

The Institute of Physics.
History of Physics Group.


Chairman : Professor A.J. Meadows CPhys FInstP.
Secretary: Dr. John Roche, Linacre College, Oxford OX1 3JA, U.K.
Editor : Mr. D. Hooper, 36, Flag Lane N., Chester CH2 1LE, U.K.

NEWSLETTER

No. 3

September 1988.



 GOLD MEDAL <small>EDUCATION DIVISION, INTERNATIONAL HEALTH EXHIBITION, LONDON, 1884.</small>	 FIRST AWARD <small>FOR EDUCATIONAL APPLIANCES, INTERNATIONAL EXHIBITION, SYDNEY, 1879.</small>	 SILVER MEDAL <small>MACHINE CONSTRUCTION, INTERNATIONAL INVENTIONS EXHIBITION, LONDON, 1885.</small>
DIPLOMA OF HONOR, New Orleans, 1884-5.		
♦ Revised and Illustrated ♦		
CATALOGUE		
OF APPLIANCES FOR		
TECHNICAL & INSTRUCTION		
— AND —		
MANUAL TRAINING SCHOOLS.		
<hr/>		
PART I.		
SCIENCE AND TECHNOLOGY.		
<hr/>		
Mechanics & Mechanism, Building & Machine Construction,		
DRAWING APPLIANCES,		
— AND —		
<i>Models as supplied under the Grants of the Department of Science & Art.</i>		
<hr/>		
ACTUAL PARTS OF MACHINERY, SCIENTIFIC APPARATUS,		
Diagrams and Books ——— Models of Ships, Bridges,		
MINING MACHINERY, ETC.		
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PART I.— <i>Science and Technology.</i>		
PART II.— <i>Science and Technology.</i>		
PART III.— <i>Manual Training Schools and School Furniture.</i>		
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JANUARY, 1889.		

James Rigg's Catalogue (7th. Edition) dated January 1889.

Forthcoming Events.

1st. to 3rd. September 1988.

The Use of History in Mathematics Teaching & Pedagogy.

University of Leicester.

British Society for the History of Mathematics.

Details : Dr CR Fletcher, Secretary BSHM, Dept. of Mathematics,
University College of Wales, Aberystwyth, Dyfed SY23 3BZ.

5th. to 9th. September 1988.

Science 88. British Association Annual Meeting.

Oxford.

Details : British Association for the Advancement of Science,
Fortress House, 23, Savile Row, London W1X 1AB.

12th. to 16th. September 1988.

VIIIth. International Scientific Apparatus Symposium.

Society of Antiquaries, London.

Details : Dr. R G W Anderson, Royal Museum of Scotland, Chambers
St., Edinburgh EH1 1JF.

(Information from EASST Newsletter (Feb/May 1988)).

17th. October 1988.

IOP

Particle Accelerators : The Marriage Between Physics and Engineering.

Mr. M Crowley- Milling (formerly of MetroVic, Daresbury & CERN.)
1745 for 1815.

Schuster Laboratory, Brunswick St., University of Manchester.

Joint Meeting of IOP Manchester and District Branch and the IEE
(NW).

Details : Mrs. R Williamson. (See page 4.)

26th. October 1988. (All day Wednesday.)

IOP GROUP

Chapters in the History of Low Temperature Research in Britain. Also A.G.M. of the Group.

Royal Institution London. 09.30 for 1000 hrs.

IOP History of Physics & Low Temperature Groups with RICHST.

Papers to be given by Prof. DSL Cardwell, Dr. CJ Latimer, Dr. WH
Brock, Dr. J Gardner, Prof. D Shoenberg, Prof. JF Allen, Prof. N
Kurti, Prof Sir B Pippard.

Fees (payable to UMIST) including lunch : IOP & RICHST Members
£15; Non-members £17; Student/Retired members £13.

Details : Mrs. R Williamson (See Page 4.).

(A.G.M. Details : Dr. J Roche.)

12th. November 1988.

