Journal of Neurology, Neurosurgery, and Psychiatry, 1975, **38**, 1–5

EDITORIAL

SI units and problems of communication

These are difficult times for medical publishing. The number of papers of good quality increases every year and authors rightly demand that the latent period between submission and publication should be as short as possible, and this has led to experimentation with new methods of publication. At the same time there is a feeling that 'the literature' is already too vast to be encompassed even by a well-stocked library. Serious workers must prefer not to waste time on evanescent material which has not passed the (voluntary) scrutiny of referees and editor, and will accept a measure of delay for this reason. Some authors nevertheless feel that the date of submission should be printed when a paper is published. We are not convinced by the arguments for such a dating which can lead to premature submission of ill-prepared work and takes no account of production problems. The Editorial Committee has, however, decided to record the date of acceptance. The need after acceptance for revision of badly prepared typescripts or figures leads inevitably to delays in publication, and it is in the author's interest to ensure before submission that the requirements and suggestions given in our Instructions to Authors are met.

Nevertheless, it is our wish to reduce publication delay to a minimum and, if possible, to find room for more contributions. For this reason monthly publication of the Journal was begun in 1974. Sadly, plans for increased pagination had to be temporarily postponed because of rapidly increasing costs. More papers will be published if authors cooperate by writing with precision and economy. A full review of 'the literature' with numerous references is rarely necessary. Illustrations should be reduced to a minimum, bearing in mind the sophisticated readership of the Journal, Preparation of tables and figures may cause a slight increase in publication time. Sufficient information must, however, be given to permit repetition of experimental work.

SCOPE OF THE JOURNAL

Authors should write to be understood by more than the specialist reader. We try to print papers in all fields of neurology, neurosurgery, and psychiatry with the exception of the very esoteric. For instance, description of a new operative technique or instrument would be considered of too sectional an interest unless coupled with an evaluation. In general, too, the Journal is intended for clinicians but welcomes contributions from the neurosciences where these are shown to have some relevance to clinical practice. Where space is at a premium, pathophysiological studies on the human will be preferred to studies on animals or on normal psychology unless these are shown to throw light on disease or its treatment.

It is desirable to place on record the rare or unusually interesting case, or to instruct the beginner or remind the forgetful about well-established facts but, while so much that is new and good cannot be found space, we must be extremely selective, basing the decision on the novelty of the case and the scientific contribution of the paper. The 'Review and Report of a Case' is rarely acceptable. The Editorial Committee recognizes the need for brief communications including addenda or major criticisms of papers already published, and we will now print a limited number of 'Letters to the Editor'. Prolonged or polemical correspondence cannot be accepted and the Editor's decision will be final.

FORMAT AND STYLE

In recent years the Journal has acquired a more modern cover. The type face has been enlarged, the layout improved, and the reproduction of half-tone blocks brought up to the best modern standards

compatible with rapid publication. A synopsis has been placed at the head of each paper and references are now given in full. With these modifications, and others projected, the format of the Journal moves with the times. In one aspect we are conservative. We require that papers be written in standard English, avoiding the jargon, neologisms, contractions, or telegraphic style which are convenient in clinic notes or in the operating theatre. This is not from pedantry. Language is an evolving thing and contemporary or advanced usage is proper to those who play with words and phrases as an art form but not for scientific communication. The Journal circulates throughout the world and is referred to by many without specialist training, often many years after the paper was written. There is a danger that local, esoteric, or simply fashionable terms may be misunderstood. The spelling should be according to the *Concise Oxford Dictionary* and *Butterworths Medical Dictionary* (MacNalty, 1965).

ABBREVIATIONS, UNITS, AND SYMBOLS

The problem of communication is greatest with abbreviations—seemingly obvious to the writer but confusing to the reader. For instance, ECG has different connotations in Europe and America; ALS is a generic term in America but is confined to one type of motor neurone disease in Britain; MS seems obvious to the neurologist but means something else to the internist. Abbreviations, best avoided, should be defined when first used. However, in the future we will accept the following: CNS (central nervous system), CSF (cerebrospinal fluid), EMG (electromyogram), EEG (electroencephalogram), ECG (electrocardiogram). Where electrocorticogram (ECoG) is intended, this should be spelled out when first used. Other abbreviations will be accepted when they are in general use and unambiguous in the context. In the same way the standard abbreviations ESR (erythrocyte sedimentation rate), Hb (haemoglobin), RBC (erythrocyte count), WBC (leucocyte count) will be used, but all numerical values must show the units, described by standard symbols.

