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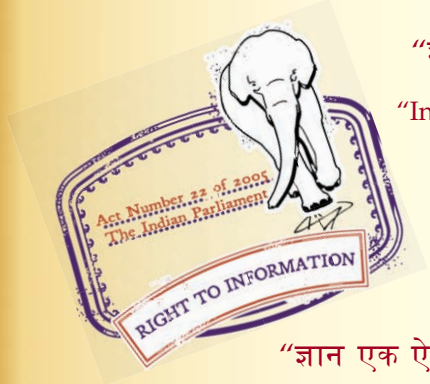

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Indian Standard

KEY FOR IDENTIFICATION OF COMMERCIAL TIMBERS

(*First Revision*)

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Indian Standard

KEY FOR IDENTIFICATION OF COMMERCIAL TIMBERS

(First Revision)

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Indian Standard

KEY FOR IDENTIFICATION OF COMMERCIAL TIMBERS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 12 October 1973, after the draft finalized by the Timber Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 A need has been felt for the preparation of a simple key for the identification of commercial timbers particularly for the use of purchasing departments, like the railways and defence and also for the timber trade and industry. Such a key would give ready guidance to the purchasing organizations in determining whether the timber supplied to them is actually of the species required by them, and would be of great help as it is specially applicable for identification of timber in the field.

0.3 This standard was first published in 1968 and specified the diagnostic features of 40 commercial timbers with the help of which these 40 species of timber could be identified. In this revision, diagnostic features of 20 more species have been added, on the basis of the work done at Forest Research Institute & Colleges, Dehra Dun.

0.4 Punched cards of the type shown in Fig. 1, measuring 145×115 mm may be obtained from the Indian Standards Institution on payment.

0.5 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

0.6 In the preparation of this standard considerable assistance has been rendered by the Forest Research Institute & Colleges, Dehra Dun, who have designed the cards and supplied the necessary data for the perforated card key.

0.7 Personnel using the key are expected to have a basic knowledge of the structure of wood on its physical properties. The Forest Research Institute & Colleges has brought out an illustrated handbook giving basic information on structure and physical characteristics of wood. The book entitled ' Field identification of fifty important timbers of India ' by Shri K. Ramesh Rao and

Shri K. B. S. Juneja can be had from the Manager of Publications, Government of India, Old Secretariat, Delhi. This book is recommended for study before using this key.

