

	SUNDAY, SEPTEMBER 19	MONDAY, SEPTEMBER 20	TUESDAY, SEPTEMBER 21	WEDNESDAY, SEPTEMBER 22
9:00		WELCOME - C.T. BRIGHTON	Session V	Session IX
9:20		Session I	<i>Electrical Properties of Bone</i>	<i>Nerves and Regeneration</i>
9:40		<i>Fracture Healing in Animals</i>		
10:00		COFFEE BREAK	COFFEE BREAK	COFFEE BREAK
10:20				
10:40		Session II	Session VI	Session X
11:00		<i>Cell Culture</i>	<i>Human Fracture Healing</i>	<i>Cellular Mechanisms</i>
11:20				
11:40				
12:00				
12:20		LUNCHEON	LUNCHEON	LUNCHEON
12:40				
1:00				
1:20		BUSINESS MEETING I	BUSINESS MEETING II	
1:40			PRESIDENTIAL ADDRESS	Session XI
2:00		Session III	Session VII	<i>Osteogenesis in Animals</i>
2:20		<i>Field Distributions:</i>	<i>Tissue and Organ Culture</i>	
2:40		<i>Theoretical Models</i>		
3:00				TEA
3:20		TEA	TEA	POSTER SESSION III
3:40		POSTER SESSION I	POSTER SESSION II	
4:00				Session XII
4:20	REGISTRATION	Session IV	Session VIII	<i>Metallic Electrodes</i>
4:40	<i>Christ Church College</i>	<i>Electrical Effects in Vivo</i>	<i>Membrane Transport and</i>	
5:00			<i>Electrochemical Fluxes</i>	
5:20				
5:40				
6:00	WELCOME RECEPTION			
6:20				
6:40				
7:00				
7:20				CLOSING REMARKS - J. WATSON
7:40				
8:00			RECEPTION AND BANQUET	
8:20			(COLLEGE FEAST)	
8:40			HALL OF CHRIST CHURCH COLLEGE	
9:00		ORGAN RECITAL		
9:20		<i>CATHEDRAL OF CHRIST CHURCH</i>		
9:30				

IV

*Coffee, Lunch and Afternoon Tea - Exhibition Hall

MONDAY, SEPTEMBER 20

9:00 WELCOME - C.T. BRIGHTON, Department of Orthopaedic Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA

SESSION I

FRACTURE HEALING IN ANIMALS

Moderator: Z.B. Friedenber
University of Pennsylvania
Philadelphia, Pennsylvania

- (1) 9:05 *Uptake of $^{99m}\text{Tc-MDP}$ At a Fracture Site Treated with Electromagnetic Induction of Current.* I.D. McCARTHY*, I.H. ANNAN*, I. LOUDON†, H.T. LAW†, and S.P.F. HUGHES*; *Department of Orthopaedic Surgery, †Bio-engineering Unit, Princess Margaret Rose Orthopaedic Hospital, Fairmilehead, Edinburgh, U.K.
- (2) 9:25 *Effects of Electrical Stimulation on Calcium-45 Uptake in Fractured Fibulae from Normal and Thyroparathyroidectomized Rabbits.* D.K. GUY and H. WALD; Department of Anatomy, Health Sciences Center, University of Louisville, School of Medicine, Louisville, Kentucky, USA.
- (3) 9:45 *Electronic Acceleration of the Rate of Fracture Healing in the Primate Metatarsal.* J. WALTER, D. HARRINGTON, T. WALTER, T. CHEN, D. BLACK, and W. BODAMER; Pennsylvania College of Podiatric Medicine, Philadelphia, Pennsylvania, USA.
- (4) 10:05 *Bioelectric and Histomorphometric Changes During Fracture Healing.* D.A. CHAKKALAKAL, L. LIPPIELLO, and J.F. CONNOLLY; Orthopaedic Research Laboratory, VA Medical Center, and Department of Orthopaedic Surgery, University of Nebraska Medical Center, Omaha, Nebraska, USA.

