

BIBLIOGRAPHY ON THE PSYCHOACTIVITY OF ELECTROMAGNETIC FIELDS [\[1\]](#)

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It is unusual to include a bibliography of this magnitude with a mere position paper; however, we feel that, with a subject as controversial as this one, it is essential to give the reader an insight into the tremendous amount of work that has gone on in the background of this relatively new field. The bibliography accompanying the article originally ran only four pages; then, with the help of Eldon Byrd of the Naval Office of Surface Weaponry, a more extensive one was compiled on this sensitive topic. This important bibliography is included in its entirety.-- Ed

- J. Aarons, J. Low frequency electromagnetic radiation 10-900 cycles per second. J. Geophys. Res. 61 (1956): 647.
- and M. Hinissart. Low frequency noise in the range 0.5-20 cycles per second. Nature 172 (1953): 682-683.
- Abbas, M., and H. Poverlein. Propagation of hydromagnetic waves in current-carrying regions of the ionosphere and magnetosphere (parallel propagation). Radio Sci. 3 (1968): 1010-1012.
- Abeles, M., and M. H. Poverlein, Jr. Multispikes train analysis. Proc. IEEE 65 (May 1977).
- Adey, W. R. Cerebral structure and information storage. In Progress in Physiological Psychology, ed. E. Stellar and J. M. Sprague, 3, 181-200. New York: Academic Press, 1970.
- Discrimination among states of consciousness by EEG measurement. Electroencephalog. Clin. Neurophysiol. 22 (1967): 22-29.
- Effects of electromagnetic radiation on the nervous system. Ann. N.Y. Acad. Sci. 247 (1975): 15.
- Evidence for cooperative mechanisms in the susceptibility of cerebral tissue to environmental and intrinsic electric fields. In The Functional Linkage in Biomolecular Systems, ed. F. O. Schmitt, D. M. Schneider, and D. Crothers. New York: Raven Press, 1975.
- Extracellular microenvironment. In A. K. Katchalsky, V. Rowland, and R. Blumenthal, Dynamic Patterns of Brain Cell Assemblies, 80-85. Cambridge, Mass.: MIT Press, 1974.
- Frequency and power windowing in tissue interactions with weak electromagnetic fields. Proc. IEEE 68 (January 1980).
- The influences of impressed electrical fields at EEG frequencies on brain and behavior. In Behavior and Brain Electrical Activity, ed. N. Burch and H. I. Altschuler, 363-390. New York: Plenum Press, 1975.
- Introduction to the effects of electromagnetic radiation on the nervous system. Ann. N. Y. Acad. Sci. 247 (Feb. 28, 1975): 15-20.
- Ionic nonequilibrium phenomena in brain cell interactions with EM fields. 179th Annual Meeting, American Chemical Society, Physical Chemistry Section, Houston, Tex., March 1980.
- Ionic nonequilibrium phenomena in tissue interactions with electromagnetic fields. In ACS Symposium Series 157, Biological Effects of Nonionizing Radiation, ed. K. H. Illinger, 272-297. Washington, D.C.: American Chemical Society, 1981.
- Long-range electromagnetic field interactions at brain cell surfaces. In Magnetic Field Effect on Biological Systems, ed. T. S. Tenforde. New York: Plenum Press, 1978.
- Models of membranes of cerebral cells as substrates for information storage. Bio Systems 8 (1977): 163-178.

-----Nonlinear effects of electromagnetic fields on whole organisms, living tissues and tissue preparations. In *Nonlinear Electrodynamics in Biological Systems*, ed. W. R. Adey and A. F. Lawrence, 3-22. New York: Plenum Press, 1983.

-----Organization of brain tissue: Is the brain a noisy process? *Int. J. Neurosci.* 3 (1972): 271-284.

-----Tissue interactions with nonionizing electromagnetic fields. *Physiol. Rev.* 1981).

-----and S. M. Bawin. Brain interactions with weak electric and magnetic fields. *Neurosci. Res. Prog. Bull.* 15 (1977).

-----and----- .Nonequilibrium processes in binding and release of brain calcium by low-level electromagnetic fields. *Advances in Chemistry Series 188*, 361-378. Washington, D.C.: American Chemical Society, 1980.

-----and A. F. Lawrence, ed. *Nonlinear Electrodynamics in Biological Systems*. New York: Plenum Press, 1983.

-----and D. O. Waiter. Application of phase detection and averaging techniques in computer analysis of EEC records in the cat. *Exp. Neurol.* 7 (1963): 186-209.

-----et al. Impedance changes in cerebral tissue accompanying a learned discriminative performance in the cat. *Exp. Neurol.* 7 (1963): 259-281.

Adler, R. A study of locking phenomena in oscillators. *Proc. IEEE* 61 (October 1973).

Adrian, D. J. Auditory and visual sensations stimulated by low-frequency electric currents. *Radio Sci.* 12 (November-December 1977): 243-250.

Albanese, R. A., and E. L. Fell. Radiofrequency radiation and chemical reaction systems. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Al'pert, Y. L., and D. S. Fligel. Propagation of ELF and VLF waves near Earth. New York: Consultants Bureau, 1970.

Altmann, G. Die physiologische Wirkung elektrischer Felder auf Organismen. *Arch. Met. Geophys. Biol.* 17 (1969): 269-290.

Alvarez, A. M. Apparent points of contact between the daily course of the magnetic components of the earth together with certain solar elements, and the diastolic pressure of human beings and the total count of their leukocytes. *Puerto Rico J. Publ. Health Trop. Med.* 10 (1935): 374-395.

Anderson, D. J., and M. J. Correia. The detection and analysis of point processes in biological signals. *Proc. IEEE* 65 (May 1977).

Anninos, P. A. Electromagnetic fields generated from neuronal activity. *T.I.T.J. Life Sci.* 3 (1973): 15-18.

Aschoff, J. Internal dissociation and desynchronization of circadian systems. *XXI Cong. Aviat. Space Med.* (1973): 225.

-----and U. Gerecht. Desynchronization of human circadian rhythms. *Jap. J. Physiol.* 17 (1967): 450-457.

-----et al. Interdependent parameters of circadian activity rhythms in birds and man. In *Biochronometry*, ed. M. Menaker, 3-27. Washington, D.C.: National Academy of Sciences, 1971.

Asian, E. Broad-band isotropic electromagnetic radiation monitor. *IEEE Trans. Instr. Meas.* 21 (1972): 421-424.

Axelrod, J. The pineal gland: A neurochemical transducer. *Science* 184 (1974): 1341.

Azarnia, R., and W. R. Loewenstein. Parallel correction of cancerous growth and of a genetic defect of cell-to-cell communication. *Nature* 241 (1973): 455-457.

-----et al. Intercellular communication and tissue growth. VI. Failure of exchange of endogenous molecules between cancer cells with defective junctions and noncancerous cells. *J. Membr. Biol.* 10 (1972): 247-258.

Azarnia, R., et al. The membrane junctions in communicating and noncommunicating cells,

their hybrids, and segregants. *Proc. Nat. Acad. Sci.* 71 (1974): 800-884.

Baranski, S. Histological and histochemical effects of microwave irradiation on the central nervous system of rabbits and guinea pigs. *Am. J. Phys. Med.* 51 (1972): 182-191.

-----and Z. Edelwejn. EEG and morphological investigations upon influence of microwaves on central nervous system. *Acta Physiol. Pol.* 18 (1967): 423.

-----and----- . Experimental and electroencephalographic studies of microwave effects on the nervous system. *Ann. N.Y. Acad. Sci.* 247 (1975): 109-116.

Barlow, J. S. Rhythmic activity induced by photic stimulation in relation to intrinsic alpha activity of the brain in man. *Electroencephalog. Clin. Neurophysiol.* 12 (1960).

Barnothy, M., ed. *Biological Effects of Magnetic Fields*. 2 vols. New York: Plenum Press, 1964, 1969.

Barnwell, F. H. A day-to-day relationship between the oxidative metabolism and world-wide geomagnetic activity. *Biol. Bull.* 119 (1960): 303.

Bass, L., and W. J. Moore. A model of neuron excitation based on the Wien Dissociation Effect. In *Structural Chemistry and Molecular Biology*, ed. A. Rich and N. Davidson, 356-369. San Francisco: W. H. Freeman, 1968.

Bassett, C. A. L. Electrical effects in bone. *Sci. Am.* 18 (1965).

----- et al. Augmentation of bone repair by inductively coupled electromagnetic fields. *Science* 184 (1974): 575-577.

Bawin, S. M., and W. R. Adey. Interactions between nervous tissues and weak environmental electric fields. *Proceedings of the 1975 Annual Meeting, U.S. National Committee, International Union of Radio Science*, 1976.

----- and ----- . Sensitivity of calcium binding in cerebral tissue to weak environmental electric fields oscillating at low frequency. *Proc. Nat. Acad. Sci.* 73 (1976): 1999-2003.

-----et al. Effects of modulated very high frequency fields on specific brain rhythms in cats. *Brain Res.* 58 (1973): 365-384.

----- et al. Effects of modulated VHF fields on the central nervous system. *Ann. N.Y. Acad. Sci.* 247 (1975).

----- et al. Possible mechanisms of weak electromagnetic field coupling in brain tissue. *Bioelectrochem. Bioenerg.* 5 (1978): 67-76.

----- et al. Weak, amplitude-modulated radiofrequency fields modify $^{4,5}Ca^{2+}$ release from cat cerebral cortex in vivo. *Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.*

Becker, R. O. The effect of magnetic fields upon the central nervous system. In *Biological Effects of Magnetic Fields*, vol. 2, ed. M. F. Barnothy, 207-214. New York: Plenum Press, 1969.

----- The neural semiconduction control system and its interaction with applied electrical current and magnetic fields. *Proc. XI Int. Cong. Radiol.* 11 (1965): 1753-1759.

Beischer, D. E., and J. D. Grissett. Extremely low frequency radiation and man. *Proceedings, Department of Defense Electromagnetic Research Workshop*, ed. P. Taylor, Commander, USN. 1971. (Limited distribution.)

----- and V. R. Reno. Magnetic fields and man: Where do we stand today? *AGARD Conference Proceedings No. 95, Pt. III: Special Biophysical Problems in Aerospace Medicine*, ed. A. M. Pfister, C12, 1-9. Paris: Necker-Enfants Malades , 1971.

----- and ----- . Microwave energy distribution measurements in proximity to man and their practical application. *Ann. N.Y. Acad. Sci.* 247 (1975): 473-479.

----- et al. Exposure of man to low intensity magnetic fields in a coil system. *NAMI-1018 NASA R- 39*. Pensacola, Fla.: Naval Aerospace Medical Institute, Oct. 3, 1967.

Beischer, D. E., et al. Exposure of man to magnetic fields alternating at extremely low frequency. *NAMRL*[\[2\]](#) Report no. 1180, July 1973.

Bender, H. A. A study of the effect of ELF electromagnetic fields upon *Drosophila melanogaster*. Final report, University of Notre Dame, November 1976.

Bennett, M. V. L. Electroreception. In *Fish Physiology*, ed. W. S. Hoar and D. J. Randall, vol. 5, *Sensory Systems and Electric Organs*, 493-574. New York: Academic Press, 1971.

Berry, M., and A. C. Riches. An immunological approach to regeneration in the central nervous system. *Brit. Med. Bull.* 30 (1974): 135-140.

Bhaumik, D., et al. On the possibility of Bose condensation in the excitation of coherent modes in biological systems. *Phys. Lett.* 56A (1976): 145-148.

Biggs, M. W. Studies on biomagnetic effect in mice. In *Magnetic Field Effect on Biological Systems*. New York: Plenum Press, 1978.

