IEEE Magnetics Society Newsletter

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Martha Pardavi-Horvath, Editor,

Romney Katti, Publicity

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Message from the IEEE Magnetics Society

President: Robert Fontana, Jr.
Vice President: Ronald S. Indeck
Secretary/Treasurer: Kevin O'Grady

For information on the IEEE Magnetics Society, please check the website at www.ieeemagnetics.org

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Chapters Corner

by
Dr. Richard H. Dee,
Magnetics Society Chapters Chair

***** NOTICE TO MAGNETICS SOCIETY CHAPTER CHAIRS *****

CHAPTER CHAIRS (or, for that matter, members at large!)... please respond to the following so we can update our members on what's happening in Chapterland!

If you are the local chapter chairman and would like to share what's happening in your chapter and local area (e.g. talks, people activity, magnetics news, company or university news, etc.), please forward a paragraph (or two), a picture, a reference to an interesting article, or something inventive or newsworthy (in your opinion) to me at r.dee@ieee.org so we can include it in the next MagSoc newsletter.

Please also update your contact information for me. I've noticed several e-mails bounce back implying that you've moved (at least e-mail addresses). Let me know at r.dee@ieee.org so we can still communicate.

For information on local chapters check the website at www.ieeemagnetics.org

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2002 Achievement Award of the IEEE Magnetics Society

The Magnetics Society of the IEEE honors one of its outstanding members each year for his or her life-long professional achievement. The Achievement Award is ***the highest award of the Magnetics Society*** and is given for scientific, technical, and service contributions to the society. The Achievement Award is presented at the Intermag Conference each year and consists of a diploma with a citation and cash prize.

The past award winners are Fred Luborsky, 1981; Herb Storm, 1982; Harold Lord, 1984; Joe Suozzi, 1985; Fritz Friedlaender, 1986; Andrew Bobeck, 1987; Floyd Humphrey, 1988; Paul Biringer, 1989; Daniel Gordon, 1990; Emerson Pugh, 1991; Yoshifumi Sakurai, 1992; William Doyle, 1993; Richard Barker, 1994; Mark Kryder, 1995; Koosuke Harada, 1996; Gordon Slemon, 1997; Stanley Charap, 1998; David Thompson, 1999; C. Denis Mee, 2000; and Fred B. Hagedorn, 2001.

This year, we are proud to announce that:

The winner for the Year 2002 IEEE Magnetics Society Achievement Award is

Shun-ichi Iwasaki of Tohoku Institute of Technology, Sendai, Japan.

He is honored for his role in establishing the Magnetics Society of Japan and for his 40 years of research supporting the recording industry, in particular on magnetic recording on perpendicular media. He will be presented with a diploma with a citation and cash prize at the Intermag 2002 Conference in Amsterdam, the Netherlands.

Floyd B. Humphrey
fbh@bu.edu

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IEEE MAGNETICS SOCIETY DISTINGUISHED LECTURERS 2001-2002

Advanced Magnetic Materials and Transducers:
Enabling Factors for the Digital Storage Explosion
Shan X. Wang
Stanford University

Advanced Magnetic Materials:
Development and Micromagnetics
Josef Fidler
Vienna University of Technology

Ferromagnetic Resonance Force Microscopy:
Probing Ferromagnets at the Micrometer Level
Philip E. Wigen
Ohio State University

See details at:

Details: http://www.ieeemagnetics.org

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MAGNEWS

Exciting new achievements?
Share with us the news!

This is the place to inform the magnetics community about a new discovery, great achievement, or theoretical or experimental breakthrough in magnetism that is considered worth sharing.

Submit for consideration a 100-word-long (maximum) description about your new results, about what might be worthy of note - pictures welcome!

Submit to the Newsletter Editor for consideration: pardavi@ieee.org

Sorry, this is NOT the place for product description or advertisement!

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VISUAL MAGNETICS

WHAT IS THIS?

SOLUTION?

