AMENDMENTS AND ADDITIONS to the INTERNATIONAL TAPPING NOTATION

BY

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I. Summary

Certain amendments and additions have been incorporated in the revised version of the international tapping notation, given in the following article (Communication No. 247). These recent changes are enumerated and explained.

Further possible amplifications of the notation are put forward for consideration or use in special circumstances. A revised scheme of classification shows how the standard symbols can be used in abbreviated terms to designate general groups and classes of tapping.

II. New Fractional Notation

We have recently received from Mr. J. F. H. Cronshey and Mr. C. Barclay, of the Plantation Research Department of the United States Rubber Plantations, Sumatra, a memorandum containing suggestions which improve the recently-introduced tapping notation. Although there are obvious objections to issuing a revised notation within six months of publishing the original, it was agreed at the recent Directors' Conference at Kuala Lumpur that the suggested improvements justify immediate revision, before the former version has been used in published works.

In the original notation we attempted to adopt symbols which were already in current use, defining clearly the meaning and implication of each and discarding ambiguous symbols which had acquired different meanings in different countries. The resultant notation included two or three independent conventions which had to be separately memorised. Cronshey and Barclay have pointed out that the common method of describing length of cut as fraction of the circumference of the tree can usefully be extended to the other factors of a tapping system. Taking daily tapping as basis, the time intervals of tapping frequency and of periodic tapping and rest can be expressed as fractions of the total time cycle of each feature: tapping on one day in two, for example—that is, alternate-daily—can be represented as tapping on half the total days, while six months' tapping followed by three months' rest can be

represented as tapping during six ninths of the total months. In this way the whole scheme is brought under one consistent fractional convention which can easily be remembered, while the

TABLE

International Notatio

(Comparative Examples o

1. ORIGINAL VERSION (1939)	2. REVISED VERSION (1940) (based on New Fractional Notation)
(1) Number, (2) Length and (3) Type of cut	**(1) Number, Type and Length of cut**
1/1S, ½V, 1/3S, ⅓S	S/1, V/2, S/3, S/4
2/2S, 2/4S, 4/2V	2S/2, 2S/4, 4V/2
(4) Frequency and (5) Periodicity	**(2) Tapping Periods and Cycles**
d, 2d. or a.d, 3d, 4d,	d/1, d/2, d/3, d/4
20/40d, 3/3w, 1/1m, 6/3m	20d/60, 3w/6, m/2, 6m/9
(7) Change-over Systems†	**(3) Number of Successive Panels, Period and Cycle of Change†**
(2x2d)	(2x2d/4), etc.
(2x6m)	(2x6m/12), (2x9m/18) etc.‡
(2x4y)	(2x4y/8), etc.
(6) Relative Intensity	**(6) Relative Intensity**
	No change
On the former notation calculation of intensity was complicated, involving the formation of the fractions which are now set forth in the new formula. The product of these fractions automatically gives the relative intensity of the system when multiplied by 400.	

*The original version of the International Notation was published as Communic in the following article (Communication No. 247).

†This part of the notation does not much concern Malayan readers at present.

‡Specific comparative examples cannot be given without the full formula. The inser system, such as S/2,d/2,100%, would be (2x6m/12); but on a periodic system, such as in the original notation.

estimate of tapping intensity follows simply from the product of the fractions. The following comparative table (Table 1) will make the new convention clear and will show how the amended version of the notation differs from the original.

for Tapping Systems

Original Version and Revision of 1940*)

	Remarks
	Revised version is merely a slight simplification of the original.
	1. Eliminates artificial distinction between frequency and periodicity in formula. 2. Gives area tapped as fraction of total. 3. Gives cycle of periods at a glance.
	1. Symbols in brackets always reduce to unity when multiplied, so that relative intensity is unaffected by this part of formula. 2. Gives panel-cycle at a glance, so that frequency of changes cannot be confused.
	On the standard system of half-circumference alternate-daily tapping the product is $\frac{1}{4}$ (= $\frac{1}{2}$x$\frac{1}{2}$)—taken as 100%; hence the multiplication factor of 400.

ation No. 240 in the J.R.R.I.M. (Vol. 9, 1939, p. 164) and the revised version is published

It may be disregarded by those not interested in change-over tapping.

tion to denote six-monthly periods of tapping on alternate panels on a continuous S/2,d/2,6m/9,67%, it would now be (2x9m/18), both having been rendered by (2x6m)

III. **Additional Symbols**

One or two additional symbols included in the revised version are listed below.

(1) C = *circumference*

This symbol can be used in place of S or V when it is desired to avoid specifying the type of cut, such as in mixed areas where both types of cut are represented.