Postgraduate Research Papers Meeting.

British Local History Room, Senate House, University of London.

Details : Dr. M. Neve, Sub- Department of History of Medicine,
University College, Gower St., London WC1.

(Details from BSHS Newsletter No. 26.)

Continued.

Forthcoming Events.

16-19 November 1988.

The Study of Science and Technology in the 1990's.

Joint Meeting of 4S (the Society for Social Studies of Science) and EASST (the European Association for the Study of Science and Technology).

Hotel Krasnapolsky, Amsterdam, Netherlands.

Details : Dr. L A Leydesdorff, Science Dynamics, Nieuwe Achtergracht, 166,
1018 WV Amsterdam, Netherlands.

23rd. November 1988.

IOP

Sir Arthur Schuster (1851-1934).

Meeting to commemorate the centenary of his appointment as Langworthy Professor of Physics at Manchester.

Papers by Mrs. Rajkumari Williamson, Prof. Sir Francis Graham Smith and Lord Flowers.

1500. (Buffet 19.15. Price £3.)

Schuster Laboratory, Brunswick St., University of Manchester.

Joint Meeting of IOP Manchester and District Branch, the Schuster Laboratory & Manchester Literary & Philosophical Society.

Details : Dr. DJ Sandiford, Dept. of Physics, Manchester University, M13 9PL, (to whom cheques payable to "University of Manchester" should be sent before 10th. November).

5th. December 1988.

IOP

The Discovery of Fission and Subsequent Events.

Prof. JR Holt.

1730 for 1800.

Schuster Laboratory, Brunswick St., University of Manchester.

IOP Manchester and District Branch.

Details : Mrs. R. Williamson. (See Page 4.)

14th. December 1988.

The English Pilot : English Sailing Directions and Charts & the Rise of English Shipping 16th. to 18th. Centuries.

Royal Geographical Society, London.

Lecture by Lieutenant Commander DW Waters.

Details : Rear Admiral RM Burgoyne, The Royal Institute of Navigation, The Royal Geographical Society, 1, Kensington Gore, London SW7 2AT.

7th. January 1989.

Science and War.

Centre for the History of Science, Technology & Medicine.

Details : Dr. D. Edgerton, Centre for the History of Science, Technology & Medicine, Mathematics Tower, Manchester University, Manchester M13 9PL.

(Details from BSHS Newsletter No. 26.)

Continued.

Porthcoming Events.

April 1989. (Saturday. Date not fixed.)

IOP GROUP

History of Physics Workshop for Physics Teachers.

It is hoped that details will be available for publication in the next Newsletter as well as in Physics Bulletin, ASE publications, etc. In the meantime anyone with a strong interest in such a workshop, mainly intended for secondary school teachers, is asked to contact Stuart Leadstone, Physics Dept., Atlantic College, Llantwit Major, Glamorgan CF6 9WF.

17th. to 20th. July 1989.

James Prescott Joule (1889-1989) Centenary : One Hundred Years of Energy.

International Conference in Manchester and Salford.

17/18th. July : "The Life, Times and Work of J.P. Joule."

19th. July : "Joule and Energy in the Teaching of Science."

20th. July : "Energy Conservation Today : Saving the Joules".

Details : Mrs. R. Williamson. (See below.)

11th. to 14th. September 1989.

The History of Technology, Science & Society, 1750-1914.

Jordanstown Campus, University of Ulster.

Details : Prof. RB Schofield, Dept. of Adult and Continuing Education, University of Ulster at Jordanstown, Shore Rd., Newtonabbey, Co. Antrim BT37 0QB.

Addresses for Details.

Mrs. R Williamson, Schuster Laboratory, Dept. of Physics,

University of Manchester, Manchester M13 9PL.

Telephone : Manchester (061) 980 7016.

RICHST : Royal Institution Centre for the History of Science and Technology, 21, Albemarle Street, London W1X 4BS.

Forthcoming Exhibitions.

8th. July to 9th. December 1988.