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Conference Report: MMM 2001

46th MMM Conference
November 12 - 16, 2001
Seattle, WA

The 46th MMM Conference was held in the Westin Hotel in beautiful Seattle from the 12th to 16th of November 2001. With more than 1000 registered attendees from around the world, the meeting was a great success. The program included more than 1100 oral and poster presentations. Of special interest were five symposia on topics including *"Spin Transfer Torques," "Spin Injection in Ferromagnetic/Semiconductor Materials,"* and *"Novel Superconductivity and Magnetism,"* an evening session on Magnetic Random Access Memory (MRAM), and a Panel Discussion on Perpendicular Recording. Invited talks on topics such as magnetic tunnel junctions, antiferromagnetically-coupled media, geometrical frustration, and colossal magnetoresistive oxides complemented a diverse scientific program.

From the seven excellent finalists, **Thomas Eimüeller** from the University of Wurzburg was chosen to be the *winner of the Student Award Competition* for his oral presentation entitled *"Undulation Instabilities in Laterally Structured Magnetic Multilayers."* Congratulations to Thomas!

In addition to the daily bierstubes, the conference participants enjoyed a *social event* on Wednesday, November 13th at Tillicum Village. The event featured a boat trip through Puget Sound, a salmon dinner, dance performances by Native Americans and plenty of time to socialize with colleagues.

The success of the conference can largely be attributed to the *new all-electronic format for abstract submission*. Janis Bennett from AIP coordinated the effort and was pleased by the time-savings. For the first time, the full program of the meeting was available on-line prior to and following the meeting. The *proceedings* will be available in the *Journal of Applied Physics* within the next few months.

The Conference Chairman, Phil Wigen, and the Program Co-chairs, Julie Borchers and Marcos Lederman, were quite pleased with the conference and happy to have their work completed. They issue a special thanks to the members of the Programming and Steering Committees, the editors, Courtesy Associates, the AIP representatives, and the IEEE Magnetics Society representatives for all of their hard work.

We look forward to seeing you at the

47th MMM conference
in November, 2002 in Tampa, Florida.

Conference Report: NAPMRC 2002

1ST NORTH AMERICAN PERPENDICULAR MAGNETIC RECORDING CONFERENCE
(NAPMRC)
January 7, 2002 - January 9, 2002
Coral Gables, Florida

The **1st North American Perpendicular Magnetic Recording Conference (NAPMRC)** debuted in Coral Gables, Florida on January 7-9, 2002. The object of the conference was a highly focused review of the latest progress in the development of perpendicular magnetic recording as well as the discussion of the advantages, challenges, and timing of the transition to perpendicular magnetic recording technology. Planned as a highly selective meeting with the purpose of attracting the key representatives of the data storage industry and academia, the conference assembled together a forum of over 100 delegates representing over 40 key industrial and academic organizations involved in magnetic data storage from the United States, Japan, the United Kingdom, South Korea, Switzerland, and France.

The 1st NAPMRC was convened during times vitally critical to the future of and advances in data storage technologies. As conventional recording schemes employed today are rapidly approaching the fundamental (superparamagnetic) limit in areal bit density, above which the recording data become unstable, it is believed that the perpendicular magnetic recording paradigm will enable sustaining the current great strides in technological advances for the next several generations of mass storage solutions. The technology is technically the closest alternative to conventional longitudinal recording, while it is capable of extending the superparamagnetic density limit beyond what is achievable with longitudinal recording.

NAPMRC had a single session format with 34 invited talks given by leaders in magnetic data storage. To ensure broad representation of the industry and academia, the conference program was developed in close collaboration with a 30 member Advisory Board, which included top leaders from the key academic and industrial organizations from around the world. The conference covered the following major topics pertinent to successful implementation of the technology:

- **Perpendicular Magnetic Recording Media**
- **Perpendicular Magnetic Recording Heads**
- **Theory of Perpendicular Recording**
- **Measurement and Characterization**
- **Channels for Perpendicular Recording**
- **Perpendicular Recording Systems and System Integration**

An additional session, exclusively devoted to the discussion of the future of magnetic data storage with the emphasis on the role of perpendicular recording, concluded the conference. A number of excellent contributed papers were presented at the special poster session.