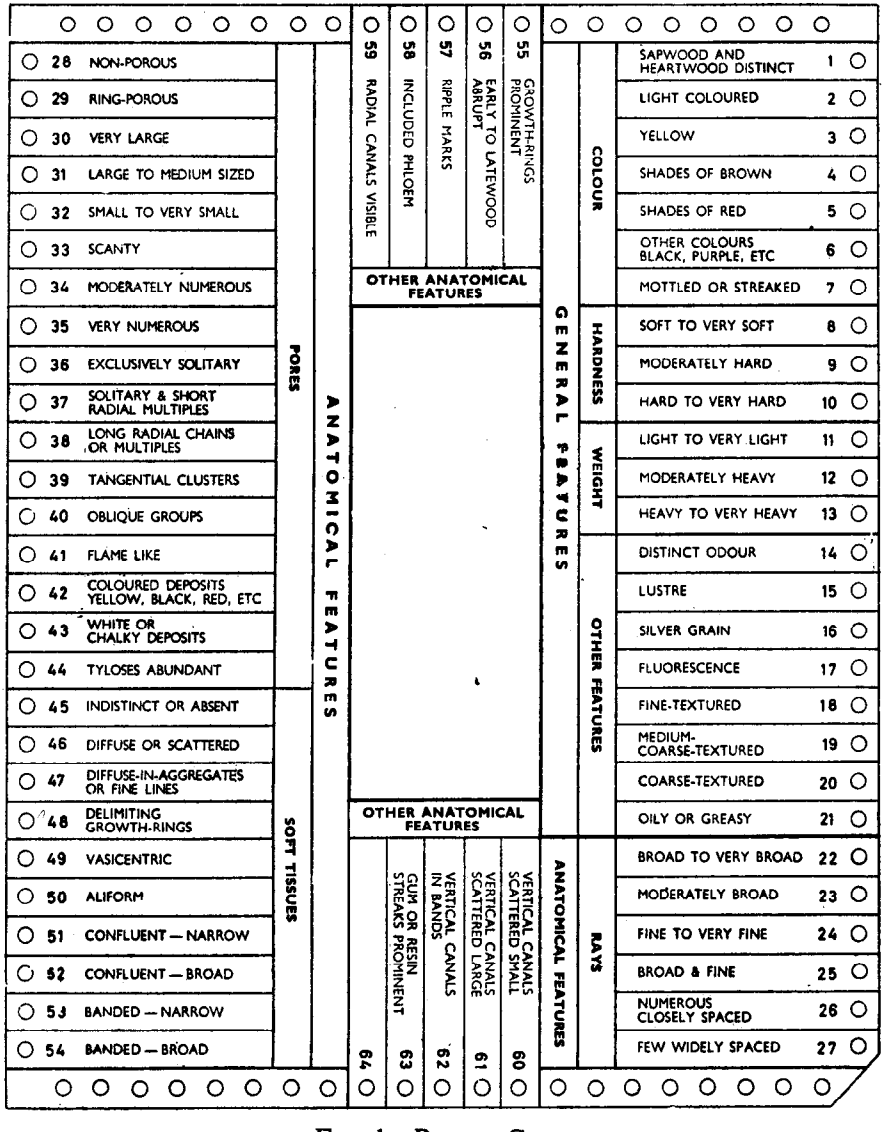

FIG. 1 PUNCH CARD

1. SCOPE

1.1 This standard covers a simply operated punched card key for the field identification of commercial timbers of India, both softwoods (coniferous) and hardwoods (non-coniferous) based on their general properties and anatomical characteristics visible under a hand lens.

2. EQUIPMENT

2.1 Sharp Pocket Knife — of the folding type with a good steel blade.

2.2 Sharp Safety Razor Blades

2.3 Hand Lens — of the folding or doublet type with a linear magnification of 10 or 12.

2.4 Stout Metal or Wooden Needle

2.5 Small Saw, Chisel and Hammer — for taking out small samples for examination when the timber to be examined is in large sizes or forms part of permanent structures.

2.6 Set of Punched Cards — *See* **0.3**.

2.7 Pair of Fine Scissors or Clippers

3. DEFINITIONS

3.0 For the purpose of this standard, the following definitions shall apply. They cover the various diagnostic features both general and anatomical which are used in the key.

3.1 Sapwood and Heartwood Distinct — When the colour distinction between sapwood and heartwood is sharp and well defined, for example, chir, sissoo and kokko. This is best seen on the cut end surface of a log but may sometimes be observed in small pieces also when the junction between sapwood and heartwood occurs in the sample.

3.2 Light Coloured — When the wood is of a relatively light or pale shade like straw-coloured, pale pink, oat-meal, greyish-white, pale yellowish-grey or pinkish-grey, for example, semul, pali, papita, kanju and gamari.

3.3 Yellow — When the wood is predominantly yellow in colour, for example, haldu.

3.4 Shades of Brown — When the wood is predominantly brown in colour, for example, sissoo.

3.5 Shades of Red — When the wood is of any relatively dark shade of red, for example, mesua.

3.6 Other Colours — Black, Purple, etc — When the wood is of any colour other than those defined under **3.2** to **3.5**, for example, black (ebony) and purple (rosewood).

3.7 Mottled or Streaked — When the wood is not uniform in colour and shows darker strips or streaks or patches giving rise to a variegated or mottled effect, for example, sissoo and kokko.

3.8 Soft to Very Soft — Readily indented by finger nail, for example, semul and papita.

3.9 Moderately Hard — Not easily indented by finger nail but readily cut with sharp knife, for example, kokko and kanju.

3.10 Hard to Very Hard — Not indented by finger nail and cut with considerable difficulty with knife, for example, mesua and ebony.

3.11 Light to Very Light — When the air-dry weight is below 550 kg/m^3, for example, papita, semul, spruce and fir.

3.12 Moderately Heavy — When the air-dry weight is between 550-750 kg/m^3, for example, poon, kokko and deodar.

3.13 Heavy to Very Heavy — When the air-dry weight is more than 750 kg/m^3, for example, sal, mesua and hopea.

3.14 Distinct Odour — When the seasoned timber has a distinct and characteristic odour, for example, teak, toon and deodar.

3.15 Lustre — Ability of the wood to reflect light when viewed from different angles. This is best seen on freshly planed or split longitudinal surfaces particularly on the radial surface, for example, mulberry and poon.