Bise, W. Low power radio-frequency and microwave effects on human electroencephalogram and behavior. *Physiol. Chem. Phys.* 10 (1978).

Blumenthal, R., et al. Membrane excitability and dissipative instabilities. *J. Membr. Biol.* 2 (1970): 351- 374.

Bodenstein, G., and H. M. Praetorius. Feature extraction from the electroencephalogram by adaptive segmentation. *Proc. IEEE* 65 (May 1977).

Boenko, I. D., and F. G. Shakhgel'Dyan. On the role of reflexogenic vascular zones in changes of blood coagulation during the effect of sound frequency electromagnetic field. *Fiziol. Zb. SSSR Imeni I.M. Sechen.* 54 (1968): 937-941.

Bowart, W. H. *Operation Mind Control*. New York: Dell, 1978.

Bowman, R. R. Some recent developments in the characterization and measurement of hazardous electromagnetic fields. In *Biologic Effects and Health Hazards of Microwave Radiation (Proceedings of an International Symposium, Warsaw, 15-18, Oct. 1973)*, ed. P. Czerski et al., 217-227. Warsaw: Polish Medical Publ., 1974.

Branover, C. G., et al. A study of the behavior of the eel in natural and artificial magnetic fields and an analysis of its reception mechanism. *J. Ichthyol.* 11 (1971): 608-614.

Brezowsky, H. and W. R. Ranscht-Froemsdorff. *Herzinfarkt und Atmospherics. Z. angew. Bader. u. Klimaheilk.* 13 (1966): 679-686.

Brodeur, P. *The Zapping of America: Microwaves, Their Deadly Risk and the Coverup*. New York: W. W. Norton, 1977.

Brown, F. Response to pervasive geophysical factors and the biological clock problems. *Cold Spring Harbor Symposia on Quantitative Biology*, 1960.

Brown, F. A., Jr. Responses of the planarian, *Dugesia*, and the protozoan, *Paramecium*, to very weak horizontal magnetic fields. *Biol. Bull.* 123 (1962): 264-281.

----- Responses of the planarian, *Dugesia*, to very weak horizontal electrostatic fields. *Biol. Bull.* 123 (1962): 282-294.

----- Some orientational influences of nonvisual, terrestrial electromagnetic fields. *Ann. N.Y. Acad. Sci.* 188 (1971): 224-241.

----- and C. S. Chow. Interorganismic and environmental influences through extremely weak electromagnetic fields. *Biol. Bull.* 144 (1973): 437-461.

Bullock, T. H. Alternation of frequency of pacemaker nerve cells by imposed direct current. *Anat. Rec.* 84 (1942): 18-19.

----- Conduction and transmission of nerve impulses. *Ann. Rev. Physiol.* 13 (1950): 261-280.

----- An essay on the discovery of sensory receptors and the assignment of their functions together with an introduction to electroreceptors. In *Handbook of Sensory Physiology*, ed. A. Fessard, III/3. *Electroreceptors and Other Specialized Receptors in Lower Vertebrates*, 1-12. New York: Springer- Verlag, 1974.

Bullock, T. H. Initiation of nerve impulses in receptor and central neurons. *Rev. Mod. Phys.* 31 (1959): 504-514.

----- . Neuronal integrative mechanisms. In *Recent Advances in Invertebrate Physiology*, ed. B. T. Scheer, 1-20. Eugene, Ore.: University of Oregon Press, 1957.

----- . Problems in the comparative study of brain waves. *Yale J. Biol. Med.* 17 (1945): 657-679.

----- . et al. Electrical polarization of pacemaker neurons. *J. Neurophysiol.* 6 (1943): 85-98.

Burch, N., and H. I. Altschuler, eds. *Behavior and Brain Electrical Activity*. New York: Plenum Press, 1975.

Callaway, E., and P. R. Harris. Coupling between cortical potentials from different areas. *Science* 183 (1974): 873-875.

Campbell, D. J., and J. A. Kiernan. Mast cells in the central nervous system. *Nature* 210 (1966): 756-757.

Campbell, P. A., ed. *Medical and Biological Aspects of the Energies of Space*. New York: Columbia University Press, 1961.

Campbell, W. H. Geomagnetic pulsations. In *Physics of Geomagnetic Pulsations*, ed. S. Matsushita and W. H. Campbell, 821-909. New York: Academic Press, 1967.

Carr, E. F. Anomalous alignment in the smectic phase of a liquid crystal owing to an electric field. *Phys. Rev. Lett.* 24 (1970): 807-809.

Corson, R. W. Anti-fatigue device works by creating electric field. *Product Eng.* (Feb. 13, 1967)

Cetas, T. C. A birefringent crystal optical thermometer for measurements of electromagnetically induced heating. USNC/URSI-IEEE Meeting, University of Colorado, Boulder, Colo., October 1975.

Changeux, J. P., et al. On the cooperativity of biological membranes. *Proc. Nat. Acad. Sci.* 57 (1967): 335-341.

Chapman, F. W., and D. L. Jones. Observations of earth-ionosphere cavity resonances and their interpretation in terms of a two-layer ionosphere model. *U.S. Nat. Bur. Stand. J. Res. Radio Sci.* 68D (November 1964)

Chapman, S. W., and W. D. Mathews. Audiofrequency spectrum of atmospherics. *Nature* 172 (1953): 495.

Chatterjee, I., et al. Electromagnetic energy deposition in man for near-field exposure conditions. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Childers, D. G. Evoked responses: electrogenesis, models, methodology and wavefront reconstruction and tracking analysis. *Proc. IEEE* 65 (May 1977).

Cleary, S. F., ed. *Proceedings of the Symposium on the Biological Effects and Health Implications of Microwave Radiation*. Richmond, Va., Sept. 17-19, 1969. U.S. Dept. HEW, BRH/DBE 70-2, June 1970.

Coate, W. B., et al. Project Sanguine Biological Effects Test Program pilot studies. Final report, Hazleton Laboratories, November 1970.

Cohen, D. Magnetic fields of the human body. *Phys. Today* (August 1975): 35-43.

----- . Magnetoencephalography: Detection of the brain's electrical activity with a superconducting magnetometer. *Science* 175 (1972): 664-666.

----- . Magnetoencephalography: Evidence of magnetic fields produced by alpha-rhythm currents. *Science* 161(1968): 784-786.

----- . and E. Givler. Magnetomyography: Magnetic fields around the human body produced by skeletal muscles. *Appl. Phys. Lett.* 21 (1972): 114-116.

----- et al. Magnetocardiograms taken inside a shielded room with a superconducting point-contact. *Appl. Phys. Lett.* 16 (1970): 278-280.

Cohn, T. E. Receiver operating characteristic analysis of sensitivity in neural systems. *Proc. IEEE* 65 (May 1977).

[----- .] Compilation of Navy Sponsored ELF Biomedical and Ecological Research Reports, vols. I, II (February 1975), vol. III (January 1977). Bethesda, Md.: Naval Medical Research and Development Command, February 1975. Committee on Biosphere Effects of Extremely Low-Frequency Radiation. Biologic effects of electric and magnetic fields associated with proposed Project Seafarer. Report of the Committee, Division of Medical Sciences, Assembly of Life Sciences, National Academy of Science, 1977.

Cone, R. A. Transductive coupling in the visual system. In *Functional Linkage in Biomolecular Systems*, ed. F. O. Schmitt, D. M. Schneider, and D. M. Crothers, 234-246. New York: Raven Press, 1975.

Cooke, J., and E. C. Zeeman. A clock and wavefront model for control of the number of repeated structures during animal morphogenesis. *J. Theor. Biol.* 58 (1976): 455-476.

Cope, F. W. Biological sensitivity to weak magnetic fields due to biological superconductive Josephson junctions? *Physiol. Chem. Phys.* 5 (1973): 173-176.

----- . Evidence from activation energies for superconductive tunneling in biological systems at physiological temperatures. *Physiol. Chem. Phys.* 3 (1971): 403- 410.

----- . Magnetolectric charge states of matter-energy, a second approximation. Part II: Magnetolectrets as possible evidence of magnetolectric dipoles in solids, and as a possible mechanism for biological effects of magnetic fields. *Physiol. Chem. Phys.* 11 (1973): 461-463.

----- . Superconductive Josephson junctions--A possible mechanism for detection of weak magnetic fields and of microwaves by living organisms. In *Magnetic Field Effect on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

Crane, J. S., and H. A. Pohl. Theoretical models of cellular dielectrophoresis. *J. Theor. Biol.* 37 (1972): 15- 41.

Creutzfeldt, O. D., et al. Relations between EEC phenomena and potentials of single cortical cells . II Spontaneous and convulsoid active. *Electroencephalog. Clin. Neurophysiol.* 20 (1966): 19-37.

Crosby, E. C., et al. *Correlative Anatomy of the Nervous System*. New York: Macmillan, 1962.

Csaba, G. Regulation of mast-cell formation. Budapest: Akademiai Kiado, 1972. Czernski, P. Experimental models for the evaluation of microwave biological effects. *Proc. IEEE* 63 (1975): 1540-1544.

----- . Influence of microwaves on the hematopoietic system with particular reference to the lymphocyte. *Ann. N.Y. Acad. Sci.* 247 (1975): 232-242.

-----, et al. Influence of microwave radiation on the hematopoietic system. In *Biologic Effects and Health Hazards of Microwave Radiation (Proceedings of an International Symposium, Warsaw, 15-18 Oct. 1973)*, ed. P. Czernski et al., 67-74. Warsaw: Polish Medical Publishers, 1974.

-----, et al. Microwave irradiation and the circadian rhythm of bone marrow cell mitosis. *J. Microwave Power* 9 (1974) : 31-37.

Damaschke, V. K., and G. Becker. Korrelation der Atmungsintensität von Termiten zu Aenderungen der Impulsfolgefrequenz der Atmospherics. *Z. Naturforschg.* 19 (1964): 157-160.

Davidson, R. O. *Methods in Nonlinear Plasma Theory*. New York: Academic Press, 1972.

Davis, A. R., and W. C. Rawls, Jr. *The Magnetic Effect*. Pompano Beach, Fla.: Exposition Press, 1980.

Davydov, A. S. *Biology and quantum mechanics*. Kiev: Nauka, 1979.

----- . Nonlinear vibrational phenomena in biology. Academy of Science, Ukrainian SSR, Institute for Theoretical Physics, Preprint ITP-79-69E, 1979.

----- . Solitons as energy carriers in biological systems. *Studia Biophys.* 62 (1977): 1-8.

----- . Solitons in molecular systems. *Phys. Scripta* 20 (1979): 387-334.

De Felice, L. J., and R. L. De Haan. Membrane noise and intercellular communication. *Proc. IEEE* 65 (May 1977).

de la Warr, G. W. *Biomagnetism*. Oxford: de la Warr Laboratories, 1967.

de Lorge, J. O. Behavior and temperature in rhesus monkeys exposed to extremely low frequency-low intensity magnetic fields. NAMRL, Report no. 1203, May 1974.

----- . Effects of magnetic fields on behavior in nonhuman primates. In *Magnetic Field Effect on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

----- . Operant behavior of rhesus monkeys in the presence of extremely low frequency-low intensity magnetic and electric fields: Experiment 1. NAMRL, Report no. 1115, 1972.

----- . -----: Experiment 2. NAMRL, Report no. 1179, March 1973.

----- . -----: Experiment 3. NAMRL, Report no. 1179, November 1973.

----- . A psychobiological study of rhesus monkeys exposed to extremely low-frequency-low intensity magnetic fields. NMRL, Report no. 1203, May 1974.