The highest quality of the technical program was acknowledged by the majority of the NAPMRC participants. Among the highlights of the NAPMRC was an overview of the history of perpendicular recording given by **Shun-ichi Iwasaki** of Tohoku Institute of Technology, Japan. Professor Iwasaki is widely accepted as the inventor of perpendicular magnetic recording. **Steven Lambert** of Maxtor Corporation presented an overview of a fully functional prototype of a 31Gbit/in2 hard-drive based on perpendicular recording developed by Maxtor Corporation. The Maxtor team successfully ran a server operating system on the developed hard-drive for one month. A number of presentations (**Naoki Honda** of AIT, **Jack Judy** of the University of Minnesota, **Masaaki Futamoto** of CRL Hitachi, **Hiroaki Muraoka** of Tohoku University, **Mason Williams** of IBM, **Mike Mallary** of Maxtor, **Roger Wood** of IBM) were devoted to the design guidelines and future prospects of perpendicular recording. The consensus was that the areal densities up to ~1Tbit/in2 are likely to be realized using perpendicular magnetic recording. **Mark Kryder** of Seagate Research gave an overview of the future of magnetic data storage including an account for the latest in heat-assisted magnetic recording (HAMR) and magnetic recording based on patterned media. It was suggested that future technologies such as HAMR or recording on patterned media would be based on perpendicular recording due to a number of advantageous properties of perpendicular recording with respect to extremely high areal bit densities, thus making perpendicular recording not merely a temporary solution but rather a necessary basis for a number of future generations of magnetic data storage devices.

The invited papers will appear in the July, 2002, issue of the **IEEE Transactions on Magnetics.**

The principal sponsor of the 1st NAPMRC is the **University of Miami** in Coral Gables, Florida. The conference was co-sponsored/endorsed by:

- **IEEE Magnetics Society**
- **National Storage Industry Consortium**
- **Materials Research Society**

The NAPMRC was endorsed by the leading academic magnetic centers involved in magnetic data storage:

- Center for Micromagnetics and Information Technologies (**MINT**) of the **University of Minnesota**
- Center for Materials for Information Technology (**MINT**) of the **University of Alabama**
- Center for Magnetic Recording Research (**CMRR**) of the **University of California in San Diego**
- Center for Research on Information Storage Materials (**CRISM**) of Stanford University
- Data Storage Systems Center (**DSSC**) of Carnegie Mellon University.

Veeco Instruments Inc. provided partial financial support of the conference banquet.

The conference was organized and co-chaired by **Sakhrat Khizroev** and **Dmitri Litvinov** of Seagate Research. Local organizational support was provided by the faculty of the Department of Physics of the University of Miami represented by **Joshua Cohn** and **Josef Ashkenazi**. NAPMRC was honorary co-chaired by **Shun-ichi Iwasaki** of Tohoku Institute of Technology, Japan and by **Stanley Charap** of Carnegie Mellon University.

The ***next NAPMRC is tentatively scheduled for January 6-8, 2003***.

More information about the NAPMRC can be found at the conference web site at http://www.napmrc.org.

Dmitri Litvinov

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Conference Announcement: Intermag 2002

Intermag Europe 2002
Amsterdam
The Netherlands
April 28 - May 2

The European Intermag2002 will be held at the RAI Conference Centre, Amsterdam, The Netherlands, from *Sunday, April 28th until Thursday, May 2, 2002.*

MAIN SUBJECT CATEGORIES:

1. ***Magnetic recording***
2. ***Magneto-electronic materials & applications***
3. ***Soft magnetic materials & applications***
4. ***Permanent magnet materials & applications***
5. ***Magnetic thin films & nanostructures***
6. ***Other magnetic materials & non-recording applications***
7. ***Characterization, imaging, modeling & theory***
8. ***Other applications & interdisciplinary topics***

In addition to the contributed papers, invited papers will be presented. There will be sessions where competing technologies can be assessed, and tutorial sessions for less formal discussions of timely and/or controversial topics. In all of the above subjects, special emphasis will be placed on application-oriented topics.

MANUSCRIPTS:
Authors who submit digests for the conference should consider submitting full manuscripts for publication, but will not be required to do so. The INTERMAG papers are scheduled to be published during the fall of 2002 in the *IEEE Transactions on Magnetics*. Instructions for manuscript preparation will be given at our website and will be sent to authors of accepted digests. The submitted manuscripts will be subject to the usual review procedures of the *Transactions*.

The length limit will be three pages for contributed papers and six pages for invited papers. ***The deadline for manuscript submission is February 14, 2002.***

VISA REQUIREMENTS:
Foreign citizens must carry a valid passport and/or visa to enter the Netherlands. You can contact the Dutch Embassy in your country for more information. Please do this well in advance, since a **visa application can take up to three months!**

If you need a personal letter of invitation to attend the conference, please contact Courtesy Associates. Be sure to provide your complete mailing address so that a signed letter of invitation can be mailed to you via standard mail service.