The Ivory Sundials of Nuremberg 1500-1700.

Whipple Museum, Cambridge.

(Please check opening days and hours.)

Details : Whipple Science Museum, Free School Lane, Cambridge.

1st. November 1988 to 15th. January 1989.

A Spectacle of Spectacles.

Royal Museum of Scotland, Edinburgh.

A loan exhibition of prints, drawings and eyeglasses from the collection of the Carl Zeiss Foundation Jena.

Details : The Royal Museum of Scotland, Chambers Street, Edinburgh EH1 1JF.

(Information from BSHS Newsletter No. 26.)

*** INTERNATIONAL EXHIBITION, SYDNEY, NEW SOUTH WALES, 1879.**

Classes 300-308.
Educational Systems,
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First Degree of Merit
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† THE WORLD'S INDUSTRIAL EXPOSITION, NEW ORLEANS, 1884-5.

Class 802.
Organization and Appliances
for
Secondary Education.



Diploma of Honor
for
"Models for Teaching
Mechanic Arts."

INTERNATIONAL INVENTIONS EXHIBITION, LONDON, 1885.

Educational Section.
Class 182.
Models and Apparatus.



Silver Medal
for
"Models of Machine
Construction."

* Exhibit purchased for the University of Sydney, N.S.W

† This Collection was bought by the United States Government, and deposited in the Pedagogical Museum, Bureau of Education, Washington.

Rigg's Technical Education Appliances, Limited.

From the January 1889 Catalogue produced by James Rigg's Company.

Editorial.

I am pleased to say that Bernard Spurgin has agreed to give me some help with the Newsletter, but please do not let this fact prevent further offers! There is plenty more to be done! I am very grateful to him for his offer and to all the contributors to the Newsletter.

It is sad to have to record the probable demise of the STSA (the Science, Technology and Society Association) on whose committee I once had the pleasure of serving. Almost everyone would agree that science, technology and society are closely related and completely inter-dependent. However in retrospect it may be said that the scope of the STSA was too wide to have had a reasonable chance of success, except with a much larger membership. It is probably better, in the U.K. at least, to have many specialist societies which organise conferences jointly with other societies on some theme of interest to both memberships. These meetings can bring together both "academic" and "practical" scholars to exchange insights on some interface between the sciences, mathematics, technology in its various forms, education, history, philosophy and the other social sciences. A glance at the list of "Forthcoming Events" in this Newsletter, indicates that many jointly organised meetings are to take place and it is to be hoped that the trend will continue. Certainly the IOP History of Physics Group will try to bring together people interested in aspects of Physics, Technology and Society. People like Charles Boyle, Steve Veazey and the many others who worked so hard and well for STSA can feel proud of what was achieved and on the record preserved in the STSA newsletter for present and future historians. Thank you.

The illustrations in this issue give evidence for some of the activities of a prominent British manufacturer of science teaching apparatus. Arthur Rigg, Principal of Chester College between 1839 and 1869 was a pioneer of scientific and technical education. A son, James Rigg, was active in the family business which started in Chester, and moved to London. The business was purchased by the better known Griffin business in about 1908.

Notes for Contributors.

The Newsletter is edited by David Hooper, 36, Flag Lane North, Upton Heath, Chester CH2 1LE. His telephone number is Chester (0244) 380844. It is hoped to publish the next issue of the Newsletter about December 1988 but this will depend on the amount of copy received. If you have contributions which are not particularly date sensitive, please send them at once. For the time being, it has been decided **not** to include book reviews, research papers and advertisements except in exceptional cases. However organisers of relevant meetings are invited to send details to the Editor for possible publication.

A Century of Radio Waves.

A report on an exhibition to mark the experimental demonstration of the existence of electromagnetic waves by Heinrich Hertz in 1886-87.

The Exhibition was held in the Baden Trade Supervision Department, Karlsruhe, Baden-Wurtemberg between 28th. January and 31st. March 1988.