10:25 COFFEE BREAK

SESSION II

CELL CULTURE

Moderator: L.A. Norton
University of Connecticut
Farmington, Connecticut

- (5) 10:40 *Primary Induced Cellular Changes and Cell Specificity in Pulsed Capacitive Stimulation of Bone Cells In Vitro*. R. KORENSTEIN*, D. SOMJENT†, H. FISCHLER*, and I. BINDERMAN†; *Department of Membrane Research, The Weizmann Institute of Science, Rehovot; †Hard Tissue Unit, Ichilov Hospital, Tel-Aviv, Israel.
- (6) 11:00 *Alternating Magnetic Fields Enhance DNA Synthesis in Fibroblastic Cells*. A.R. LIBOFF, T. WILLIAMS, JR., D.M. STRONG, and R. WISTAR, JR.; Dental Research Branch, Naval Medical Research Institute, Bethesda, Maryland, USA.
- (7) 11:20 *The Effect of Pulsating Electromagnetic Fields on Prostaglandin Synthesis in Osteoblast-Like Cells*. D.E. JOHNSON and G.A. RODAN; Department of Oral Biology, University of Connecticut, School of Dental Medicine, Farmington, Connecticut, USA.
- (8) 11:40 *In Vitro Capacitively Coupled Electrical Stimulation of Bovine Articular Chondrocyte Pellets in Varying Serum Concentrations*. C.T. BRIGHTON, A.S. UNGER, and J.L. STAMBOUGH; Department of Orthopaedic Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA.
- (9) 12:00 *Stimulation of Connective Tissue Protein Synthesis in Fibroblast Cultures by Pulsed Magnetic Fields*. C. MURRAY, Strangeways Research Laboratory, Cambridge, U.K.
- 12:20 LUNCH
- 1:20 BUSINESS MEETING I

SESSION III

FIELD DISTRIBUTIONS: THEORETICAL MODELS

Moderator: A.J. Grodzinsky
Massachusetts Institute of Technology
Cambridge, Massachusetts

- (10) 1:40 *A Generalized Theoretical Approach to the Determination of Local Field Parameters During Capacitively Coupled Electric Stimulation In Vivo.* E.J. VRESILOVIC*, S.R. POLLACK*, and C.T. BRIGHTON†; *Department of Bioengineering, †Department of Orthopaedic Surgery, University of Pennsylvania, Philadelphia, Pennsylvania, USA.
- (11) 2:00 *Frequency Windows in Stimulating a Cell with Electric Field: A Computer Simulation.* S. RIDELLA, G.P. DRAGO, and M. MARCHESI; Istituto Circuiti Elettronici, Consiglio Nazionale delle Ricerche, Genova, Italy.
- (12) 2:20 *Induced Electric Potentials In Vivo Produced by Capacitively Coupled Signals.* M.D. BRAGER, C.T. BRIGHTON, and S.R. POLLACK*; Department of Orthopaedic Surgery, *Department of Bioengineering, University of Pennsylvania, Philadelphia, Pennsylvania, USA.
- (13) 2:40 *Helmholtz Coil-Cell System Spatial Relationship and Electrical Dosage in the Electromagnetic Modulation of Tissue Growth and Repair.* B.R. McLEOD*, A.A. PILLAT†, and M.W. SAMPSEL*; *Department of Electrical Engineering and Computer Science, Montana State University, Bozeman, Montana; †Bioelectrochemistry Laboratory, Departments of Applied Chemistry and Chemical Engineering, Columbia University, New York, New York, USA.
- (14) 3:00 *A New Procedure for Electrically Stimulating Cells in Culture.* A.R. LIBOFF and B.A. HALVERSON; Dental Research Branch, Naval Medical Research Institute, Bethesda, Maryland, USA.
- 3:20 Tea - POSTER SESSION I

