ., Amsterdam.
- WIGNER, E. P. (1949). In Weinberg, 1981.
- WILCOX, M., G. J. MITCHISON and R. J. SMITH (1975). Spatial control of differentiation in the blue-green alga *Anabaena*. *Microbiol.* 1975: 453-463.
- WILLIAMS, J. G. (1988). The role of diffusible molecules in regulating the cellular differentiation of *Dictyostelium discoideum*. *Development* 103: 1-16.
- WILLIAMS, K. L., P. H. VARDY and L. A. SEGEL (1987). Cell migrations during morphogenesis: some clues from the slug of *Dictyostelium discoideum*. *BioEssays* 5: 146-152.
- WILLIAMS, M. A. J., A. BECKETT and N. D. READ (1985). Ultrastructural aspects of fruit body differentiation in *Flammulina velutipes*. In *Developmental Biology of Higher Fungi*. Pp. 429-450. D. Moore, L. A. Casselton, D. A. Wood and J. C. Frankland (eds), Cambridge University Press. 615 pp.
- WILLIAMSON, R. E. (1975). *J. Cell Sci.* 17: 655-668.
- WILLINGHAM, M. C. and I. PASTAN (1984). Endocytosis and exocytosis: current concepts of vesicle traffic in animal cells. *Intern. Rev. Cytol.* 92: 51-92.
- WILSON, E. B. (1925). *The Cell in Heredity and Development*. 3rd ed., Macmillan, New York.
- WILSON, I. B. (1954). In *Mechanisms of Enzyme Action*. W. D. McElroy and B. Glass (eds), Johns Hopkins Press, Baltimore.
- WITT, P. L., H. RIS and G. G. BORISY (1980). Origin of kinetochore microtubules in Chinese hamster ovary cells. *Chromosoma* 81: 483-505.
- WOCHOK, Z. S. and I. M. SUSSEX (1976). In McDaniel, 1984a.
- WOHLFARTH-BOTTERMANN, K. E. (1975). Weitreichende fibrilläre Protoplasmadifferenzierungen und ihre Bedeutung für die Protoplasmastromung. X. Die Anordnung der Actomyosinfibrillen in experimentellen unbeeinflussten Protoplasmaadern von *Physarum in situ*. *Protistologica* 11: 19-30.
- (1983). Dynamic cellular phenomena in *Physarum* possibly accessible to laser techniques. In *The*

- Application of Laser Light Scattering to the Study of Biological Motion*. J. C. Earnshaw and M. W. Steer (eds), NATO ASI series, Series A: Life Sciences 59, Plenum Press, New York, London.
- WOLK, C. P. (1967). Physiological basis of the pattern of vegetative growth of a blue-green alga. *Proc. Natn. Acad. Sci. U.S.A.* 57: 1246-1251.
- WOLPERT, L. (1969). Positional information and the spatial pattern of cellular differentiation. *J. Theor. Biol.* 25: 1-47.
- (1971). Positional information and pattern formation. *Curr. Top. Dev. Biol.* 6: 183-224.
- WOLPERT, L. (1981). Positional information and pattern formation. *Phil. Trans. Roy. Soc. B.* 295: 441-450.
- WOLPERT, L. and A. HORNBRUCH (1981). Positional signalling along the anteroposterior axis of the chick wing. The effect of multiple polarizing region grafts. *J. Embryol. Exp. Morph.* 63: 145-159.
- WOLPERT, L. and W. D. STEIN (1984). Positional information and pattern formation. In *Pattern Formation. A Primer in Developmental Biology*. Pp. 3-21. G. M. Malacinski and S. V. Bryant (eds), Macmillan, New York, London. 626 pp.
- WOLPERT, L., A. HORNBRUCH and M. R. B. CLARKE (1974). Positional information and positional signalling in hydra. *Amer. Zool.* 14: 647-663.
- WOLPERT, L., J. LEWIS and D. SUMMERBELL (1975). Morphogenesis of the vertebrate limb. In *Cell Patterning*. Pp. 95-105. R. Porter and J. Rivers (eds). Ciba Foundation Symposium, vol. 29, Elsevier, Amsterdam.
- WOOD, W. D., S. STROME and J. S. LAUFER (1983). Localization and determination in embryos of *Caenorhabditis elegans*. In *Time, Space and Pattern in Embryonic Development*. Pp. 221-239. W. R. Jeffery and R. A. Raff (eds), Alan R. Liss, New York. 395 pp.
- WOODRUFF, R. I. and W. H. TELFER (1980). Electrophoresis of proteins in intercellular bridges. *Nature* 286: 84-86.
- WOUDE Van der, W. J., D. J. MORRE and C. E. BRACKER (1971). Isolation and characterization of secretory vesicles in germinated pollen of *Lilium longiflorum*. *J. Cell Sci.* 8: 331-351.
- YAJIMA, H. (1964). Studies on embryonic determination of the harlequin fly, *Chironomus dorsalis*. *J. Embryol. Exp. Morphol.* 12: 89-100.
- YAMAGATA, Y. (1966). A hypothesis for asymmetric appearance of biomolecules on Earth. *J. Theoret. Biol.* 11: 495-498.
- YANG, D. S. C., M. SAX, A. CHAKRABARTY and C. L. HEW (1988). Crystal structure of an antifreeze polypeptide and its mechanistic implications. *Nature* 333: 232-237.
- YISRAELI, J. K. and D. A. MELTON (1988). The maternal mRNA Vgl is correctly localized following injection in *Xenopus* oocytes. *Nature* 336: 592-595.
- YOUATT, J., N. A. R. GOW and G. W. GOODAY (1988). Bioelectric and biosynthetic aspects of cell polarity in *Allomyces macrogynus*. *Protoplasma* 146: 118-126.
- YOUVAN, D. C. and B. L. MARRS (1987). Molecular mechanisms of photosynthesis. *Sci. Amer.* 256: 42-48.
- ZACHARIAH, K. and P. O. METITIRI (1971). The organization of the penicillus of *Penicillium claviforme* Bainier. In *Taxonomy of Fungi Imperfecti*. Pp. 120-131. Bryce Kendrick (ed.), Univ. of Toronto Press. 309 pp.
- ZACHRISSON, A. and C. H. BORNMAN (1986). Electromanipulation of plant protoplasts. *Physiol. Plant.* 67: 507-516.
- ZALOKAR, M. (1959). Growth and differentiation in *Neurospora* hyphae. *Am. J. Bot.* 46: 602-610.
- ZEEMAN, C. (1988). In Stewart, I. (1988). Yin-yang and the art of noise. *Nature* 335: 394.
- ZEWAIL, A. H. (1988). Laser femtochemistry. *Science* 242: 1645-1653.

- ZIGMOND, F. H., H. I. LEVITSKY and B. J. KREEL (1981). Cell polarity: An examination of its behavioral expression and its consequences for polymorphonuclear leukocyte chemotaxis. *J. Cell Biol.* 89: 585-592.
- ZIMMERMANN, U. (1982). Electrical field-mediated fusion and related electrical phenomena. *Biochim. Biophys. Acta* 694: 227-277.