3.16 Silver Grain — Lustrous effect visible on the radial surface due to conspicuous ray flecks, for example, oak.

3.17 Fluorescence — When the water extract shows distinct fluorescence, for example, bijasal.

3.18 Fine-Textured — The word texture when applied to timber refers to the size and distribution of the wood elements. It is described as fine-textured when it gives a fine, smooth feel due to relatively small elements, for example, boxwood and haldu.

3.19 Medium-Coarse-Textured — When the wood elements especially the pores are of medium size giving rise to a texture intermediate between fine and coarse, for example, kanju, pali and vellapine.

3.20 Coarse-Textured — When the wood feels rough and coarse on all the three surfaces due to the large size of the elements, for example, semul, papita and gurjan.

3.21 Oily or Greasy — When the wood gives an oily or greasy feel due to the presence of natural infiltration products like oil and waxes, for example, teak and deodar.

3.22 Rays — Broad to Very Broad — When the rays are prominent and conspicuous to the eye, for example, semul and papita.

3.23 Rays — Moderately Broad — When the rays are distinctly visible to the eye but not conspicuous, for example, gurjan, sal and teak.

3.24 Rays — Fine to Very Fine — When the rays are not visible or barely visible to the eye, for example, benteak, bijasal and laurel.

3.25 Rays — Broad and Fine — When a few, rather widely spaced, large conspicuous rays are interspersed with numerous closely spaced fine rays visible only under a lens, for example, oak.

3.26 Rays — Numerous, Closely Spaced — When the rays are 10 or more per mm, for example, benteak, bijasal and ebony.

3.27 Rays — Few Widely Spaced — When the rays are less than 5 per mm, for example, aini, papita and semul.

3.28 Non-porous — Wood devoid of pores or vessels, a feature characteristic of softwoods (coniferous), for example, chir, deodar and spruce.

3.29 Ring-Porous — Wood in which the pores of the early wood are distinctly larger than those of the late wood and forms a well defined zone or ring, for example, mulberry, teak and toon (diffuse-porous character is not included amongst the diagnostic features as most of the Indian timbers are diffuse-porous)

3.30 Pores — Very Large — When the pores are clearly visible to the eye with their outlines distinct, for example, semul.

3.31 Pores — Large to Medium Sized — When the pores are just visible to the eye, their outlines being not very distinct, for example, kanju.

3.32 Pores — Small to Very Small — When the pores are not visible to the eye, for example, haldu and gardenia.

3.33 Pores — Scanty — When the pores are few, less than 5 per mm^2, for example, semul and papita.

3.34 Pores — Moderately Numerous — When the pores are 10-20 per mm^2, for example, babul and sal.

3.35 Pores — Very Numerous — When the pores are over 40 per mm^2, for example, boxwood and gardenia.

3.36 Pores — Exclusively Solitary — When the pores occur singly without abutting on or coming into contact with other pores near them, for example, poon, mesua and oak.

3.37 Pores — Solitary and Short Radial Multiples — When the pores occur singly or in groups of two or more, contiguous radially and flattened along the line of contact so as to appear as subdivisions of a single pore, for example, babul, kokko and bijasal.

3.38 Pores — Long Radial Chains or Multiples — When several pores (3 to 6 or more) are arranged in long radial lines or series, for example, ebony, pali and satinwood.

3.39 Pores — Tangential Clusters — When the pores are grouped in clusters arranged tangentially, for example, elm and silver oak.

3.40 Pores — Oblique Groups — When the predominant pattern of pore distribution is somewhat diagonal to the rays with most of the pores arranged in long or short radially oblique groups, for example, poon and mesua.

3.41 Pores — Flame Like — When the pores are in somewhat sinuous, radially oblique triangular patches, resembling the flame of a candle, for example, Rhamnus, Osmanthus and some oaks.

3.42 Coloured Deposits, Yellow, Black and Red — When many of the pores are filled with natural gums or infiltration products which may be yellowish, reddish or blackish in colour, for example, bijasal and babul.

3.43 White or Chalky Deposits — When some of the pores are completely occluded by white or pale yellowish white chalky deposits which are usually some kind of organic or mineral substances, for example, kanju.

3.44 Tyloses Abundant — When most of the pores are completely filled with tyloses — a glistening foam-like mass formed by in-growth of adjoining parenchyma cells into the pore cavity, for example, sal and gamari.

3.45 Soft Tissues — Indistinct or Absent — When the soft tissues or parenchyma cells are absent or are so scanty as not to be visible even under a hand lens, for example, salai.

