The object of this note is to clarify the recent history of a frequently published procedure which enables one to solve an intriguing puzzle by means of a graph theoretic technique. Four small cubes of the same size are given, each face having one of four colors. The object is to pile the cubes so that the four different colors are showing on each of the four sides of the pile.

The story started in the 1940's when four Cambridge undergraduates adopted the two pseudonyms of Blanche Descartes and F. de Carteblanche (purportedly Blanche's husband) for the purpose of publishing light and entertaining mathematical notes and poems. The puzzle, attracting considerable attention in Great Britain at that time, was called "The Tantalizer." The more recent "Instant Insanity" puzzle is equivalent, but the four cubes are not colored in the same way.


Incidentally, using standard methods of graphical enumeration [Harary and Palmer 1973], it is not difficult to develop a formula for the number of different "Tantalizer" games with four cubes (or for that matter with any number of them). This can be done by associating a graph with each such game, and then counting such graphs. These graphs $G$ have four points labeled according to the four colors, and twelve lines marked with the numbers 1, 2, 3, and 4 showing which of the four colored cubes have corresponding colors on opposite pairs of faces. Thus both loops and multiple lines can occur: a loop
indicates an opposite pair of faces of a cube having the same
color while multiple lines show that two cubes have the same
pair of colors appearing on opposite faces.

We conclude by describing briefly the method of Leonard
Brooks, Cedric Smith, Arthur Stone, and William Tutte
[Carteblanche 1947]. Using the graph theoretic terminology of
[Harary 1969], let G be the "pseudograph" (in which both loops
and multiple lines are admissible) obtained as above from a
given set of four colored cubes. One then inspects G to find
two line-disjoint 2-factors (spanning regular subgraphs of
degree 2), each of which uses lines marked 1, 2, 3, and 4. Any
two such 2-factors give all the information required to align
the four cubes properly without having to resort to trial and
error. If the four cubes have been fiendishly colored so that
there do not exist such 2-factors, then the puzzle has no
solution.

REFERENCES

Brown, T A 1968 A note on "Instant Insanity" Math. Mag. 41,
167-169
Busacker, R G & Saaty, T L 1965 Finite Graphs and Networks
New York (McGraw-Hill)
Carteblanche, F de 1947 The coloured cubes problem Eureka (9),
9-11
Grecos, A P & Gibberd, R W 1971 A diagrammatic solution to
"Instant Insanity" problem Math. Mag. 44, 119-124
Harary, F 1969 Graph Theory Reading, Mass. (Addison-Wesley)
(Academic Press)
Schwartz, B L 1970 An improved solution to "Instant Insanity"
Math. Mag. 43, 20-23
Van Deventer, J 1969 Graph theory and "Instant Insanity"
The Many Facets of Graph Theory (G. Chartrand and S. Kapoor,
eds.) Berlin(Springer) 283-286