British medical journals have recently eliminated many traditional Imperial units of measurement in favour of the metric system (centimetre-gram-second: CGS). Nevertheless, the units of measurements made in medicine have developed empirically. In recognition of this, laboratories all over the world are, or will be, adopting the International System of Units (SI) based on the metre, kilogram, second, ampere. This will introduce some relatively unfamiliar units but the advantages are that these units will be the same for all branches of science and that calculation is facilitated. As the majority of hospital laboratories will have changed to the SI system in 1975, we have decided to adopt the system for the Journal. For a transitional period the CGS units will also be given but it will be the responsibility of the author to supply the equivalent SI units and symbols. Some of the symbols resemble the discarded systems; therefore, whenever ambiguity could arise it is better not to abbreviate. We recommend careful study of the papers by Baron *et al.* (1974)[1] and Baron (1974) with its accompanying annotation in the *British Medical Journal*, 30 November 1974. A revised edition of the Royal Society's *Quantities, Units and Symbols* is in preparation but meanwhile Baron *et al.* (1974) will be the standard guide.

In the International System there are seven basic units (Table 1) and a number of derived units, some of which have special names or symbols (Table 2). Any physical quantity may be expressed in terms of SI units. For convenience, the litre is recognized as a unit of volume rather than the cubic metre, which is 1 000 times larger. Concentrations of solutions are therefore expressed with the litre in the denominator.

Where it is more convenient to use a decimal multiple or sub-multiple of SI units the appropriate prefixes and symbols should be used (Table 3). Note that μ is a dimensionless prefix and meaningless when used without a unit (for example 'μm').

It is important to use upper and lower case letters correctly (compare symbol 'H' in Table 2 and

[1] The journal department of the *British Medical Journal* has prepared two leaflets to help authors with conversion to SI units: the first, aimed at the general reader, is a reprint of Baron (1974) and contains conversion scales based on those used in the United Leeds Hospital; the second, more oriented towards laboratory practice, is a reprint from the *Journal of Clinical Pathology* (Baron *et al.*, 1974). The price for each leaflet is 50p, post free, from the Publishing Manager, *BMJ*, BMA House, Tavistock Square, London W.C.1.

TABLE 1

NAMES AND SYMBOLS FOR BASIC SI UNITS

Physical quantity	*SI units*	
	Name	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

TABLE 2

SPECIAL NAMES AND SYMBOLS FOR DERIVED SI UNITS

Quantity	*SI units*		*Expression in terms of SI base units or Derived units*
	Name	*Symbol*	
Frequency	hertz	Hz	1 Hz = 1/s
Force	newton	N	1 N = 1 kg·m/s^2
Work, energy, quantity of heat	joule	J	1 J = 1 N·m
Power	watt	W	1 W = 1 J/s
Quantity of electricity	coulomb	C	1 C = 1 A·s
Electric potential, potential difference, tension, electromotive force	volt	V	1 V = 1 W/A
Electric capacitance	farad	F	1 F = 1 A·s/V
Electric resistance	ohm	Ω	1 Ω = 1 V/A
Flux of magnetic induction, magnetic flux	weber	Wb	1 Wb = 1 V·s
Magnetic flux density, magnetic induction	tesla	T	1 T = 1 Wb/m^2
Inductance	henry	H	1 H = 1 V·s/A
Pressure	pascal	Pa	1 Pa = 1 N/m^2 = 1 kg/m·s^2

'h' in Table 3). Occasionally the same symbol has a different meaning according to its position. Thus a Newton metre is 'Nm', not 'mN', which means 10^{-3} N. No space should be left between the symbol for a prefix and its unit ('ms' means millisecond) but a space is placed between symbols in derived units ('m s' indicates metres × second). Baron (1974) recommends using a point above the line, thus 'm·s'. The possibility of ambiguity is obvious and it will often be better not to abbreviate. For example the symbol for year is 'a' but in English the word is better written in full.

The solidus (/) or word 'per' should not be used more than once in each unit. It is better to use the multiplier form with a negative index. For example, ml/min/m^2 could mean (ml/min)/m^2 or ml/(min/m^2). There is no confusion if it is written ml·min^{-1}·m^{-2}. Baron *et al.* (1974) should be studied carefully on the use of decimal points, grouping of large number in threes, use of multiple or submultiple to give simple whole numbers, and the correct description of substances such as plasma components.

Concentration may be expressed in two ways. Substances of defined chemical composition should be described by molar concentration when this is possible. For proteins and substances which do not have a sufficiently well-defined composition Baron recommends using mass concentration (g/l; do not use 100 ml as the unit of volume) Haemoglobin is one such substance but it has been decided to continue recording it as g/dl pending a future recommendation on its molar concentration.

Other permitted exceptions to the general rules are measurements of human serum immuno-

TABLE 3

PREFIXES FOR SI UNITS

Factor	*Name*	*Symbol*	*Factor*	*Name*	*Symbol*
			10^{-18}	atto-	a
			10^{-15}	femto-	f
10^{12}	tera-	T	10^{-12}	pico-	p
10^{9}	giga-	G	10^{-9}	nano-	n
10^{6}	mega-	M	10^{-6}	micro-	μ
10^{3}	kilo-	k	10^{-3}	milli-	m
10^{2}	hecto-	h	10^{-2}	centi-	c
10^{1}	deca-	da	10^{-1}	deci-	d

globulins and some pharmaceuticals where a pure reference material is not available. It is recommended that these should be expressed in terms of International Units expressed as mmHg and not as pascals.

