Making a Black Pot Red:
The Vaiśeṣika Theory of the *Pīlupāka*

translated by Gary A. Tubb

September 1992

Introduction:

Although the two schools of Vaiśeṣika and Nyāya are generally viewed as having merged to form a single system, there are said to be three points of difference between the two that survive to this day. Each point involves the analysis of situations in which certain qualities appear to be produced in substances that did not possess them previously. The Vaiśeṣika school specializes in meticulous explanations of physical events, and on each of the points in question an unreconstructed Vaiśeṣika philosopher will hold to a complex and peculiar theory, rejected by the followers of the Nyāya school in favor of a more commonsense approach, and ridiculed by all other schools of Indian philosophy.

The most notorious of the three points is the problem of how it happens that new qualities may be produced in earthy substances when they are exposed to heat. Although four types of qualities are said to be produced through heating—color, taste, aroma, and feel—the standard examination of the problem focuses on the change of color that occurs when a clay pot is fired in the kiln. A black pot goes in and a red one comes out; the Nyāya school (in what is called the *piṭhara-pāka-vāda*, "doctrine of the heating of the pot") maintains simply that the heat changes the color of the pot from black to red by penetrating down to the level of the molecules, while the Vaiśeṣika (in what is called the *pīlu-pāka-vāda*, "doctrine of the heating of the atoms") insists, for reasons offered below, that the heat dismantles the black pot into its constituent atoms, destroys the black color of those atoms, and produces red color in them, after which the newly red atoms are recombined to form a red pot of the same shape as the previous black one. The passage translated below is a famous presentation of this strange theory, culminating in the Vaiśeṣikas' trademark procedure of counting, moment by moment, the precise number of steps required in a scrupulous account of every detail of causation involved in the problem at hand.

In this case the counting of moments is complicated by considerations involving the second of the three points of difference, the problem of the ways in which disjunction between substances can come about. For both the Nyāya school and the Vaiśeṣika school, the term "disjunction" (*vibhāga*) refers to the state of being spatially separated, which is analyzed as a quality, rather than to the act of becoming separated, which is analyzed as a motion. Neither should be confused with the destruction of contact between substances, which is analyzed as yet another event. It is characteristic of the painstaking linear approach of the Vaiśeṣikas that each of these three is given a step of its own in the causal sequence, so that the motion which removes one substance from another is the cause of the subsequent disjunction between them, which in turn is the cause of the subsequent destruction of the contact between them, which in turn paves the way for a fourth event (and thus a fourth moment in the sequence), that of the contact of the substance with a new location.

This much is accepted by the Nyāya school as well, and both schools can agree that when a person withdraws a hand that had been leaning against a tree, the motion of the hand is the cause of the hand's subsequent state of disjunction from the tree. But what about the disjunction of the person's body from the tree? The Nyāya school is content to say that this is caused by the same motion (although in its "New" version, armed with a metalanguage of limitors and describers, the school returns to the problem of whole and part that is involved here), while the Vaiśeṣikas consider this too simple, since the motion of a part is not the motion of the whole, as a turning wheel demonstrates. They insist that in such circumstances one disjunction (e.g., body from tree) may have to be viewed as caused by another disjunction (e.g., hand from tree).

The third point of disagreement between the two schools is not directly referred to in the passage translated here, and involves the problem of how the quality of number arises in a substance. Both schools recognize that the fact of an object's being part of a group of two objects or part of a group of three objects is associated with an enumerating cognition on the part of an observer. The Nyāya school says that this cognition serves to manifest a number already present, while the Vaiśeṣika school insists that the enumerating cognition actually brings into being the quality of number in the substances so enumerated. At first glance the Vaiśeṣika view may seem the simpler, but the element of causation leads to greater complexity on the level of counting the individual moments required.

The passage translated below is from a particularly skillful treatise on the views of the Vaiśeṣika school, the *Kiraṇāvalī* of Udayana (11th century). For all its originality, this text is formally a commentary on another very original work, the *Padārthadharmasaṅgraha* or *Praśastapādabhāṣya* of Praśastapāda (5th century), which in turn is ostensibly a commentary on the Vaiśeṣika Sūtras themselves. I have translated from the Sanskrit text as edited by Jitendra S. Jetly in *Praśastapādābhāṣyam: With the Commentary "Kiraṇāvalī" of Udayanācārya*, Gaekwad's Oriental Series, No. 154 (Baroda: Oriental Institute, 1971), pp. 121–124 (= section 128 in Praśastapāda).