----- and J. D. Grissett. Behavioral effects in monkeys exposed to extremely low frequency electromagnetic fields. *Int. J. Biometeorol.* 21 (1977): 357-365.

----- and M. J. Marr. Operant methods assessing the effects of ELF electromagnetic fields. In *ELF and VLF Electromagnetic Field Effects*, ed. M. A. Persinger, 145-175. New York: Plenum Press, 1974.

Dern, H., and J. B. Walsh. Analysis of complex waveforms. In *Physical Techniques in Biological Research*, ed. W. L. Nastuk, vol. VI, chap. 3. New York: Academic Press, 1963.

Devyatkov, N. D. Influence of millimeter-band electromagnetic radiation on biological objects. *Sov. Phys. Usp.* 16 (1974): 568-574. Transl.

Dmitriev, V. G., et al. Nonlinear perception of infrared radiation in the 800-1355 nm range with human eye. *Sov. J. Quantum Electron.* 9 (1979): 475-479. Transl.

Doty, R. W. Electrical stimulation of the brain in behavioral context. *Ann. Rev. Psychol.* 20 (1969): 289- 320.

Dowling, J. E., et al. The interplexiform cell: A new type of retinal neuron. *Invest. Ophthalmol.* 15 (1976): 919-926.

Drago, G. P., and S. Ridella. A cell electrical model. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Dropp, M. M. Mast cells in the mammalian brain. *Am. Zoologist* 13 (1973): 514.

----- . Mast cells in the mammalian brain. I: Distribution. *Acta Anat.* 94 (1976):1-21.

Dubrov, A. P. *The Earth's Magnetic Field and Life*. Ed. Yu. A. Kholodov. Leningrad: Gidrometeoizdat, 1974.

Dumanskij, J. D., and M. G. Sandala. The biologic and hygienic significance of electromagnetic fields of superhigh and ultrahigh frequencies in densely populated areas. *Biologic Effects and Health Hazards of Microwave Radiation (Proceedings of an International Symposium, Warsaw, Oct. 15- 18, 1974)*. Warsaw: Polish Medical Publishers, 1974.

Durfee, W. A., et al. Extremely low frequency electric and magnetic fields in domestic birds. Technical Report, Phase I (Continuous Wave), University of Rhode Island, March 1975.

Durney, C. H., et al. Qualitative explanations of near-field sar characteristics based on experimental and theoretical observations. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Eccles, J. C. *The Physiology of Synapses*. Berlin: Springer-Verlag, 1964.

Einaudi, F., and J. R. Wait. Analysis of the excitation of the earth-ionosphere waveguide by a satellite- borne antenna. Pts. I and II. *Can. J. Phys.* 49, (1971): 1452-1460.

Einolf, C. W., and E. I. Carstensen. Low frequency dielectric dispersion in suspensions of ion-exchange resins. *J. Phys. Chem.* 75 (1971): 1091-1099.

- Eisenberg, D., and W. Kauzmann. *The Structure and Properties of Water*. Oxford: Clarendon Press, 1969.
- Elul, R. Dipoles of spontaneous activity in the cerebral cortex. *Exp. Neurol.* 6 (1962): 285-299.
- Elul, R. Fixed charge in the cell membrane. *J. Physiol.* 189 (1967): 351-365.
- . The genesis of the EEG. *Int. Rev. Neurobiol.* 15 (1972): 227-272.
- . Relation of neuronal waves to EEG. In A. K. Katchalsky, V. Rowland, and R. Blumenthal, *Dynamic Patterns of Brain Cell Assemblies*, 97-101. Cambridge, Mass.: MIT Press, 1974.
- Emlen, S. T. Can birds obtain directional information from the earth's magnetic field? *Am. Zoologist* 7 (1967): 806.
- Enright, J. T. Heavy water slows biological timing processes. *Z. vergl. Physiol.* 72 (1971): 1-16.
- Estes, W. K., and B. F. Skinner. Some quantitative properties of anxiety. *J. Exp. Psychol.* 29 (1941): 390-400.
- Faber, D. F., and H. Korn. A neuronal inhibition mediated electrically. *Science* 179 (1973): 577-578.
- Fife, P. C. Asymptotic analysis of reaction-diffusion wave fronts. *Rocky Mountain J. Math.* 7 (1977): 389-415.
- . Stationary patterns for reaction-diffusion equations. In *Nonlinear Diffusion*, ed. W. E. Fitzgibbon and H. F. Walker, 81-121. San Francisco: Pitman, 1977.
- Finkelstein, D., and J. Powell. Earthquake lightning. *Nature* 228 (1970): 759-760.
- Fischer, W. H., et al. Laboratory studies of fluctuating phenomena. *Int. J. Biometeorol.* 12 (1968): 15-19.
- Flanagan, W. F., et al. Non-metallic electrode system for recording EEG and ECC in electromagnetic fields. *Physiol. and Behav.* 8 (1977): 531.
- Formanck, V. C., and A. K. Valentino. An improved ELF electric field probe. Technical Memorandum no. 2, HTR no. E6249, March 1974. HTRI, 1825 K St., N.W., Washington, DC.
- Frankenhauser, B., and A. L. Hodgkin. The action of calcium on the electrical properties of squid axons. *J. Physiol.* 137 (1957): 218-244.
- Frey, A. H. Auditory system response to radio frequency energy. *Aerospace Med.* 32 (1961): 1140-1142.
- . Behavioral biophysics. *Psychol. Bull.* 63 (1965): 322-337.
- . Behavioral effects of electromagnetic energy. In *Symposium on Biological Effects and Measurement of Radio Frequency/Microwaves*, ed. D. Hazzard, 11-22. HEW Publ. (FDA) 77-8026, July 1977.
- . Brain stem evoked responses associated with low intensity pulses of UHF energy. *J. Appl. Physiol.* 23 (1967): 984-988.
- . Human auditory system response to modulated electromagnetic energy. *J. Appl. Physiol.* 17 (1962): 689-692.
- . and S. R. Feld. Avoidance by rats of illumination with low power nonionizing electromagnetic energy. *J. Comp. Physiol. Psychol.* 89 (1975): 183-188.
- Frey, K. W., and I. Goeke. Wetter und Radiospeicherung der Schilddrüse. *Aertzliche Forschg.* 23 (1969): 373-375.
- Friede, R. L. *Topographic Brain Chemistry*. New York: Academic Press, 1966.
- Friedman, H., and R. J. Carey. Biomagnetic stresser effects in primates. *Physiol. and Behav.* 9 (1972): 171-173.
- . and ----- . The effects of magnetic fields upon rabbit brains. *Physiol. and Behav.* 4 (1969): 539-541.

----- . and H. A. Taub. The transephalic DC potential and reaction time performance. *Psychophysiol.* 5 (1969): 504-509.

----- . et al. Effect of magnetic fields on reaction time performance. *Nature* 213 (1967): 949-956.

----- . et al. Geomagnetic parameters and psychiatric hospital admissions. *Nature* 200 (1963): 626- 628.

Friend, A. W., et al. Low frequency electric field induced changes in the shape and motility of amoebas. *Science* 187 (1975): 357-359.

Frohlich, H. Evidence for Bose condensation-like excitation of coherent modes in biological systems. *Phys. Lett.* 51A (1975): 21-22,

----- . The extraordinary dielectric properties of biological materials and the action of enzymes. *Proc. Nat. Acad. Sci.* 72 (1975): 4211-4215.

----- . Long-range coherence. and energy storage in biological systems. *Int. J. Quantum Chem.* 2 (1968): 641-649.

----- . Long-range coherence and the action of enzymes. *Nature* 228 (1970): 1093.

----- . Low frequency vibrations of macro molecules. *Phys. Lett.* 44A (1973): 385.

----- . Possibilities of long- and short-range electric interactions of biological systems. In *Brain Interactions with Weak Electric and Magnetic Fields*, M.I.T. Neuroscience Research Program Bulletin, 1976.

----- . Selective long-range dispersion forces between large systems. *Phys. Lett.* 29A (1972): 153-154.

Furchtgott, E. Behavioral effects of ionizing radiations. *Psychol. Bull.* 60 (1963): 157-199.

Furedi, A. A., and I. Ohad. Effects of high-frequency electric fields on the living cell. I. Behaviour of human erythrocyte in high-frequency electric fields and its relation to their age. *Biochem. Biophys. Acta* 71 (1964): 1-8.

Galejs, J. ELF and VLF propagation for models of a perturbed ionosphere. *Radio Sci.* 5 (1970): 1041- 1044.

----- . Schumann resonances. *U.S. Nat. Bur. Stand. J. Res. Radio Sci.* 69D (August 1965).

----- . Terrestrial extremely low frequency propagation. In *Natural Electromagnetic Phenomena below 30 Kc/s*, ed. D. F. Bleil, 205-260. New York: Plenum Press, 1964.

----- . *Terrestrial Propagation of Long Electromagnetic waves*. Elmsford, N.Y.: Pergamon Press, 1972. [See pp. 129-138.]

Gardiner-Medwin, A. R. Membrane transport to solute migration affecting the brain cell microenvironment. *Neurosci. Res. Prog. Bull.* 18 (1980): 208-226.

Gauquelin, M., and F. Gauquelin. A possible hereditary effect on time of birth in relation to the diurnal movement of the moon and the nearest planets: It's relationship with geomagnetic activity. *Int. J. Biometeorol.* 11 (1967): 341.

Gavalas-Medici, R. [J.], and S. R. [Day-]Magdaleno. An evaluation of possible effects of 45 Hz, 60 Hz and 75 Hz electric fields on neurophysiology and behavior of monkeys. Phase 1. Continuous wave. ONR Technical Report Control no. N00014-69-A-0200-4037, National Technical Information Service no. AD-A008-404/6GA, Springfield, Va., April 1975.

----- . and S. R. Day-Magdaleno. Extremely low frequency, weak electric fields affect schedule- controlled behaviour of monkeys. *Nature* 261 (1976): 256-258.

Gavalas [-Medici], R. J., et al. Effect of low-level low frequency electric fields on EEG and behavior in *Macaca nemestrina*. *Brain Res.* 18 (1970): 491-501.

Geacintov, N. E. Orientation of biological membranes and cells in magnetic fields. In *Magnetic Field Effect on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

Geel, S. E., and P. S. Timiras. Influence of neonatal hypothyroidism and of thyroxine on the acetylcholinesterase and cholinesterase activities in the developing central nervous system of

the rat. *J. Endocrinol.* 80 (1967): 1069-1074.

Gibson, R. S., and W. F. Moroney. The effect of extremely low magnetic fields on human performance: A preliminary study. NAMRL, Report no. 1175, August 1974.

Glansdorff, P., and I. Prigogine. *Thermodynamic Theory of Structure, Stability and Fluctuations* New York: Wiley-Interscience, 1971. [See pp. 61-95.]

Gollender, H. Eosinophil and avoidance correlates of stress in anterior cingulate cortex lesioned rats. *J. Comp. Physiol. Psychol.* 64 (1967): 40-48.

Goodman, E. M., et al. Effects of extremely low frequency electromagnetic fields on *Physarum polycephalum*. *Radiat. Res.* 66 (1976): 531-540.

Graf, E. R., et al. Radiation noise energy and human physiology in deep space. American Astronautical Society, 1976 National Symposium: Saturn v. Apollo, and Beyond, (EN-2) (1976): 1-18.

Grant, E. H. The structure of water neighboring proteins, peptides and amino acids as deduced from dielectric measurements. *Ann. N.Y. Acad. Sci.* 125 (1965): 418-427.

Green, D. E. A framework of principles for the unification of bioenergetics. *Ann. N.Y. Acad. Sci.* 227 (1974): 6-45.

