

MODELS AND MODELLING: SCULPTURING BALINESE IDEOLOGY

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Lord Shri Krishna said:... 'However men try to worship Me, so I do welcome them. By whatever path they travel, it leads to Me at last.'

The Bhagavad-Geetā: The Dnyāna-Yōga

I

'IDEOLOGY' in the present title refers to ideas and values in social action, not to the delusions of nor deceptions perpetrated upon social classes, however defined. 'Balinese' refers to the Balinese of western Lombok unless otherwise indicated.¹

In what follows, mention is made of 'social facts'. By this expression is meant 'what we think we may know about aspects of a form of life'. No commitment is here made to a particular epistemology. The phrase is most closely associated with Durkheim, of course, and it has been the focus of different kinds of investigation. I understand that hardly anyone, least of all among sociologists, gives the expression much attention any more. I gather that this attitude stems at

The present study was written in August 1989 to be read to a joint meeting of the Scottish Branch of the RAI and the Traditional Cosmology Society in January 1990 at the University of Edinburgh, where I was the holder of the 1989/1990 Cosmos Fellowship. I am grateful to Dr Emily Lyle and Dr Charles Jedrej for their invitation. At the time of writing, I had limited access to my papers and books.

1. I lived in Pagutan, western Lombok, for about 21 months between 1979 and 1981. For about half this time I was the guest of Ida Pedanda Gdé Madé Karang (a Brahmana 'priest') of the Gria Taman; for the other half I lived in the Sudra (non-'caste') village (*kaklianan*) of Baturujung.

least in part from the claim that in *Suicide* Durkheim did not manage to isolate any social facts, though he thought he had. First, of course, the cogency of the claim depends upon how 'social fact' is defined. Then it is enough to point out how Durkheim's essay *Primitive Classification* (Durkheim and Mauss 1903), written with his nephew Mauss, has been shown to be hopelessly flawed, logically and evidentially (Needham 1963). Yet the essay was an inspiration to early writers this century, mainly Dutch, about Indonesia (then the Netherlands East Indies) and elsewhere; and if the essay did not give rise to the mode of analysis that has proved (mainly because of its wide purview) to result in singularly enlightening findings, it underlies it. It does so, not because Durkheim and Mauss achieved what they set out to demonstrate, but because they did not achieve the integrated or holistic account that they sought: the ambition to achieve such holism remained and, in the case of the Balinese at least (a people not mentioned in the essay), remains. The ambition was and is fostered by the metaphysics (Bal. *sarva-surya*) and the theology (Bal. *sarva-tattva*) of, or by the social facts that constitute other aspects of, what are now politically speaking Indonesian forms of life.

One of the ways in which this goal has been approached is through relations. Such constants (as they are conventionally called) as symmetry and asymmetry, and others alluded to below, are social facts. They are also abstractions that only with great difficulty can (if at all) be concatenated one with another, but which can be put together physically. Here the relations that obtain among the relations are clearly a central concern. The articulation of the relations and the relations among them is one form of model-building.

II

Models can, of course, take many forms. Models of all kinds may be and often are constructed as part of mechanical, technological, or ideational production processes; and different modes of representation may be and are employed to express the same material. Interesting examples of this usage are Hanihara's (1989: 100, figures 2 and 3).² Another most interesting representational device is N. J. Allen's employment of 'the image of a kernmantel rope seen from the side as it runs down the page' (Allen 1989: 49ff.; see Fig. 2 below). Various comments could be made about these models; Hanihara's being fairly standard statistical representations like the dendrogram (see Fig. 1), Allen's deriving from rock climbing. Note, though, that these models are imposed on the data they are to explicate. A model based on a 'distance matrix transformed from Q-mode correlation coefficients' clearly does not derive from the daily lives (nor from the

2. Reproduced here as Figures 1a and 1b.

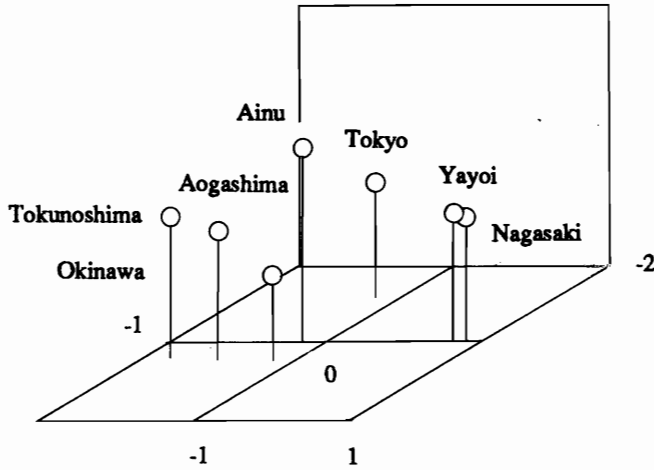


FIG. 1a. Three-dimensional expression from multi-dimensional scaling. Based on the distance matrix transformed from Q-mode correlation coefficients (after Hanihara 1989: 100, fig. 2)