In reading the passage, keep in mind that what is meant by the destruction of a molecule is not the obliteration of its matter but the dismantling of its parts, and that what is meant by disjunction is not the process of separating substances but the state of their separation.

[Praśastapāda's *Bhāṣya*, section 218:]

And the cessation and arising of color, etc., cannot take place in a composite substance, because (a composite substance) is not pervaded by heat in all its parts, both inside and out. Nor can pervasion occur by penetrating to the atoms, because of the (resulting) destruction of the composite substance.

[Udayana's commentary on this in the *Kiraṇāvalī*:]

Now what harm would there be if (we were to suppose that) the cessation of the previous color, etc., and the arising of the subsequent color, etc., were to take place in the composite substance itself? (In response) to this he offers this refutation: **"And the cessation and arising of color, etc., cannot take place in a composite substance."** Why not? (you might ask). Hence he says, **"Because it is not pervaded by heat in all its parts, both inside and out."** What he means is that there would be no heating (of the entire substance) because, even if the heat reached the substance as a whole, it could not reach to the innermost parts because of obstruction by the outer parts. (But, you might say,) composite substances do have intervals (between their parts, through which the heat might penetrate), or else how could the water in the middle (of a pot on the fire) show agitation and motion? So there is nothing to rule out penetration (of the heat) to the atoms. Hence he says, **"Nor can pervasion occur by penetrating to the atoms."** Why? **"Because of the (resulting) destruction of the composite substance."**

The idea is this. Since heat is such a light thing its velocity and its impact are so great that the motion it produces knocks out of place the previous arrangement of a composite substance and brings its parts into a different arrangement. Otherwise how could such (composite substances) as milk and water swell up when they are boiled, once the heat has penetrated into the intervals (between their parts)? If (you reply that) this is because of the weak contact (between the parts in such fluids), (we say) no, because the same (swelling) is observed in (firmer and more compact substances) such as rice grains as well. And because even the hardest (substances), such as gems and diamonds, explode when heated. If (you reply that) this is because of the intensity of the contact with heat, (we say) what does "intensity" mean? If (your answer is that it means) being repeated many times, (we say) no, because if the preliminary (application of heat) is not effective, what use is repeated application? (It is of no use,) because there can be no accumulation on the part of sequential items that are momentary by nature. Therefore we view it as reasonable to suppose that just as in the body (of a human being), for example, a change that is not noticed day by day may be perceived as obvious after the interval of some time, so also in something like the heating of a pot (a gross change may occur through minute events not noticed in themselves). This refutes the notion that the destruction of the previous substance is proven through certain facts: that we recognize (the pot as being the same as before), that we see it (abiding) in all the stages (of its being fired), that other objects of clay placed above it (when the items to be fired are stacked in the kiln) are held up (rather than crashing down because the supporting pot is destroyed), and that there is no change in such (characteristics) as its external shape, its number, its size, and the lines, scratches, or other identifying marks upon it. (The notion is refuted) because it is possible (for there to be a new pot even though in most respects it seems to be the same pot as before), just as, for example, a pot that has had three or four tiny particles scraped away by being pierced with a needle (is no longer the same pot as before). In spite of this the Mīmāṃsakas are impudent enough to claim that (substances) such as a pot are never really destroyed at all. They deserve our pity. For once the atoms have ceased to exist the molecules must necessary be destroyed; otherwise it would follow that effects would be permanent. And upon their destruction the tiny particles (made up of molecules) would necessarily be destroyed, and upon their destruction, their effects (would be destroyed), and so on by this same sequence down to the general destruction of the end products; because otherwise it would follow that effects persist even after they have lost their substratum. Even if a few of the parts are destroyed, (you might argue,) the remaining parts could provide a substratum for the effect. They could not, (we reply,) because a substance that possesses a size capable of being filled out by a given number of parts simply will not fit within a reduced number (of parts). If (you propose that) there will be a shrinking in size, as in a cloth that is folded up, (we reply that) there could not be; for (in the case of a cloth before and after folding) there is no difference between the two, since the lack of difference is a property of the substance. (This is so) because no destruction (of the previous size without the destruction of the underlying substance is possible), since the size abides as long as the substance exists, and can be destroyed only when the underlying substance is destroyed. If (you propose) that it will also be subject to destruction upon the removal or destruction of some parts of its substratum, (we say) no, because it is wishful thinking to suppose that upon the removal or destruction of parts the whole will not be destroyed but its size will be destroyed. If (you insist on your theory) because of our recognizing the whole (as being the same as before), then why is it that we cannot recognize its size (as being the same as before) when only a few tiny parts have been removed? But enough of this torment.

