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Product Semantics
Observing people categorize products

PRODUCT SEMANTICS

- Observing people categorize products

SPECIAL PROJECT

by
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GUIDE
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APPROVAL SHEET

The special project entitled 'Product semantics - observing people categorize products' by Prashant Ahir is approved in partial fulfilment of the requirements for M.Des degree in Industrial Design.

Signature

Date

Guide

P. A. Ahir

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Human beings are exposed to 'Real world' which is very complex. Large area of human brain offers an almost unlimited capacity to store symbols for objects and events from the real world. It develops its own symbols for objects and events in the outside world. Organisation of these symbols is also essential for efficient retrieval.

What makes it significant to the field of design is the fact that this coding is based on sensory information and for most objects it is primarily the visual component of the information about the object, that is used in processing. We can learn to deal with semantic issues more effectively if we understand how coding process exploits the semantic information available from the objects.

Organisation of these symbols leads to the formation of categories at various levels of abstraction. The strategy used to construct categories and to form concepts is uniquely different and can offer clues on how visual information can be controlled.

The process of categorization shows the ingenuity of human information processing strategy over the intelligent machines. So far as the behaviour and properties of the objects within the category remain predictable, it is advantageous not to differentiate the object from others. So instead of categorizing objects into large number of finely discriminate and tight concepts, the mind automatically chooses the cognitively economical option of neglecting the infinite differences among the objects to behaviourally and cognitively usable proportions. The categorization process treats nonidentical objects as equivalent, when differences are irrelevant to the human response. Objects within a category appear to substantially share features that show a clear co-relation. The fuzzyness of the boundaries, an important characteristic

of the human categorization process, does not create operative problems, because the categories are not defined by its boundaries but by its centre.

The internal structure of categorization is explained by the hypothesis of 'Tree structure'. In this model each category within a taxonomy is entirely included within one other category at a higher level. For example all hacksaw, plain handsaw, fret saw etc are included in a category saw then saws, planes, hammers etc. etc. are included in the category wood working hand tools. Wood working tools and metal working tools etc. go into a higher category of tools. All these are different levels of categorization. They are termed as subordinate level, basic level and superordinate level etc.

It is important to understand how the levels along the vertical dimension work in defining the concepts. Category belongingness along the vertical dimension automatically means sharing semantic features. Semantic features are shared at every level. The relationships along the vertical dimension establish the rich links between the concepts.

However this model has certain drawbacks. One branch of the tree does not interact with the other to form another branch, it can only divide. So if such a criss-cross relationship exists it cannot be explained through this model.

The criss-cross relationships between the objects can be explained through another hypothesis-'The radial structure'.

THE RADIAL STRUCTURE

According to this model the centre develops into categories radially. These categories can further develop to form more categories. In this structure there is a freedom for two categories to interact and form one more category. This model is capable of explaining all the complex relationships between the products.

The relationship between categories and how people see them is very interesting. The idea of this project was to observe how people categorise products. The categorization at super ordinate level or basic level is not very refined, and may appear obvious. At lower levels the categorization is complex and requires more sensitivity towards the products.

A sample group of wrist watches was selected for experiments for two reasons,

- a) Every body is familiar with the product
- b) Large variety in the product is already developed.

Both the models were to be tried out with people. Initially a methodology was thought of and was experimented with people. The methodology was as follows -
For 'tree structure '-

- 1) The person was asked to observe the watches and group them into two -
The idea was to get a higher level category.
- 2) The person was asked if he was comfortable with the group, if not he could make one more. He was asked the reason for grouping them, the way he did.
- 3) The person was asked to group further each one of those groups.
- 4) She/He was given time and chance to reconsider the groups he made and was allowed to reshuffle some of the elements if he felt the need to do so.
- 5) He/She was asked to group further till he/she felt that it was not possible to group further.
- 6) Comments on a particular watch if felt necessary were asked.