SESSION IV

ELECTRICAL EFFECTS IN VIVO

Moderator: C.A.L. Bassett
Columbia University
New York, New York

- (15) 3:50 *On the Treatment of Loosening of Endoprostheses by Means of Pulsing Electromagnetic Fields.* W. KRAUS*, F. LECHNER**, R. ASCHERLT†, and G. BLÜMELT; *Institute f. Med. Physics, †Institute for Experimental Surgery of the Technical University Munich, Munich, **Garmisch-Partenkirchen Hospital, Garmisch-Partenkirchen, Federal Republic of Germany.
- (16) 4:10 *Pulsatile Electromagnetically Induced Currents Synergize with Polymer Immunomodulating Drugs in the Inhibition of Growth of Murine Malignant Melanoma.* A.A. PILLA*, L. NORTON†, and L. TANSMANT; *Bioelectrochemical Laboratory, Departments of Applied Chemistry and Chemical Engineering, Columbia University; †Mount Sinai School of Medicine, Department of Neoplastic Diseases, New York, New York, USA.
- (17) 4:30 *The Side Effects to the Internal Organs of Pulsing Electromagnetic Fields.* T. OHASHI, S. INOUE, H. SASAKI, and T. ASHIHARA*; Department of Orthopaedic Surgery, Murakami Memorial Hospital, Gifu College of Dentistry, Gifu; *First Department of Pathology, Kyoto Prefectural University of Medicine, Kyoto, Japan.
- (18) 4:50 *Treatment of Avascular Necrosis of the Femoral Head with Direct Current: A Preliminary Report.* M.E. STEINBERG, C.T. BRIGHTON, S.E. TOOZE, G.D. HAYKEN, and D.R. STEINBERG; Department of Orthopaedic Surgery, University of Pennsylvania, Philadelphia, Pennsylvania, USA.
- (19) 5:10 *Selective In Vivo Cellular Stimulation With A Direct Current: A Preliminary Report.* R.G. SCHMIDT, Z.B. FRIEDENBERG, and C.T. BRIGHTON; Department of Orthopaedic Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA.
- 5:30 Adjourn
- 8:30 ORGAN RECITAL - CATHEDRAL OF CHRIST CHURCH.

TUESDAY, SEPTEMBER 21

SESSION V

ELECTRICAL PROPERTIES OF BONE

Moderator: J.A. Spadaro
Upstate Medical Center
Syracuse, New York

- (20) 9:00 *Similarity of Piezoelectric Properties of Dry Bone and Poled Polymers.* W.S. WILLIAMS, Department of Ceramic Engineering, University of Illinois, Urbana, Illinois, USA.
- (21) 9:20 *In Vitro Measurements of Biological Impedances.* B. TUERLINCKZ*, J-L. HENROTTE*, L. RYBOWSKI*, M. DIERICKX**, M. HINSENKAMP*, and F. BURNY†; *Electricite Generale Universite Libre de Bruxelles, **Electricite Generale, F.S.A., †Universite Libre de Bruxelles, and ‡Chirurgie Osseuse, Hopital Erasme, Universite Libre de Bruxelles, Brussels, Belgium.
- (22) 9:40 *On the Origin of Stress Generated Potentials in Wet Bone.* R. SALZSTEIN and S.R. POLLACK, Department of Bioengineering, University of Pennsylvania, Philadelphia, Pennsylvania, USA.
- 10:00 COFFEE BREAK

SESSION VI

HUMAN FRACTURE HEALING

Moderator: J. Watson
University of Wales
Swansea, United Kingdom

- (23) 10:20 *Factors Influencing Healing in the Treatment of Nonunion with Electricity.* C.T. BRIGHTON, Z.B. FRIEDENBERG, J. BLACK, R.B. HEPPENSTALL, and J.L. ESTERHAI, JR.; Department of Orthopaedic Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA.