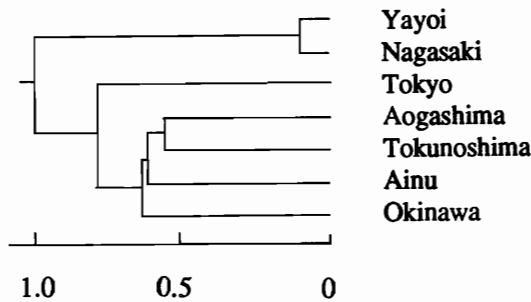


FIG. 1b. Dendrogram drawn from the same matrix (after Hanihara 1989: 100, fig. 3)

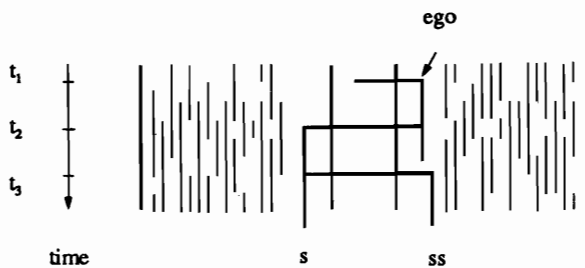


FIG. 2. A manipulation of the image of the kernmantel rope (after Allen 1989: 50, fig. 2)

ideas that inform them) of the seven peoples whose dental measurements Hanihara is comparing. Nor does the kernmantel rope, nor the double helix model also employed by Allen, derive from the archaic society that the images are intended to help us envisage.

Doubtless these images are adequate to the tasks these writers intend them to perform. Yet if one reads Hanihara's essay, or Allen's, one is constantly in need of specialist and sometimes extremely detailed and complicated information to make sense of and to manipulate the models. This, of course, restricts the explanatory potential of the models to those who have this information or the time to acquire it, and are then able to do things with it. One of the best reasons for model-making—that a model can be taken in at a glance and held in the mind (Wittgenstein 1969: 6)—is thus subverted.

Then, a model can be taken from another form of life, especially the one being considered with its help, more or less wholesale, by following conventions laid down by the ideology and/or by picking an indigenous representation that fits the bill. One such model is Henk Schulte Nordholt's model of Balinese society and its history as he interprets parts of it (1986a, 1986b). This model is based on the flow of water through various levels, defined in terms of the purity of the water at each of them. There is no doubt that water is an extremely important commodity and symbol in Balinese ideology; and the image of water moving through levels will not be lost on someone who has seen, or better, worked in rice-fields, especially terraced fields. I have elsewhere (1988a: 184-6) expressed doubts about the efficacy of this model in explicating Balinese ideology. But the model is an attractive one, making use of matters that any Balinese could respond to—any comparativist, too, for water is a representational device which, like fire, for instance, seems to have a global distribution.

In the present case, I have chosen the cone. This shape is important in Balinese life, being seen in the 'centre' of Lombok, Gunung Rinjani, part of the Mahameru of the Balinese, the cone of rice (*tumpéng*) served to guests in more or less formal circumstances (Duff-Cooper 1985a), the *gunungan* of a house (Duff-Cooper 1985b), and the *gunungan* made in gardens (Duff-Cooper 1984), as well as in the *puspe* ('flower') offering made at cremations. The cone shape is constructed in accordance with social facts of Balinese ideology. There are other shapes that could have been borrowed—those of the many biscuits (*jajan*) that Balinese women and girls make to go with coffee, tobacco and betel, perhaps, or the shapes of offerings such as *canang*, 'betel-chewing ingredients', which, through shape, colour and relative positioning, represent the universe, really, divided into five (Bal. Skt. *panca*). In the event, I hope it will be agreed that the cone works all right.