Hertz was appointed Professor of Physics at the Karlsruhe Technische Hochschule in December 1884. This followed a two year period at Kiel where in the absence of a physics laboratory, Hertz made a deep theoretical study of Maxwell's electrodynamics. In Karlsruhe he found that the induction coils he was using in lecture demonstrations were exactly what was needed for undertaking the experimental test of Maxwell's theory which was prompted by Helmholtz.

The centenary exhibition commemorated the crucial work done there by Hertz between November 1886 and the end of 1888. The exhibits included original apparatus, the Karlsruhe context of the work and subsequent developments of the work. A video recording showed a local professor, perhaps Hertz's successor demonstrating the basic experiments to the standard media woman interviewer, displaying just the right combination of incredulity and intelligence!

Each section of the exhibition was introduced by a display board. It is worth quoting the one relevant to Hertz's fundamental researches :

"In 1886-1887 Hertz began to experiment with a large oscillator. With the spark gap in the middle and a minimal length of this dipole he was able to produce some 50 million oscillations per second. The dipole sends electromagnetic waves out into the surrounding space. With this instrument Hertz possessed the experimental technology to produce the electromagnetic waves predicted by Maxwell. Hertz himself was able only through indirect effects to prove that the oscillator could transmit energy. This he did by employing round and square "resonators" as antennas which were activated by the energy being produced by the dipole. Discharges were shown in the small gaps of the "resonators". The difficulty entailed by this method of optical proof becomes evident when one considers that this tiny spark was only a few hundredths of a millimetre long."

With this evidence, Hertz delivered the decisive vindication of Maxwell's theory.

Stuart Leadstone.

The History of Physics Group Questionnaire.

Dr. Roche thanks those who have returned the questionnaire and would be very pleased to receive replies from those who have not already responded.



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EXHIBITION
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FOR
*Accurate and Economical
Scientific Appliances.*



Title page of a John J. Griffin & Sons Ltd. Catalogue c. 1898.

Al-Hazan : Mad, not without reason.

Al-Hazan (965-1039?) was born in Basra in Southern Iraq and was perhaps the greatest of early Moslem physicists. Interested in astronomy, he wrote about the theory of atmospheric refraction and estimated the height of the atmosphere from observations he had made at twilight. In addition he studied lenses and deduced the mathematical theory of spherical and parabolic mirrors, his work remaining a standard entry in textbooks until the 17th. century.

Al-Hazen once boasted that he was able to construct a machine which could be used to control and regulate the annual inundation due to the river Nile. He was accordingly summoned to Cairo by Caliph Hakim to explain and perhaps demonstrate his idea. Aware that his scheme was totally impracticable, and fearing torture, better, death at the hand of the Caliph, Al-Hazan pretended to be mad. The insane, it is said, were specially protected in those times. Al-Hazan kept up the pretence of madness with great care until Hakim's death in 1021.

For further details see :

Eves H. (1983) An introduction to the History of Mathematics.
Philadelphia : Saunders College Publishing. 5th. Edition p.175.
Shepherd W. (1965) Outline History of Science.
London : Ward Lock Educational. p.140.
Smith D.E. (1958) History of Mathematics.
New York : Dover Publications. Vol. 1, p.175.

Editor's Note :

Mr. Stander of 23, Beacon Down Ave., Beacon Park, Plymouth PL2 2RU, from whom the above anecdote comes, will be glad to receive similar items.

This type of story would be very useful to physics teachers trying to enliven, say, a lesson on spherical mirrors. How far it can be documented from primary sources is perhaps more a question for debate amongst those who can read the Arabic documents! Does the accuracy, really matter in the teaching situation? Comments from teachers and/or historians of this period would be welcome.

Many thanks to Derek Stander.

Grants for Research in the History of Science.

The Royal Society makes Grants to applicants domiciled in the U.K. to persons not employed by the Government, unless for research "unconnected with the applicant's regular employment". The next closing date is 30th. September 1988. Details from the Royal Society, 6, Carlton House Terrace, London SW1Y 6AG. (Telephone London (01) 839 5561. Ext. 261.)