- (24) 10:40 *Treatment of Nonunion with Constant Direct Current.* T. AHL*, G. ANDERSSON**, P. HERBERTSt, and R. KALEN*; *Department of Orthopaedic Surgery, Danderyds Hospital, Danderyd; **Department of Orthopaedic Surgery, Sahlgrenska Hospital, Goteborg; †Department of Orthopaedic Surgery, Ostra Hospital, Goteborg, Sweden.
- (25) 11:00 *Roentgenographic Observation of Electrical Callus Formation in Clinical Cases.* S. INOUE, T. OHASHI, K. KAJIKAWA, M. TADA, and Y. SAITO; Department of Orthopaedic Surgery, Murakami Memorial Hospital, Gifu College of Dentistry, Gifu, Japan.
- (26) 11:20 *Electro-Magnetic Fields Used in the Treatment of Fresh Fractures of the Radius.* O. WAHLSTROM; Department of Orthopaedic Surgery, University Hospital, Linkoping, Sweden.
- (27) 11:40 *The Use of the Denham External Fixator in Conjunction with Electro-Magnetic Induction of Fracture Healing.* R.B. SIMONIS*, C. GOOD*, and T.K. COWELL†; Rowley Bristow Orthopaedic Hospital, Pyrford, Woking, Surrey; †Department of Bioengineering, St. Thomas Hospital, London, U.K.
- (28) 12:00 *The Compatibility of Metallic Fixation with Pulsed Electro-Magnetic Fields.* C.A.L. BASSETT, M.M. SCHINK, and S.N. MITCHELL; Orthopaedic Research Laboratories, Columbia-Presbyterian Medical Center, New York, New York, USA.
- 12:20 LUNCHEON
- 1:20 BUSINESS MEETING II/PRESIDENTIAL ADDRESS

SESSION VII

TISSUE AND ORGAN CULTURE

Moderator: B.F. Sicken
University of Kentucky
Lexington, Kentucky

- (29) 2:00 *The Effect of Pulsed Magnetic Fields on cAMP Metabolism in Chick Embryo Tibiae.* D.B. JONES; Strangeways Research Laboratory, Cambridge, U.K.

- (30) 2:20 *Electromagnetic Modulation of Calcium Uptake in Embryonic Chick Tibia In Vitro: Dependence on Induced Current Waveform Parameters.* A.A. PILLA and G. COLACICCO; Bioelectrochemistry Laboratory, Department of Applied Chemistry and Chemical Engineering, Columbia University, New York, New York, USA.
- (31) 2:40 *Physical Factors Involved in Biological Responses to Pulsed Magnetic Fields.* S.F. JACKSON, T.P. MARSLAND, R.W. FARNDAL, and A.R. BOUTLE; Strangeways Research Laboratory, Cambridge, U.K.
- (32) 3:00 *Effect of Pulsed Electromagnetic Fields on Cellular Infiltration and Collagen Formation in Implanted Viscose Sponges.* W.B. JOLLEY, K. KNIERIM, J.M. HAM, and D.B. HINSHAW; Department of Surgery, Loma Linda University School of Medicine, Loma Linda, California, USA.
- 3:20 Tea - POSTER SESSION II

SESSION VIII

MEMBRANE TRANSPORT AND ELECTROCHEMICAL FLUXES

Moderator: A.A. Pilla
Columbia University
New York, New York

- (33) 3:50 *Measurement of Skin Potential Patterns.* N. MacDONALD and J. WATSON; Department of Electrical Engineering, University of Wales, Swansea, U.K.
- (34) 4:10 *The Effects of Pulsed Electromagnetic Fields on Protein Synthesis and Membrane Transport in Rat Skin.* P.H. DELPORT*, N. CHENG*, M.J. HOOGMARTENS**, J.C. MULIER**, W. SANSENT†, and W. DeLOECKER*; *Department of Biochemistry, **Department of Orthopaedic Surgery; †Department of Electrotechnique, University of Louvain, Faculty of Medicine, Leuven, Belgium.
- (35) 4:30 *The Effects of Direct Electric Currents on Intracellular pH and Transmembrane Potentials in Rat Skin.* N. CHENG*, J. PRENEN**, E. CARMELIET**, M.J. HOOGMARTENS†, J.C. MULIER†, W.M. SANSENT††, and W. DeLOECKER*; *Department of Biochemistry, **Department of Physiology, †Department of Orthopaedic Surgery, ††Department of Electrotechnique, University of Louvain, Faculty of Medicine, Leuven, Belgium.