The phrase 'modes of representation' used above referred to Hanihara's dendogram and Allen's rope or helix. It implies a medium. As far as the cone is concerned, various delineations of this, using pencil and later printers' ink and paper, have been produced (Duff-Cooper 1986a, 234-5, Figs. I-IVb; 241, Figs. V, VI). Other methods—molecular structure model-making kits, clay and wire,

polystyrene balls and wire and glue—were tried but for different reasons proved not to be successful.³ In principle, the model and some of its transformations could be produced using computer graphics. Here the operator needs knowledge of analytic geometry, but in any case the computer is not a medium faithful to the ideology being represented. This is not a prejudice against computing machines—a bamboo or wooden abacus would not be out of place on Lombok among the Balinese, but most do not use it. The computer, though, is the form that ‘our’ computing machines have taken in response to certain kinds of questions. The tone of these questions is hardly in keeping with the mythological, imaginative tone of Balinese ideology (see Duff-Cooper 1987a, 1987b). Moreover, of course, the use of computer graphics restricts access to the model or else results in (simply) sophisticated pencil-and-paper drawings. The matter of a medium, anyway, is taken up again below.

III

We can (at least) contemplate a model, as one looks at a painting or a work of calligraphy, say, or reason about it. Neither rules out the other, so we can do both.

Reason, first. Do the parts of the model adequately express the social facts considered in the construction of the model? Do they adequately express the relationships of the facts one to another? Durkheim’s well-known injunction was, of course, that social facts be treated as things. By this I understand that to find out social facts we should consider aspects of forms of life from as many points of view as possible, as one would a sculpture, say, or a fine piece of furniture.

The introduction of sculpture is not gratuitous. Social anthropology is after all often said to be an art, and different writers have suggested different ways in which this is so: Evans-Pritchard, famously, rejected Radcliffe-Brown’s claim that social anthropology was anything like even Radcliffe-Brown’s rather facile notion of natural science, and replaced the search for function with an emphasis on meaning. Anthropology was to be seen not as a science but perhaps as a blend of various approaches (comparative theology, the history of ideas, linguistic studies, philosophy, and so on) but with its own distinctive contributions to make. Later, Needham suggested (1978) that social anthropology (or that part of the subject that interested him) is an empirical philosophy, an approach to the perennial question about the nature of humankind. This philosophy is empirical in that it relies on social facts generally recorded in ethnographical articles and monographs. Among the exemplars we can turn to in writing such reports, Needham suggests, are *Middlemarch* and *Crime and Punishment*. Mark Hobart, also, suggests somewhere

3. These reasons are given in Duff-Cooper 1986a: 236-8.

that anthropology is an art, or at least akin to one: poetry, and especially writing poetry. Hobart does not define 'poetry', but it clear enough what he intends.

Social anthropology, that is, is more or less authoritatively variously linked to history and closely related subjects, philosophy, and novel- and poetry-writing (and perhaps reading). Complementary to these views is the view propounded here, viz., that model-building—not any old model-building but one in which relations and the relations among them are the focus—is akin to the production of sculpture. Naum Gabo's constructions, for instance, admirably express all manner of abstract matters in ways that encourage reasoning and contemplation. A model of the kind we are concerned with here attempts to do the same.

The 'contemplation' of a model suggests the question, 'Where is it to be contemplated?' Usually this question does not arise. The convention (increasingly being made more difficult to comply with) that academics publish, assumes that a model will be looked at in print. Thus, while Hanihara and Allen, for instance, have produced models about which comments can be made and questions raised, these would not very revealingly include why they are in journals (though why they are in the journals in which they appear might be a more interesting question). However, if, like the Balinese cone, a model is chosen from indigenous sources, there are likely to be, as there are in this case, conventions and other ideas associated with the shape adopted. Whether we follow, adapt, or ignore those conventions and ideas (including those associated with being an academic) depends upon the effect to be created and hopefully appreciated. We shall return to this later, in section VIII.

'Contemplation' also implicates what the model is made of. Naum Gabo's prime medium from about 1920 on was clear plastic. The quality of this material was as much a resource in his work as were shape, structure, rhythm, and implied or actual motion (*Naum Gabo* 1987: 13). For various reasons, certain materials could *not* be used in constructing the cone: the molecular structure model-making kits, for instance, were not amenable to the demands of the case, not being pliable enough, not allowing that elasticity that even the most rigid model can show. Other materials come to mind. Bamboo, for instance, is a material very common in various guises among the Balinese and has at once the pliability and rigidity required. A form of cut-out (a technique adopted by Matisse to much effect in two designs, *Polynésie, Le Ciel* and *Polynésie, La Mer* (both 1946), now in the Pompidou Centre) might be a technique to follow up, though I am doubtful of this. Cardboard or paper, out of which one cone, the *puspe* offering, is made, would not be able to bear the weight of the relations to be depicted; while cutting-out from marble or casting in bronze, say, would result in far too weighty and cumbersome a construction—it would be big—at once inconvenient and unfaithful to the artefacts of Balinese life where objects do not have any monolithic quality. At present (August 1989), one of UPVC, acrylic, or butyrate seems the material most likely to fit the needs of the case.