Despite the difficulties for author and reader, the move towards standardization and rationalization of units and symbols must be welcomed. With regard to abbreviations the most difficult problem for medical journals has been in biochemistry, histochemistry, and nomenclature of drugs. For biochemistry we will adopt the nomenclature and abbreviations of *Biochemical Journal* (*1973*) *Instructions to Authors*, including the conventions for representing ions and isotopically labelled compounds, and *Enzyme Nomenclature* (1972). It is, however, advisable to spell out the names of enzymes likely to be unfamiliar to the general reader. In the absence of an agreed system, histochemical methods should be spelled out when first mentioned in the text and in the first figure to use a method. For hormones, those abbreviations listed in *Units, Symbols and Abbreviations* (Royal Society of Medicine, 1971) may be used; others should be spelled out. Nomenclature of drugs and radiological contrast media is the most difficult of all. Until there is international agreement this Journal will use the non-proprietary Approved Name of the *British National Formulary*. A proprietary equivalent may be indicated once in parentheses. Frequency of dosage should be described in English (not t.d.s., etc.).

PREPARATION OF PAPERS

The title of a paper and its synopsis should be informative and not ambiguous They will be used by keyword indices and abstracting services, so must give a clear but succinct summary of the contents. Papers need not follow a strict pattern, but authors are advised to read *General Notes on the Preparation of Scientific Papers* (Royal Society of London, 1974), especially with regard to preparation of graphs and other line drawings requiring reduction by the blockmaker When sending photographs for reproduction, authors should supply unmounted glossy prints numbered and marked legibly in pencil on the back (ballpoint pen or heavy pencil marks will reproduce through a glossy print) with the author's name and with top and bottom indicated. Lettering should be in either Letraset or stencil and care should be taken that all lettering and symbols are of comparable size. Spelling and symbols must conform to the above recommendations. The scale of every photomicrograph must be indicated on the photograph, and the scale of every other photograph should be indicated if possible, either on the photograph or in the legend. When correcting proofs, authors should ensure that the magnification shown corresponds with the printed illustration since this may have been reduced from the original print.

Tables should be split up if it is apparent that the data are too extensive for printing in the format of a Journal page. Tables are expensive to print and should be as few as possible. They should be typed on separate sheets, numbered and referred to in the text by arabic numerals. Each table should have its own explanatory heading. Tabulated data should not be further presented graphically. All text should be typewritten, *double spaced*, on one side of the paper only, and with ample

margins to permit editorial instructions to the printer. It is helpful to provide a second copy so that editorial work can be done while the top copy is being considered by referees.

ETHICS OF HUMAN EXPERIMENTATION AND PRIVACY

The Editorial Committee agrees with the principles of the Declaration of Helsinki (1964) regarding experimentation on the human subject, and draws attention to the advice of the Medical Research Council (1962–63) and other professional bodies (*British Medical Journal*, 1964; Royal College of Physicians, London, 1973). It is the responsibility of authors to comply with these declarations and the Editor will not accept a paper which is considered to contravene these principles. A paper describing any experimental work with humans should include a statement that the Ethical Committee of the institution in which the work was performed has approved of it, and should state that the subjects have given informed consent to the work. Individuals shown in clinical photographs or described in the text should not be identifiable unless the subject has given written permission.

With the cooperation of authors in the ways described above, the Editorial Committee will ensure publication as rapidly as possible while maintaining the high standards of the Journal.

J. A. SIMPSON

REFERENCES

Baron, D. N. (1974). SI units. *British Medical Journal*, **4**, 509–512.

Baron, D. N., Broughton, P. M. G., Cohen, M., Lansley, T. S., Lewis, S. M., and Shinton, N. K. (1974). The use of SI units in reporting results obtained in hospital laboratories. *Journal of Clinical Pathology*, **27**, 590–597.

Biochemical Journal (1973). Policy of the Journal and instructions to authors. *Biochemical Journal*, **131**.

British Medical Journal (1964). Human experimentation, **2**, 177–178.

British Medical Journal (1974). Annotation: SI units, **4**, 490.

Concise Oxford Dictionary of Current English (1964). 5th edn. Clarendon Press: Oxford.

Enzyme Nomenclature: Recommendations (1972) of the International Union of Pure and Applied Chemistry and the International Union of Biochemistry (1973). Elsevier: Amsterdam.

MacNalty, A. S. (1965). *Butterworths Medical Dictionary*. Butterworths: London.

Royal College of Physicians of London (1973). *Committee on the Supervision of the Ethics of Clinical Research Investigations and Institutions*. Royal College of Physicians: London.

Royal Society of London (1974). *General Notes on the Preparation of Scientific Papers*. The Royal Society: London.

Royal Society of London (1975). *Quantities, Units and Symbols*. The Royal Society: London.

Royal Society of Medicine (1971). *Units, Symbols and Abbreviations. A Guide for Biological and Medical Editors and Authors*. The Royal Society of Medicine: London.