Green, J. D., et al. Rabbit EEG "theta" rhythm, its anatomical source and relation to activity in single neurons. *J. Neurophysiol.* 23 (1962): 403-420.

Green, J. P. Histamine. In *Handbook of Neurochemistry*, ed. A. Lajtha, vol. IV, Control Mechanisms in the Nervous System, 221-250. New York: Plenum Press, 1970.

Grewal, G. S., et al. Measurements of RF absorption in biological models due to near-field exposure. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Grissett, J. D. Biological effects of electric and magnetic fields associated with ELF communications systems. *Proc. IEEE* 68 (January 1980).

----- . Exposure of man to a simulated lunar environment, physiological and nervous system effects. Diss., Virginia Commonwealth University, Richmond, Va., 1970.

----- . Exposure of squirrel monkeys for long periods to extremely low-frequency magnetic fields: Central-nervous system effects as measured by reaction time. NAMRL, Report no. 1146, October 1971.

----- . and J. de Lorge. Central-nervous-system effects as measured by reaction time in squirrel monkeys exposed for short periods to extremely low-frequency magnetic fields. NAMRL, 1971.

Grodsky, I. T. Neuronal membrane, a physical synthesis. *Math. Biosci.* 28 (1976): 191-219.

----- . Possible physical substrates for the interaction of electromagnetic fields with biological membranes. *Ann. N.Y. Acad. Sci.* 247 (1975): 117-123.

Guy, A. W. Biophysics-energy absorption and distribution. AGARD Lecture Series 78, Radiation Hazards (Non-ionizing Radiations--Biological Effects and Safety Considerations, September 1975.

----- . A note on EMP safety standards. *IEEE Trans. Biomed. Eng.* 22 (1975): 464-467.

----- . Quantitation of induced electromagnetic field patterns in tissue and associated biologic effect. In *Biologic Effects and Health Hazards of Microwave Radiation (Proceedings of an International Symposium, Warsaw, 15-18 Oct. 1973)*, ed. P. Czerski et al., 203-316. Warsaw: Polish Medical Publishers, 1974.

----- . et al. Determination of power absorption in man exposed to high frequency electromagnetic fields by thermographic measurements of scale models. *IEEE Trans. Biomed. Eng.* 23 (1976): 361-371.

----- . et al. Electrophysiological effects of electromagnetic fields on animals. In *Fundamental and Applied Aspects on Non-ionizing Radiation (Proceedings of the Rochester International Conference on Environmental Toxicity, Rochester, N.Y., 5-7 June 1974)*, ed. S.

M. Michaelson et al., 167-211. New York: Plenum Press, 1975.

Hagiwara, S., et al. Physiological properties of electroreceptors of some gymnotids. *J. Neurophysiol.* 25 (1962): 430-449.

Hallgren, R. Inductive neural stimulator. *IEEE Trans. Biomed. Eng.* 20 (1973): 470-472.

Hamer, J. R. Biological entrainment of the human brain by low-frequency radiation. Northrop Space Laboratories, Report no. NSL 65-199, 1965.

----- . Effects of low level, low frequency electric fields on human reaction time. *Commun. Behav. Biol.* 2 (1968): 217-222.

----- . Effects of low-level, low-frequency electric fields on human time judgment. *Proc. Fifth Biometeorol. Cong.*, ed. S. W. Tromp and W. W. Weihe, 129. Amsterdam: Springer-Verlag, 1969.

Hansen, K, M. Some observations with a view to possible influence of magnetism upon the human organism. *Acta Med. Scand.* 97 (1938): 339-364.

Hansson, H.-A. Effects on nervous tissue of exposure to electromagnetic fields. In *Nonlinear Electrodynamics in Biological Systems*, ed. W. R. Adey and A. F. Lawrence, 65. New York: Plenum Press, 1984.

Hardy, J. D. Posterior hypothalamus and the regulation of body temperature. *Federat. Proc.* 32 (1973): 1564-1571.

Hauf, R., and J. Wiesinger. Biological effects of technical electric and electromagnetic VLF fields. *Int. J. Biometeorol.* 17 (1973): 213-215.

Hazzard, D., ed. *Symposium on Biologic Effects and Measurement of Radio Frequency/Microwaves*. HEW Publ. (FDA), 77-8026, July 1977.

Healey, R., and J. Reed. *The Behaviour of Slow Electrons in Gasses*. Sydney: Amalgamated Wireless, 1941. [On the Luxembourg effect.]

Heinmets, F., and A. Herschman. Considerations on the effects produced by superimposed electric and magnetic fields in biological systems and electrolytes. *Phys. Med. Biol.* 5 (1961): 271-288.

Herin, R. A. Electroanesthesia: A review of the literature (1819-1965). *Activ. Nervosa Superior* 10 (1968): 439-454.

Hines, J. N. Antennas. In *Radio Engineering Handbook*, 5th ed., ed. K. Henney, chap. 20, p. 1. New York: McGraw-Hill, 1959.

Hirsch, F. G., D. R. McGiboney, and T. D. Harnish. The physiologic consequences of exposure to high density pulsed electromagnetic energy. *Int. J. Biometeorol.* 12 (1968): 263-270.

Hodgkin, A. L., and A. G. Huxley. A quantitative description of membrane current and its application to conduction and excitation in nerve. *J. Physiol. (London)* 234 (1952): 500-544.

Holubar, J. *The Sense of Time*. Cambridge, Mass.: M.I.T. Press, 1969.

Holzer, R. E., and O. C. Deal. Low audio-frequency electromagnetic signals of natural origin. *Nature* 177 (1956) : 536-537.

Hong, F. T. Mechanisms of magnetic field interactions with retinal rods. In *Magnetic Field Effect on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

Hughes, H. C. On the directional dependency of "slow trail" extremely low-frequency atmospheric wave-forms. *J. Atmos. Terr. Phys.* 29 (1967): 545-552.

Hunt, E. L., et al. Behavioral effects of pulsed microwave radiation. In *Biological Effects of Non-ionizing Radiation*, ed. P. D. Tyler, 440-453. New York: New York Academy of Science, 1975.

Hyden, H. A calcium-dependent mechanism for synapse and nerve cell membrane modulation. *Proc. Nat. Acad. Sci.* 71 (1974): 2965-2968.

----- . Changes in brain protein during learning. In *Macromolecules and Behaviour*, ed. G. B. Ansell and P. B. Bradley, 3-26. London: MacMillan, 1973.

Ibrahim, M. Z. M. The mast cells of the mammalian central nervous system. 1. Morphology, distribution, and histochemistry. *J. Neurol. Sci.* 21 (1974): 431-478.

----- . The mast cells of the mammalian nervous system. 2. The effect of proton irradiation in the monkey. *J. Neurol. Sci.* 21 (1974): 479-499.

Illinger, K. H. Interaction between microwave and millimeter-wave electromagnetic fields and biologic systems: Molecular mechanisms. In *Biological Effects and Health Hazards of Microwave Radiation (Proceedings of an International Symposium, Warsaw, 15-18 Oct. 1973)*, ed. P. Czerski, et al., 160-172. Warsaw: Polish Medical Publishers, 1974.

----- . Molecular mechanisms for microwave absorption in biological systems. In *Symposium Proceedings: Biological Effects and Health Implications of Microwave Radiation, BRH/DBE 70-2, PB 193898*, 112-115. Rockville, Md.: 1970.

Jacobs, J. A. *Geomagnetic Micropulsations*. New York: Springer-Verlag, 1970.

Jaggard, D. L., and J. L. Lords. Cellular effects: Millimeter waves and Raman spectra-- Report of a panel discussion. *Proc. IEEE* 68 (January 1980).

Jasper, H. H., and C. Stefanis. Intracellular oscillatory rhythms in pyramidal tract neurons. *Electroencephalog. Clin. Neurophysiol.* 18 (1965): 541-553.

Johnson, C. C., and A. W. Guy. Nonionizing electromagnetic wave effects in biological materials and systems. *Proc. IEEE* 60 (1972): 692-718.

----- . and M. L. Shore, eds. *Biological Effects of Electromagnetic Waves: Selected Papers of the USNC/USRI Annual Meeting, Boulder, Colo., 20-23 Oct. 1975*, vols. I-II. HEW Publication no. (FDA) 77-8010, 1976.

----- . et al. Fiberoptic liquid crystal probe for absorbed radio-frequency power temperature measurement in tissue during irradiation. *Ann. N.Y. Acad. Sci.* 247 (1975): 527-531.

Jones, R. W. Biological control mechanisms. In *Biological Engineering*, ed. H. P. Schwan, 87-203. New York: McGraw-Hill, 1969.

Justesen, D. R. and A. W. Guy, eds. *Biological effects of electromagnetic waves*. *Radio Sci.* 12, Suppl. 6(s) (1977).

Kaezmarek, L. K. Cation binding models for the interaction of membranes with EM fields. *M.I.T. Neurosci. Res. Prog. Bull.* 15 (1977): 54-60.

----- . Frequency sensitive biochemical reactions. *Biophys. Chem.* 4 (1976): 249-252.

----- . and W. R. Adey. The efflux of $^{45}\text{Ca}^{2+}$ and (^3H)-aminobutyric acid from cat cerebral cortex. *Brain Res.* 63 (1973): 331-342.

----- . and----- . Factors affecting the release of [^{14}C] taurine from cat brain: The electrical effects of taurine on normal and seizure prone cortex. *Brain Res.* 76 (1974): 83-94.

----- and----- . Some chemical and electrophysiological effects of glutamate in cerebral cortex. *J. Neurobiol.* 5 (1974): 231-241.

----- and----- . Weak electric gradients change ionic and transmitter fluxes in cortex. *Brain Res.* 66 (1974): 537-540.

Kaiser, F. Coherent oscillations in biological systems. II. Limit cycle collapse and the onset of traveling waves in Frohlich's brain wave mode. *Z. Naturforschg.* 33a (1978): 418-431.

Kalmijn, A. J. The detection of electric fields from inanimate and animate sources other than electric organs. In *Handbook of Sensory Physiology*, ed. A. Fessard, III. 3. *Electroreceptors and Other Specialized Receptors in Lower Vertebrates*, 147-200. New York: Springer-Verlag, 1974.

----- . The electric sense of sharks and rays. *J. Exp. Biol.* 55 (1971): 371-383.

----- . Electro-orientation in sharks and rays: Theory and experimental evidence. *Scripps Institution of Oceanography Reference Series, Contract no. 73-39*, 1-22, 1973.

----- . Electroperception in sharks and rays. *Nature* 212 (1966): 1232-1233.

Kataoka, K., and E. DeRobertis. Histamine in isolated small nerve endings and synaptic vesicles of rat brain cortex. *J. Pharmacol. Exp. Ther.* 156 (1967): 114-125.