Contemplation, also, though unconcerned in its present form with any intentional action, is a component in reason. After all, we refer to the elegance of

an argument, and our responses to an argument can be swayed for or against it by this aesthetic criterion. And it has been noted that the mind (by which I mean the brain), in contemplating a model and taking it in, is involved in assimilating material that can provide grist to the business of reasoning. An aesthetic response, further, can found the basis for an argument, rather as other non-rational factors can influence positions we take up and arguments we make from them. An appreciation of the later paintings of Matisse, for instance, provides support for the view that one of the most successful and interesting courses to adopt is simplification, abstracting in the hope of reaching essentials.

IV

At this point I should like to (have) produce(d) a 'sculpture' or construction to be looked at and reasoned about. I should probably present it already assembled for lack of time. Ideally, its parts should be taken out of an egg-shaped or round container, which opens into two symmetrical parts, and then it should be assembled. Container and parts, unassembled and assembled, would all represent totality. They also represent some of the essentials of Balinese ideology, and have been attained by abstraction. I produce a blueprint of this construction (Fig. 3) below. Before that, a number of preliminary matters must be considered.

V

Confronted with a model in two or three dimensions, the question immediately arises, 'Is the model sound?' The answer to this question is, 'Yes—so long as the facts from which it emerges are sound', i.e., are social facts about the ideology described. This may be a matter of argument. In any case, the work I have produced on Balinese ideology has not been shown to be wrong-headed, neither by those who have addressed it in print, nor, of course, by those who haven't. Therefore, as far as the blueprint for the model to be constructed is concerned (which includes lighting schedules alluded to in section VI below), it may be claimed that on this ground at least, the model to be constructed is sound.

The model has to depict relations and the relations between them. These are drawn from the social facts and are themselves social facts. Before these relations can be drawn from the facts, though, they must be defined. Some relations are defined by recourse to formal logic. This approach has procured interesting results within different forms of life and cross-culturally, but it has also been limiting. Formal logic claims that its definitions are *the* definitions, and correct. This

amounts to claiming that a language or a family of languages adequately and incontrovertibly describes the world of, for instance, relations; and that unless one subscribes to it, one's enquiries are bound to fail.

Various factors combine, however, to cast doubt on these claims. The historicity and historiography of classical logic show that the claim to continuous, or at least continual, right-minded insight is itself contradictory. Moreover, fuzzy logics have had to be introduced to cope with situations that are not cut and dried, or that are not properly treated as such, as two-valued logics require. Finally, by isolating degrees of asymmetry—*contra* claims that this relation, like symmetry, does not admit of further qualification, as it is an absolute predicate—greater sense has been made of Balinese ideology than the employment of this relation as an absolute predicate would allow. Add to all this the facts that in Balinese ideology the relationships designated by the phrases 'is father's father's father's father of' and 'is father's father's father's mother of' (Bal. *kelab*) may designate a relationship that is reflexive, while the English 'is an ancestor of' designates a relationship that is irreflexive; and one begins to think that one should not allow formal logic to constrain one without consideration of each case as it arises.⁴

Various relations are to be depicted. First, mediated relationships. Transitivity comes in the three modes, transitive, intransitive, and non-transitive relations. Here (Duff-Cooper 1990a) the usual formal definitions have been accepted and applied, but analysis was far more complex than that implicated by the usual three terms of such analysis.

Reflexivity, of course, also comprises three modes: reflexive, irreflexive, and non-reflexive relations. In the analysis (Duff-Cooper 1988a), formal logical definitions were noted, but were rejected in favour of parallel ordinary-language definitions. A relation is reflexive if any particulars that stand in that relation one to another also have that relation to themselves (e.g., 'is the same age as', 'has the same colour hair as'). An irreflexive relationship is one that no particular can have to itself (e.g., 'is north of', 'is married to', 'is father of'). Relationships that are neither reflexive nor irreflexive are non-reflexive (e.g., 'loves', 'dislikes').