Recent Publications.

Normally only publications (or part-publications) by Members of the Group or books edited by them are recorded here. Members are requested to inform the editor when a suitable item is published.

40 Years of Particle Physics.

Foster B. and Fowler P.H.
Bristol and Philadelphia : Adam Hilger. 1987.

Proceedings of the International Conference to celebrate the 40th. Anniversary of the discovery of the pi meson held at the University of Bristol 22nd. to 24th. July 1987. For a brief notice of this conference see the account by Rajkumari Williamson (a member of the organising committee) on page 6 of Newsletter No. 2. The book also contains reprints of some important papers from the period 1947 to 1952.

Letter to the Editor.

(Correspondents are requested to keep their letters as concise as possible).

From the British Society for the History of Mathematics Newsletter No. 8. (June 1988.) :

"Congratulations to the Institute of Physics Group on the very nice production of their Newsletter. The decorative covers of the first two issues are very attractive, and we can only applaud the decision to use two notable MATHEMATICS texts for the purpose. We wish them success..."

Reply by the Editor :

Many thanks for the comments; constructive feedback is always welcome whether complimentary or not! I hope the mathematicians are not too disappointed by the cover of this issue. Best wishes for the continuing success of the lively BSHM Newsletter.

Food for thought.

"There are few people who are capable of doing experiments well. Often through doing them ill, one finds the contrary to what one should find."

R. Descartes (1596-1650) to M.Mersenne (1588-1648).

(Lettres III p. 190 quoted by J.F. Scott in The Scientific Work of Descartes p.68.)

Short quotations of a similar nature would be welcomed for the Newsletter.

SATIS.

SATIS stands for Science and Technology in Society and is a highly innovative project sponsored by the Association for Science Education with additional funds from charitable trusts and industry. Its aims are to produce learning resources, to be published by the ASE at low cost to the purchaser, copyright for example being largely waived. The material is particularly intended for use by teachers dealing with the 16-19 age range. Target students include A level scientists and those taking AS level "Science, Society and Technology", A/AS level General studies, CPVE or BTEC.

The intention is to produce three framework units "What is Science", "What is Technology" and "How Society Decides" to act as a core for some courses. However most material will be for interactive student/student and student/teacher learning sessions. Most units relate to science and technology in society today but many use historical material and many refer to the history of physics. Some of those which could interest readers of the Newsletter are units on The History of Astronomy (Copernicus, Kepler etc.), The story of Galileo, Wireless Telegraphy (Hertz, Marconi etc.), and The History of the Atomic Bomb. A framework unit, written by Joan Solomon makes extensive use of the history of physics.

For further information about SATIS please contact the Project Director, Andrew Hunt, 84, Valley Walk, Croxley Green, Rickmansworth, Herts WD3 3TU. Telephone 0923-220407.

John Cartwright. (Chester College.)

Disclaimer.

The IOP Historical Group Newsletter expresses the views of the Editor or of named contributors, and not necessarily those of the Group nor of the Institute of Physics as a whole. While every effort is made to ensure accuracy, information must be checked before use is made of it which would involve financial or other loss. The Editor would like to be told of any errors as soon as they are noted please.

Manufacturers' Catalogues.

Editorial Note :

The readers of this Newsletter will have noted that the illustrations, unlike those in the preceding issues, have been taken from trade catalogues. Some members of the Group will know that Brian Gee, formerly on the staff of the College of St. Mark and St. John, Plymouth, has been researching into these catalogues for many years. I am very grateful to him for supplying most of the illustrations, and for supplying an article on them, which will appear in the next Newsletter, if space permits. I am however able to print the following introduction to the subject written by Mr. Gee. It mentions the Handlist which should be very useful to a significant number of the members of our Group.

A Handlist of Instrument Makers' Catalogues to 1914.