(2) L = *extended-V* cut, indicating that the arms of the V are unequal.

In the usual type of full-circumference extended-V the left arm of the original half-V is prolonged upwards for another half-circumference, so that the two arms do not meet and ring the tree. (The significance of the symbol, capital L, can be remembered by tilting it to the left when it can be imagined as a pictorial representation of the extended-V cut).

(3) y = *year*

This symbol, to complete the series d, w and m, was inadvertently omitted from the original version.

IV. **Further Amplifications of the Notation**

It seems opportune to put on record further possible amplifications of the notation which might be used in special circumstances. Some explanation of the conceptions of tapping system and intensity is also desirable.

(1) Tapping System

For clear appreciation of *intensity* of tapping, the working conception of a "tapping system" must be understood. The *tapping system* designated by a formula is imagined, in the first place, as a self-contained entity, operating over a given area, of which a due proportion is tapped at all seasons when tapping is permissible. Any complete "system" (other than daily continuous tapping) must therefore comprise more than one task; the number of tasks required is a multiple of the denominator of the simplest vulgar fraction given by the product of the frequency and periodicity fractions in the tapping formula. For example,

System	Product of frequency and periodicity fractions	Unit set of tasks for operation of complete system	No. of tasks tapped daily per set
C/2,*d*/2,6*m*/9,67%.....	$\frac{1}{2} \times \frac{6}{9} = \frac{1}{3}$	.....3.....	1
C/2,*d*/3,8*m*/12,44%...	$\frac{1}{3} \times \frac{8}{12} = \frac{2}{9}$	.....9.....	2

Over a period of observation which is not a multiple of the periodic cycle of the system, the intensity of tapping on individual tasks differs from the average of the system.

The following discussion and equations refer to a set of tasks making up a complete system.* If every day were a tapping day, the *potential* intensity of the given system (or maximum rate of tapping) would be achieved. Potential intensity is never realised in practice. On several days in the year there is no tapping owing to weather, holidays or strikes; on other days tapping is incomplete owing to omission of trees due to be tapped (poor or diseased trees out of tapping, trees which escape notice or trees in "vacant tasks" with absentee tappers). In most parts of Malaya there is practically no weather factor to interrupt tapping except rain; but in some countries, during part of the year, tapping ceases for several weeks or months at a stretch—for example, where there is severe wintering (*e.g.* Indo-China), persistent interference by rain (*e.g.* Burma) or an established custom (*e.g.* Ceylon). Such periods, when tapping ceases over a whole area, should be considered as interruptions of tapping due to weather and not treated as part of the periodicity of the system.

The *actual* intensity realised on any given system will thus vary greatly with climate, custom, health of trees, etc. from one locality to another—or even, in the same locality, from one season to another. To compare tapping results in different places or seasons, statement of actual intensity is needed, mention of relative intensity of the system, as in the international tapping formula, being insufficient. This may be given either in the form of actual *rate* of tapping or of *amount* of tapping in the stated period.

Complications introduced by trees changed in and out of tapping (*e.g.* brown bast) or inadvertently left untapped, have been ignored, on the assumption that such reductions are usually

*When it is necessary to deal with only part of a system (extending, for example, over three separate monoclonal areas, each comprising for periodic tapping either an A, B or C section, instead of each subdivided into its own component A.B.C. sections) each case will require individual consideration.

The need to distinguish between the system and individual tasks (or sections) may be illustrated by example (7) on p.160 of Comm. No. 239 (*J.R.R.I.M.*, Vol. 9, 1939), where mention of the actual intensity for a single task, which happened to be in continuous tapping throughout the period of observation—instead of the average intensity over a complete set of tasks making up the system—is misleading.

negligible. But there is no difficulty in making allowance for vacant tasks—a quite considerable factor on some estates—if total tapper-days are recorded.

Potential intensity in circumference-cuts per day equals the product of the fractions in the tapping formula. Whence, obviously,

$$\text{potential intensity in full-circumference cuts per day} = \frac{\text{rel. int.}}{400}$$

Therefore, if we reckon intensities in quarter-cuts per day, the standard system (S/2,d/2,100%) has a potential intensity of unity. The measure of potential intensity in these units is $\frac{\text{rel. int.}}{100}$.

