

EDITORIAL

## Computer memories

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# Computer memories

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## The original paper

The paper 'Computer simulation of electric field lines' (Kirkup 1985 *Phys. Educ.* **20** 142) appeared in 1985 and contains details of a BBC computer program that does exactly what the title says.

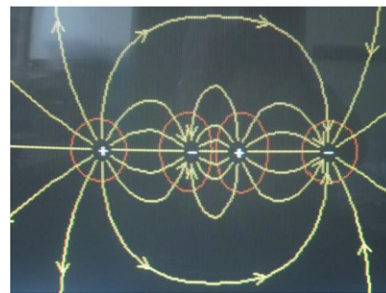
## The commentary

Students are often asked to view and consider the properties of electric field lines as part of their introduction to the electric field. Textbooks are generally limited to presenting field line plots resulting from simple arrangements of electric charges. The increasing availability and power of desk top computers in the early 1980s encouraged me to write, and write about, an electric field line plotting program that would allow the user to pick the number, size and location of charges then view the electric field line pattern produced. As the BBC 'B' computer was very popular in schools and colleges in the early 1980s, it was a natural choice of platform for the program as its graphics were very good (for the time) and its BASIC programming language was also good.

The *Physics Education* paper was well received, with many teachers in 1985 and 1986 contacting me for a copy of the program (which I recall I supplied on cassette tape). Occasionally teachers would write back to me to tell me of the value of the program in their teaching. To quote a letter from 1985:

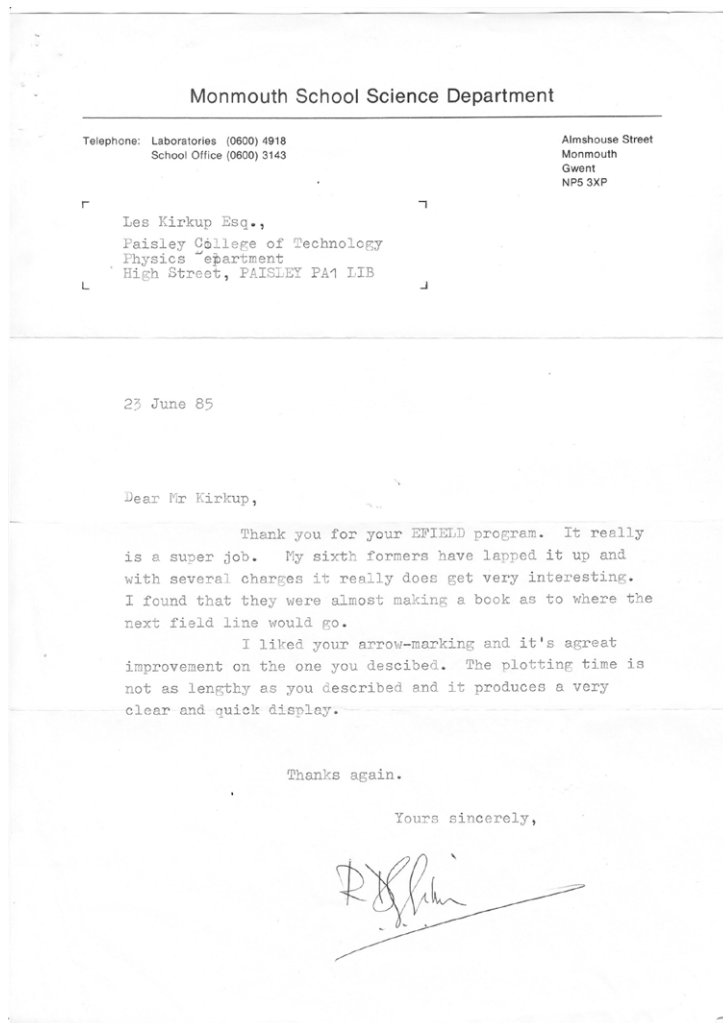
*Thank you for your EFIELD program.... my sixth formers have lapped it up and with several charges it really does get very interesting. I found they were almost making a book as to where the next field line would go ...*

Teacher, Monmouth School, Gwent



The paper was written with the needs and interests of educators in mind. So it came as a surprise fairly recently to find that the paper has benefitted researchers. Engineering researchers at North Western University in North America adopted the approach contained in paper for drawing field lines and coined the phrase the 'Kirkup–Merrill field line calculation mechanism' ([www.mccormick.northwestern.edu/eecs/documents/tech-reports/2010–2014/NWU-EECS-11-04.pdf](http://www.mccormick.northwestern.edu/eecs/documents/tech-reports/2010–2014/NWU-EECS-11-04.pdf), p 14). This illustrates you never know who is going to find your work useful.

Understanding the electric field is no less important or challenging today than it was 30 (or a 100) years ago. Today you can Google 'electric field line simulation' and find good field line plotting routines, for example: <https://academo.org/demos/electric-field-line-simulator/>. However, the paper is not obsolete as it probably represents a good starting point for those who want their students to learn a science-oriented computer language such as MATLAB through working on a problem of scientific significance.



*Computer simulation of electric field lines* was my first journal paper. Writing the paper had a considerable influence on my learning and my career. I learned something of programming, simulation, the versatility of the BBC computer (which had a large role to play in my PhD) and perhaps most of all the paper encouraged me to improve my writing. I also experienced for the first time that sense of satisfaction you feel when your name appears on a paper.

### Editors note

Professor Kirkup had kept the original letter mentioned in the article above. Unfortunately we could not read the signature but I do happen to know the recently retired Head of Physics at Monmouth School, Dr Keith Moseley. Keith was able to shed light on the letter: 'It was written by RDG 'Tim' Gibson, who was head of science/

physics at Monmouth School until 1987. He died around ten years ago, having retired with his wife Elizabeth to Cheltenham'.

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**Les Kirkup** was born near Newcastle upon Tyne. He studied for degrees in England and Scotland before joining the University of Technology Sydney in 1990. He is currently a professor in the School of Mathematical and Physical Sciences. Many of his educational development activities have focused on enhancing the student experience in laboratories. He has a particular interest in developing activities to engage students required to study physics, but who do not intend to major in physics. His contributions to teaching and learning were recognized nationally in 2007 and again in 2011 with National Teaching Fellowships. In 2014 he was awarded the Australian Institute of Physics Education Medal.