'Opposition' and 'reversal' ('inversion') are also to be depicted. Neither of these modes of relation allows of a formal definition, as Needham (1983, 1987) has established. Opposition is a metaphor; reversal or inversion may also take different forms depending upon the empirical cases examined. Yet they are to be represented in the model among the relational constants that articulate Balinese ideology.

But how can 'opposition' and 'reversal' be called relational constants when neither is amenable to one formal definition? Opposition, first, when taken in a very accommodating sense, can be represented as such. As for reversal, instances of this operation vary formally comparatively, but some forms of the relation may

4. Fuzzy logics (Zadeh 1975) introduce a third value, neither true nor false. For further discussion of the matters raised in this paragraph, see Duff-Cooper 1985c, 1986b, 1988a: 252 n.7 and 1990b.

be common enough to be termed characteristic of an ideology. In the Balinese case enantiomorphic reversal ($A, B, C \Leftrightarrow C, B, A$) is characteristic of it (Duff-Cooper 1986c).

Finally, alternation, analogy and homology are to be represented. We return to these relations below. The question now is, 'How are these relations and the relations among them to be depicted?' What are being depicted are, of course, not the relations *tout court*, but the definitions of them chosen. One criterion, moreover, is to be satisfied: time or process is to be incorporated into the model (cf. Duff-Cooper 1986d). This incorporation will give the lie to the common view that models that depict formal relations are necessarily synchronic.⁵ Moreover, of course, it is faithful to Balinese ideology, which is lived in time (*sakala*), though aspects of it are timeless (*niskala*). Not that time or process is to be emphasized more than other aspects of the model: it takes its place alongside other aspects of it.

The introduction of time raises a complication. It has been put in different ways by David Parkin (1984: 348) and by Mark Hobart (1986: 4): no relationship that is in time (it is claimed) can be symmetrical. Parkin's argument seems to be empirical: equality of power in any relationship cannot be sustained for more than a few seconds. Time inexorably leads to asymmetry. Hobart's argument is a priori, not even bothering to argue for (what he claims is) the necessary asymmetry of social relationships. My view is that these and similar formulations are wrong-headed (see Duff-Cooper 1988a). But let us not be further diverted by this issue, and get on to considering the model as delineated in Figure 3.

VI

What Figure 3 depicts is clearly a rather imperfect cone, one whose framework is less regular and more detailed than earlier delineations of it. This new framework shows the gradual relationships established by Balinese ideology from the One, Vidhi, the highest Balinese god, to the One divided into eleven (archetypally represented in the huge rites of the Eleven Rudras (Éka Dasa Rudra) supposed to be held at the temple Besakih on Gunung Agung on Bali once every hundred years. Classification by partition is pervasive in Balinese life, and the model depicts this thoroughgoingness.⁶

5. See also Needham, e.g. 1966, 1967, and 1984 on structural change.

6. Whether '1' or '11', as ends in the sequence of numbers from one to eleven, is here the most complex or the most simple of the series depends upon how these epithets are defined (Duff-Cooper 1990c).