- (36) 4:50 *Changes in Membrane Permeability and Interactions Between Connective Tissue Macromolecules Induced by an Applied Electric Current.* S.R. EISENBERG, A.J. GRODZINSKY, and P.Y. FECHNER. Continuum Electromechanics Laboratory, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA.
- (37) 5:10 *The Possible Roles of Electrogenic Sodium Transport in the Control of Early Embryonic Development.* C.D. STERN, Department of Anatomy and Embryology, University College, London, England.
- 5:30 Adjourn
- 7:00 RECEPTION AND BANQUET (COLLEGE FEAST) - HALL OF CHRIST CHURCH COLLEGE

WEDNESDAY, SEPTEMBER 22

SESSION IX

NERVES AND REGENERATION

Moderator: D.H. Wilson
Leeds General Infirmary
Leeds, United Kingdom

- (38) 9:00 *Nerve Regeneration In Vitro: Correlation of Current/Potential Levels with Neurite Outgrowth, Neuronal Cell Number and Area.* B.F. SISKEN and E. BARR; Wenner-Gren Research Laboratory and Department of Anatomy, University of Kentucky, Lexington, Kentucky, USA.
- (39) 9:20 *Electromagnetic Induction of Neurotransmitter Release from a Neuronal Cell Line in Tissue Culture.* G. REIN, R. DIXEY, and B. WATSON; St. Bartholomew's Hospital, Department of Medical Electronics, West Smithfield, London, England.
- (40) 9:40 *The Effects of Embryonic Nerve Tissue and Direct Current on Amputated Rat Limbs.* B.F. SISKEN and I. FOWLER; Wenner-Gren Research Laboratory and Department of Anatomy, University of Kentucky, Lexington, Kentucky, USA.
- 10:00 COFFEE BREAK

SESSION X

CELLULAR MECHANISMS

Moderator: R. Korenstein
Weizmann Institute of Science
Rehovot, Israel

- (41) 10:20 *Effect of Electromagnetically Induced Pulsating Currents on the Growth Cycle of Chick Embryo Chondrocytes in Culture.* M.T. CORVOL*, J.D. MONET**, N. DAUTIGNY**, and J. ASSAILLY**; *Unite de Recherche sur les Maladies du Metabolisme chez l'enfant, INSERM U. 30 Hop. Enfants Malades; **Centre de Technologie Biomedicale INSERM SCR 4, Hopital Necker, Paris, France.
- (42) 10:40 *Selected Electromagnetic Field Effects on Cellular Regulatory Processes.* R. GOODMAN*, C.A.L. BASSETT**, and A.S. HENDERSON†; *Department of Pathology, †Department of Human Genetics and Development, **The Orthopaedic Research Laboratories, Columbia University College of Physicians and Surgeons, New York, New York, USA.
- (43) 11:00 *Actin Polymerization Induced by Pulsed Electric Stimulation of Bone Cells In Vitro.* F. LAUB and R. KORENSTEIN; Department of Membrane Research, Weizmann Institute of Science, Rehovot, Israel.
- (44) 11:20 *Electromagnetic Modulation of Enzyme Function: Application to Na-K ATPase in Human Erythrocytes.* A.A. PILLA and K. GARY; Bioelectrochemistry Laboratory, Department of Applied Chemistry and Chemical Engineering, Columbia University, New York, New York, USA.
- (45) 11:40 *Stimulation of Matrix Production by Pulsed Magnetic Fields.* R.W. FARNDAL; Strangeways Research Laboratory, Cambridge, U.K.
- (46) 12:00 *The Effects of Pulsed Electromagnetic Fields upon Periosteal and Osteoblast-Like Cells Grown in Culture.* K.J. HANLEY, L.A. NORTON, and G.A. RODAN*; Department of Orthodontics, *Department of Oral Biology, University of Connecticut, School of Dental Medicine, Farmington, Connecticut, USA.
- 12:20 LUNCHEON