HOTEL ACCOMMODATION:
The RAI conference centre does not have its own hotel accommodation. Reservation of the official conference hotels, with discount, can be booked through the RAI Hotel Service. For the Intermag 2002 participants more than 700 hotel rooms have been reserved in various price categories. Hotel information and booking details will be given at the Intermag Europe website. ***Because the conference period includes the Queens Day celebration at April 30th, it advisable to reserve your hotel accommodation as soon as you can. This day is a national holiday and there will be many tourists in Amsterdam looking for accommodations as well.***

ADVANCE REGISTRATION:
Advanced registration will be open, with the form posted on the website, by January 1, 2002. Advance registration will be closed, i.e. the registration website will be closed, on April 5, 2002. Following that date, all registration fees must be paid on-site at the conference itself. More information about the registration is on our website.

EXHIBITION:
A technical exhibition of materials, services, instruments, and literature will be held during the conference. If you or your company are interested in exhibiting or would like to receive additional information about the Intermag Europe 2002 Exhibition, please **contact** Dr. Martin Bijker, Exhibits Chair, e-mail: MBijker@otb.nl, Tel: +31 (0)40 2919 796 and Fax: +31 (0)40 2919 799 or look at our web page from where you can download all relevant information.

CONFERENCE SOCIAL EVENT:
The social event will be a reception held at the Netherlands Maritime Museum at the heart of Amsterdam's characteristic harbour. One of the absolute highlights of the Maritime Museum is the exact replica of the VOC ship 'Amsterdam' dating from 1748. The 28 exposition rooms in the Netherlands Maritime Museum house a unique and priceless collection of paintings, drawings, ship models, instruments, and other tools.

FURTHER INFORMATION ON THE WEBSITE:
http://www.intermagconference.com

or Courtesy Associates
intermag@courtesyassoc.com
Tel/FAX: +1 202 973-8676/8722

Cock LODDER, Chairman

Conference announcement: CEFC 2002

IEEE
CEFC 2002
PERUGIA

The Tenth Biennial IEEE Conference on
Electromagnetic Field Computation
Perugia, Italy,
June 16-19 2002

Department of Industrial Engineering, University of Perugia

The Tenth Biennial IEEE Conference on Electromagnetic Field Computation (**CEFC**) will be held in Perugia, Italy, during ***June 16-19, 2002***. The last Conference was held in Milwaukee, Wisconsin, USA in 2000.

Perugia is an ancient town founded in the prehistoric epoch, located in the Umbria region. Perugia is also called "the green heart of Italy" for its rich and extensive vegetation. Perugia is a very popular tourist destination, known for its important monuments, its folklore, its rich cuisine, and its quiet and friendly people.

The aims of the IEEE CEFC are to present the latest developments in modeling and simulation methodologies for the analysis of electromagnetic fields and wave interactions, with the application emphasis being on the computer-aided design of low and high frequency devices, components and systems. Scientists and engineers worldwide are invited to submit original contributions in the areas of static and quasi-static fields; wave propagation; material modeling; coupled problems, optimization; numerical techniques, software methodology; applications of electromagnetic CAD to electrical/electronic device, component and system prototyping. The Conference will feature oral and poster presentations.

Further information can be obtained from:
CEFC2002 Secretariat
Prof. Ermanno Cardelli
Department of Industrial Engineering
Via G.Duranti 1/A-4
06125 Perugia - Italy

Tel. +39 075 585 3731
Fax. +39 075 585 3703

E-mail: cefc2002@unipg.it

http://www.unipg.it/cefc2002/preliminary.htm

Conference announcement: IEEE-NANO 2002

IEEE-NANO 2002
Second IEEE Conference on Nanotechnology

August 26-28, 2002,
Washington DC, USA

Sponsored by
IEEE Nanotechnology Council
(will be founded in February, 2002)

Conference organization:
General Chair: Dr. Clifford Lau, ONR, lauc@onr.navy.mil
Program Chair: P.L.E. Uslenghi, Univ. of Illinois at Chicago, uslenghi@uic.edu