- Katchalsky, A. Polyelectrolytes and their biological interaction. In *Connective Tissue: Intercellular Macromolecules* (Proceedings of a Symposium Sponsored by the New York Heart Association), 9- 42. Boston: Little, Brown, 1964.
- Kazhinskiy, B. B. Biological radio communication. USAF, Foreign Technology Division, FTD-TT-62- 1923/1+2, 1962.
- Keeton, W. T. Magnets interfere with pigeon homing. *Proc. Nat. Acad. Sci.* 68 (1971): 102-106.
- . et al. Normal fluctuations in the earth's magnetic field influence pigeon orientation. *J. Comp. Physiol.* 95 (1974): 95-103.
- Keilmann, F., and W. Grundler Nonthermal resonant action of millimeter microwaves on yeast growth. In *Nonlinear Electrodynamics in Biological Systems*, ed. W. R. Adey and A. F. Lawrence, 59. New York: Plenum Press, 1984.
- Kelsall, M. A., and P. Lewis. Mast cells in the brain. *Federat. Proc.* 23 (1964): 1107-1108.
- Kendig, J. J. Anesthetics and pressure in nerve cells. In *Molecular Mechanism of Anesthesia*, ed. B. R. Fink, vol. 2. New York: Raven Press, 1981.
- Kevanishvili, G. S., and T. G. Zhgenti. Primary mechanism of electromagnetic field effect on living organisms. *Izv. Akad. Nauk. S.S.R.* 62 (1971): 37-40.
- Keynes, R. D. Evidence for structural changes during nerve activity and their relation to the conduction mechanism. In *The Neurosciences: Second Study Program*, ed. F. O. Schmitt, 707-714. New York: Rockefeller University Press, 1970.
- Kholodov, Y. The effect of electromagnetic and magnetic fields on the central nervous system. NASA TT F 465, 1967. Trans.
- . Effects on the central nervous system. In *Biological Effects of Magnetic Fields*, ed. M. Barnothy, 196-200. New York: Plenum Press, 1964.
- . Magnetism in biology. Translation no. JPRS 60737. Washington, DC.: Joint Publication Research Service, Department of Commerce, 1973.
- Kiernan, J. A. A comparative survey of the mast cells of the mammalian brain. *J. Anat.* 121 (1976): 303- 311.
- . Degranulation of mast cells following antidromic stimulation of cutaneous nerves. *J. Anat.* 111 (1971): 349-350.
- Kimeldorf, D. J., and E. L. Hunt. *Ionizing Radiation: Neural Function and Behaviour*, 261-263. New York: Academic Press, 1965.
- King, R. W. P., and T. T. Wu. *The Scattering and Defraction of Waves*. Cambridge, Mass.: Harvard University Press, 1959.
- Kirkwood, J. G., and J. B. Shumaker. The influence of dipole moment fluctuations on the dielectric increment of proteins in solution. *Proc, Nat. Acad. Sci.* 38 (1952): 855-862.
- Kirschbaum, R. N. Increasing growth rates and livability of mice with an ELF. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.
- . and E. W. Kienholz. Increasing chicken growth rates with niobium and magnetic fields. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.
- Kolin, A., et al. Stimulation of irritable tissues by means of an alternating magnetic field. *Proc. Soc. Exp. Biol. Med.* 102 (1959): 251-252.
- König, H. L. Behavioral changes in human subjects associated with ELF electric fields. In *ELF and VLF Electromagnetic Field Effects*, ed. M. A. Persinger. New York: Plenum Press, 1974.
- . Biological effects of extremely low frequency electrical phenomena in the atmosphere. *Interdiscip. Cycle Res.* 2 (1971): 317-323.
- . ELF and VLF signal properties: Physical characteristics. In *ELF and VLF Electromagnetic Field Effects*, ed. M. A. Persinger, 9-34. New York: Plenum Press, 1974.

----- . Environmental effects of atmospheric electric processes of very low frequency. USAF, Cambridge Research Laboratory, AF 19(628)-3880 T-G-232, January 1965. Transl. Kopell, N. Reaction-diffusion equations and pattern formation. In *Studies in Mathematical Biology*, ed. S. A. Levin, 191-205. Washington, D.C.: Mathematics Association of America, 1978.

----- . Waves, shocks, and target patterns in an oscillating chemical reagent. In *Nonlinear Diffusion*, ed. W. E. Fitzgibbon and H. F. Walker, 129-154. San Francisco Pitman, 1977.

Kornberg, H. A., et al. Health effects of occupational exposure to ELF fields. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Kouwenhoven, W. B., et al. Medical evaluation of men working in alternating current electric fields. *IEEE Trans. Power Appar. Systems PAS-86*, 4 (1967): 506.

Kreutzberg, G. W., ed. *Physiology and Pathology of Dendrites*. New York: Raven Press, 1975.

Krippner, S. *Human Possibilities*. New York: Doubleday Anchor Books, 1980.

Kritikos, H. N., and H. P. Schwan. Hot spots generated in conducting spheres by electromagnetic waves: Biological implications. *IEEE Tracts. Biomed. Eng.* 19 (1972): 53-58.

----- , et al. Effects of RF fields on nervous activities. *Proceedings, Microwave Power Symposium*, 54- 65, Waterloo, Ontario, 1975.

Krumpe, P. E., and M. S. Tockman. Evaluation of the health of personnel working near Project Sanguine beta test facility from 1971 to 1972. USN, Naval Medical Research Unit no. 4, Great Lakes, Ill., December 1972.

Krushausl, J. A. Solitons in physics. In *Solitons and Condensed Matter Physics*, ed. A. R. Bishop and T. Schneider, 22-26. Berlin: Springer-Verlag, 1978.

Labes, M. M. Magnetic field coupling with liquid crystalline structures. In *Magnetic Field Effect on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

Lagunoff, D. The mechanism of histamine release from mast cells. *Biochem. Pharmacol.* 21 (1972): 1889-1896.

Lakhtakia, A., et al. Near-field absorption in prolate spheroidal models exposed to a small loop antenna of arbitrary orientation. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Large, D. B., and J. R. Wait. Theory of electromagnetic coupling phenomena in the earth-ionosphere cavity. *J. Geophys. Res.* 73 (1968): 4335-4362.

Lawrence, A. F., and W. R. Adey. Non-linear wave mechanisms in tissue-electromagnetic field interactions. DOE, Contract Report no. DE-A101-79 ET, 1979.

Lawrence, G. Electronics and brain control. *Popular Electron.* 4 (July 1973): 65.

Lawrence, J. H., et al., eds. *Advances in Biological and Medical Physics*, vols. 16-17. New York: Academic Press, 1978.

Lefever, R., and J. L. Denaubourg. On the changes in conductance and stability properties of electrically excitable membranes during voltage-clamp experiments. *Adv. Chem. Phys.* 29 (1975): 349-374.

Lehninger, A. L. The neuronal membrane. *Proc. Nat. Acad. Sci.* 60 (1968): 1069-1080.

Lewis, A. J. A report by A. J. Lewis, Ph.D. Document EW-76-011, Supplemental Report Contract no. XG- 4208 (54-20) 75S, January 1976. [Report on Soviet parapsychology, the work of Gennady Sergeev, magnetic field effects (ELF), psychotronics, bioplasma research, etc.]

Lieber, A. L., and C. R. Sherin. Homicides and the lunar cycle: Toward a theory of lunar influences on human emotional disturbances. *Am. J. Psychiat.* 129 (1972): 101-106.

Lin, J. C., et al. Microwave selective brain heating. *J. Microwave Power* 8 (1973): 275-286.

Lindstrom, L. H., and R. I. Magnusson. Interpretation of myoelectric power spectra: A model

and its applications. Proc. IEEE 65 (May 1977).

Ling, G. N., et al. The physical state of solutes and water in living cells according to the association-induction hypothesis. Ann. N.Y. Acad. Sci. 204 (1973): 6-47.

Lin-Liu, S., and W. R. Adey. Effect of ELF modulated 450 MHz field on calcium efflux from rat synaptosomes. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Lissmann, H. W. On the function and evolution of electric organs in fish. J. Exp. Biol. 35 (1958): 156-191.

Little, W. A. The existence of persistent states in the brain. Math. Biosci. 19 (1974): 101-120.
----- . and G. L. Shaw. A statistical theory of short and long term memory. Behav. Biol. 14 (1975): 115-133.

Llaurado, J. G., et al. Biological and Clinical Effects of Low-Frequency Magnetic and Electric Fields. New York: C C Thomas, 1974.

Loewenstein, W. R. Cell-to-cell connections. In Cell Interactions (Third Petit Colloquium, London, November 1971), ed. L. G. Silvestri, 296-298. Amsterdam: North-Holland, 1972.

----- . Cellular communication by permeable junctions. In Cell Membranes: Biochemistry, Cell Biology and Pathology, ed. G. Weissman and R. Claiborne, 105-114. New York: Hospital Practice, 1975.

----- . Cellular communication through membrane junctions. Arch. Intern. Med. 129 (1972): 299-305.

----- . Intercellular communication. Sci. Am. 22 (May 1970): 78-86.

----- . Intercellular communication through membrane junctions and cancer etiology. In Membrane Transformations in Neoplasias, ed. J. Schultz and R. E. Block, vol. 8, Miami Winter Symposia, 103-120. New York: Academic Press, 1974.

----- . Membrane junctions in growth and differentiation. Federat. Proc. 32 (1973): 60-64.

----- . Permeability of membrane junctions. Ann. N.Y. Acad. Sci. 137 (1966): 441-472.

----- . Permeable junctions: Permeability, formation, and genetic aspects. In The Nervous System: The Basic Neurosciences, ed. D. B. Tower, vol. 1, 419-426. New York: Raven Press, 1975.

Luben, R. A., and C. D. Cain. Use of bone cell hormone response systems to investigate bioelectromagnetic effects on membranes in vitro. In Nonlinear Electrodynamics in Biological Systems, ed. W. R. Adey and A. F. Lawrence, 23. New York: Plenum Press, 1984.

Ludwig, H. W. Electric and magnetic field strengths in the open and in shielded rooms in the ULF- to LF-zone. In ELF and VLF Electromagnetic Field Effects, ed. M. A. Persinger, 35-80. New York: Plenum Press, 1974.

----- . A hypothesis concerning the absorption mechanism of atmospheric in the nervous system. Int. J. Biometeorol. 12 (1968): 93-98.

----- . Shielding effect of materials in the ULF, ELF and VLF region. Int. J. Biometeorol. 17 (1973): 207-211.

----- . et al. Physiological effects of electromagnetic fields in the ELF region. II. A review. Arch. Met. Geophys. Biol. B 21 (1973): 110-116.

Lu, S., et al. Neuroendocrine and cardiodynamic response of the dog subjected to cranial exposure to 2450 MHz (CW) microwave. Proceedings, Microwave Power Symposium, Waterloo, Ontario, 1975.

----- , et al. Thermogenic and cardiovascular regulation in dogs cranially exposed to 2450 Mhz (CW) microwave. Proc. IEEE-S-MTT (Microwave Symposium), Atlanta, Ga., June 12-14, 1974.

Lux, H. D., and P. Schubert. Some aspects of the electroanatomy of dendrites. In Physiology and Pathology of Dendrites: Advances in Neurology, ed. G. W. Kreutzberg, vol. 12, 29-44. New York: Raven Press, 1975.

Maass, J. A., and M. M. Asa. Contactless nerve stimulation and signal detection by inductive transducer. *IEEE Trans. Magn.* 6 (1970): 322-326.

McAfee, R. D. Neurophysiological effect of 3-cm microwave radiation. *Am. J. Physiol.* 200 (1961): 192.

McClain, D. S., and G. M. Edelman. Surface modulation and transmembrane control. In *The Molecular Basis of Cell-Cell Interaction*, ed. R. A. Lerner and D. Bergsma, 1-28. New York: Alan R. Liss, 1978.

McCleave, J. D., et al. Perception and effects on locomotor activity in American eels and Atlantic salmon of extremely low frequency electric and magnetic fields. Final report prepared at University of Maine for ONR, 1974.

McConnell, H. M. Coupling between lateral and perpendicular motion in biological membranes. In *Functional Linkage in Biomolecular Systems*, ed. F. O. Schmitt, D. M. Schneider, and D. Crothers, 123-131. New York: Raven Press, 1975.

MacGregor, R.J. A brief survey of literature relating to the influence of low intensity microwaves on nervous function. Rand Corp, Publication no. P 4397, June 1970.

