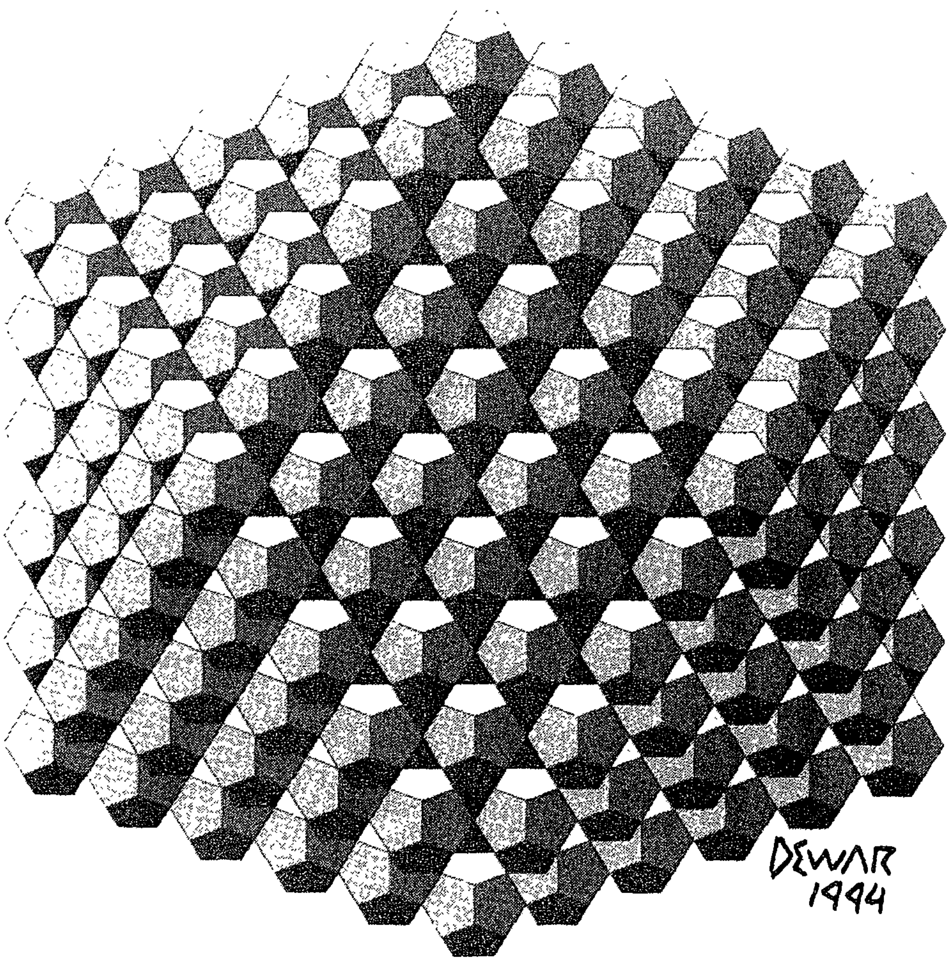
Symmetry: Culture and Science

Symmetry: Natural and Artificial, 3

The Quarterly of the
International Society for the
Interdisciplinary Study of Symmetry
(ISIS-Symmetry)

Editors:
György Darvas and Dénes Nagy

Volume 6, Number 3, 1995



Third Interdisciplinary Symmetry Congress and Exhibition
Washington, D.C., U.S.A. August 14 - 20, 1995

ANALYSIS OF "REVERSALS" IN THE CUNNINGHAM DANCE TECHNIQUE. ISSUES CONCERNING THE PERCEPTION OF SYMMETRY IN DANCE.

Robert A. Wechsler
Artistic Director, Palindrome Dance Company
Johannisstr. 42, 90419 Nürnberg, Germany
E-mail: R.Wechsler@rzmail.uni-erlangen.de

This lecture (with movement demonstrations) uses the International Symmetry Notation system (ISN) to present an empirical explanation of reversals as they occur in Merce Cunningham's dances and teaching. While not limited to his technique, reversals are used more often and more systematically in Cunningham's technique than other major dance systems. The use of reversals is not an artificial contrivance, but rather it reflects the eye's natural tendencies in symmetry-perception of the human form. Despite their inherently inexact nature, Cunningham's use of reversals demonstrates the subtle yet profound role of higher-order symmetries in dance.

1. Reversal vs. Reflection

The term "reversal" has two meanings in dance. It has the general definition of describing a movement or position that is in some way turned around, so that we see it again: altered in some systematic way. Used this way, "reversal" may describe a variety of different symmetry operations, in time or space, performed by a single dancer, or by a group of dancers.