SESSION XI

OSTEOGENESIS IN ANIMALS

Moderator: J. Black
University of Pennsylvania
Philadelphia, Pennsylvania

- (47) 1:20 *Microenvironmental Changes Associated with Electrical Stimulation of Osteogenesis by Direct Current.* T.J. BARANOWSKI, JR., J. BLACK, and C.T. BRIGHTON; Department of Orthopaedic Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA.
- (48) 1:40 *An In-Depth Scanning Electron Microscopy Study of Electronically Stimulated Bone Growth.* T. CHEN, D.B. HARRINGTON, P. FRASCA, T. WALTER, J. WALTER, and M. DARI-GAN; Pennsylvania College of Podiatric Medicine, Philadelphia, Pennsylvania, USA.
- (49) 2:00 *In Vivo Growth Plate Stimulation in a Capacitively Coupled Electric Field.* C.T. BRIGHTON and G.B. PFEFFER; Department of Orthopaedic Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA.
- (50) 2:20 *Experimental Bone Healing Influenced by Electrical Properties and Location of Osteosynthetic Devices.* CL.L.R.S. LAGEY, J.M.M. ROELOFS, W.J. VISSER, R. LENTFERINK, and S.A. DUURSMA; Department of Internal Medicine, University Hospital, Utrecht, Holland.
- (51) 2:40 *Prevention of Denervation/Disuse Osteoporosis in the Rat with a Capacitively Coupled Electrical Field.* C.T. BRIGHTON*, M.J. KATZ*, and S.R. POLLACK**; *Department of Orthopaedic Surgery, **Department of Bioengineering, University of Pennsylvania, Philadelphia, Pennsylvania, USA.
- 3:00 Tea - POSTER SESSION III

SESSION XII

METALLIC ELECTRODES

Moderator: A.R. Liboff
Oakland University
Rochester, Michigan

- (52) 3:30 *The Effect of Direct Current Mediated by Porous Electrodes on Bone Growth.* N. CHENG, P. DELPORT, J.C. MULIER, J. NIJS, J. WOUTERS*, W.M. SANSEN*, W. VAN RAEMDONCK†, and P. DUCHEYNET; Department of Orthopaedics, *Department of Electrotechnique, †Department of Metallurgy, University of Louvain, Leuven, Belgium.
- (53) 3:50 *Direct Current Stimulation of Bone Ingrowth in Titanium Implants.* T. ALBREKTSSON*, F. BUCH*, and E. HERBST**; *Laboratory for Experimental Biology, University of Gothenburg, **Department of Applied Electronics, Chalmers University of Technology, Gothenburg, Sweden.
- (54) 4:10 *Silver-Nylon: A New Anti-Bacterial Agent.* A.A. MARINO, E.A. DEITCH, and J.A. ALBRIGHT; Louisiana State University Medical Center, Shreveport, Louisiana, USA.
- (55) 4:30 *Bone Formation at Platinum, Co-Cr, and Other Cathodes.* J.A. SPADARO; Department of Orthopaedic Surgery, State University of New York, Upstate Medical Center, Syracuse, New York, USA.
- (56) 4:50 *The Role of Electrode Material and Current Density in Electrical Stimulation of Osteogenesis.* J. BLACK, D.S. NORD, S.B. JONES, S.M. DYMECKI, T.J. BARANOWSKI, JR., and C.T. BRIGHTON; Department of Orthopaedic Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA.
- 5:10 CLOSING REMARKS - J. WATSON, Department of Electrical Engineering, University of Wales, Swansea, United Kingdom.