MacGregor, R. J. A direct mechanism for the influence of microwave radiation on neuroelectric potentials. Rand Corp., Publication no. P 4398, June 1970.

----- . Intrinsic oscillations in neural networks: A linear model for the nth order loop. Rand Corp., Publication no. R 642, February 1971.

----- . A possible mechanism for the influence of electromagnetic radiation of neuroelectric potentials. *IEEE Trans. Microwave Theor. Techn.* 21 (1979): 914-918.

----- . A simulation study of coincidence detection in the dendrites of a single nerve cell. Rand Corp., Publication no. RM-5598-RC, December 1969.

McLees, B. D., and E. D. Finch. Analysis of reported physiologic effects of microwave detection. *Adv. Biol. Med. Phys.* 14 (1973): 163-223.

McPherron, R. L., C. T. Russell, and P. J. Coleman. Fluctuating magnetic fields in the magnetosphere. II. ULF waves. *Space Sci. Rev.* 13 (1972): 411-454.

Magnusson, C. E., and H. C. Stevens. Visual sensations caused by changes in the strength of a magnetic field. *Am. J. Physiol.* 29 (1911): 124-136.

Mahlum, D. D. Mechanisms of biomagnetic effects. In *Magnetic Field Effect on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

Marha, K., et al. *Electromagnetic Fields and the Life Environment*. San Francisco: San Francisco Press, 1971.

Marino, A. A., and R. O. Becker. Biological effects of extremely low frequency electric and magnetic fields: A review. *Physiol. Chem. Phys.* 9 (1977): 131-147.

----- , et al. In vivo bioelectrochemical changes associated with exposure to extremely low frequency electric fields. *Physiol. Chem. Phys.* 9 (1977): 433-441.

Marr, M. J., et al. The effect of low energy ELF electromagnetic radiation on operant behavior in the pigeon and the rat. Final Report, prepared at Georgia Institute of Technology for ONR, Contract no. N00014-67-0159-0009, 1973.

Marton, J. P. Conjectures on superconductivity and cancer. *Physiol. Chem. Phys.* 5 (1973): 259-270.

Mascarenhas, S. Electrets in biophysics. *J. Electrostat.* 1 (1975): 141-146.

Massoudi, H., et al. Long-wavelength analysis of electromagnetic absorption in prolate spheroidal models of man and animals irradiated by a small loop antenna. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Mathewson, N. S., et al. Extremely low frequency (ELF) vertical electric field exposure of rats: A search for growth, food consumption, and blood metabolite alterations. USAF. Armed Forces Radiobiology Research Institute, January 1977.

Maxey, E. S. Critical aspects of human versus terrestrial electromagnetic symbiosis

USNC/URSI Meeting, University of Colorado, Boulder, Colo., Oct. 20-23, 1975.

Maxwell, E. L., and D. L. Stone. Natural noise fields from 1 c/s to 100 kc/s. ONR, Report prepared at Deco Electronics for ONR, Report no. 371-590, 1960.

Medici, R. C. Methods of assaying behavioral change as a function of exposure to weak electric fields. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Menzel, D. H., and W. W. Salisbury. Audio-frequency radio waves from the sun. *Nature* 161 (1948): 91.

Meyer, M. E., and D. R. Lamb. Sensitivity of the pigeon to change in the magnetic field. *Psychonom. Sci.* 5 (1966): 349-350.

Michaelson, S. M. Biological effects of microwave exposure. [Proceedings,] Medical College of Virginia Symposium, 1970.

----- . Human exposure to non-ionizing radiation energy-potential hazards and safety standards. *Proc. IEEE* 60 (1972): 389.

-----, et al. Effects of electromagnetic radiations on physiological responses. *Aerospace Med.* 38 (1967): 293-298.

Michalke, W., and W. R. Loewenstein. Communication between cells of different type. *Nature* 232 (1971): 121-122.

Milroy, W. C., ed. Biomedical aspects of nonionizing radiation. Proceedings of a Symposium Held at the Naval Weapons Laboratory, Dahlgren, Va., 10 July 1973.

Milroy, W. C., et al. Electromagnetic pulse radiation: A potential biological hazard? *J. Microwave Power* 9 (1974): 213-218.

Mitchell, D. C., et al. Hyperactivity and disruption of operant behavior in rats after multiple exposures to microwave radiation. *Radio Sci.* 12 (1977): 163-271.

Mittler, S. Low frequency electromagnetic radiation and genetic aberrations. Final Report, Northern Illinois University, September 1972.

Mohler, R., et al. A systems approach to immunology. *Proc. IEEE* 68 (August 1980): 964-977.

Moseley, J. I. et al. Unit activity during focal cortical hypothermia in the normal cortex. *Exp. Neurol.* 37 (1972): 152-163.

Murr, L. The biophysics of plant growth in a reversed electrostatic field. *Int. J. Biometeorol.* 10 (1966): 135-146.

Nahas, G. G. Magnetic field effects on rodents. In *Magnetic Field Effects on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

Nazarea, A. D. Electric fields and self-coherent patterns and structures in chemical systems: Large-scale effects and biological implications. *J. Chem. Phys.* 9 (1979): 415-449.

Neumann, E., and K. Rosenheck. Permeability changes induced by electric impulses in vesicular membranes. *J. Membr. Biol.* 10 (1972): 279-290.

Nicholson, C. Brain-cell microenvironment as a communication channel. In *The Neurosciences: Fourth Study Program*, ed. F. O. Schmitt and F. C. Woden, 457-476. Cambridge, Mass.: MIT Press, 1977.

----- . Dynamics of the brain cell microenvironment. *Neurosci. Res. Prog. Bull.* 18 (1980): 275-289.

Nicolas, G., and I. Prigogine. *Self-Organization in Nonequilibrium Systems*. New York: John Wiley, 1977.

Nunez, W., and M. Gershon. Species differences in mast cells of the thyroid gland. *Endocrinol.* 92 (1973): 152-159.

Ochs, S. *Elements of Neurophysiology*. New York: John Wiley, 1965.

Ogawa, T., et al. Observations of natural ELF and VLF electromagnetic noises using ball antennas. *J. Geom. Geoelectr.* 18 (1966): 443-454.

O'Konski, C. T. Electric properties of macromolecules. V. Theory of ionic polarization in polyelectrolytes. *J. Phys. Chem.* 64 (1960): 605-619.

O'Neil, J. J. *Prodigal Genius: The Life of Nikola Tesla*. New York: I. Washburn, 1944.

Orgel, A. R., and J. C. Smith. Test of the magnetic theory of homing. *Science* 120 (1954): 891-892.

Orme, J. E. *Time, Experience, and Behavior*. New York: American Elsevier, 1969.

Ormenui, I. Possible effect of ELF range atmospheric of 3-cps range on traffic accidents in a metropolitan area in Hungary. *Int. J. Biometeorol.* 16 (Suppl.) (1972): 93-94.

Ossenkopp, K. P. Maturation and open-field behavior in rats exposed prenatally to an extremely low frequency rotating magnetic field. *Psychol. Report* 30 (1972): 371-374.

-----, and M. D. Ossenkopp. Self-inflicted injuries and the lunar cycle: A report. *J. Interdiscip. Cycle Res.* 4 (1973): 337-348.

-----, and J. Shapiro. Effects of prenatal exposure to a 0.5 Hz low-intensity rotating magnetic field on white Peking ducklings. *Am. Zool.* 12 (1972): 650.

-----, et al. Prenatal exposure to an extremely low-intensity rotating magnetic field and increase in thyroid and testicle weights in rats. *Devel. Psychobiol.* 5 (1972): 275-285.

Oncley, J. L. The electric movements and relaxation times of proteins as measured from their influence upon the dielectric constants of solutions. In *Proteins, Amino Acids and Peptides as Ions and Dipolar Ions*, ed. E. J. Cohn and J. T. Edsall, 543-568. New York: Hafner, 1965.

Ortoleva, P. J., and J. Rosee. Response of unstable chemical systems to external perturbations. *J. Chem. Phys.* 56 (1972): 293-294.

Olsen, R. G. Evidence for microwave-induced acoustic resonances in biological material. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Olsson, Y. Mast cells in the nervous system. *Int. Rev. Cytol.* 24 (1968): 27-70.

Padawer, J. The ins and outs of mast cell function. *Am. J. Anat.* 141 (1974): 399-402.

Parker, J. H., and E. F. Carr. Anomalous alignment and domains in a nematic liquid crystal. *J. Chem. Phys.* 55 (1971): 1846-1850.

Patel, V. L., and L. J. Cahill. Evidence of hydromagnetic waves in the earth's magnetosphere and of their propagation to the earth's surface. *Phys. Rev. Lett.* 12 (1964): 213-215.

Pauly, H., and H. P. Schwan. Dielectric properties and ion mobility in erythrocytes. *Biophys. J.* 6 (1966): 612-639.

Pennock, B. E., and H. P. Schwan. Further observations on the electrical properties of the hemoglobin-bound water. *J. Phys. Chem.* 73 (1969): 2600-2610.

Perkel, D. H., and T. M. Bullock. Neural coding. *Neurosci. Res. Prog. Bull.* 6 (1968): 221-248.

Persinger, M. A. Day time wheel running activity in laboratory rats following geomagnetic event of 5-6 July 1974. *Int. J. Biometeorol.* 20 (1976): 19-22.

----- . Effects of magnetic fields on animal behavior. In *Progress in Biometeorology: Animal Biometeorology*, ed. H. D. Johnson, 177-182. Amsterdam: Swets and Zeitlinger, 1976.

----- . ELF electric and magnetic field effects: The patterns and the problems. In *ELF and VLF Electromagnetic Field Effects*, ed. M. A. Persinger, 275-310. New York: Plenum Press, 1974.

----- . Mast cells in the brain: Possibilities for physiological psychology. *Physiol. Psychol.* 5 (1977): 166-176.

----- . Open field behavior in rats exposed prenatally to a low intensity-low frequency rotating magnetic field. *Devel. Psychobiol.* 2 (1969): 168-171.

----- . Possible cardiac driving by an external rotating magnetic field. Symposium on Biological Effects of Natural, Electric, Magnetic and Electromagnetic Fields. Sixth Int. Biometeorol. Cong., Noordwijk, the Netherlands, Sept. 3-9, 1972; *Int. J. Biometeorol.* 17

(1973) : 263-266. [This issue of Int. J. Biometeorol. contains 7 other papers from the symposium.]

----- . Prenatal exposure to an ELF rotating magnetic field, ambulatory behavior, and lunar distance at birth: A correlation. Psychol. Report 28 (1971): 435-438.

----- . Studies on the biological effects of low and extremely low frequency electromagnetic fields. Laurentian University, Sudbury, Ontario, 1973-1978. [Monograph available from the author.]

----- . and D. J. Coderre. Thymus mast cell number following perinatal and adult exposure to low intensity 0.5 Hz magnetic fields. Int. J. Biometeorol. 22 (1978): 123-128.

----- . and W. S. Foster. ELF rotating magnetic fields: Prenatal exposure and adult behavior. Arch. Met. Geophys. Biol. 18 (1970): 363-369.

----- . and K. P. Ossenkopp. Some behavioral effects of pre- and neonatal exposure to an ELF rotating magnetic field. Int. J. Biometeorol. 17 (1973): 217-220.

----- . and J. J. Pear. Prenatal exposure to an ELF rotating magnetic field and subsequent increase in conditioned suppression. Devel. Psychobiol. 5 (1972): 269- 274.

----- , et al. Behavioral changes in adult rats exposed to ELF magnetic fields. Int. J. Biometeorol. 16 (1972): 155-162.