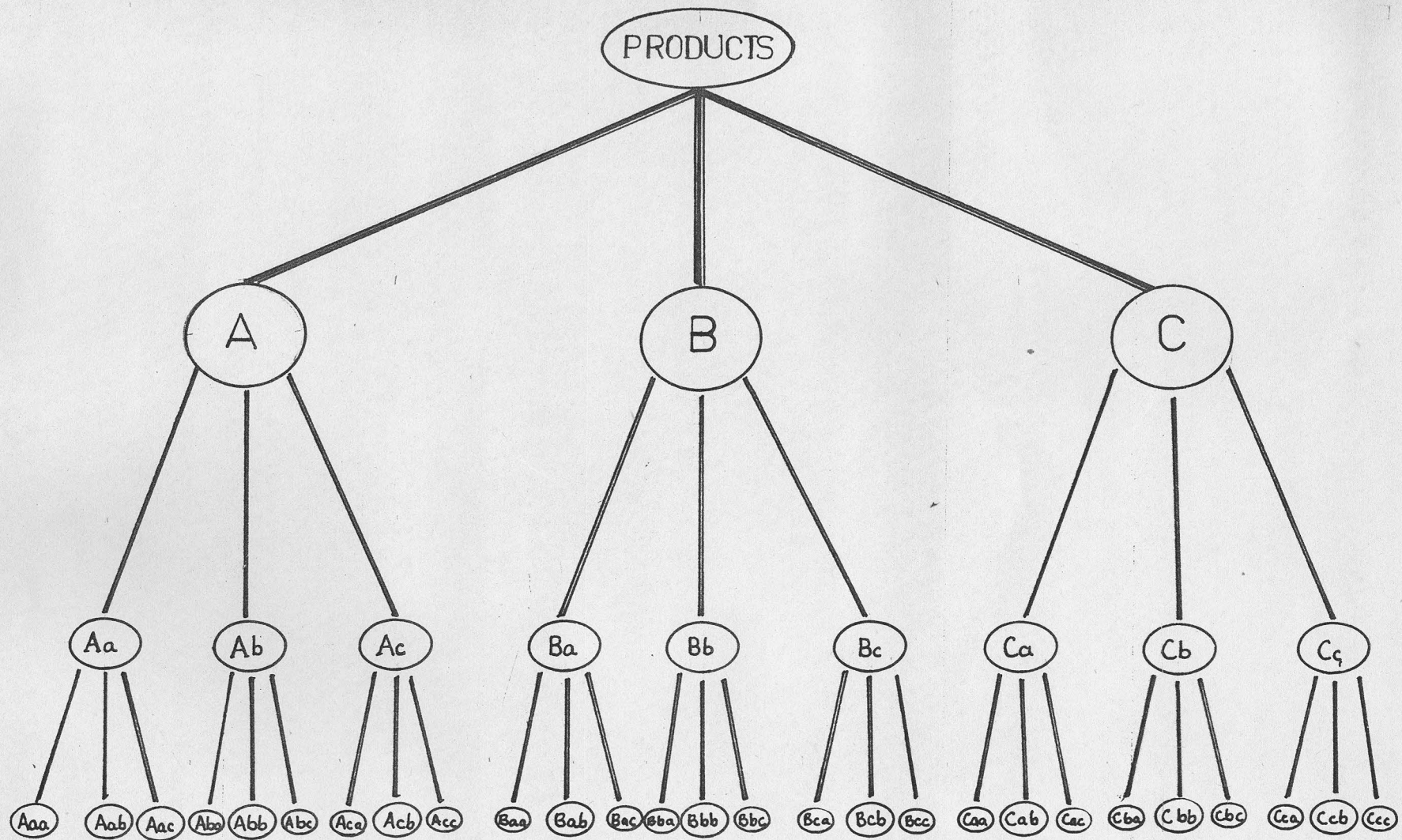
This methodology was tried out with some people. The following changes were thought of for the said reasons.

- 1) Comments on a watch if were to be asked, it should be seen that it does not appear as an objection or the person should not feel that the decision is wrong and she/he starts reconsidering it.
- 2) It was felt that it is necessary to ask for a watch, representative of that group, which should give the central tendency of the group
- 3) Similarly a watch which is odd in the group was asked for to get the idea of the compromise done while grouping.

A similar study in case of Radial structure was done.