Conference announcement: EMFA and MM 2002

Joint Congress of two International Conferences
XVIth Electromagnetic Fields and Materials (EMFM)
former International Conference on Microwave Ferrites (ICMF)

and

Magnetic Measurements'02 (MM)

Slovak University of Technology
Faculty of Electrical Engineering and Information Technology in Bratislava, Slovakia
September 11-13, 2002

Details at:

http://iris.elf.stuba.sk/emfm-mm

Conference announcement: PIERS 2002

PIERS 2002
Progress in Electromagnetics Research Symposium
July 1 - 5, 2002
Cambridge, Massachusetts, USA

Progress in Electromagnetics Research Symposium (PIERS) provides an international forum for reporting progress and recent advances in the modern development of electromagnetic theory and its new and exciting applications.

PIERS 2002 will be held on July 1 - 5, 2002 in Cambridge, Massachusetts, USA.

PIERS 2002 is accepting submission of summaries on space-available basis.

Please send all summaries and registrations to:
PIERS Office
c/o Professor J. A. Kong
Room 26-305

77 Massachusetts Avenue
Cambridge, MA 02139, USA
Fax: 617-258-8766 and/or 617-258-9525
E-mail: piers@ewt.mit.edu and/or piers@ceta-mac1.mit.edu

http://piers.org/piers2k2/index.html

For your convenience and reference, here is a collection of the downloadable material made available on this site:

- PIERS SURVEY FORM (PDF)
- SAMPLE SUMMARY SUBMISSION (PDF)
- DOWNLOAD PIERS 2002 CALL FOR PAPERS (PDF)

Conference announcement 6: Wigner Centennial

Wigner Centennial

8-12 July 2002, Pécs, Hungary

Wigner Jenõ Pál (Eugene Paul Wigner), one of the greatest physicists of the 20th century, was born in Budapest, Hungary, in 1902. In the year 2002, the physics community will celebrate the Wigner Centennial year in various forms.

A Centennial Conference in Commemoration of Eugene Paul Wigner will be held in Hungary on 8-12 July, 2002 as a part of this celebration. The conference will be hosted by the University of Pécs which was the first university established in Hungary and is one of the oldest in Europe.

The conference is intended to cover at least partly the large variety of fields to which Wigner made contributions and broke new paths in many domains of physics. The heritage of the ingenious work of Wigner includes important contributions to nuclear physics; epoch-making work on how symmetry is implemented in quantum mechanics; the determination of all the irreducible unitary representations of the Poincaré group; and his work with Bargmann on realizing those irreducible unitary representations as the Hilbert spaces of solutions of relativistic wave equations, discrete symmetries and superselection rules in quantum mechanics, symmetry implications for atomic and molecular spectra, natural line-width theory, contrast of microscopic and macroscopic physics and of general relativity and quantum mechanics, explanation of why symmetry yields more information for quantum than for classical mechanics, introduction of the quasiprobability distributions later named after him and prevalently used in quantum optics, philosophical questions such as what nature laws should be, limits on causality, and whether quantum mechanics could in principle explain life.

Information on the conference

- The conference will be held in Pécs, south Hungary, on 8-12 July, 2002.
- The URL of the conference is: http://quantum.ttk.pte.hu/~wigner
- Mail address: wigner@quantum.ttk.pte.hu

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Book Review

PERMANENT MAGNET AND ELECTROMECHANICAL DEVICES Materials, Analysis, and Applications
by Edward P. Furlani
Academic Press, San Diego (2001)

The author of this book, Dr. Edward Furlani, works at the Eastman Kodak Company carrying out applied magnetics research involving the design and development of magnetic devices and processes. The book, which arises from the author's

considerable experience, is written to be useful as a self-contained textbook in Electrical Engineering, with substantial discussions of the physical principles of magnetism, magnetic materials, Maxwell's Equations, magnetostatics, and analytical and numerical methods. There are also appendices covering vector analysis, Green's functions, systems of equations, and units.

Most of the book is appropriately devoted to the analysis of practical devices, roughly divided into the Title subjects: permanent magnet applications and electromechanical devices. Among the topics covered are permanent magnet brushless DC motors, stepper motors, magnetic circuit actuators, rare-earth magnetic couplings, magnetic gears, magnetic bearings, MRI devices, electrophotography (including the magnetic brush), magneto-optical recording, free-electron laser magnets, linear and rotational actuators, magnetic levitation, and magnetic MEMS actuators.