3.46 Soft Tissues — Diffuse or Scattered — When the parenchyma cells are distributed singly, appearing as whitish or light coloured scattered dots against the relatively darker fibrous ground mass visible only under a hand lens, for example, haldu.

3.47 Soft Tissues — Diffuse-In-Aggregates or Fine Lines — When the parenchyma cells tend to be grouped in short tangential lines extending from ray to ray, for example, ebony, sundri and semul.

3.48 Soft Tissues — Delimiting Growth Rings — When the parenchyma cells appear as a more or less continuous line or thin layer demarcating the growth rings, for example, satinwood and champ.

3.49 Soft Tissues — Vasicentric — When the parenchyma cells appear as a narrow but complete whitish or light coloured sheath round the pores, for example, babul.

3.50 Soft Tissues — Aliform — When the parenchyma cells form a distinct eyelet round the pores with wing-like lateral extensions, for example, kokko.

3.51 Soft Tissues — Confluent, Narrow — When aliform parenchyma of adjacent pores becomes connected together by relatively narrow or fine lateral extensions, for example, kanju.

3.52 Soft Tissues — Confluent, Broad — When aliform parenchyma of adjacent pores becomes connected together by relatively broad or wide lateral extensions, for example, sandan and amaltas.

3.53 Soft Tissues — Banded, Narrow — When the parenchyma occurs in the form of numerous, narrow or fine concentric bands alternating with relatively wider fibrous layers, for example, banati and bijasal.

3.54 Soft Tissues — Banded, Broad — When the parenchyma occurs in the form of light-coloured, broad, concentric bands alternating with the darker fibrous layers, for example, fig and narikel.

3.55 Growth Rings, Prominent — When the wood formed during one growing season or year is clearly demarcated from that of the previous and subsequent year (season) by distinctive features, such as dense late wood, a belt of large early wood pores or a continuous line of delimiting parenchyma, for example, chir, teak and champ.

3.56 Early to Late Wood Abrupt — When the transition of the early wood to late wood within a growth ring is abrupt, that is, when the late wood is sharply delimited and stands out clearly from the early wood, for example, chir and mulberry.

3.57 Ripple Marks — Numerous fine equidistant wavy lines or striations across the grain visible on the tangential surface of the wood due to storied arrangement of rays and other wood elements, for example, bijasal, satinwood and kanju.

3.58 Included Phloem — Strands or layers of phloem or bast included in the wood, for example, *Strychnos* spp. and *Avicennia* spp.

3.59 Radial Canals Visible — When radial resin or gum canals occurring in the rays are sufficiently large to be seen under the hand lens on the tangential surface as dark dots in some of the rays, for example, salai and jhingan.

3.60 Vertical Canals, Scattered Small — When the vertical resin or gum canals are scattered singly or in short groups of two or three and on account of their small size are visible as fine dots only under a hand lens, for example, spruce and vellapine.

3.61 Vertical Canals, Scattered Large — When the vertical resin or gum canals are scattered singly or in short tangential groups and can be seen with the naked eye, for example, chir.

3.62 Vertical Canals in Bands — When the vertical canals are arranged in long tangential bands, for example, sal and deodar.

3.63 Gum or Resin Streaks, Prominent — When the vertical canals are prominent on the longitudinal surface appearing as reddish brown gummy streaks, for example, chir, kail and piney.

4. DIAGNOSTIC FEATURES

4.1 The diagnostic features of 60 common commercial timbers (*see* Note) are given in Table 1 . Features which are present only in some samples of a timber, or which are not always well developed are indicated in brackets. Timbers with such features are provided with two or more cards as may be necessary.

NOTE — The numbers of species will be increased gradually to widen the scope of the key.

5. PREPARATION OF CARDS

5.1 The set of punched cards is made ready for use by notching the appropriate diagnostic features given in Table 1, in the cards allotted for each timber. The notching of the features is made with a pair of scissors or clippers as shown in Fig. 2. The trade and botanical names of the timbers are to be indicated in the blank space provided for the purpose in the middle of each card.

6. METHOD OF USE

6.1 The method of using the card key is given in **6.1.1** to **6.1.7**.

6.1.1 Stack all the cards with their face upwards in such a way that the truncated corners are in alignment. This ensures proper orientation of the pack so that the numbered perforations representing a particular diagnostic feature of the wood in each card coincides exactly with the perforation having the same number in every other card.