- 1) The person was asked to find out the most typical group of watches.
- 2) Then he was told to make one group close to that
- 3) And then one close to that and so on.
- 4) All the groups were placed on a linear scale.
- 5) Then keeping the typical group in the centre he/she was asked to arrange them on the different concentric circles. Before they start of with actual experiment they were given photographs of cameras to try out the radial structure
- 6) The distance from the typicality was to be expressed in radii and the influence of one group on the other by direct distance between them.

With these as methodologies experiments were done with people and observations made. The results and observations follow in the report.



TREE STRUCTURE

A ROUND

Aa Golden 63*,59,14,19,9,20,21,63

Ab White 51*,46,13,48,24

Ac Black

Ad Mixed colour

Aca Meter like 29,56,39*,61,34

Acb Normal 22,10*,25,27,58

Ada Digital 49,6

Adb Analog 17,32,52

Adc Ana-digi 15,65

B OTHER THAN ROUND

Ba Prominently gold 41,23,35,55*,57

Bb Calender type 60,45

Bc Unusual features 38,54,3

Bd Jewellery

Be Black squarish 50

Bf Medium size 8,40,44*

Bg TV display, 5,1,*42,2

Bh Small (ladies)* 43*, 4,37,53,7,26

Bda Gold 30,35

Bdb Platinum 11,47

Bdc Square 12,

A ROUND

Aa Golden dial
 - 63 was a problem case because of two colour dial

Ab White
 - Shine in the dial made 51 an exception and also the treatment of frame added to the cause
 - 24 though of different colour was taken into group, which is close to white
 - Colour of the dial was deciding criteria.

Ac Black

Aca Meter like
 - Use of maximum black is done and the graphics is not in bright colours.
 - Black, red, 34 watch is different in the group, but still compromise is done for the group.
 - 39 was an exception because of the central colourful dial.

Acb Normal
 - 10 was considered as an exception because of complexity but was considered very close to the normal

Acb -Normal
 - In case of 22, inspite of the golden frame it was not considered different and the colour of the dial was given more importance

Ad Mixed colour

Ada Use of more than one colour

Adb Grey watches also put in this group and not in black (Ac), because of the use of other colours on the dial.
 - 31 was a problem case and also an exception as it could also have gone in white (Ab). but because of graphics in centre was grouped in Adb.

Adc Analog and Digital
 - Facility of both made a group

B OTHER THAN ROUND

Ba Golden colour has dominated the form and other features
 - Because of the digital display 55 was a problem case
 - Rectangular form and offset display made 57 an exception in the group.

Bb Calendar
- It is interesting to note that both the watches have a treatment similar to calendars.

Bc Unusual features
- 38, rectangular form and numbers
- 54 texture in the dial
- Though the form is usual the markings are in a different way

Bd Jewelery
- Jewelery type of looks for all watches.

Bda Golden belt dominating to form a group

Bdb Colour has dominated the looks

Bdc Form and colour compensation made it form a different group altogether.

Bf One line display
- 44 was an exception

Bg TV display
- Bigger display
- 42 Calculator watch was a problem case

Bh Small (Ladies)
- 43 was an exception because of oblique lines
- Overall look was considered to form a group, form, colour did not matter.

** Colour of the dial and overall looks were the criterias for grouping.

A LADIES
 Aa Small dial
 Ab Round
 Ac Vertical rectangle 12,50,57,38
 Ad Squarish horizontal 23,25,41*
 Ae Redish 49*, 11,34
 Af Blakish 48,58
 Ag Digital, Big dial 7,26
 Ah Unique octagonal 36
 Aaa Analog 35,33,47,
 Aab Digital 4,43,37,53
 Aac Jewellery 30
 Aba Numbered 24,13,46 20*
 Abb Without numbers 9,51,59,63,22

B GENTS
 Ba Gents Analog
 Bb Complex 39,61,29,56,52,32
 Bc Ana-digital 55,15,65
 Bd Digital
 Baa Round frame also dial 14,21,18,19
 Bab Round dial, other frame 27*,16,17
 Bac Oval-horizontal 54,60,10
 Bad Square 3
 Bda Calculator 42
 Bdb One line diaplay 44,40,8,6
 Bdc Two line diaplay 1,2,5
 Bdd Other, exception 45

A LADIES

Ac Vertical Rectangle
-50 is treated as vertical rectangle because of the belt.

