

The career of F. W. Twort

SIR—By using the title ‘What happened?’ to R. A. Slepecky’s letter¹, you seem to be inviting further comment on the career of F. W. Twort. His work after the discovery of bacteriophage in 1915², his ideas about biological replication and the relationship of organisms to one another, and his frequent troubles with sources of finance, are described in papers by him in 1936³ and 1949⁴, and in the obituary by Sir Paul Fildes in 1951⁵.

His discovery of bacteriophage was a logical consequence of his earlier work on Johnne’s bacillus, which would not grow in culture media although it closely resembled the tubercle bacillus which grew readily. He reasoned that the latter was able to make an essential growth factor and that this would enable Johnne’s bacillus to grow. By adding killed tubercle cultures, or extracts from them, to the medium, he got Johnne’s bacillus to grow and made a practically useful diagnostic vaccine. Extending this principle to viruses, he cultivated the various bacteria present in commercially available glycerinated vaccinia lymph and tried to get the vaccinia virus to grow on these bacteria. The logic was imperfect because there was no reason to think that these bacteria had any evolutionary or developmental connection with vaccinia and had not merely strayed into the lymph during commercial production, but the patches of transmissible bacterial degeneration were unmistakable.

His ideas about evolution, competition and interdependence made him assume that viruses which did not overtly infect hosts, and previruses, were omnipresent. The problem was to get them to multiply to an extent that would make that presence obvious. This is the main theme of his 1936 paper. In an attempt to recreate conditions analogous to those he thought typical of probiotic Earth, he reflected light from many different minerals on to many potential substrates. It is interesting to note the important place of clays (to which interest is now returning) from various sources in these experiments. In his 1949 paper, he wrote “. . . by 1939 I knew that the technique which was being evolved was correct. Striking results of a positive nature were obtained, but, unfortunately, in 1944 the laboratories of the Institution were destroyed by a bomb, and the University deprived me of my post and all facilities for completing the research.” It is a pity he did not say what sort of results he was getting. Nevertheless, as I have argued elsewhere⁶, it might be worthwhile setting up similar mixtures and examining them every few years for signs of change.

In his 1936 paper, he stressed that he was trying to identify novel or latent forms

of life rather than its creation. He became more ambitious later. Soon after Twort’s death, someone (presumably Fildes) lent me a long typescript which discussed biopoeisis. According to my memory, it made no points with which I was not already familiar. I may be wrong; Twort obviously thought he was being original. In those days, photocopiers were not part of normal laboratory furniture; I returned the typescript uncopied. If a copy still exists somewhere, it would be interesting to see how well, after 40 years, the ideas in it agree with those that have now become conventional. Twort’s intuition was productive about Johnne’s bacillus and about the potentialities of vaccine lymph. Perhaps what Fildes called the “admirable confusion” of his work on clay and other minerals was not as daft as most of his contemporaries thought.

N. W. PIRIE

42 Leyton Rd,
Harpندن,
Herts AL5 2JB, UK

1. Slepecky, R.A. *Nature* **342**, 730 (1989).
2. Twort, F.W. *Lancet* **ii**, 1241 (1915).
3. Twort, F.W. *J. Hygiene* **36**, 204–235 (1936).
4. Twort, F.W. *Penguin Science News* **14**, 33–43 (1949).
5. Fildes, P. *Obituary Notices of Fellows of the Royal Society* **7**, 505–517 (1951).
6. Pirie, N.W. *Origins of Life* **15**, 207–212 (1985).

SIR—I can tell Ralph A. Slepecky that I have prepared a biography of my father, Frederick William Twort (1877–1950) and am currently negotiating for publication. My father’s life was never dull but full of troubles, many of them relating to lack of proper support for his imaginative researches in microbiology. He was a man of many parts who suffered the greatest frustration. But he did none of the things suggested in Slepecky’s letter. His constant preoccupation with scientific thoughts would have made him a very bad London taxi driver, but he would have enjoyed the challenge of designing a better vehicle.

A. E. P. TWORT

Bryn Tor,
Deanery Road,
Godalming,
Surrey GU7 2PQ, UK

Thinking machines

SIR—Richard Gregory twits physiologists for not sharing his mechanistic views (*Nature* **342**, 471; 1989). They must answer for themselves, but they are probably less frightened of being branded alchemists than of being considered neovitalists. In August (*Nature* **340**, 517; 1989), you printed a fine colour photograph of the Science Museum’s recent construction of a sub-unit of Babbage’s Second Difference Engine. What a pity

you did not reprint it to illustrate Gregory’s article. It might have helped your readers to decide whether *any* machine composed of such elements (or of electronic ones), however complex its specification, can properly justify Gregory’s assertions that Babbage “showed that a machine could make *its own* decisions during calculations” (emphasis added) — and that today’s computers can “see”.

More helpfully, Gregory does state elsewhere in the article (page 472) that Newton “found the mechanistic account of nature in terms of forces and motions of bodies unsatisfactory as a complete account”. Perhaps physiologists should enquire whether physicists agree with Newton or with Gregory.

D. H. TOMPSETT

34 Vicarage Road,
Henley on Thames,
Oxon RG9 1HW, UK

SIR—I should like to add to Richard Gregory’s fascinating and interesting article on Newton and alchemy (1989). It is true that Newton was the posthumous offspring of a farmer, but Newton’s mother, Hannah, was fairly rich, because of the fortune she inherited from her second husband, the Reverend Barnabas Smith, who died in 1653. She married him in 1645, when Newton was barely three years old, and for about eight years Newton lived with his grandparents and hardly saw his mother. This forced separation and his total rejection by his stepfather embittered Newton all his life, and he never got over the loss of his mother’s love. While at Cambridge, Newton had to wait on tables in the dining room, although Hannah could easily have paid all his expenses. His unhappy childhood is probably responsible for Newton being a bachelor and dying a virgin.

H. CHANG

337 Los Altos Avenue,
Los Altos, California 94022, USA

Mirabile dictu

SIR—I was amused to read in a recent leading article your statement that a single well-authenticated case of water running uphill would be a scientific observation well worthy of publication.

I occasionally go for my holidays to a valley in the West of Ireland where this phenomenon is a common sight. Winds blowing in off the Atlantic Ocean are funnelled by the valley walls and intensified to such an extent that it is not unusual to note a mountain stream reversing direction, or even a waterfall turning into a fountain.

MARTYN J. FOGG

44 Hogarth Court,
Fountain Drive,
Upper Norwood,
London SE19 1UY, UK