TABLE 1 DIAGNOSTIC FEATURES OF COMMERCIAL TIMBERS

(*Clauses* 4.1 *and* 5.1)

Sl No.	Trade Name	Botanical Name	Diagnostic Features
1.	Aini	*Artocarpus hirsutus* Lamk.	1,3,4,9,12,15,20,23,27,30,31,33, 37,43,49,50
2.	Axlewood (Bakli)	*Anogeissus latifolia* Wall.	1,2,4,10,13,18,24,26,32,34,37, (40),49,50,51,(2 cards)
3.	Babul	*Acacia niletica* (Linn.) Willd. (*Syn. Acacia arabica* Willd.)	1,4,5,10,13,19,23,27,31,34,37,42, 49
4.	Benteak	*Lagerstroemia lanceolata* Wall.	1,4,5,9,12,19,24,26,29,37,(44),50, 51,55,(2 cards)
5.	Bijasal	*Pterocarpus marsupium* Roxb.	1,4,7,9,10,12,13,17,19,24,26,(29) 31,33,37,42,51,53,57,(2 cards)
6.	Boxwood	*Buxus sempervirens* Linn.	2,3,10,13,18,24,26,32,35,37,45
7.	Champ	*Michelia champaca* Linn.	1,4,8,9,11,12,15,18,23,24,(31), 32,34,37,48,55,(2 cards)
8.	Chaplash	*Artocarpus chaplasha* Roxb.	1,3,4,9,12,15,20,23,27,30,31,33, 37,43,49,50
9.	Chir	*Pinus roxburghii* Sargent	1,4,5,9,12,14,19,24,26,28,55,56, 61,63
10.	Cypress	*Cupressus torulosa* D. Don	1,2,4,8,9,11,12,14,18,24,26,28, 46,55
11.	Deodar	*Cedrus deodara* D. Don	1,2,4,9,12,14,18,21,24,26,28,55, (62),(2 cards)
12.	Dhaman	*Grewia tiliaefolia* Vahl.	1,2,4,9,12,19,23,24,31,34,37,43, 46,49,(57),(2 cards)
13.	Dillenia	*Dillenia* spp.	4,9,12,20,23,27,31,34,36,43,46
14.	Ebony	*Diospyros melanoxylon* Roxb.	1,2,6,10,13,18,24,26,32,34,37,38, 47
15.	Fir	*Abies pindrow* Royle	2,8,11,18,24,26,28,55
16.	Gamari	*Gmelina arborea* Linn.	2,4,8,9,11,12,15,19,23,27,(29) 31,34,37,44,(48),49,(4 cards)
17.	Gardenia	*Gardenia latifolia* Aiton	2,9,12,18,24,26,32,34,35,37,45,46
18.	Gurjan	*Dipterocarpus* spp.	1,4,9,12,19,20,23,27,30,31,34,36, 47,49,61
19.	Haldu	*Adina cordifolia* (Roxb.) Hk. f.	3,9,12,18,24,26,32,34,37,46,47

(*Continued*)