Ad 41 is the problem case because of the hexagonal form

Ae 49 Redish dial, and electronic display made it a problem case
- 11 red belt has been dominating

Af Blackish
- 48, black frame and belt has been dominating

Ag Size of the watch made the difference inspite of the same display size.

Ah Small size was the criteria for grouping in ladies watches

Aaa 47 was treated as an exception because of offset belt.

Aac 30, diamonds gave it a jewelery look

Aba Fine markings and thin hands was the criteria for grouping in ladies watches

Abb 9, markings were not treated as numbers, probably was a very different way of representing them.

B GENTS

Ba All the groups on the basis of form

Bb Too many dials and graphics gave them complex look.

Bc Function dominated the form and colour

Bda Calculator watch 42, always remained a seperate group

Bdb Display was given more importance

Bdd 45, style of display made it different

C KIDS

- 31 graphics was the criteria for the decision.

** Overall look and form, colour were the criterias for grouping.
- Showed sensitivity to form and colour.

.....DINESH

A ROUND DIALS

Aa Frame circular

Ab Frame circular following dial

Ac Angular frame

Aaa Numbered 12 divisions 9*, 13, 31, 24,
46, 35*

Aab Markings 63,51

Aac Blank dials 59*, 58, 22, 30*

Aba Numbers 6

Abb Markings & dates 48*,29,19,18,21,
14,20

Abc Markings, time 15,65

Aca Complex 10,34*, 61'

Ach Numbers 16', 27, 17, 36, 11*

Acc Complex different frame 58',32,39#
52

B OTHER THAN ROUND

Ba Squarish

Bb Octagonal 40, 37

Bc Other than square form

Bd Odd forms 45, 54, 41,

Baa Square 50,12,3

Bab Square with rounded corners 33,55

Bac With one line display 8

Bad Square with rounded corner digital
53,44,43*,7!

Bca Ovals 25,60,23

Bcb Rectangular vertical 57,38

Bcc Offset belt 47

Bcd Date time etc. 2,1,5

Bce Others 4,26

Baa' Calculator 42



Aaa



Aba



Aca



Aab



Abb



Acb



Aac



Abc



Acc



Bb



Bab



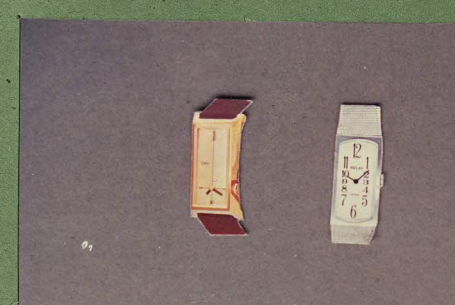
Bca



Bd



Bac



Bcb



Baa



Bad



Bcc



Bcd



Bce



Baa'

A ROUND DIALS

Aaa Numbered 12 divisions

- 9, markings in an unusual way made it an exception.
- 13 was the representative of the group.

Aab Markings

- Clear suggestion of markings was the criteria for grouping

Aac Blank dials

- 59, 30 were exception because of the treatment of the dial.
- 22, was the representative of the group.
- The markings were neglected because were not very obvious, 58

Abb Markings and Date

- 48, was an exception because of the way numbers were written.

Aca Complex

- 34 was an exception because of the colours used

Acb Numbers, Angular frame

- 11 was an exception because of the treatment of the dial.

Bad Square with rounded corners and digital

- 43 was an exception because of treatment of the dial- display not in the centre.

** All the groups were based on the frame dial relationship and form of the frame dominated the grouping.

A ROUND FORM
 Aa Golden body
 Ab Black plastic 48,56
 Ac Chrome plated 13,31
 Aaa Ladies
 Aab Gents 51,9
 Aaa' Analog 46,59,19,24,22
 Aaa'' Digital 49

 B OTHER THAN ROUND(ANALOG)
 Ba Rectangular form
 Bb Chronographic
 Bc Normal watch
 Bd Unusual forms 10,60,54,11
 Bf Geometric forms 23,41,54
 Baa Gold 57,50,
 Bab Chrome 3,38,
 Bac Diamond studded 12
 Bba Actual chronographic 56,52,
 61,29,28,32,
 Bbb Like chronographic 15,34,29