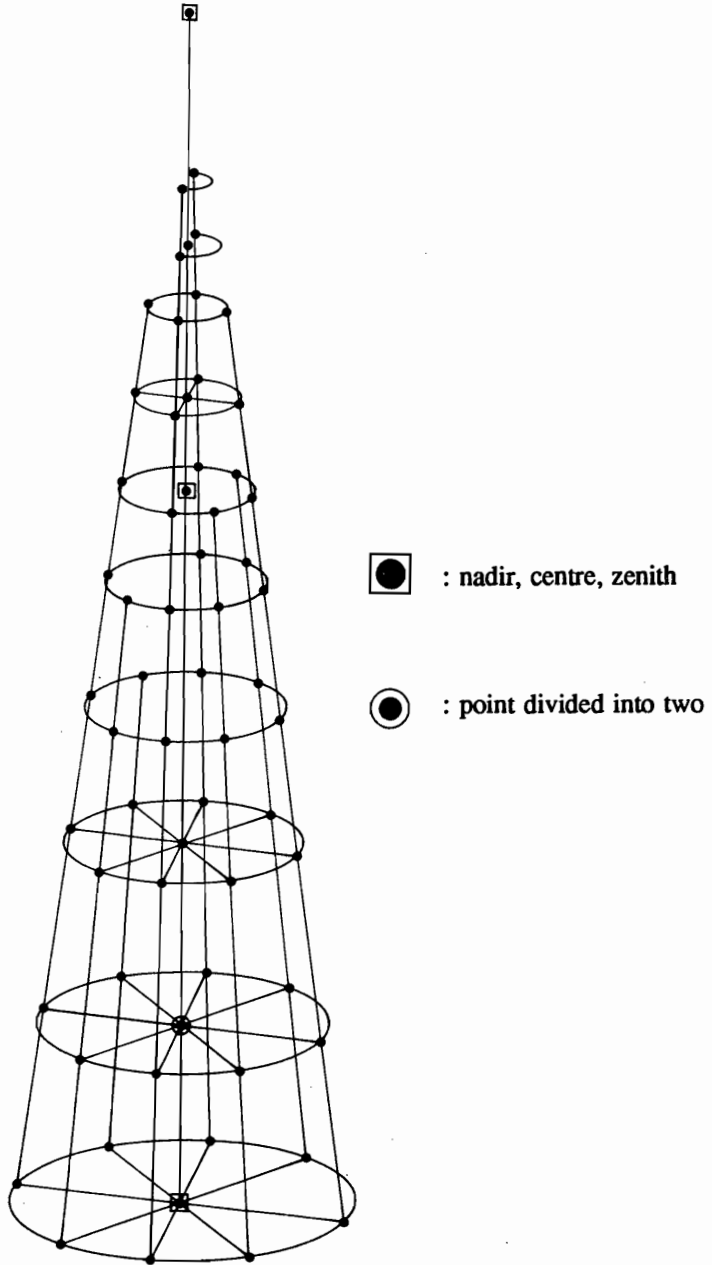


FIG. 3. Framework of Balinese ideology

The relations to be depicted are to be drawn out of the framework, as they are from any body of social facts. But how are they to appear on the model? Small, white lights lying flush with the framework at each joint will be used. Time is thus necessarily involved: lights implicate ignition. From ignition to extinction can be measured. This necessity is exploited in depicting the relations. Balinese conceptions of duration are not as punctilious as 'ours' can be. But many Balinese people wear watches, and not always just for adornment. The exploitation mentioned is thus at least partly in line with Balinese life and thus far legitimate.

The depiction of the relations is a rather tedious business to organize; but it has to be done. The calculations by which a sequence of lights can be interpreted are available for consultation from the writer, and they will be made available with the model. Whether these interpretative materials are taken up depends upon whether one is interested in reasoning about the model. Those who do not take them up, however, can in principle respond to the relations subliminally, for they are probably basic properties of the brain—or at least no critique I am aware of has successfully controverted the 'fundamental properties' approach often alluded to in their own ways by Lévi-Strauss and Needham (cf. Robert Parkin 1988: 11), which is the most compelling view of these relations presently available, at least in the form in which it has been propounded by Needham.

VII

Where are the relations to appear on the model? Of the modes of relation to appear, duality is logically the most basic. This is so in Balinese ideology (Duff-Cooper 1985d), and it is expressed by the model being divisible into four different pairs or halves, each pair of which consists of two halves that are enantiomorphs one of another, rather, as in the Balinese rice-planting rite *nuasén*, when the rice used to make the *nini*, an effigy of the goddess Sri, is planted, the pattern made by the path of the right hand of the planter is at once dual and enantiomorphic (Duff-Cooper 1987c, 1989). Duality is further implicated by symmetry and asymmetry—all of which is to say that duality does not itself have to be depicted further in the model.

Of the other relations, in the sense that a mode of reflexivity is built into 'simple' duality while the modes of transitivity necessarily implicate three entities (which may of course themselves be related dyadically), the modes of reflexivity are simpler than the modes of transitivity. They are therefore considered in this order. Alternation and reversal are operations that are subsequent to duality, triads, and so on. These relations are therefore dealt with after the other relations just mentioned, though the fact that alternation here precedes reversal is arbitrary. Analogy is then considered, and homology, as a necessary correlate of analogy, after that relation.

Relations are to obtain horizontally and vertically, and are variously distributed among the tiers of the model. The tiers from top to bottom are called tier 1, tier 2, and so on to tier 11. Other ways of labelling the tiers, e.g. by moving clockwise through the Balinese spectrum from tier 1, the white tier, could be used, but numbering is more convenient; and moving through the tiers from one to eleven is faithful to Balinese ideology in that 'the first' is a way of signalling 'the most important', as arguably Vidhi, the One, is.