If tapping were complete on every tapping day, so that the only difference between potential and actual intensity were due to days on which there was no tapping,

$$\underset{\text{(in quarter-cuts per day)}}{\text{actual intensity}} = \frac{\text{rel.int.} \times \text{tapping days in period observed}}{100 \quad \text{total days in period observed}}$$

It is only occasionally however that this simple case occurs in practice. When tapping is incomplete, the number of tapping days must be replaced by the average number of tappings per tree (or per task, assuming intra-task complications can be neglected). To calculate average number of tappings we must know the number of tapper-days and the number of tasks in the system; and it is simpler to estimate actual intensity direct from these factors and from length of cut in the tapping formula rather than to derive it from relative intensity. The equation* is

$$\underset{\text{(in q.-cuts per day)}}{\text{actual int.}} = \frac{\text{length of cut} \times \text{number of tapper-days in observed period} \times 4}{\text{total number of tasks} \times \text{total number of days in observed period}}.$$

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*Those accustomed to algebraic formulae, may prefer the following expression of the various relationships and methods of calculating intensities:

Let c be the length of cut as fraction of a circumference,
d „ „ fraction expressing daily tapping frequency,
p „ „ „ (or fractions) expressing periodicity,
T „ „ number of tapper-days in the observed period,
D „ „ total number of days in the observed period,
N „ „ total number of tasks in the system,
I_p „ „ potential intensity of the system $= c\,d\,p$ circs. per day,
I_r „ „ relative intensity (= ratio of I_p : I_p of the standard tapping system, i.e. C/2,d/2,cont.) usually expressed as a percentage $= I_p$ in quarter-cuts per day $\times 100$
and I_a „ „ actual intensity.

(2) Restricted Tapping

Under Restriction, on some estates, or perhaps only in certain fields of an estate, tapping days may be restricted to a fixed maximum: to twenty-four days in the month, for example. Another common form of restriction is to stop tapping altogether for one or two months in the year, usually during the period of wintering and refoliation. Yet another way of restricting crop is to cease all Sunday tapping, which reduces total tapping days to six sevenths of the normal number.

All these forms of restriction have the effect of reducing tapping intensity to less than normal for the system. This might be indicated by adding to the formula, after normal relative intensity, the appropriate fraction due to restriction followed, when possible, by resultant restricted intensity.

For example, (a) for tapping on a *restricted number of days*, the formula S/2,d/2,100% × 24d/*m* would indicate that the normal 100% system of alternate-daily tapping on a half-spiral cut was being artificially restricted to a maximum of twenty four days in the month; and S/2,d/2,100% × 6d/7 = 86% would indicate cessation of tapping on one day in seven, as with omission of Sunday tappings. (Resultant percentage is stated in the second case, where restriction is independent of weather and relative intensity is reduced on the average to the resultant given. It cannot be stated in the first, where the twenty four days on which tapping is actually allowed will not always be the same proportion of the potential tapping days in the month). Similarly, (b) for tapping with *annual wintering rests* of several weeks or months in Malaya and other countries, where wintering rests are not the rule, the formula S/2,d/2,100% × 10m/12 = 83% would indicate complete cessation of tapping during two months out of twelve, while the usual formula S/2,d/2,10m/12,83% would indicate a periodic system on which one sixth of the area was always out of tapping.

The term "restricted tapping" is to be referred to the system as defined in (1) above. The annual rests of Ceylon would generally be ignored, as outside the system, and the ordinary formulae used. "Restriction" may then be negative, if the weather conditions

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Then,

ratio of tasks in tapping on one day : total number of tasks in system = dp,

average number of tapping days in system = $\frac{T}{N\ d\ p}$

and $I_a = I_p \times \frac{T}{N\ d\ p} \times \frac{1}{D}$

$= \frac{4cT}{ND}$ in quarter-cuts per day.

usually considered to restrict tapping in a country are ignored. For example, if in a given locality of Ceylon it is customary to stop tapping for five weeks a year but on a given field 100% tapping is carried through this period, the "restriction" factor would be 52w/47=111%; while, if in another field an extra long wintering rest were given (ten weeks instead of five), the restriction factor would be 42w/47=89%. These factors should only be used to indicate any departure from normal practice in the country or on the estate concerned.

(3) Bark Cycle

Symbols, similar to the notation for cyclic changes of panel, might be introduced, where desired, both in straight and "change-over" systems, to indicate the cycle of bark renewal. To distinguish them from change-over symbols, bark-cycle symbols should be placed at the end of the formula, *after* relative intensity. Thus it is suggested, for example, that (2×4y/8) at the end of the formula might be taken to mean four years' tapping on each panel with a total bark cycle of eight years, while its general omission would imply that the tapping cycle is indefinite, each panel being tapped through to its base.