Bca Gold 19,21,
 Bcb Chrome 14,17,18

 C OTHER THAN ROUND(DIGITAL)
 Ca Gents
 Cb Ladies
 Cc Complicated 42,1,
 Caa Robust 5,8,
 Cab Mild 44,40,7,2
 Cba Soft 43,37,6
 Cbb Hard 26,53,4

- Ab Black plastic
- Material was the criteria for grouping
- Ac Chrome plated
- Material used for plating became the criteria of grouping
- Bd Unusual forms
- Forms normally not seen formed the group
- Bf Geometric forms
- Forms which could not be defined easily came under a general category of geometric forms.
- Cc Complicated
- Number of functions and keys gave a complicated look
- Aab Size of the watches was the criteria of grouping them into gents watches -
- 9, idea of ladies watches is still smaller watches
- Baa Material dominated the grouping
Bab criteria
Bac
- Bbb Like chronographic
- Complicated dials and markings on the dial made them look like chronographic watches.

** Categorization based on material used created a clear division line and hence there were no problem cases.

It is interesting to note that this person is a student of Industrial Design and wants to do further studies in materials and processes.

.....MEHTA

A ANALOG
Aa Chronographic 61,52,56,29,32,39
Ab Round dia shapes
Ac Other than round
Aba Higher grey value 63*,10,27,18,17,
36,22,58,34,16,
Abb Lower grey value 20*,51,21,48,59
19,31,9,20,14,24,46,13
Aca Square 33,3,12
Acb Rectangle 50,57,38
Acc Oval 25,23,35,11,30,54
Acd Others 60,47,41

B DIGITAL
Ba Ana-digital
Bb Two line display 42,2,5,41,1
Bc Digital one line 8,26,40,7,37,
43,53,6,49, 4
Bd Other than digital 45
Baa Round 65,15
Bab Square 55

A ANALOG

Aa Chronographic
 - Group formed because of multi-functional elements.

Aba Higher grey value
 - Grey value of dial was taken into account
 - 63 was a problem case because the dial is split into two areas of black and offwhite
 - According to him the group could not be divided further and was quite comfortable with the group, showed his less sensitivity to colour, form etc.

Abb Lower grey value
 -20, was the problem case because of yellow orange colour
 - Even this group he did not wish to group further

Aca All the groups done only by the
 Acb outer form.
 Acc
 Acd - Form dominated colour or looks etc.