The 'variously' used in the first line of the preceding paragraph requires comment. Analysis of social facts alone can establish whether a mode of relation appears on a tier—'on' because in Balinese ideology the mystical (what is essential, and generally invisible) generally sits on (*ring*), not in, the mundane (what is material and generally visible). (The *arca*, a god sitting on a stone, is a good example of this.) Similarly, relations 'sit on' the facts, not in them. Unfortunately, most of the analyses that establish whether a mode of relation is to appear on a tier are not to hand. Rather than guessing, it is preferable to approach the matter anew. Three questions need answering in this connection: 'Is a mode of relation to be expressed on each tier?'; if so, 'How many instances are to appear?'; then, 'How are the relations distributed on each tier?' These questions will be answered, first, empirically and also, secondly, by recourse to what may broadly be called aesthetics, both 'ours' and Balinese conceptions of aesthetics.

As far as the empirical is concerned, an earlier essay about reflexive relationships in aspects of Balinese ideology establishes combinations of the modes of reflexivity, modes of transitivity and symmetrical or (unqualified) asymmetrical relations (Duff-Cooper 1988a: 246, Table). These combinations are not, of course, exhaustive, but they are a start. The information that is presented in Table 1 is produced after a re-reading of Duff-Cooper 1988a.

Tier:	1	2	3	4	5	6	7	8	9	10	11
Symmetrical	x	x	x	x	x	x	x	x	x	x	x
Asymmetrical	x	x	x	x	x	x	x	x	x	x	x
Reflexive	x	x	x	x	x	x	x	x	x	x	x
Irreflexive	x	x	x	x	x	-	-	x	x	x	x
Non-reflexive	x	-	x	-	-	x	x	-	-	-	x
Transitive	x	x	x	-	x	-	-	x	x	x	x
Intransitive	x	-	x	x	x	-	-	x	x	x	-
Non-transitive	x	-	x	-	-	x	x	-	-	-	x

Table 1. Mode of relation appearing on tiers of the model
Key: x, relation appears; -, relation not established to appear

To these findings must now be added 'aesthetics'. To satisfy 'our' notions of aesthetics, the relations must combine to create the greatest possible elegance. One facet of an elegant anthropology is that it does not impose anything upon the

ideology being explicated. Here, then, Balinese criteria of elegance, or fineness (what is *alus*) should prevail. In Balinese thought, what is higher and/or more to the right is finer than what is lower and/or more to the left (Duff-Cooper 1984). The finest relations are, by these criteria, therefore, to be depicted at the top of the model, less fine relations below. Because each tier is an analogue of each other tier, these criteria are also to be expressed on each tier. This solves the problem of deciding what 'fine' means when used of relations, especially as all the relations are evinced on tier 1. An aspect of fineness in Balinese life is multiplicity: the greater the number, the less fine. Gradations or degrees of fineness can therefore be expressed through increasing multiplicity, here from top to bottom. As all relations appear on tier 1, multiplicity refers to the number of instances of a relation depicted on a tier, not to the number of relations depicted. The positioning of the relations on each tier can now be considered; this addresses the third question mentioned above and will hopefully make the matter of multiplicity that much clearer. Because space is limited, only tiers 1, 6, and 11 will be considered.⁷

At tier 1, all the relations listed in the table above are to be depicted, employing the one light at this point, from symmetry through to non-transitive relations, following the directions given in the lighting schedule. Tier 6 is the central tier of the model in two related senses: it lies midway between tiers 1 and 11, and it is the tier where the central point of the three vertical points (zenith, middle and nadir, associated with ParamaSiva, SadaSiva and Siva respectively) that comprise part of tier 11 is located. On this tier, symmetrical, asymmetrical and reflexive relations are to be shown by lights that (as it were) move round the six points in overlapping pairs, beginning with the top peripheral, i.e., the point at 'north'.⁸ Non-reflexive and transitive relations are evinced on this tier, the former by random pairs of lights, the latter as follows: a chosen point remains steady; that to its right is to flash and not flash alternately, that to its left is to flash. This sequence is repeated through triads of points. On the bottom tier, intransitive relations alone of those that have been of concern do not appear. Symmetry will appear in the sets of peripherals (right/left, top/bottom) and their interstitial sets, and additionally through each peripheral in turn and the bottom centre (nadir, *keluanan*). Asymmetry will be shown by this central point and each peripheral in turn clockwise (*pradaksina*), beginning with the point interstitial between the top and left peripherals, and through each peripheral and each of the three centres of the vertical in succession. Reflexive relations are to be expressed through the top and bottom centres (zenith, *keluan*, and nadir) and through the sets of peripherals,

7. The sequences for lights depicting relations on tiers 2-5 and 7-10 of the model have been prepared and are available from the writer (see section VI above).

