Battery cars
Dear Sir—In connection with B. J. Prigmore's article (12th June 1975 E&P, p.671) it may interest your readers to notice the appearance of three cars which I built in 1942 and which ran till the end of the Second World War.

During the German retreat from Brussels, I had great difficulty in persuading their officers that the battery cars would be unable to take them and their luggage to Berlin...

In view of their low speeds, the framework was very light, built of cycle and motorcycle tubes.

As you may know, battery cars were recently introduced on pedestrian streets in the town of Sainte Maxime near Saint Tropez, and found to be too silent, which alarmed pedestrians!—Yours faithfully,

O. D. ROBINSON
Elvaston House
2 Beechwood Avenue
Bournemouth, Dorset
11th July 1975

Pressure points
Dear Sir—I am not sure whether to be dismayed or appalled over the performance figures for back-pressure steam turbine quoted by K. W. Sutton and J. J. Crawford in their articles on total energy (25th May 1975 E&P, pp.615 and 622). The figures are appallingly and unrealistically low, and play right into the hands of those who oppose the introduction of district heating in Britain.

Keith Sutton says that the power generation efficiency of back-pressure steam systems lies between 5 and 17%, while John Crawford quotes 8% as the overall efficiency. The magnitude of these errors can be seen by comparing the figures with, for example, the guarantee figures for the 106 MW back-pressure district-heating turbine in Orebro, Sweden, in terms of electrical output after driving the turbine auxiliaries related to fuel energy in, the guaranteed electrical efficiency is over 32%, and even after allowing for the entire boiler and turbine auxiliary load the electrical efficiency is over 30%.

John Crawford also quotes an electrical efficiency for a gas turbine on district-heating duty of 20%. This is somewhat better, but still low: the electrical efficiency (electrical energy out as a function of fuel energy in) of a modern third-generation gas turbine is over 30%, with about 40-45% available as mechanical energy.

May be rather than simply criticise others, which is so easy to do, I should present Table 1, which shows the various efficiencies of different types of plant. Messrs. Sutton and Crawford have not always defined their terms very precisely; it should therefore be understood that in the Table, electrical efficiency is at the net output at the generator terminals after deducting power for excitation and turbine auxiliaries. Boiler auxiliaries and drive power not deducted. Boiler efficiency relates to the heat energy added to the secondary system in terms of the net's lower heat value.

100 units of fuel energy give the figures shown in Table 1—Yours faithfully,

NEIL MUIR
Stat-Law Turbin AB
S-61220, Finspang, Sweden
16th June 1975

Professional careers
Dear Sir—In common with other heads of engineering departments, I am concerned at the low level of interest in engineering as a career. It would be irrational to suggest a simple basic explanation, but the 26th June interesting feature in E & P indicates a contributory factor which might be a significant one.

On p. 756 a Civil Service advertisement invites applicants with a degree, HNC or equivalent in electronic engineering or equivalent to consider appointment as a Scientific Officer at a salary in the range £2150–£3352. On p. 760 a Civil Service advertisement invites applicants with an ONC in electrical engineering or equivalent, qualification, plus training and experience, to consider posts with a salary range £2740–£3860.

Whilst a detailed investigation might reveal a satisfactory explanation, parents, careers masters and prospective trainees can easily gain the impression that all the posts offered to professional engineers are often compared unfavourably with those offered to technician engineers who have not suffered the arduous and prolonged additional study and training necessary to become a professional engineer.

I suggest that the IEE has a responsibility to investigate this situation and set in motion actions with a view to developing social recognition of, and proper financial rewards for, professional engineers, before we find ourselves with a generation of engineers that are either too few in number or too poor in quality for industry (and the rest of Britain) to prosper.—Yours faithfully,

A. C. SIM
Department of Electrical Engineering
North East London Polytechnic
Longbridge Road
Dagenham, Essex RM10 6NG
England
16th July 1975

Black and white
Dear Sir—It is always interesting to read reviews (12th June 1975 E&P, p.678) where one has been personally involved at an earlier stage.

The dot matrix printer exists in four basic forms:
(i) Fully parallel, i.e. the 7 x 5, 35 wires per character
(ii) Serial parallel, i.e. five wires actuated seven times per character
(iii) Serial serial, i.e. seven wires actuated five times per character
(iv) Fully serial, i.e. one wire actuated when required.

(i) and (iii) were used to interpret cards during the 1940s with the card moving sidewise and (ii) was used experimentally for multiposition print heads.

The most common form was, however, (iv) in which the paper was moved continuously past an oscillating bar, one wire per print position. One could generate characters by impressing the wire through carbon ribbon onto the paper placing the dots where required, not necessarily in a fixed 7 x 5 format.

Several interesting features emerged. First, the duplicates under the top copy, although produced at the same time, could be smaller if the paper moved more slowly. Secondly, reversed characters for offset masters could be produced directly by setting the oscillating arm 180° out from its normal position.

Unfortunately this work was done at the limits of speed of electromechanical equipment and the electronic era has found other solutions. It is, however, (iv) satisfying to have produced in 1951 a 120-position fully alphanumeric printer capable of 400 lines per minute.—Yours faithfully,

M. C. P. HEWITT
Parvus House
62 Floral Farm, Canford Magna
Wimborne, Dorset
England
24th July 1975

Railway review
Dear Sir—In response to D. E. A. Cole's letter (4th September 1975 E&P, p. 871). While in general agreement with the first three points of his 'programme' I feel his fourth point should not go unchallenged for the following reasons:
(a) We ought by now to be aware of the dangers of making ourselves vulnerable to political