In advanced Cunningham technique classes, and to a lesser extent in ballet classes, "reversal" is also used in a more specific context. While I have met many dancers adept at *reversing* (I will italicize the word when using it in its "specific" context) movements, very few could explain this phenomenon in a systematic way. Yet the concept of *reversing* a movement seems to be intuitively well-understood by many dancers.

A *reversal* is not the same as creating a mirror-image movement. Dancers call this doing it on *the other side*. To understand *reversals* we must first be clear on what is meant by *the other side*.

Every object in the universe can be represented in two forms or parities: The original and its mirror image. Because the human body has an inherent accurate symmetry along the sagittal plane, we can easily simulate our own parity. Thus, any human movement or position can be represented in two essentially equivalent forms -- a mirror is all that is needed to convert one into the other.

There are, however, other less exact ways in which the body can simulate its own parity. Instead of taking advantage of the similarities that exist through the body's sagittal plane (ie. between the two sides of the body: right and left), a dancer can accomplish a similar effect by exploiting the similarities through the body's frontal plane (ie. front and back).

To understand this, imagine a figure standing in a darkened room. In silhouette, it is difficult to tell whether the figure is facing towards us or away from us. Because it is a dancer with good turn-out, seeing the feet is of little help since they face directly outward. Even with the knees bent we still cannot tell which way the figure is facing since the knees, too, point directly to the side -- as they would no matter which way the figure were facing. The front and back of the human body, then, can be said to have an approximate mirror symmetry along the body's frontal plane. It is exactly this similarity which is exploited in reversals. A *reversal*, then, involves the same symmetry operation as doing *the other side*: both are emulated reflections*. The difference lies in how this emulated reflection is achieved. When doing a position on *the other side*, we imagine its mirror-image, then fill-in this form substituting one side of our body with the other. In a *reversal* we do this substitution by climbing into the image facing the other way.

Don't be confused by the question of where the imaginary mirror is located. This might at first appear to be the principle difference between the two. It is not. This imaginary mirror is indeed located differently in the two cases, but this is purely a matter of classroom convention and has no bearing on the symmetry itself. (This issue is discussed in the next section).

In practice, one quickly finds that certain positions are impossible to reflect accurately in this way. Neither the arms nor the legs, for example, move as freely to the back as to the front. Yet -- and this is the key -- in our perception, there is enough similarity that the eye generally has no problem making the association: we see at once that the movement is somehow the same, and yet is somehow "reversed".

That we as audience, or indeed as dancers, may have no clear understanding of how *reversals* function is of little consequence. In practice, as with other structural choreographic devises, the fact that our eyes (and muscles) respond to them, that we recognize them intuitively, is enough to give the artist a handle on their use.

In normal daily life, such secondary symmetries are rarely used. To undo a task which we have accomplished with forward motion, we rarely reverse our movements. Instead, we turn around and create a new set of forward-going motions that have the end effect of cancelling our accomplishment. In certain sports where it is difficult to turn around (like skiing and rock climbing) one is challenged to think symmetrically in this way. In dance, there are obviously other concerns beyond the perfunctory.

2. Rules of Reversal

Practically the only way to understand *reversals* is to try them out. Make a shape and try to reverse it. If you are not used to doing it, you will probably have trouble. If you now try to *reverse* the twists and turns of the body in motion, "trouble" gives way to bafflement. Useful, is a set of rules to convert any position or movement to its *reverse*:

1. The same leg will be in the air (the "working" leg stays the same).

----

* - On reflections as emulations vs. simulations: One could debate the use of the word emulate ("to try to equal or surpass"), as opposed to simulate ("to give a false appearance of, to fake"). In the mathematical sense, we can at best only attempt (unsuccessfully) to make a mirror image of our movements or positions (ie. such attempts are "simulations"). But as dancers, this is not really our intent. In class we generally try to do each side better than the other, as it were. Our "other sides", or reversals, are not "fake" versions of the original in any way. Thus, in reference to dance, the term "emulate" would seem appropriate.

2. Every step or leg movement to the front goes to the back, and vice-versa.

3. Turns en dédant change to en déhors, and vice-versa. Turns to the right change to the left, and vice-versa.

4. Torso curves become arches and vice-versa.

5. Torso twists reverse direction, but tilts stay the same.

6. Arms, in theory, should follow the example of legs (ie. rules 1 and 2). In practice, however, because they can be so extremely awkward when combined with *reversed* legs, arms are often simply done on the *other side*.