(4) Classification of Tapping Systems

In a former article (Guest, 1939) there is a table which broadly classifies tapping under the two main categories: (1) *continuous* systems and (2) *periodic*. Specific factors are set forth in the table, showing the form in which they are usually combined in the commoner tapping systems. Need has also been felt for standard general terms to replace the loose grouping of these systems under terms such as A.B. and A.B.C. tapping, which writers have been urged to abandon. For this purpose introduction of the abbreviated terms "*cont.*", for continuous, and "*per.*", for periodic, is suggested. General class abbreviations could then be formed, in combination with standard symbols, on the lines of the revised classification given in Table 2.

Acknowledgements

Particular acknowledgement is due to Mr. J. F. H. Cronshey, whose original comments led to the revision explained in this article, and to Mr. C. Barclay. The new symbols C and I, were recently suggested by M. Jean Talou, who pointed out to the writer nearly a year ago that a fractional notation of the form j/4, j/3, j/2 etc. . . (j=jour) was being used to denote tapping frequency in Indo-China. Unfortunately, the idea of extending the fractional notation to periodicity did not strike root at the time, or

TABLE II

General Classification of Tapping Systems

Category	Group * (by relative intensity	Class (by frequency) †	Typical Tapping Systems (as examples of each class and group)	Former General Terms ‡	
				In Malaya and Ceylon	In Sumatra and Java
Continuous tapping *(cont.)*	67% continuous	d/2,cont,67%	C/3,d/2,67%		A.B.
		d/3,cont,67%	C/2,d/3,67%		A.B.C.
	100% continuous	d/1,cont,100%	C/4,d/1,100%		
		d/2,cont,100%	C/2,d/2,100%		A.B.
		d/4,cont,100%	C/1,d/4,100%		(A.B.C.D.)
	133% continuous	d/1,cont,133%	C/3,d/1,133%		
		d/3,cont,133%	C/1,d/3,133%		(A.B.C)
Periodic tapping *(per.)*	50% periodic	d/2,per,50%	C/2,d/2,12m/24,50%	A.B.	
	67% periodic	d/1,per,67%	C/3,d/1,m/2,67% C/2,d/1,20d/60,67%	D.A.M.	A.B. A.B.C.
		d/2,per,67%	C/2,d/2,12m/18,67%	A.B.C.	
	75% periodic	d/2,per,75%	C/2,d/2,12m/16,75%	A.B.C.D	
		d/4,per,75%	C/1,d/4,9m/12,75%	(A.B.C.D.)	
	80% periodic	d/2,per,80%	C/2,d/2,12m/15,80%	A.B.C.D.E.	
		d/4,per,80%	C/1,d/4,8m/10,80%	(A.B.C.D.E.)	
	89% periodic	d/3,per,89%	C/1,d/3,4m/6,89%	(A.B.C.)	
	100% periodic	d/1,per,100%	C/2,d/1,m/2,100%	D.A.M.	
		d/3,per,100%	C/1,d/3,3m/4,100%	(A.B.C.D.)	

* The classification is presented under the two main categories of "continuous" and "periodic" tapping, each subdivided into groups by relative intensity. Only the commoner groups are given here. Other groups at various intermediate intensities could have been shown; but representative tapping systems are not common.

† Each group can be subdivided into classes either under tapping frequencies (as shown here) or under types of cut, numbers of cuts etc., according to the contrast required. The above sub-classification by tapping frequencies shows the abbreviations suggested to designate such classes.

For example, in the 7th Mile Tapping Experiment (Sharp, 1938), eight tapping systems were compared, representative of the three groups: 67% periodic (systems 1—6), 75% periodic (system 7) and 100% continuous (system 8). Sub-classification could be either into the four classes d/2,cont,100% (system 8), d/2,per,67% (the three "A.B.C." systems, 1—3), d/3,per,67% (the three "Sunderland" systems, 4—6) and d/4,per,75% (system 7) if it is desired to emphasize the contrast in tapping frequencies, or into C/2,cont,100% (system 8), C/2,per,67% (systems 1—3), 2C/2,per,67% (systems 4—6) and 2C/2,per,75% (system 7), if it is desired to emphasize the difference that some systems are on single and others on double-cuts.

‡ Where comparatively new systems of tapping have been given as illustrative examples the symbols in brackets in these columns indicate the notation which would probably have been applied to them. In Java the common notation was not identical with that used in Sumatra, though nearer to it than to the Malayan.

the original notation might have been published in its present form and the inconvenience caused by so early a revision avoided. Mr. H. Fairfield Smith, to whom acknowledgement is due for criticism and discussion, is largely responsible for the definition of intensity.

References

GUEST, EVAN (1939): *J.R.R.I.M.* **9,** Comm. 239, p. 162

SHARP, C. C. T. (1938): *J.R.R.I.M.* **8** *(et ante)*, p. 241

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