TABLE 1 DIAGNOSTIC FEATURES OF COMMERCIAL TIMBERS—*Contd*

Sl No.	Trade Name	Botanical Name	Diagnostic Features
20.	Hopea	*Hopea parviflora* Bedd.	4,10,13,18,24,31,32,34,37,(40), 46,49,50,51,62,(2 cards)
21.	Indian oak	*Quercus* spp.	2,4,5,10,13,16,20,25,27,(29),31, 32,36,40,41,46,47,(55),(2cards)
22.	Irul	*Xylia xylocarpa* Taub	1,4,10,13,19,24,26,31,32,34,37, 42,(48),49,(2 cards)
23.	Jaman	*Syzygium cumini* Skeels	2,4,10,13,19,24,26,31,34,37,51,53
24.	Jarul	*Lagerstroamia speciosa* Pers.	1,4,5,9,12,19,24,26,29,37,(44), 50,51,55,(2 cards)
25.	Kail	*Pinus wallichiana* A. B. Jacks.	1,5,8,11,14,18,24,26,28,55,61,63
26.	Kala-siris	*Albizia odoratissima* Benth.	1,4,7,9,12,15,20,24,27,30,31,33, 37,42,50
27.	Kanju	*Holoptelea integrifolia* Planch	2,3,9,12,19,23,26,31,34,37,43,50, 51,57
28.	Kathal	*Artocarpus heterophyllus* Lamk.	1,3,4,9,12,15,20,23,27,30,31,33, 37,43,49,50
29.	Khair	*Acacia catechu* Willd.	1,4,5,10,13,19,23,27,31,34,37,42, (43),49,(2 cards)
30.	Kokko	*Albizia lebbeck* Benth.	1,4,7,9,12,15,20,24,27,30,31,33, 37,42,50
31.	Kuthan	*Hymenodictyon excelsum* Wall.	2,8,11,19,24,26,31,34,37,47
32.	Lambapatti	*Planchonella longipetiolata* (King et Prain) H. J. Lam.	2,8,11,18,24,26,32,34,38,53
33.	Laurel	*Terminalia tomentosa* Wight et Arn.	1,2,4,6,7,10,13,20,24,26,31,33, 34,37,48,50
34.	Maina	*Tetrameles nudiflora* R. Br.	2,8,11,20,23,27,31,33,37,49
35.	Mango	*Mangifera indica* Linn.	2,4,9,12,20,24,26,31,34,37,(48), 50,(2 cards)
36.	Mesua	*Mesua ferrea* Linn.	1,4,5,10,13,18,19,24,26,31,33,36, 40,53
37.	Mulberry	*Morus* spp.	1,3,4,9,12,15,19,23,27,29,39,44, 48,49,51,52,55,56
38.	Narikel	*Pterygota alata* R. Br.	2,8,9,11,12,16,20,22,27,31,33,37, 54

(*Continued*)

TABLE 1 DIAGNOSTIC FEATURES OF COMMERCIAL TIMBERS—*Contd*

Sl No.	Trade Name	Botanical Name	Diagnostic Features
39.	Padauk	*Pterocarpus dalbergioides* Roxb.	1,4,5,7,9,10,12,13,19,24,(29),31, 33,37,42,51,53,57,(2 cards)
40.	Pali	*Palaquium ellipticum* (Dalz.) Engler	1,4,5,9,12,19,24,26,31,34,38,47
41.	Papita	*Pterocymbium tinctorium* Merr.	2,8,11,16,20,22,27,31,33,37,46, 47,49
42.	Piney	*Kingiodendron pinnatum* (Roxb.) Herms	1,4,5,9,12,19,24,26,31,34,37,42, 48,49,61,63
43.	Poon	*Calophyllum* spp.	1,5,7,9,12,15,20,24,26,31,33,36, 40,53
44.	Rosewood	*Dalbergia latifolia* Roxb.	1,6,7,10,13,14,19,24,26,31,34,37, 42,(48),50,51,53,(57),(4 cards)
45.	Safed-siris	*Albizia procera* Benth.	1,4,7,9,12,15,20,24,27,30,31,33, 37,42,50
46.	Sal	*Shorea robusta* Gaertn. f.	1,4,10,13,19,23,27,31,34,37,44, 46,49,50,52,62
47.	Salai	*Boswellia serrata* Roxb.	1,4,9,12,20,23,27,31,34,37,45,59
48.	Sandan	*Ougeinia oojeinensis* Roxb.	1,2,4,10,13,20,24,26,31,33,37,42, 48,50,52,57
49.	Satinwood	*Chloroxylon swietenia* DC.	2,3,10,13,15,18,24,32,34,35,38, 48,55,57
50.	Semul	*Bombax Ceiba* Linn. (*Syn. Salmalia malabarica* DC. Schott. and Endl.)	2,8,11,16,20,22,27,30,33,37,47
51.	Sissoo	*Dalbergia sissoo* Roxb.	1,4,7,10,13,19,24,26,31,34,37, 42,(48),50,51,53,(57),(4 cards)
52.	Spruce	*Picea smithiana* Boiss.	2,8,11,18,24,26,28,55,60
53.	Sundri	*Heritiera* spp.	1,2,4,5,10,13,18,24,31,32,33,34, 37,42,47,(57),(2 cards)
54.	Teak	*Tectona grandis* Linn. f.	1,4,7,9,12,14,19,21,23,27,29,37, 43,48,49,55
55.	Thingan	*Hopea odorata* Roxb.	4,10,13,18,24,31,32,34,37,(40), 47,49,62,(2 cards)
56.	Toon	*Toona Ciliata* (Roxb.) Roem. (Syn. *Cedrela toona* Roxb.)	1,5,8,9,11,12,14,15,19,23,27,29, 37,42,45,48,49,55

