Next to me, a waterwheel—an example of rotational symmetry—many years ago in Budapest (photograph by Istvan Hargittai).

Symmetry and Perception: Logos of Point-Groups Induce the Feeling of Motion[a]

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In addition to being aesthetically pleasing, the symmetric design of decorations can induce the feeling of motion or the feeling of stopping motion (see the References). Polar one-dimensional space-group border decorations (frieze patterns) can direct the movement of people in underpasses or airline terminals. Two-dimensional space-group patterns of rotational symmetry only have been suggested for decorating dance halls; those containing symmetry planes have been suggested for decorating the sites of serious meetings. Glide-reflection may induce the feeling of confusion.

In this article we suggest that point-groups also have the capability of inducing a feeling of motion, and that certain symmetries in company logos may be better suited to convey the essence of company activities than others.

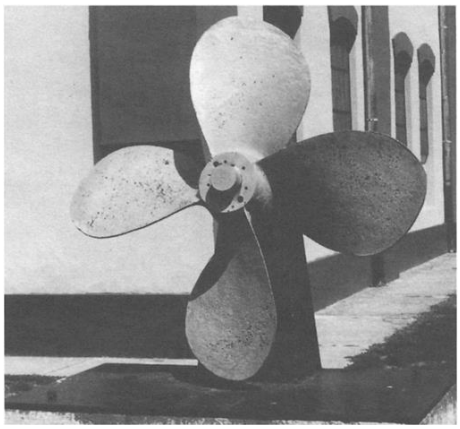

Figure 1. Four-bladed propeller displayed in front of the Budapest Technical Museum. (All photographs in this article are by the authors.)

First, let us consider a four-bladed propeller (Figure 1). It has four-fold rotational symmetry and no symmetry plane. Having rotational symmetry only corresponds to its function, as do the rotational symmetries of other rotating parts in machinery, such as propellers, turbine wheels, windmills, or children's pinwheels.

Logos themselves do not rotate physically, but they may best convey the essence of the company's activities if their symmetries induce consistent feelings in observers. Thus a railway company, or travel companies in general, may be best represented by a logo with rotational symmetry only, and even more specifically, by two-fold rotational symmetry. There is always motion, and the motion is back and forth: the train is taking you there and bringing you back, again and again. Our sampler of examples in Figure 2

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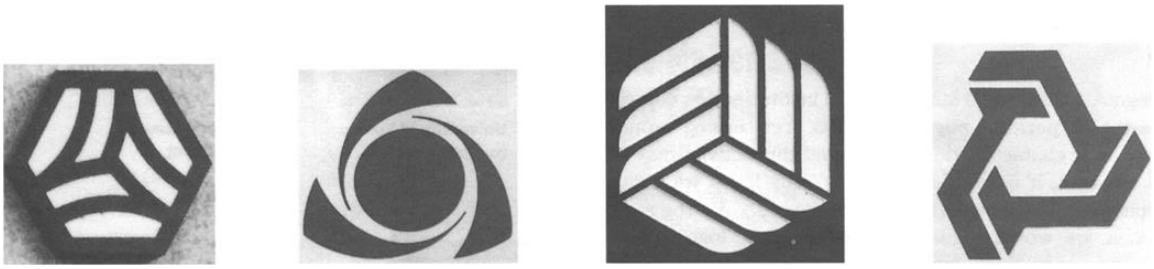
includes logos of railway companies and other transportation companies, such as subways, tourist bureaus, bus companies, and expediters.

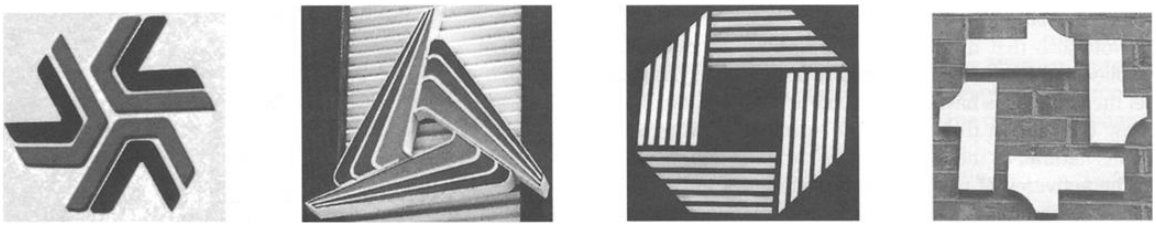
Figure 2. Sampler of logos of transportation companies (all of two-fold rotational symmetry)

Of course, we are not suggesting that a transportation company with a logo containing mirror planes would perform its function any worse. We are suggesting,