For dance students, there remains the potentially confusing question of facings. This, and our location in the room, are the factors determined by where we locate our imaginary mirror. When a phrase is done on *the other side*, the imaginary mirror is always placed so that it runs in a downstage direction (perpendicular to the downstage wall) and through the dancer. (Note: this is not the same as saying that the mirror divides the dancer down the middle of his body -- through his sagittal plane. It does not. If it did, a phrase that began facing diagonally downstage right, would not be changed to face downstage left, which it always is). Facings of *reversals* are similar. The mirror is still located to run through the body, but it is now imagined as running parallel to the downstage wall. (If the studio has a mirror, ignore it! It will only add to the confusion.)

3. Symmetry-order Expansion

Let us now consider the similarities between the upper and lower body, that is, between "top" and "bottom". Another plane of approximate symmetry arises, this time along the body's horizontal plane. In this case we must imagine the arms as symmetrical to the legs (ignoring, for example, the head). We can easily sense this symmetry when a figure stands with arms and legs both extended at a similar angle from the body. Many of the classical ballet arm-leg combinations exploit this phenomenon. Another example of its use would be to reflect pliés into relevés and vise-versa. Horizontal plane reversals are necessarily more abstract than frontal plane reversals, which in turn are more abstract than sagittal plane reversals.

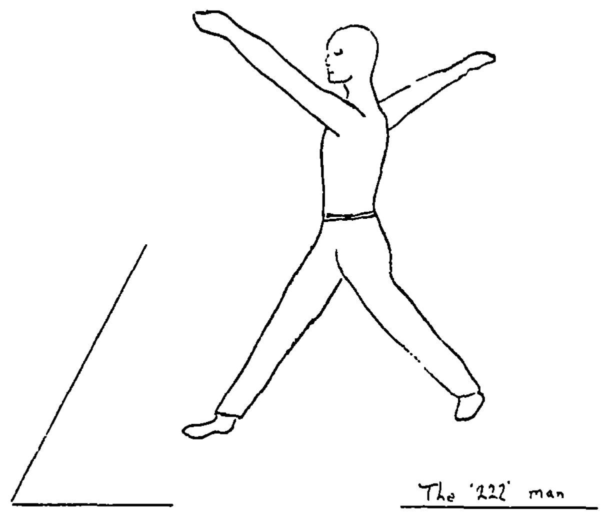
This kind of "symmetry expansion" -- the perception of the human form as an object of higher symmetry-order -- can be logically plotted. At rest, the body has a symmetry (in International Symmetry Notation) of ***1m***, the symmetry of an isosceles triangle-base pyramid. That is, the top is different from the bottom, the front different from the back, and the 2 sides are equivalent. In a system allowing front/back reversal (eg. Cunningham's *reversals*), the symmetry of the form is increased to ***2mm*** (that of a rectangular-base pyramid). Next, allowing top/bottom reflections we arrive at a symmetry of ***2/m 2/m 2/m***. In some positions of the body we can even sense front/side symmetries, a yet higher symmetry: ***4/m 2/m 2/m***. Carrying this extrapolation to its logical conclusion, we must imagine the human form as cube (***4/m /3 2/m***) and, finally the form with the highest symmetry, a sphere (∞/∞).

The symmetry operation known as rotation also plays an important role in our perception of the human form. In choreography, rotations involving groups of dancers are common around the z-axis. This is particularly true in the work of choreographers, like Cunningham, who do not hesitate to place dancers to facing in directions other than downstage.

In Cunningham's "Pictures" (1984) a repeating motif in the work is the human form with a symmetry of *222* (one 2-fold rotation is possible in each of the body's planes -- sagittal, vertical and horizontal -- yet the form allows no reflections. See figure 1.) We can sense the 2-fold rotational symmetry around the z-axis, and since the arms and legs are carefully placed to extend in equivalent diagonals, we can easily see that 2-fold rotations are possible around the x and y axes as well.

These and many other higher-order symmetries require us to think 3-dimensionally -- imagining symmetry operations that can only be demonstrated accurately in zero gravity. When we see the *222* figure in Cunningham's dance, are we drawn to mentally rotate the dancer around each of 3 perpendicular axes? No. Can we sense such a complicated symmetry? Do we, for example, experience *222* in a dance, differently than *2/m 2/m 2/m*? Certainly. When we use vague and ambiguous terms like "line" and "balance" in describing dance, we are in fact groping for a language to express our intuitive perception of such higher-order symmetries. Again, our perception of symmetry in the human form is so acute, that even as it appears in inaccurate and complex forms, it plays an important role in how dance is perceived.

Figure 1:



BIBLIOGRAPHY

Cunningham, M., "Cunningham Dance Technique: Intermediate Level" (video), Cunningham Dance Foundation, New York, 1987

Wechsler, R., "Symmetry in Dance", *Contact Quarterly*, Northhampton, MA, Fall 1990