Shockling practice

Dear Sir — As one of the 'Uncle' volun-
teers who are helping school pupils to
bridge the gap between school and
industry, may I invite the opinions of
members regarding two practices which
are employed in some schools.

At one grammar school, student's
benches are provided with 13 A
unswitched sockets, which are fed from
a transformer with an earthed centre
tap. Commercial portable equipment is
provided, units having single-pole
mains switches and warning lights. If
the equipment be plugged in and the
switch opened, extinction of the warn-
ing light would lead the student to
believe that all components beyond the
switch were safe to touch, whereas he/
she would be subject to a 125 V shock.

The second practice is required of
Uncle volunteers in a distributed book-
let. It requires the use of double-pole
mains switches. This practice appears to
have emerged from the days of the
two-pin reversible plug, a practice
which involved me in a nearly fatal acci-
dent. A water-heater failed and its
warning light was extinguished. I
opened the switch, removed the cover
from the heater, went to tighten a ter-
minal and received a very severe
shock. Had my other hand been on the
casing, the shock would almost cer-
tainly have been fatal. The cause? The
mechanical link between the two
blades of the switch had broken. The
blade in the neutral had opened, thus
extinguishing the lamp and cutting off
the supply to the heating element, but
the blade in the live lead had not
opened.

Why should students be taught non-
standard techniques? — Yours faith-
fully,

R.C. WHITEHEAD (M)
7 Dibdin Close, Sutton
Surrey SM1 2PJ, UK
26th May 1987

Mind your language

Dear Sir — The article 'Forth — not a
computer language but an engineering
tool' (May 1987 E&P, p.323) gives the
impression that Forth is fundamentally
different from all other programming
languages, based on the fact that it is
possible to implement other languages
in it. The authors even go so far as to
call it a 'meta-language'. In fact, it is
possible to write compilers/interpreters
in virtually any language, even Basic for
example, so to state that Forth is 'one
step above a language' is absurd.

Forth may be thought of as a cosmet-
ically altered (towards obscurity) subset
of Lisp, designed specifically for ease
of compilation and fast execution. It is,
however, correspondingly low level. While high-level functions may be pro-
vided in separate libraries the same
can be said for any functional language.

One suspects that the positive atti-
itude held by the authors is indicative of the
interactive environment in which they
use it and also the speed with
which they can compile and run pro-
grams rather than any esoteric propert-
ies which make it a meta-language! —
Yours faithfully,

S. LUCAS (AM)
9c Grimshill Court
Parkwood, The University
Canterbury, Kent CT2 7ST, UK
7th June 1987

Advantages of wave power

Dear Sir — While there have been some
successful tidal-power schemes, for
example, the one at La Rance in France,
there has been no successful
wave-power installations. This is sur-
prising because tidal-power schemes
have some disadvantages. Power is not
available during periods of slack water,
the installations are expensive in civil
engineering and in general are an
obstruction to shipping, requiring a river
estuary. Wave power has none of these
objections; the installation would only
require exposure to an open sea.

At Kiama, on the east coast of Aus-
tralia, about 75 miles south of Sydney, a
freak of Nature shows the way. Here a
rocky promontory reaching out to sea
has dissolved in it a tunnel reaching
some distance inland. As the waves hit
this tunnel water travels through it until
it reaches the inshore end where the
tunnel turns upwards. At this point the
kinetic energy of the water becomes
potential energy and the water is
thrown well above sea level to be
caught in a saucer-shaped depression and
returned to the sea.

No use has been made of this, it is
only a tourist attraction. Imitating this on
a civil-engineering scale would be relat-
eliy easy. The water thrown up being
catch in a reservoir, which would act
as a hydraulic smoothing circuit, the
water passing through an outlet in the
bottom to a water turbine and so back
to the sea.

Some ingenuity would be required to
keep the inlet or inlets at the right level
according to the state of the tide. This
could no doubt be achieved by making
the seaward end of the tunnel flexible
and floated in some manner. Alterna-
tively the whole structure could be
floated to maintain a constant head. —
Yours faithfully,

S.A. STEVENS (F)
Thames Bank Nursing Home
Thames Road, Going on Thames
Reading, UK
15th June 1987

Screw tightness

Dear Sir — With reference to the letter
from J.W. Pollitt (May 1987 E&P, p.304),
I remember being told by practising
engineers when I was a student that
screw terminals in circuits carrying
approximately 10 A or more tend to
shake loose, but there appears to be no
record of any scientific investigation of
the subject. Wires carrying about 30 A
in thyristor-controlled circuits can
sometimes be seen to jump and it is
assumed that this is due to self-induced
electromagnetic forces. I have always
assumed that it is similar minute self-
detracting electromagnetic forces which
tend to shake loose screws in the
power circuits of domestic wiring.

It is interesting that Mr. Pollitt
includes the sentence 'Should terminals
be lightened up every ten years or so?'
In my home I did just that after one 13 A
socket became warm in use, and it was
about ten years since that circuit had
been installed! I am not sure my experi-
ments is just coincidental. I do not know
of the same problem being so noticeable
in lighting circuits where the currents
are much smaller. Is it electromagnetic
forces creating the creep stress relaxation in the copper of the
wire that Mr. Pollitt mentions in his letter
or is it electromagnetic forces shaking the
screws loose? — Yours faithfully,

A.J. BADEN FULLER (M)
Department of Engineering
University of Leicester
Leicester LE1 7RH, UK
12th June 1987