Manufacturers' catalogues are a window on science education in as much as they represent the state of the art in laboratory practice. As a primary source they are usually neglected and the reason for this is not difficult to understand. Catalogues are non-bibliographic material and as such, they are generally treated as ephemera by librarians. Those kept in laboratories had a limited life, usually only until the next issue arrived. In fact few present day companies have their own old catalogues because, over the years, water damage, fire, bombing, or simply thoughtless office clearouts have eroded the stock of archives. Thus some effort is currently being made to rescue, record and conserve what remains. At a future date, therefore, it ought to be possible to re-consider such evidence, along with syllabi, textbooks, and extant apparatus, in order to provide a deeper insight into the origins of science education. Some headway in this respect has been made by V.K. Chew, Research Fellow at the Science Museum (London). Chew has made interesting studies, using texts and makers' catalogues, providing histories of various physics topics such as the Wheatstone bridge and "pin optics".

Three years ago a project was begun by the present writer together with John Burnett and Robert A. Anderson of the Royal Museum of Scotland, Edinburgh, to identify and record all known makers' catalogues of the optical, mathematical, philosophical and chemical variety. Probably in the late autumn, our Handlist of Instrument Makers' Catalogues to 1914 will be available from the Science Museum Library. This will list over 1500 catalogues known world wide and will give locations.

The search is, however, not yet over particularly for the period prior to 1850.

Brian Gee.

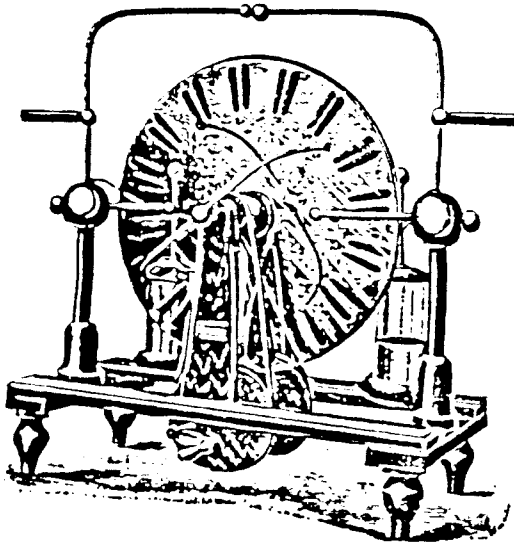
Further information regarding the location of trade catalogues will be welcomed by Mr. Gee, 7, Barton Close, Landrake, Saltash PL12 5BA, U.K.

Manufacturers' Catalogues.

Telegraphic Address:
"SCIENCE, BIRMINGHAM."

TELEPHONE NUMBER
23.

CATALOGUE
— OF —
Physical and Practical Physics
Apparatus, &c.



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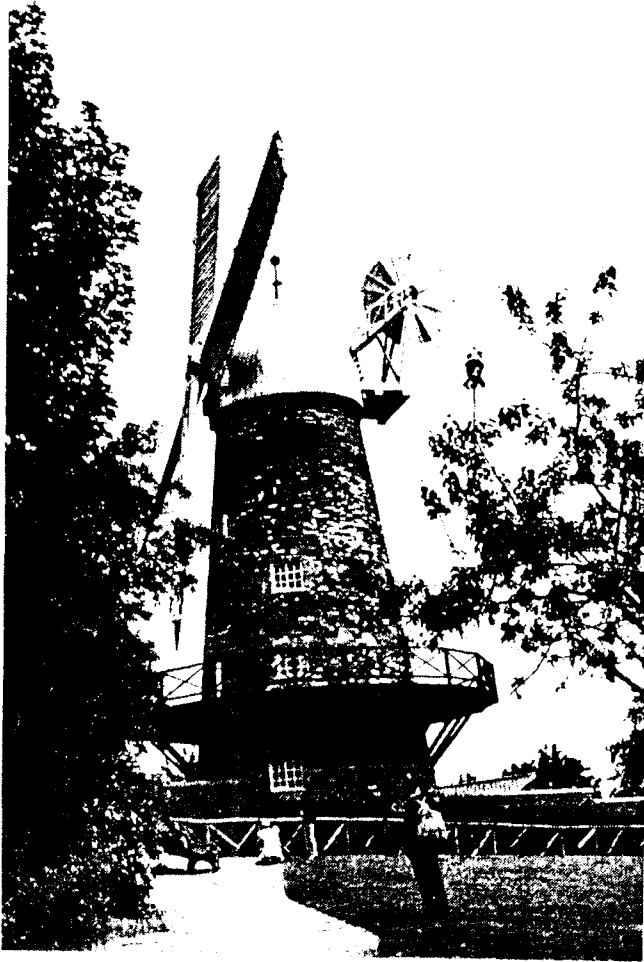
Workshops and Laboratories: CORNWALL STREET