----- , et al. Physiological changes in adult rats exposed to ELF rotating magnetic. fields. Int. J. Biometeorol. 16 (1972): 163-172.

----- , et al. Psychophysiological effects of extremely low frequency electromagnetic fields: A review. Percept. Motor Skills 36 (1973): 1139-1159. [Note: This is perhaps the single most pertinent reference on ELF in this bibliography.--AU.]

----- . Thirty-eight blood tissue and consumptive measures from rats exposed perinatally and as adults to 0.5 Hz magnetic fields. Int. J. Biometeorol. 22 (1978): 213-226.

Petersen, W. F. E. Man, Weather, Sun. Springfield, Ill.: Charles C. Thomas, 1947.

Petrov, J. R. Influence of microwave radiation on the organism of man and animals. NTIS, Report no. 72-22073, 1972.

Photiades, D. P., et al. Electrosleep in man by a combination of magneto-inductive and transtemporal electric currents. In The Nervous System and Electric Currents, ed. N. L. Wulfsohn and A. Sances, 153-158. New York: Plenum Press, 1970.

Piccardi, G. The Chemical Basis of Medical Climatology. Springfield, Ill.: C C Thomas, 1952.

Picton, H. D. Some responses of Drosophila to weak magnetic and electrostatic fields. Nature 211 (1966): 303-304.

Pierce, E. T. Some ELF phenomena. J. Res. 64 (1960): 383-386.

Pinneo, L. K., et al. The neural effects of microwave radiation, USAF, Rome Air Force Development Center, Report no. TRD-62-231, AD 277684, 1962.

Pionsey, R. Action potential sources and their volume conductor fields. Proc. IEEE 65 (May 1977).

Pohl, M. A. Natural AC electric fields in and about cells. In Nonlinear Electrodynamics in Biological Systems, ed. W. R. Adey and A. F. Lawrence, 87ff. New York: Plenum Press, 1984.

----- and J. S. Crane. Dielectrophoresis of cells. Biophys. J. 11 (1971): 711-727.

----- and----- . Dielectrophoretic force. J. Theoret. Biol. 37 (1972): 1-13.

----- and I. Hawk. Separation of living and dead cells by dielectrophoresis. Science 152 (1966): 647- 649.

Polk, C., and F. Fitchen. Schumann resonances of the earth-ionosphere cavity: Extremely low frequency reception at Kingston. U.S. Nat. Bur. Stand. J. Res. Radio Propagation 66D (May-June 1962).

Popa, M. M. Response of guinea-pig adrenals to continuous and arrhythmically interrupted

low frequency electromagnetic fields. Proc. 5th Biometeorol. Cong., ed. S. W. Tromp and W. H. Weihe, vol. 4, 129. Amsterdam: Springer-Verlag, 1969.

Popp, F.-A., et al. Electromagnetic Bio-Information. Munich: Urban and Schwarzenberg, 1979.

Poppel, E., and H. Giedke. Diurnal variation of time perception. Psychol. Forsch. 34 (1970): 182-198.

Pressman, A. S. The action of microwaves on living organisms and biological structures. Sov. Phys. Usp. 8 (1965): 463-488.

----- . Electromagnetic Fields and Life. New York: Plenum Press, 1970.

----- . The role of electromagnetic fields in life processes. Biofiz. 9 (1964): 131-134.

[----- .] Proceedings, Ad Hoc Committee for the Review of Biomedical and Ecological Effects of ELF Radiation. USN, Bureau of Medicine and Surgery, 1973.

Raemer, H. R. On the spectrum of terrestrial radio noise at extremely low frequencies. U.S. Nat. Bur. Stand. J. Res., Radio Propagation 65D (November-December 1961).

Ramon, C., et al. Effect of low-frequency weak magnetic fields on E. Coli bacteria. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Ravitz, J. L. History, measurements, and applicability of periodic changes in the electromagnetic field in health and disease. Ann. N.Y. Acad. Sci. 98 (1962): 1144-1201.

Rein, G., and R. Dixey. Neurotransmitter release stimulated in a clonal nerve cell line by low intensity pulsed magnetic fields. In Nonlinear Electrodynamics in Biological Systems, ed. W. R. Adey and A. F. Lawrence, 79-86. New York: Plenum Press, 1984.

Reno, J. L. Microwave reflection, diffraction and transmission studies of man. NAMRL, Report no. 1199, February 1974.

Rentsch, W. Magneto-inductive transmission of stimuli to the brain, in electrotherapeutic sleep and electroanesthesia. Proceedings, First Annual Symposium (Graz, Austria, 12-17 Sept. 1966), ed. F. M. Wagenweder and O. St. Schuy, 161-168. Amsterdam: Excerpta Medica, 1967.

Reynolds, D. V., and A. E. Sjoberg, eds. Neuroelectric Research. Springfield, Ill.: C C Thomas, 1971. [This book contains papers by 81 contributors.]

Riesen, W. H., et al. A pilot study of the interaction of extremely low-frequency electromagnetic fields with brain organelles. HTRI, Technical Memorandum no. 3, HTRI Project E6185, Contract N00039-71-C-0111, 1971.

Roberts, A. M. Effect of the electric fields on mice. Nature 223 (1969): 639.

Romig, M. F., and D. L. Lamar. Anomalous sounds and electromagnetic effects associated with fireball entry. Rand Corp., RM-3724-ARPA, July 1963. Rosenblum, W. I. A possible role for mast cells in controlling the diameter of arterioles on the surface of the brain. Brain Res. 49 (1973): 75-82.

Russo, F., and W. E. Caldwell. Biomagnetic phenomena: Some implications for the behavioral and neurophysiological sciences. Genet. Psychol. Monogr. 84 (1971): 177-243.

Saito, M., et al. Response of nonspherical biological particles to alternating electric fields. Biophys. J. 6 (1966): 313-327.

Saito, T. Geomagnetic pulsations. Space Sci. Rev. 10 (1969): 319-411.

Sampson, H. W., et al. An ultrastructural investigation of calcium-dependent granules in the rat neurophil. Brain Res. 22 (1970): 157-162.

[----- .] Sanguine Division, Sanguine System Final Environmental Impact Statement, 77-78. USN, Naval Electronics Systems Command (PME 117-21), 1972.

Scheich, H., and T. H. Bullock. The detection of electric fields from electric organs. In Handbook of Sensory Physiology, ed. A. Fessard, III. 3. Electrosensory Systems in Lower Vertebrates, 201-256. New York: Springer-Verlag, 1974.

Schiff, J. and W. R. Loewenstein. Development of a receptor on a foreign nerve fiber in a

Pacinian corpuscle. *Science* 177 (1972): 712-715.

Schmidt, S., and P. Ortoleva. Multiple chemical waves induced by applied electric field. *Chem. Phys.* 67 (1978): 1010-1015.

----- .and----- . A new chemical wave equation for ionic systems. *J. Chem. Phys.* 67 (1977): 3771-3776.

Schmitt, F. O., and F. E. Sampson. Brain cell microenvironment. In *Neuroscience Research Symposium Summaries*, ed. F. O. Schmitt et al., vol. 4, 191-325. Cambridge, Mass.: MIT Press, 1970.

----- , et al. Electronic processing of information of brain cells. *Science* 193 (1976): 114-120.

Schmitt, O. H., and R. D. Tucker. Human perception of moderate strength low-frequency magnetic fields. IEEE meeting, 1973. Typescript.

Schumann, W. O. Elektrische Eigenschwingungen des Hohlraumes Erde-Luft-Ionosphäre. *Z. angew. u. Phys.* 9 (1957): 373-378.

----- . Über die strahlungslosen Eigenschwingungen einer leitenden Kugel, die von einer Luftschicht und einer Tonosphärenhülle umgeben ist. *Z. Naturforschg.* 7A (1952): 149-154.

Schwan, H. P. Alternating current spectroscopy of biological substances. *Proc. IEEE* 47 (1959): 1841- 1855.

----- . Biological impedance determinations. *J. Cell. Comp. Physiol.* 66 (Suppl.) (1965): 512.

----- . Biological hazards from exposure to ELF electrical fields and potentials. NWL, Technical Report no. TR-2713, 1972.

----- . Characteristics of absorption and energy transfer of microwaves and ultrasound in tissues. In *Medical Physics*, ed. O. Blassers, 1-7. Chicago: Yearbook Publishers, 1960.

----- . Determination of biological impedances. In W. L. Nastuk, *Physical Techniques in Biological Research*, vol. 6, 323-406. New York: Academic Press, 1963

----- . Electrical properties of bound water. *Ann. N.Y. Acad. Sci.* 125 (1965): 344-354.

----- . Electrical properties of tissue and cell suspension. *Adv. Bioi. Med. Phys.* 5 (1957):147-209

----- . Interaction of microwave and radio frequency radiation with biological systems. *IEEE Trans. Microwave Theor. Techn.* 19 (1971): 146-152.

----- . Microwave biophysics. In *Microwave Power Engineering*, ed. E. Okress, vol. 2, 213-244. New York: Academic Press, 1968.

----- . Microwave radiation: Biophysical considerations and standards criteria. *IEEE Trans. Biomed. Eng.* 19 (1972): 304-312.

----- . Principles of interaction of microwave fields at the cellular and molecular level. In *Biologic Effects and Health Hazards of Microwave Radiation (Proceedings of an International Symposium, Warsaw, 15-18 Oct. 1973)*, ed. P. Czerski et al., 152-159. Warsaw: Polish Medical Publishers, 1974.

----- . To provide for the protection of the public health from radiation emissions. U.S. Senate, 19th Congress, Hearings Before the Committee on Commerce, May 13, 1968, 699-718.

----- . and K. R. Foster. RF-field interactions with biological systems: Electric properties and biophysical mechanisms. *Proc. IEEE* 68 (January 1980).

----- . and G. M. Piersol. The absorption of electromagnetic energy in body tissues-- Review and critical analysis. I. Biophysical aspects. *Am. J. Phys. Med.* 33 (1954):371-404.

-----and----- . The absorption of electromagnetic energy in body tissues. II. Physiological and clinical aspects. *Am. J. Phys. Med.* 34 (1955): 425-448.

-----and L. D. Sher. Alternating-current field-induced forces and their biological implications. *J. Electrochem. Soc.* 116 (1969): 22C-26C.

-----, et al. Complex permittivity of water at 250 C. *J. Chem. Phys.* 64 (1976): 2257-2258.

-----, et al. The electrical properties of bilayer membranes. Abstracts, 10th Annual Meeting, Biophysical Society, Boston, 1966.

Schwartz, J. Histamine as a transmitter in the brain. *Life Sci.* 17 (1975): 503-518.

-----, et al. Histamine formation in the rat brain in vivo Effects of histidine loads. *J. Neurochem.* 19 (1972): 801-810.

Schwarz, G. A basic approach to a general theory for cooperative [?] intramolecular conformation changes of linear biopolymers. *Biopolymers* 5 (1967): 321-324.

----- . Cooperative binding in linear biopolymers. I. Fundamental static and dynamic properties. *Eur. J. Biochem.* 12 (1970): 442-453.

----- . General equation for the mean electrical energy of a dielectric body in an alternating electrical field. *J. Chem. Phys.* 39 (1963): 2387-2388.

-----, et al. On the orientation of nonspherical particles in an alternating electrical field. *J. Chem. Phys.* 43 (1965): 2562-2569.

Sclabassi, K. J., et al. Complex pattern evoked somatosensory responses in the study of multiple sclerosis. *Proc. IEEE* 65 (May 1977).

Seamon, K. B. Calcium and magnesium-dependent conformational states of calmodulin as determined by nuclear magnetic resonance. *Biochem.* 19 (1980): 207-215.