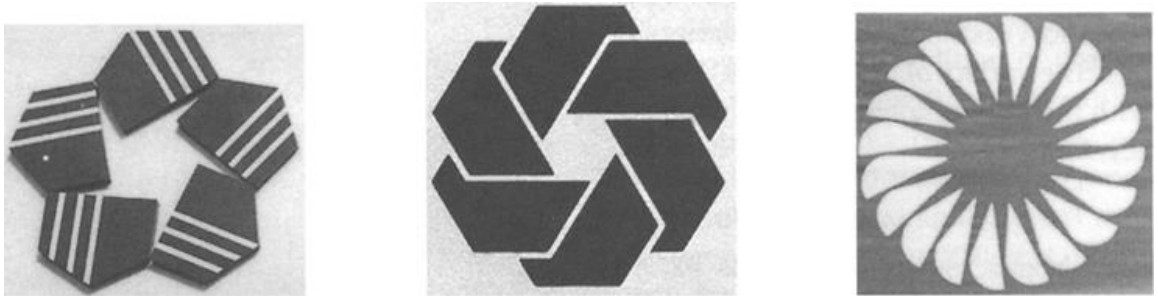
though, that a logo of only rotational symmetry conveys the essence of transportation companies better than a logo with mirror planes.



Osterreichische Verkehrakreditbank (Linz, Austria), Bank in Stockholm, Banco Mello (Portugal) American Service Bank



Banca Popolare di Ancona (Rome), Sicilcassa (Palermo, Italy), Chase Manhattan Bank, and a bank in Illinois



Korea Housing Bank (Seoul), Bank in Tokyo, and Frost Bank (Austin, Texas)

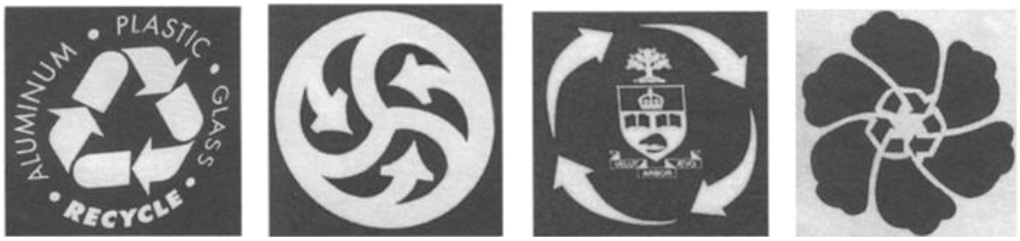
Figure 3. Sampler of bank logos

Banks very frequently have logos of rotational symmetry only and no symmetry planes. A sampler of examples is shown in Figure 3. Here the abstraction is of even higher degree, as banks and other financial institutions do not represent or perform physical motion. Yet turning around money is characteristic of them, and this activity may be the reason, if only subconsciously, why logos with rotational symmetry come to them so naturally. By the same token, we would suggest mirror-symmetric logos for insurance companies, health care services, retirement systems, and any other organizations where mobility is less desirable. We are not suggesting any rigorous correspondence between the symmetries of logos and the activities of the companies they represent, but there seems to be some correlation.

Note also that the logos of transportation companies, displayed in Figure 2, are invariably of two-fold symmetry, yet the bank logos have no such characteristic number

and show diversity in their rotational symmetries. This again seems natural, as there is a definite two-way directionality in the activities of transportation companies but a multiplicity of possibilities in directionality of bank activities.

Reynolds Aluminum Recycling and Bottles recycling (Italy)



Recycling (Washington, DC), New Hampshire recycling, University of Toronto recycling, Recycle Hawaii

Figure 4. Sampler of recycling logos

Our third and final category is recycling logos. They are, again, of only rotational symmetry, in keeping with the process of recycling--that is, turning around the wastes and producing new materials. Although three-fold rotational symmetry is the most common, there is a variety in rotational symmetries. The variety of design is less than for banks, in keeping with the international and less competitive character of recycling.

References

1. A.V. Shubnikov and V.A. Koptsik, *Symmetry in Science and Art,* Plenum Press, New York (1974). [Russian original: *Simmetriya v nauke i iskusstve,* Nauka, Moscow (1972)].
2. I. Hargittai and M. Hargittai, *Symmetry: A Unifying Concept,* Shelter Publications, Bolinas, California (1994).
3. I. Hargittai and M. Hargittai, *Symmetry through the Eyes of a Chemist,* Second Edition, Plenum Press, New York (1995). [Latest edition: M. Hargittai and I. Hargittai, *Symmetry through the Eyes of a Chemist,* 3rd Edition, Springer (2009 and 2010)]