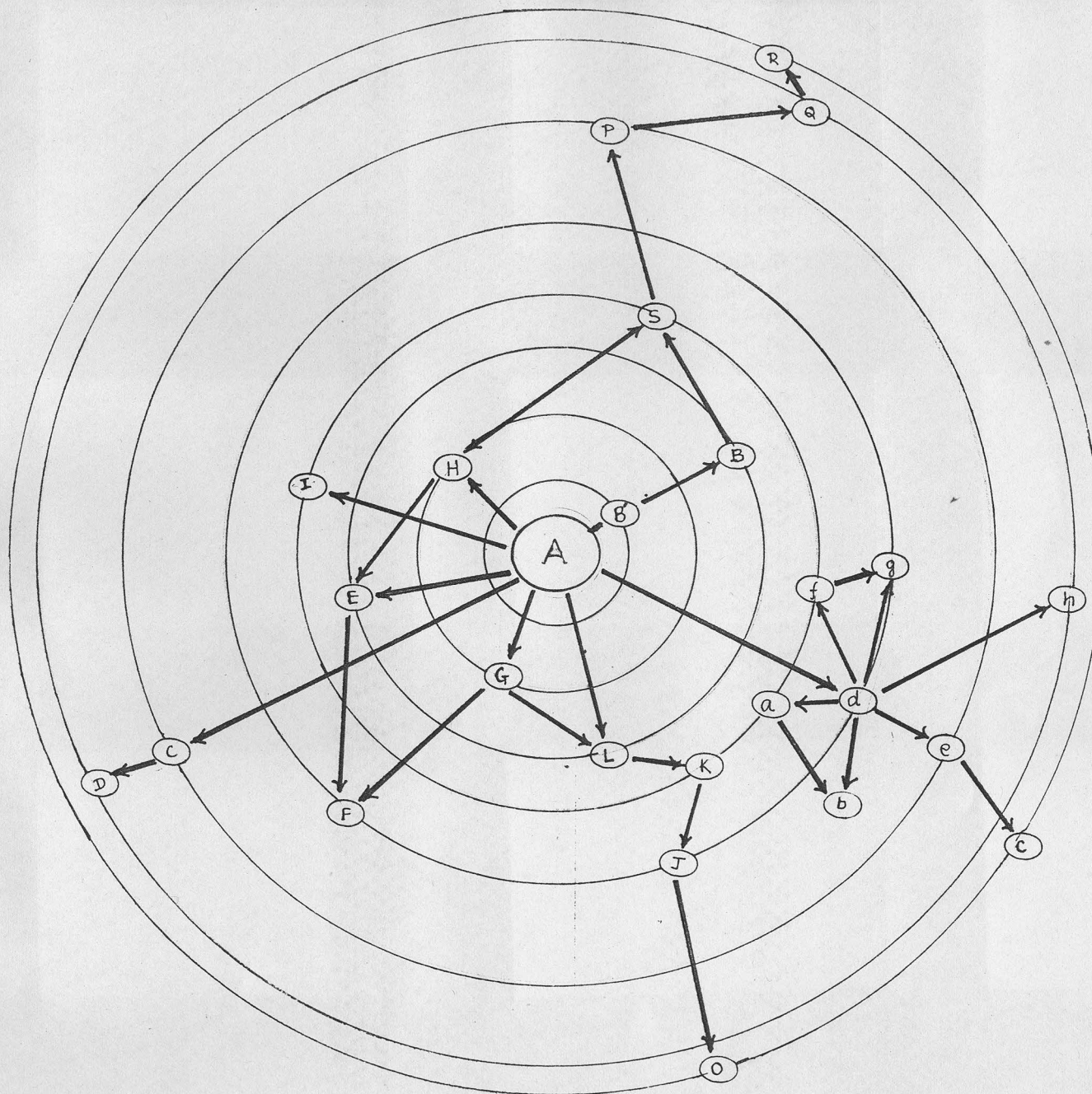
B DIGITAL

Baa Ana-digital
 Bab - Groups were formed purely on the basis of function.

Bb Display was much more important
 Bc and were the criteria for grouping.

Bd Different type of display seperated this watch 45.

** This person, a computer science graduate showed understanding of only structural elements rather than overall looks, colour form etc.



A- 14,18,21,20,
 64,19
 B'- 27 B- 54,10,17,16
 G- 36
 H- 9,24,13,46
 I- 31
 E- 63,51,22
 F- 35,30,25
 L- 41,33,23
 K- 3,50,12
 J- 57,33
 O- 60,11,41
 D- 48
 C- 58,11
 P- 34
 Q- 29,52,59
 R- 32,61,56
 S- 15,65
 d- 44
 f- 27,43
 g- 53,4
 h- 49,6
 a- 1,2,5
 b- 42
 c- 45
 e- 7



A



G



E



B



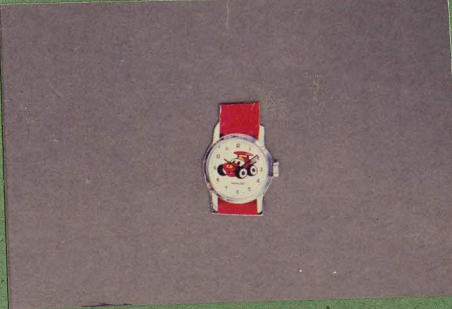
H



F



B'



I



L



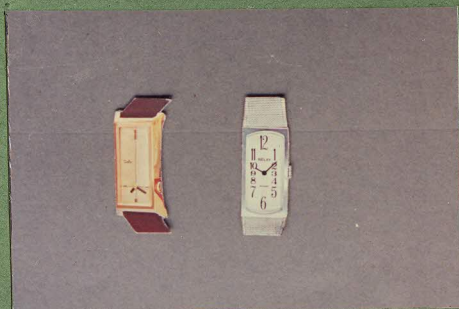
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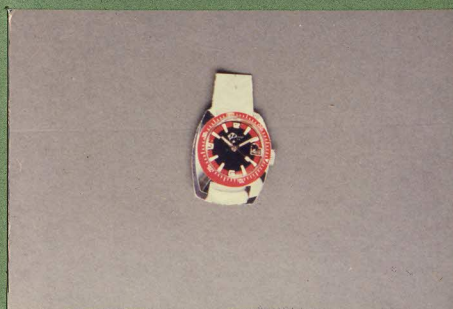
D



