accept K as the symbol for Potassium so why not
I for gas flow-rate? Indeed, some “non-initial”
symbols will have to be accepted soon in order
to relieve the clash of C standing for compliance
and for concentration in the blood phase and R
for resistance and respiratory exchange ratio.

As the system expands, further clashes will
occur and no doubt further changes will be re-
quired. For instance, who is going to write
\( F_{CEP} - CHOB \) for the fractional concen-
tration of halothane in inspired gas? But while these
changes can, and, indeed, generally must, be left
until the need arises, it seems to me essential that
the fundamental differences between this system
and the mathematical systems used in all other
branches of science (use of italics and avoidance
of “on the line” suffixes and improper use of
symbols such as \( \overline{V} \)) should be resolved as quickly
as possible before they become too heavily en-
trenched.

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Pappenheimer, J. R. (1950). Standardization of
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Sir,—Thank you for giving me the opportunity
to comment on Dr. Mapleson’s letter.

I think his suggestions about the use of italics
and inferiors are reasonable and if used in the
Journal should cause no confusion.

I do not think his remarks about the correct
designation of time derivatives are as sound. I
would like to comment on this aspect of his letter
in more detail. However, I was not party to the
discussion under the chairmanship of Dr. Pappen-
heimer (Fed. Proc. (1950), 9, 602) which adopted
the conventions and I might therefore confuse
the issue.

Dr. Mapleson’s comments and suggestions are
obviously important outside the immediate field
of anaesthesia and I suggest that he write to the
members of the original committee or that one of
them be invited to comment on his letter.

E. J. M. CAMPBELL

DOSE OF CURARE

Sir,—Dr. Foster in his letter (Brit. J. Anaesth.
(1957), 29, 433) reproaches me for attempting
long range diagnosis in my paper on “Doses of
Curare” (Brit. J. Anaesth. (1957), 29, 288). In
medical literature full case reports are given to
enable the reader to visualize courses of events,
that he may learn from, and profit by, the author’s
experience. If after careful study of a clear and
detailed description different conclusions are
reached they ought not to be called telepathic.

As Dr. Foster’s case was used to illustrate
what I consider to be the effect of large doses of
curare there was no need to comment on pre-
medication or to mention that large doses of
neostigmine by themselves have a curarizing effect
and may summate with the paralytic action of
dtc (Chase et al., 1949).

For me it is not difficult to believe that a
patient who was unconscious under 75/25 per
cent nitrous oxide-oxygen while lying undisturbed
on the operating table may partially regain con-
sciousness during intubation. Dr. Foster’s case
did not show an isolated reflex movement but was
“moving his arms and legs, shaking his head,
opening his eyes”. The depth of anaesthesia
reached by such a mixture varies considerably in
different patients (Nosworthy, 1953).

Though being familiar with the nitrous oxide
 technique and using it routinely with hardly any
supplement for intracranial and lung surgery, in
my hands it has not been successful in abdominal
operations. In my opinion a given anaesthetic
state is the balance between potency of anaes-
thetic mixture (i.e. gases and drugs) and stimuli.
As the stimuli vary the mixture, too, ought not
to remain fixed and nitrous oxide ought to be
supplemented, e.g. for traction on mesentery or
peritoneum. Nosworthy (1953) has raised the
question whether certain circulatory disturbances
and vasovagal attacks may not sometimes be due
to too light anaesthesia, as curarization has little,
if any, effect on autonomic reflex activity.

As Dr. Foster rightly states, large doses of thi-
pentone, pethidine and ether have undesirable
side effects, but large doses are rarely needed,
and small supplementary amounts will damage
the patient less than unsuppressed reflex stimuli.
The summary description of my case 1, criticized
by him, did not convey the state of a sudden
severe illness in a man of powerful build whose muscles are not relaxed by 12 mg dtc, but required 40 mg gallamine to permit abdominal exploration. Supplementary thiopentone, pethidine and ether were given when needed and in the amounts needed and, therefore, I did not "throw caution to the winds". It is precisely my contention that if drugs are "titrated" against the reactions of a particular patient and not given in preconceived large amounts overdosing hardly ever occurs. This "titration" gives satisfactory though sometimes quite unexpected results.

A man of 82, obese and muscular, suffered from volvulus of his tremendously distended sigmoid, requiring a Mikulicz resection. After premedication with atropine only, a sleep dose of 100 mg thiopentone followed by cyclopropane with traces of ether and 10 mg dtc sufficed for the whole procedure which took 1½ hours. Three days later a frail woman of 74, about half his size, needed more anaesthetic and 14 mg dtc for reduction of a volvulus of caecum and caecostomy, lasting 1 hour.

Confronted with a woman of 65, desperately ill, suffering for three days from paralytic ileus due to a perforated gall bladder, fibrillating with a heart rate of 170/min, uraemic and hypochlaemaemic, I felt sure that after premedication with 50 mg pethidine and 50 mg phenergan, she would not require anything but nitrous oxide/oxygen and some relaxant. But with 10 mg dtc I needed 300 mg thiopentone to allow intubation, with some bucking and thereafter no progress could be made with nitrous oxide. Two further doses of 6 and 4 mg dtc and ether did not abolish tension nor depress respiration, and even with gradual additions of 475 mg thiopentone and finally 40 mg pethidine the patient would move whenever reduction of ether was tried. In spite of this frightening medication the abdominal muscles resisted closure. 20 mg gallamine provided excellent closing conditions but, as feared, brought the heart rate which had settled at 140 back to 160/min.

None of these patients reacted as anticipated; none required neostigmine for return of adequate respiration; all three recovered from the operation though the third died 10 days later of biliary peritonitis.

The article by Burchell (1957) reached me when my paper was already in press. The moderate dtc doses used by him do not sufficiently explain the irreversible respiratory depression in cases of ileus in the aged. A depressed acetylcholine-cholinesterase system, as postulated by him, or hypokalaemia, as suggested by Dr. Foster, may play a part. It might be best to avoid relaxants in such cases, as Burchell suggests, though cyclopropane which he advises does not always give sufficient relaxation and may cause postoperative depression. Perhaps halothane will become the anaesthetic of choice.

But if relaxants are used I would plead again to test small doses on the individual patient. If the effect of 5–10 mg dtc passes quickly it will not be dangerous to add small amounts. But should complete relaxation and apnoea be prolonged no more need be given and the chances for return of spontaneous respiration will be better. With intravenously administered drugs which act within minutes it is easy to correct any deficiency but once given they cannot be removed nor always be antagonized, as shown by Foster, Burchell and in the reports quoted in my article.

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