Now, students will wish to know how many moments it takes, starting with the destruction of the molecules (of the old pot), for (the new) molecules to be produced and to come to possess color. In order to clarify the mind of students, the sequence involved is (summarized) as follows:

1. Through a sequence beginning with the impulse (i.e., the contact with heat, which generates motion within the pot, which in turn causes the separation of its constituent parts), there is the destruction of the molecule.

2. Once the molecule is destroyed, (the original color,) e.g., black, ceases to exist in the atom, through contact with heat.

3. Once (the color) black, etc., has ceased to exist (in the atom), there arises, through yet another contact with heat, (the new color,) e.g., red (in the atom).

4. Once (the color) such as red has arisen, then because of the contact of the atom with souls, in which the unseen power (of fate inheres, by which those souls are destined to experience in the future the new pot that is about to be formed), there arises in the atoms a motion conducive to the assembling of a (new) molecule.

5. By this motion (is produced) disjunction (of the atoms) from their previous locations.
6. And by this disjunction (is produced) the destruction of the contact (of the atoms) with their previous locations.
7. Once this has been destroyed, there arises the contact (of each atom) with another atom.
8. From the conjoined atoms there is the construction of a molecule.
9. In the constructed molecule there is the arising of qualities, such as the colors, as effects of the qualities of the (atoms which are the material) cause (of the molecule).

Thus there are nine moments in the sequence.

The sequence as given above is in accordance with the view that both *(a)* the disjunction that destroys the contact (between parts) that constructs the (composite) substance and *(b)* the disjunction that does not destroy (the constructing contact, viz., the disjunction of a part from its previous location in space rather than from its contact with another part) are caused by (a single) motion. On the view that the disjunction (caused by the motion) causes the destruction of the previous contact (of part with part), and thereupon arise both the destruction of the (composite) substance and a disjunction (of the parts from their previous location in space) caused (not by the original motion but) by (the first) disjunction, there will be (not nine but) ten moments, as follows:

1. The destruction of the molecule (as in the sequence above), and the arising of a disjunction caused by disjunction (i.e., a disjunction of the atoms from their previous places in space, caused by the previous disjunction of the atoms from each other, which was the cause of the destruction of the contact between the atoms and thus of the molecule).
2. The destruction of the prior contact (of the atoms with their original locations in space), and the cessation of such (qualities) as (the color) black (in the atoms).
3. The subsequent contact (of the atoms with their new locations in space), and the arising (of the new qualities) such as (the color) red.

4. The cessation of the disjunction caused by the disjunction and of the motion.
5. The (new) motion in the atoms, which will cause the construction of the (new composite) substance.
6. Disjunction (of the atoms from their intermediate location in space), caused by the motion.
7. Cessation of the contact (of the atoms from their intermediate location in space), caused by that (disjunction).
8. Contact (of the atoms) with other atoms.
9. The arising (of a new composite) substance (viz., the molecule).
10. The arising of the quality (i.e., the color, in the molecule).

However, on the view that subsequent to the destruction of the (composite) substance (viz., the molecule) there will be the disjunction caused by disjunction and the cessation of the black color, and subsequent to that the cessation of the previous contact and the arising of the red color, and subsequent to that the arising of the subsequent contact, and subsequent to that the cessation of the disjunction caused by disjunction and of the motion, and subsequent to that the motion in the atoms that will cause the construction of the substance, there will be (not nine or ten but) eleven moments, as follows: ...

[Udayana discusses other possible sequences and then concludes the section with the following remark:]

And so what we learn from all of this is that the special qualities of a composite (substance) last as long as the substance lasts, and that they can be produced by heating only at the level of atoms. This should be viewed as logical support for the same points that I made in discussing the soul: that (qualities of the soul) such as pleasure cannot belong to the body (which is a composite substance), because they do not last as long as it lasts, nor can they belong to (the mind, which is) an atomic thing, because they are perceptible.