R



J



P



S



O



Q



d



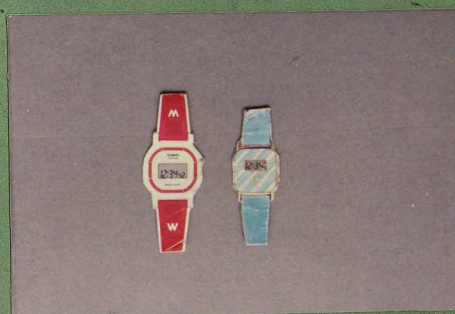
f



a



e



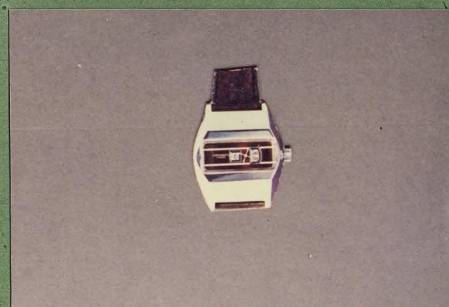
g



b



h



c

A A typical watch group mainly based on frequency of occurrence. It is worth noting that all are gents watches.
 - Similar watch close to it formed a separate group, 27

H Circular watches formed a group closed to it

G Polygonal ~~frame~~ formed the group close to A

E H and A influenced to form an 'ornamental' group

I Formed from A and is a separate group which can develop.

B Developed further from A' to form robust watches.