In addition to its use as a textbook, the book should also be quite useful as a reference volume for students and workers in the field, although it is not sufficiently comprehensive to be lauded as a handbook. Perhaps the second edition can aspire to this. In the basics areas, it needs more coverage on ferrimagnetism (ferrites are well covered), the magnetocaloric effect, and on the Preisach model. In the applications area, exchange spring magnets, and hysteresis brakes or clutches appear to be missing. More intensive indexing would also be useful, e.g, Halbach configurations are nicely discussed and referenced, but Halbach does not appear in the index.

Larry H. Bennett
lbennett@seas.gwu.edu

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Obituary: Peter A. McEwen

Peter A. McEwen
1964-2001

Peter A. McEwen, a leading expert in coding and signal processing for data storage, died Nov. 25, 2001, in Sunnyvale, California. He was 37.

Dr. McEwen was manager of the Advanced Recording Channel Architecture Group at Maxtor Corporation in Milpitas, California. His group was responsible for evaluating coding, detection, error correction, and servo algorithms and selecting the ones to be used in read channels for next-generation products. He had the valuable capacity to integrate all the various signal processing details into an elegant read channel architecture whose performance was excellent but whose implementation was simple.

Dr. McEwen 's interests were diverse. He contributed to research in the areas of detection theory, modulation codes, synchronization, equalization, mitigating thermal asperities, and in matching read channel architectures to specific head and media technologies. Dr. McEwen was educated in electrical engineering, receiving his B.S. degree from the Massachusetts Institute of Technology in 1986. He went to work for Digital Equipment Corporation in 1986, returning to school and receiving an M.S. degree from Carnegie Mellon University in 1990. Dr. McEwen joined Quantum Corporation when it acquired Digital's storage business in 1994. He returned to school again at UC San Diego's Center for Magnetic Recording Research, receiving his Ph.D. degree in 1999. He joined Maxtor Corporation in 2001 as it merged with Quantum's disk drive business.

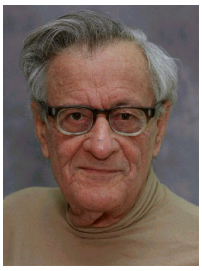
Dr. McEwen's favorite topic was coding for the magnetic recording channel. This was the subject for his dissertation, and he continued to show great interest in this area throughout his career. His thesis included work on construction of trellis codes and forbidden list codes. Later he complemented these constructions with higher rate codes such as event error control codes.

A congenial colleague, Dr. McEwen collaborated with dozens of coauthors on research papers, meticulously ensuring they all received proper credit for their contributions. He was always willing to spend time explaining codes and channel architecture to coworkers.

Dr. McEwen's success was achieved despite being afflicted with scleroderma, a rare, chronic autoimmune (arthritis) disease which impaired his ability to do everyday activities such as writing and typing.

Obituary: Amikam Aharoni

We regret to announce that Professor Amikam Aharoni of the Weizmann Institute, Rehovoth, Israel, passed away on 21 January 2002.



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VISUAL MAGNETICS - SOLUTION

What is this?

FARADAY'S ROTATING MAGNET

Robert Davidson (1804-1894) was able to exhibit in the early 1840s a lathe, a saw, and a small printing machine, all electrically operated, and a model electric locomotive that would carry two people on a railway. In 1842 he built at his own expense a prototype locomotive on the Edinburgh and Glasgow Railway. It ran, but failed to deliver enough power.

Our device shows the small scale of rotary motion that could be obtained from electromagnetism when Davidson began experimenting. The central pointed bar is a magnet down half of which electric current from a battery could be passed. The current entered and left through short amalgamized pick-up wires that dipped into open cups of mercury on the wooden platforms (now empty, in the interests of health). The interaction between the magnetic field of the current and the lower half of the magnet itself caused the bar to rotate.

Our model was probably used by Davidson's friend, Professor William Knight, to illustrate electromagnetically-induced rotation to his Natural Philosophy class at Marischal College. Unfortunately this method of achieving rotation produces no useful power and cannot be scaled up. Robert Davidson had to think up for himself completely different means for his own practical ends.

John S. Reid
http://www.abdn.ac.uk/~nph126/items/nl65.htm

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