Sel'kov, E. E. Oscillations in biological and chemical systems. *Eur. J. Biochem.* 4 (1968): 79-86.

Servantie, B., et al. Pharmacologic effects of a pulsed microwave field. In *Biologic Effects and Health Hazards of Microwave Radiation (Proceedings of an International Symposium, Warsaw, 15-18 Oct. 1973)*, ed. P. Czerski et al, 36-45. Warsaw: Polish Medical Publishers, 1974.

----- . Synchronization of cortical neurons by a pulsed microwave field as evidenced by spectral analysis of electrocorticograms from the white rat. *Ann. N.Y. Acad. Sci.* 247 (1975): 82-86.

Sharma, R. C. Mechanism of characteristic behaviour of cells in an alternating electric field. *Nature* 214 (1967): 83-84.

Shatten, V. H., and J. M. Wilcox. Response of the geomagnetic activity index Kp to the interplanetary magnetic field. *J. Geophys. Res.* 72 (November 1967): 5185-5191.

Sheer, D. E. *Electrical Stimulation of the Brain*. Austin: University of Texas Press, 1961.

Sheppard, A. R. High frequency permittivity measurements in the time and frequency domains. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

----- . Magnetic field interactions in man and other mammals: An overview. In *Magnetic Field Effect on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

----- and M. Eisenbud. *Biological Effects of Electric and Magnetic Fields of Extremely Low Frequency*. New York: New York University Press, 1977.

-----, et al. ELF electric fields alter neuronal excitability in aplysia neurons, Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

-----, et al. Extracellular alternating currents change firing rate in aplysin pacemaker neurons. *Soc. for Neurosci. Abstr.* 6 (November 1980).

-----, et al. Models of long-range order in cerebral macromolecules: Effects of sub-ELF and of modulated VHF and UHF fields. *Radio Sci.* 14 (November-December 1979): 141-145.

Sher, L. D. *Mechanical effects of AC fields on particles dispersed in a liquid: Biological implication*. Diss., University of Pennsylvania, Philadelphia, Penna., 1963.

-----, et al. On the possibility of nonthermal biological effects of pulsed electromagnetic radiation. *Biophys.* 10 (1970): 970-979.

Sholl, D. A. *The Organization of the Cerebral Cortex*. New York: John Wiley & Sons, 1956.

Silverman, C. Nervous and behavioral effects of microwave radiation in humans. *Am. J. Epidemiol.* 97 (1973): 219.

Soyka, F. *The Ion Effect*. New York: E. P. Dutton, 1976.

Spiegel, R. J., and W. T. Joines. A semiclassical theory for nerve excitation by a low intensity electromagnetic field. *Bull. Math. Biol.* 35 (1973): 591-605.

Spirkin, A. Getting to know psycho-biophysical reality. USAF, Foreign Technology Division, Report no. FTD-ID (RS) T-1175-80.

Stein, M., R. C. Schiavi, and M. Camerion. Influence of brain and behavior on the immune system. *Science* 191 (1976): 435-440.

Stern, S., et al. Detection of 60 Hz electric fields by rats: Preliminary results. Second Annual Meeting, Bioelectromagnetics Society, San Antonio, Tex., Sept. 14-18, 1980.

Stewart, G. T. Change of phase and change of state in biological systems. *Molec. Cryst. Liq. Cryst.* 7 (1969): 75-102.

----- . Liquid crystals of lipid in normal and athromatous tissue. *Nature* 183 (1959): 873-875.

----- . Some physico-chemical properties of paracrystalline spherulites of biological origin. *Nature* 192 (1961): 624-625.

Stratton, J. A. *Electromagnetic Theory*. New York: McGraw-Hill, 1941.

Sturrock, P. A. Generation of radio noise in the vicinity of the earth. *U.S. Nat. Bur. Stand. J. Res., Radio Propagation* 66D (March-April 1962).

Subbota, A. G. The effects of a pulsed super high frequency field on the higher nervous activity of dogs. *Bull. Exp. Med.* 46 (1958): 1206-1211.

Sugiura, M., and J. P. Heppner. Electric and magnetic fields in the earth's environment. In *American Institute of Physics Handbook*, sec. 5, 265-303. New York: McGraw-Hill, 1972.

Swenberg, C. E. Theoretical remarks on low frequency magnetic field interactions with biological systems. In *Magnetic Field Effect on Biological Systems*, ed. T. S. Tenforde. New York: Plenum Press, 1978.

Swicord, M. L., G. S. Edwards, and C. C. Davis. Strong interactions of radiofrequency fields with nucleic acid. In *Nonlinear Electrodynamics in Biological Systems*, ed. W. R. Adey and A. F. Lawrence, 35- 58. New York: Plenum Press, 1984.

Szuts, E. Z., and R. A. Cone. Rhodopsin: Light activated release of calcium. *Federat. Proc.* 33 (1974): 1471. [Abstract.]

Tabichers, L. Y., et al. Apparatus for the treatment of neuropsychic and somatic diseases with heat, light, sound, and VHF electromagnetic radiation. U.S. Patent no. 3,733,049.

Takashima, S. Membrane capacity of giant squid axon during hyper- and depolarizations. *J. Membr. Biol.* 27 (1976): 21-39.

----- and A. Minakata. Dielectric behavior of biological macromolecules. In *Digest of Dielectric Literature*, ed. W. Vaughn. Washington, D.C.: National Research Council, National Academy of Sciences, 1976.

----- and H. P. Schwan. Passive electrical properties of squid axon membrane. *J. Membr. Biol.* 17 (1974): 51-68.

----- , et al. Effects of modulated KF energy on the EEG of mammalian brains, II. Appearance of fast and slow waves after chronic irradiations. *Proceedings of the 1978 Symposium on Electromagnetic Fields in Biological Systems*, Ottawa, Ontario, June 28-30, 1978.

Tasaki, I. Evolution of theories of nerve excitation. In *The Nervous System*, ed. D. B. Tower, vol. III. *The Basic Neurosciences*, 177-195. New York: Raven Press, 1975.

Tenforde, T. S., ed. *Magnetic Field Effect on Biological Systems*. New York: Plenum Press, 1978.

Teng, H. C., and H. E. Howard. The relationship between sudden changes in weather and the

occurrence of acute myocardial infarction. *Am. Heart J.* 49 (1955): 9-20.

Tepley, L. R., and K. D. Amundsen. Notes on sub ELF emissions observed during magnetic storms. *J. Geophys. Res.* 69 (1964): 3749-3754.

Toomey, J., and C. Polk. Research on extremely low-frequency propagation with particular emphasis on Schumann resonance and related phenomena. Bedford, England: Air Force Cambridge Research Laboratories, 1970.

Triffet, T., and H. S. Green. Information and energy flow in a simple nervous system. *J. Theor. Biol.* 86 (1980): 3-44.

Tromp, S. W. *Medical Biometeorology*. New York: Elsevier, 1963.

----- . *Psychical Physics*. New York: Elsevier, 1949.

----- . Seasonal and yearly fluctuations in meteorologically induced electromagnetic wave patterns in the atmosphere (period 1956-1968) and their possible biological significance. *Interdiscip. Cycle Res.* 1 (1970): 193-199.

Trullinger, S. E. Where do solitons go from here? In *Solitons and Condensed Matter Physics*, ed. A. R. Bishop and T. Schneider, 338-340. Berlin: Springer-Verlag, 1978.

Tyler, P. E., ed. Biologic effects of nonionizing radiation. *Ann. N.Y. Acad. Sci.* 247 (February 1975).

Uteush, E. V. Research on the psychophysiological peculiarities of the operator. USAF, Foreign Technology Division, Report no. FTD-MT-24-57-1970.

Vaccaro, S. R., and H. S. Green. Ionic processes in excitable membranes. *J. Theor. Biol.* 81 (1979): 771- 802.

Valentinuzzi, M. *Magnetobiology*. Downey, Calif.: North American Aviation, 1961.

Von Holst, E. Electrically controlled behavior. *Sci. Am.* 206 (March 1962): 50-59.

Vyalov, A. M., et al. On the problem of the effect of constant and variable magnetic fields on the human organism. In *Occupational Pathology*, ed. A. P. Shiskova, 169-175. Moscow: Ministry of Health, 1964. [Translation available.]

Wachtel, H. et al. Effects of low intensity microwaves on isolated neurons. *Ann. N.Y. Acad. Sci.* 247 (1975): 46-62.

Wade, N. Fischer-Spassky charges: "What did the Russians have in mind?" *Science* 177 (1972): 778.

Walcott, C., and R. P. Green. Orientation of homing pigeons altered by a change in the direction of an applied magnetic field. *Science* 184 (1974): 180-182.

Wallach, D. F. H., and P. H. Zahler. Protein conformation in cellular membranes. *Proc. Nat. Acad. Sci.* 56 (1966): 1552-1559.

Waltmann, N. Electrical properties and fine structure of the ampullary canals of Lorenzini. *Acta Physiol. Scand.* 66 (Suppl. 264) (1966): 1-60.

Wang, H. H., and W. R. Adey. Effects of cations and hyaluronidase on cerebral electrical impedance. *Exp. Neurol.* 25 (1969): 70-84.

----- , et al. Calcium, mucopolysaccharides, and cerebral impedance. *Federat. Proc.* 27 (1968): 749. [Abstract.]

Wever, R. Different aspects of the studies of human circadian rhythms under the influence of weak electric fields. In *Chronobiology*, ed. L. E. Scheving, F. Halbert, and J. E. Pauly, 694-699. Tokyo Igako Shoin, 1974.

----- . The effects of electric fields on circadian rhythms in man. *Life Sci. Space Res.* 8 (1970): 177- 187.

----- . ELF-effects on human circadian rhythms. In *ELF and VLF Electromagnetic Field Effects*, ed. M. A. Persinger, 101-144. New York: Plenum Press, 1974.

----- . Human circadian rhythms under the influence of weak electric fields and the different aspects of these studies. *Int. J. Biometeorol.* 17 (1973): 227-232.

----- . Influence of electric fields on some parameters of circadian rhythms in man. In

Biochronometry, ed. M. Menaker, 117-132. Washington, D.C.: National Academy of Sciences, 1971.

----- . Influence of light on human circadian rhythms. Nord. Council Arct. Res. Report 10 (1974): 33-47.

----- . A mathematical model for circadian rhythms. In *Circadian Clocks*, ed. J. Aschoff, 47-63. Amsterdam: North Holland, 1965.

Wieske, C. W. Human sensitivity to electric fields. *Biomedical Sciences Instrumentation: Proceedings of the First National Biomedical Sciences Instrumentation Symposium*, vol. 1, 467-475. Distributed by Plenum Press, New York, 1963.

Williamson, S. J., et al. Evoked neuromagnetic fields of the human brain. *J. Appl. Phys.* 50 (March 1979).

Wortz, E. C., et al. Biophysical aspects of parapsychology. Garrett Airesearch Corp., Document no. 75- 11096A, 1975.

----- . Novel biophysical information transfer mechanisms (NBIT). Garrett Airesearch Corp. Document no. 76-13197, Contract no. XG-4208 (54-20) 75S, January 1976.

Zeeman, E. C. Primary and secondary waves in developmental biology. In *Lectures on Mathematics in the Life Sciences*, ed. E. C. Zeeman, 69-101. Providence, RI: American Mathematics Society, 1974.

Zhokov, V. P., and E. I. Indeikin. Relationship between acute attacks of glaucoma and changes in the magnetic field of the earth. *Vestn. Ophthalmol.* 5 (1970): 29-30.

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[2] NAMRL = Naval Aerospace Medical Research Laboratory (Pensacola, Fla.)

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