S Robust and digital

LMN A and G influenced to form watches with polygonal frames

F E and G influenced to form oval group with ornamental look

K Formed by the influence of LMN

J Rectangular elongated frame influenced by LMN and K

O Offset pivot came from J

P Chronographic look developed from S

Q Chronographic watches influenced by P

R Complex chronographic influenced by Q

C Influenced by A

D Influenced by C

d Influenced f, g and e

d~~l~~ Influenced b

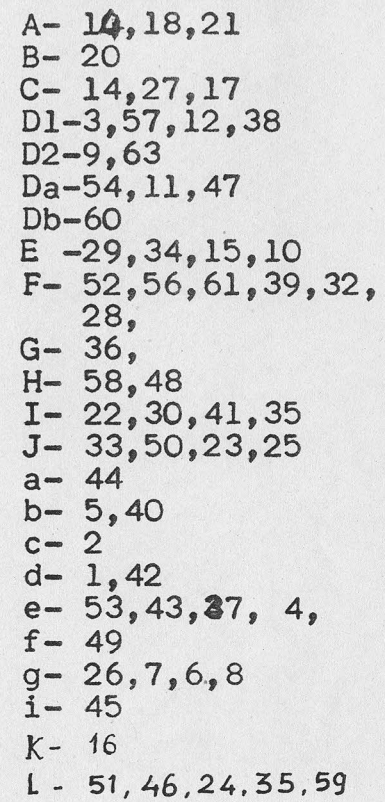
e~~l~~

a Influenced by b and d

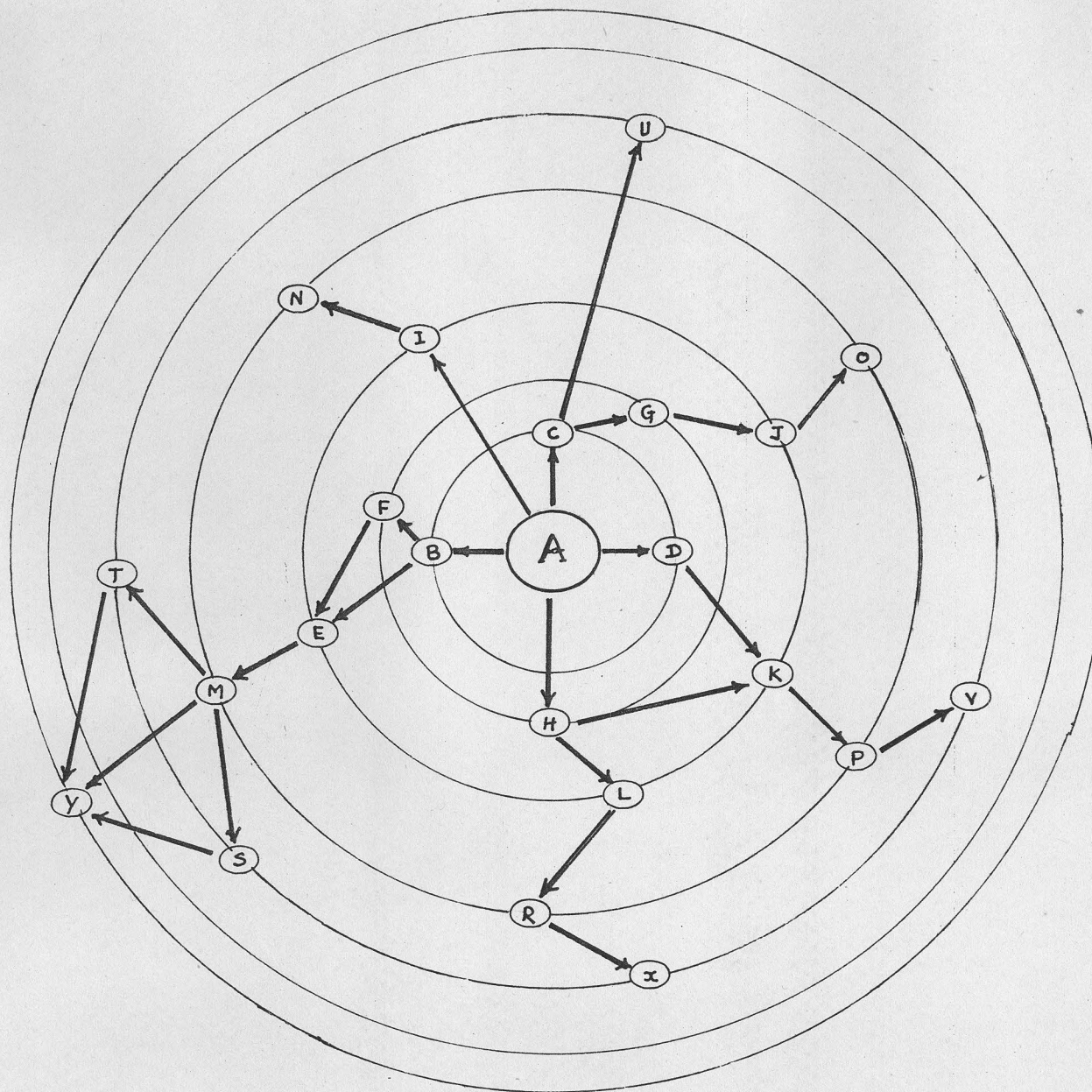
c Influenced by e

** Watches from r and o get related to each other and are called wrist watches because they are linked through the centre.

.....B.K.C.(RADIAL)



L - 51, 46, 24, 35, 59



A- 62,14,64
 B- 20,9
 C- 19,21
 D- 18,21,16
 E- 15
 F- 13,24
 G- 33,41
 H- 27
 I- 22,25,63
 J- 35,30
 K- 45,10
 L- 3,50,12
 M- 46
 N- 23
 O- 58
 P- 29,15,39,38
 Q- 36
 R- 45,60
 S- 59
 T- 57,33
 U- 31
 V- 19,32,56,52
 W- 34
 X- 11,47
 Y- 48

MEHTA

- Arrows show how the influences occurred.
- Because of the shift in the prototypical image simpler watches (circular with numbers) have gone away from the centre.
- Chronographic watches always went away from the centre
- typical watches are almost the same -
- In digital the developed watch became the prototypical image
- influences are as shown and are self explanatory from the diagram .

For all the other radial structures the figure is self explanatory.

- The radial distance shows the influence of the centre tendency (typical group) on the group. More the distance less the influence.
- The arrows shows the direct influence of one group over the other.

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