(At the back of our Edmund Street premises.)

[ENTERED AT PATENT OFFICE.]

Front page of an early Philip Harris and Co. Ltd. Catalogue.

George Green, Miller, Physicist and Mathematician.



Green's Mill, Sneinton Nottingham.

From a photograph by David Hooper, 16th. July 1988.

George Green, Miller, Physicist and Mathematician.

A very successful meeting of the History of Physics Group, organised jointly by Dr. J.J. Roche and Miss D. M. Cannell of the George Green Memorial Fund was held in Nottingham on the 15th. and 16th. July 1988.

The theme of the meeting was the life and work of George Green (1793-1841). Green worked as a miller until he was thirty-seven and then concentrated upon mathematics for the remainder of his short life. Green published ten mathematical works of which his An Essay on the Application of Mathematical Analysis to the Theories of Electricity and Magnetism (1828) was perhaps the most important.

Interesting biographical papers were given by Professor L.J. Challis and Miss D. M. Cannell, and more technical papers by Dr. J.J. Roche, Professor A.J.M. Spencer, FRS, Dr. I. Grattan-Guinness, Dr. F.W. Sheard and Dr. Ferrina.

An archive exhibition was well patronised and attracted much interest, but the highlight of the meeting for some was the visit to Green's Mill and Centre. This is at Sneinton which is only a mile to the East of the Nottingham City Centre. Thanks mainly to the City of Nottingham and the George Green Memorial Fund Green's Mill has been converted from "an empty brick shell with a flat concrete roof, standing in a cobbled millyard overgrown with weeds..." (Cannell 1988 p.65) into a working mill, actually producing flour for sale. Our Guide conveyed his enthusiasm for the mill and gave excellent explanations.

The Green Science Centre, adjoining the Mill, has a good selection of scientific exhibits and working models to delight children of all ages. It was a pity that more time could not have been allocated for this visit. When the wind blows, members of the Group visiting Nottingham will certainly not regret a visit to the Mill.

A number of members of the British Society for the History of Mathematics, helped with the meeting and participated in it and our thanks are due to them. Thanks are also due to the staff of Cavendish Hall, University of Nottingham, to the Lord Mayor of Nottingham for honouring us with his presence for some of the time, and to the very efficient joint organisers.

It is hoped to give more details of this meeting in our next Newsletter.

David Hooper.

Reference.

Cannell D.M. (1988) George Green. Miller and Mathematician.
Nottingham : City of Nottingham Arts Department.

THE INSTITUTE OF PHYSICS HISTORY OF PHYSICS GROUP NEWSLETTER.

No. 3

September 1988.

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Further Food for Thought.

Martin Klein added the consideration that what the teacher of physics required of historical examples was precisely what the historian rejected as poor history : the one delighted in a "sharply defined single insight", the other in the "rich complexity of fact".

Heilbron J.L. "Applied History of Science."
Isis 78 (1987) pp 552-563. He refers to Klein's paper in :
Brush S.G & King A.L. (1972) History in the Teaching of Physics.
Hanover, N.H. : University Press of New England. pp 12-18.