(*Continued*)

TABLE 1 DIAGNOSTIC FEATURES OF COMMERCIAL TIMBERS—*Contd*

Sl No.	Trade Name	Botanical Name	Diagnostic Features
57.	Vellapine	*Vateria indica* Linn.	2,4,9,12,15,19,23,27,31,32,34,37, (40),49,60,(2 cards)
58.	White cedar	*Dysoxylum malabaricum* Bedd.	2,9,12,14,18,24,26,32,34,37,42, 48,49,55
59.	White chuglam (silver greywood)	*Terminalia bialata* Steud.	2,4,7,9,12,20,24,26,31,33,37,(48), 50,51,52,(2 cards)
60.	Yon	*Anogeissus acuminata* Wall.	1,2,4,10,13,18,24,26,32,34,37, (40),49,50,51,(2 cards)

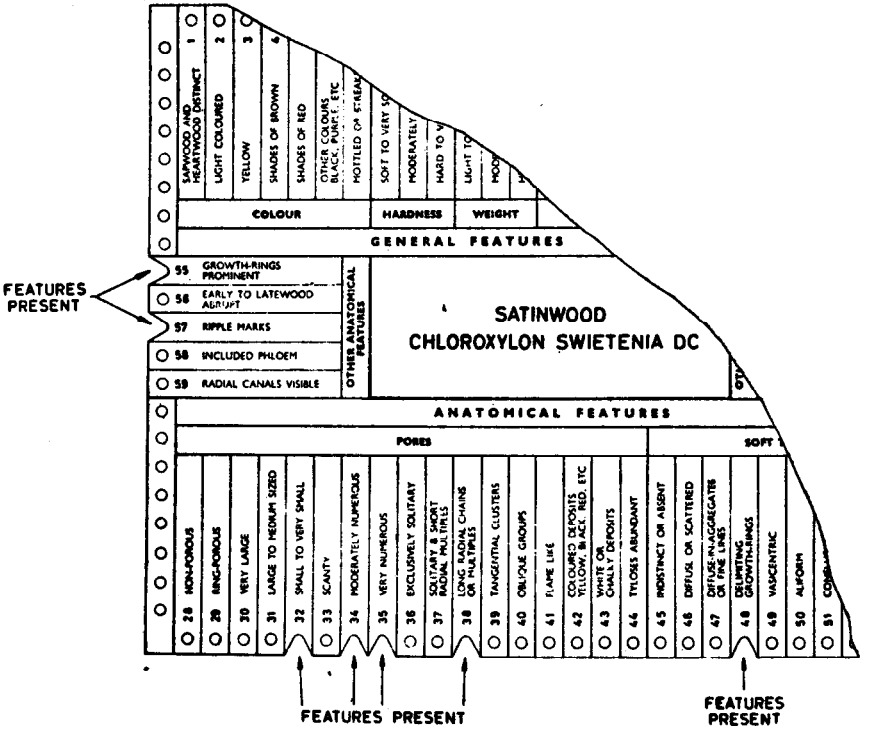

FIG. 2 METHOD OF NOTCHING OF PUNCH CARDS

6.1.2 Examine the unknown timber to be identified for any distinctive feature that may be present. Out of the features observed, select any striking or well defined one and insert a long stout needle through the appropriate hole in the pack representing the feature in question. Raise the full pack on the needle and gently shake it. All cards in which the particular feature is present and has been notched will automatically fall out.

6.1.3 Re-stack the cards which have dropped after correctly orienting them.

6.1.4 Insert the needle through another hole representing some other diagnostic feature of the unknown timber. On again shaking the pack with the needle a few more cards in which this feature is also present will fall out.

6.1.5 Repeat the process of re-stacking sorting based on presence of other diagnostic features in the above manner till only a single card falls out. This card should give the correct species of the timber under inspection.

6.1.6 Absence of any features may also be utilized in the eliminating operations. However, in such cases only the cards remaining on the needle are to be used for further sorting.

6.1.7 Occasionally, even after repeated operations more than one card may drop out. In such cases, the exact identification is only possible by comparing the unknown timber with known samples.

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 331 01 31
331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :		*Telephone*
Central	: Manak Bhavan, 9, Bahadur Shah Zafar Marg, NEW DELHI 110002	{ 331 01 31 { 331 13 75
* Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	37 86 62
Northern	: SCO 445-446, Sector 35-C, CHANDIGARH 160036	2 18 43
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