POSTER SESSION I

- (57) *Effects of Pulsed Electromagnetic Fields on Cultured Chick Embryonic Femora.* M. NODA, A. SATO, Y. ISOBE*, K. FUROYA*, and A. ISHIDA**; Department of Dental Technology, *Department of Orthopaedic Surgery, **Institute of Medical and Dental Instrument, Tokyo Medical and Dental University, Tokyo, Japan.
- (58) *Bone Resistivity:* R.A. RINALDI and J. GOODRICH*; Department of Anatomy, *Department of Chemistry, Louisiana State University School of Medicine, Shreveport, Louisiana, USA.
- (59) *Growth of Chick Embryo Modulated by Pulsed Electromagnetic Stimulation.* S. SAHA, A. PAL, G.N. REDDY, and J.A. ALBRIGHT; Biomechanics Laboratory, Department of Orthopaedic Surgery, Louisiana State University Medical Center, Shreveport, Louisiana, USA.
- (60) *Observations on the Effects of PEMF's on In Vitro Macromolecular Models.* A.M. ANDERSON and G.W. HASTINGS; Bio-Medical Engineering Unit, The Medical Institute, Hartshill, Stoke-on-Trent, Staffordshire, England.
- (61) *Computer Analysis of Data on More than 11,000 Cases of Ununited Fracture Submitted for Treatment with Pulsing Electromagnetic Fields.* A.A.J. GOLDBERG, S.R. GASTON, and J.P. RYABY; Electro-Biology International (UK) Ltd., Reading, Berkshire, England.
- (62) *Electromagnetic Treatment of Non-union. A European Multicenter Study.* M. HINSENKAMP, J. RYABY*, and F. BURNY; *Service d' Orthopedie-Traumatologie, Hopital Universitaire Erasme, Bruxelles, Belgium; *Electro-Biology, Inc. Fairfield, New Jersey, USA.
- (63) *Chances and Problems of the Supplementary Treatment of Congenital Pseudarthroses of the Tibia with Electric and Electromagnetic Fields.* R. ASCHERL, A.v. FINKENSTEIN*, F. LECHNER*, and G. BLÜMEL; Institute for Experimental Surgery of the Technical University Munich, Munich; *Garmisch-Partenkirchen Hospital, Garmisch-Partenkirchen, Federal Republic of Germany.
- (64) *Treatment of Congenital Pseudarthrosis of the Tibia Using a Constant Direct Current.* D. PATERSON and R.B. SIMONIS*; Department of Orthopaedic Surgery, Adelaide Children's Hospital, South Australia; *Rowley Bristow Orthopaedic Hospital, Pyrford, Woking, Surrey, U.K.

- (65) *Electric Resistance and Impedance of Dog Tissues.* T. OHASHI, S. INOUE, K. KAJIKAWA, K. IBARAGI, and H. SASAKI; Department of Orthopaedic Surgery, Murakami Memorial Hospital, Gifu College of Dentistry, Gifu, Japan.
- (66) *Experimental Study of Bone Remodeling Influenced by DC Currents.* CL.L.R.S. LAGEY, J.M.M. ROELOFS, R. LENTFERINK, L.M.A. AKKERMANS, L.W.M. JANSSEN, and P. WITTEBOL; Department of Experimental Surgery, University Hospital, Utrecht, Holland.
- (67) *Electrical Stimulation of Freeze-Dried Bone Allografts.* G.B. BRANHAM, R.G. TRIPLETT, A.R. LIBOFF, and S.S. YEANDLE; Dental Research Branch, Naval Medical Research Institute, Bethesda, Maryland, USA.
- (68) *Fluorescent Microscopic Investigations into the Bone Healing under Stimulation with Bipolar Pulse Currents and Interference Current in the Animal Experiment.* Th. SCHUBERT, J. KLEDITZSCH, P. WOLF, L. BEER, and J. HELLINGER; Orthopadische Klinik der Medizinischen Akademie "Carl Gustav Carus," Dresden, German Democratic Republic.

TUESDAY, SEPTEMBER 21st

POSTER SESSION II

- (69) *Technical Problems of the Implantable Bone Stimulators.* P. GUTTLER, J. KLEDITZSCH, and J. HELLINGER; Medizinische Akademie "Carl Gustav Carus," Dresden, German Democratic Republic.
- (70) *The Electrical Environment Produced at Bone Fracture Sites by Inductive Coupling.* F.X. HART and A.A. MARINO*; Department of Physics, University of the South, Sewanee, Tennessee; Louisiana State University, Shreveport, Louisiana, USA.
- (71) *Low Frequency Pulsing Electromagnetic Fields in the Treatment of Delayed Unions and Acquired Pseudo-Arthrosis.* R. CADOSSO, F. GIANCETTI*, and G. FONTANESI*; Centre for Experimental Haematology, University of Modena, Modena; *Divisione di Ortopedia e Traumatologia, Arcispedale S. Maria Nuova, Reggio Emilia, Italy.
- (72) *Electromagnetic Stimulation of Freeze-Dried Cortical Bone Grafts in Rabbits.* J.B. ZEHNER, Salem, New Jersey, USA.

- (73) *In Vivo Skeletal Modifications of Chicken Embryos Induced by Electromagnetic Fields.* M. ROOZE*, M. HINSEMKAMP**, and J. DUCHATEAU*; *Laboratoire d'Embryologie et d'Anatomie Humaine; **Service d'Orthopedie-Traumatologie, Hopital Universitaire Erasme, Bruxelles, Belgium.
- (74) *Repair of Nonunions by Electrically Pulsed Current Stimulation.* L. ZICHNER and D. SCALE; Department of Orthopaedic Surgery, University of Frankfurt, Frankfurt, Federal Republic of Germany.
- (75) *Electrostimulation and Bonelengthening.* D. SCALE and L. ZICHNER; Department of Orthopaedic Surgery, University of Frankfurt, Frankfurt, Federal Republic of Germany.
- (76) *Treatment of Nonunion of the Femur with Pulsed Electromagnetic Fields.* P. DELPORT, M. MULIER, N. CHENG, and J.C. MULIER; Department of Orthopaedics, University Hospital, Pellenberg, Belgium.
- (77) *Physical Aspects of Pulsed Magnetic Field Stimulation.* T.P. MARSLAND; Strangeways Research Laboratory, Cambridge, U.K.
- (78) *Oxygen Reduction and Peroxide Production at Cathodes Used for Tissue Growth Stimulation.* J. DAROLLES, P. SÉCHAUD, P. DAHHAN, and R. BUVET; Laboratoire d'Energetique Electrochimique et Biochimique, Universite Paris, Val-de-Marne, Creteil, France.
- (79) *SEM of S. Aureus on Current Activated Surgical Pins Coated with Silver and Silver Stearate Monolayers.* G. COLMANO, L.K. FAINTER, S.S. EDWARDS, and S.D. BARRANCO*; College of Veterinary Medicine Research Center, VPI and SU; *Montgomery County Orthopaedic Associates, Blacksburg, Virginia, USA.
- (80) *Specific UHF Frequencies for Cells Stimulation and Healing Process.* V.M. FELLUS; Meudon, France.
- (81) *Electrical Stimulation of the Spinal Cord after Cordotomy to Increase Surface Temperature.* R.A. RINALDI; Louisiana State University Medical School, Shreveport, Louisiana, USA.

POSTER SESSION III

- (82) *A Pilot Study of a Case of Long Standing Degenerative O.A. (Osteo-Arthritis) of Both Hips.* A.K. RAKSHIT; London, England.
- (83) *Clinical Experience with Additional Post-Operative Electromagnetic Stimulation of Pseudarthroses.* H.J. WIENDL; Unfallchirurgische Klinik, Allgemeines Krankenhaus, Bamberg, Federal Republic of Germany.
- (84) *The Efficacy of Electrical Stimulation on Experimentally Induced Nonunion Fracture of the Canine Tibia.* D. HARRINGTON, J. WALTER, T. WALTER, T. CHEN, W. BODAMER, and D. BLACK; Pennsylvania College of Podiatric Medicine, Philadelphia, Pennsylvania, USA.
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