8. In the model, to attain the greatest possible abstraction, the points of the compass normally termed north/south and east/west have been called the top/bottom and right/left peripherals respectively. 'Interstitial peripheral' refers to each of the points at northeast (top/right), southwest (bottom/left), northwest (top/left), and southeast (bottom/right) respectively.

beginning with a different set from that showing symmetry. Irreflexive relations will begin with a peripheral, say the one between top and left, and the central point, and will move round the peripherals clockwise from the first, and in the two other centrals of the vertical from bottom upwards also. Non-reflexive relations are shown by the bottom centre and each of the top, bottom, left, right, and their interstitial peripherals in turn. Transitive relations are variously expressed: by the top and two lower centres, by the middle and bottom centres and the left peripheral, and all other peripherals round to the left/bottom interstitial peripheral, i.e. 'southwest'. Non-transitive relations, finally, are shown by moving through triads of peripherals to other such triads. Choosing any starting-point, the light to its right will alternate between being steady and flashing, that to its left will flash. The starting-point in each case is to remain steady.

Before considering what is to be done with the model constructed, four matters should be addressed. The first is degrees of asymmetry. The four degrees are to be depicted in tandem, the first degree employing the left and the right peripherals on tier 2, the second degree the same left peripheral but the right peripheral on tier 3, the third degree again the left peripheral on tier 2 but the right peripheral on tier 4, while the fourth degree employs the same left peripheral again, but uses the right peripheral on tiers 5, 6, 7, and so on. These directions are then to be repeated one tier lower. These degrees may also be depicted by keeping the central point, or the right peripheral on tiers with no designated centre, steady, the left peripheral or whichever flashing as follows: t_1+ , t_2 , t_3- , t_4 , t_5+ , t_6 , t_7- , t_8 , t_9 , $t_{10}-$, ...; then on through the tiers.⁹

Next, reversal (inversion). In Balinese ideology, this operation, we noted, is usually enantiomorphic, a sequence that can of course be expressed by lights, particularly appropriately perhaps, as reversal or inversion generally take place at boundaries, points of transition from one state, place, or such like to another. When do they take place? Mainly at such times as between dusk and dawn or sunset, and at midday. Clearly we cannot be constrained by these social facts (i.e. depicting reversals only when the sun is at certain points in the sky). It is therefore stipulated that this operation is to take place randomly, but at fairly distant intervals, on each tier through the model in succession beginning at tier 1. After one sequence through the tiers, the reversal is itself to be reversed until the next randomly selected reversal.

We could have begun with reversal. This would have been consonant with Balinese ideology in which either side of the little formula $A, B, C \Leftrightarrow C, B, A$ (see section V above) can be the reversal of the other, 'normal' side depending upon

9. This sequence means that at time t_1 a light is lit (+), it stays lit for t_2 and is extinguished (-) at t_3 . Each pair of signs (e.g., t_1+ , t_2 , t_3- , and t_5+ , t_6 , t_7-) refers to different lights except where specified. The time intervals designated by 't' are all of the same duration, the actual duration not being specified but being about three to four seconds. It may be said that lights implying a power source are faithful to Balinese village life where electricity is sometimes employed for lighting and also, in 1979-81, to power a television.

whom the operation is performed by. But it would be oddly imbalanced to permit reversal of the sequences set out in the lighting schedule so to predominate, and it would be at odds with the fact that reversals do not predominate in Balinese life.

Then 'analogy', which (it will be recalled) designates a similar relation that obtains between quite different entities. Thus in Balinese ideology, for instance, male is to female as the sun is to the moon, such that male and the sun are superior to female and the moon. In the model, various analogical relations are expressed among the points of the different tiers. This follows from points being related symmetrically, asymmetrically or in other ways depicted. Moreover, if the model is bisected horizontally into two pieces—one consisting of tiers 1-5, and the other consisting of tiers 6-11—there are very good grounds for arguing that these two pieces are analogous to one another. (The argument would depend upon tier 1 being expressible as two, as depicted in Duff-Cooper 1986a: 234, Figs. I, IIb, IIIb; 235, Fig. IVb.) In any case, analogical relationships do not have to be expressed further.

Finally, 'homology', the mode of relation that follows from entities being related analogically. Thus, to employ the examples just given, male and the sun are homologues one of another, as are female and the moon. Of course, in the model there are numerous points on the various tiers that are homologous. This is a necessity. It would be a lengthy, rather tedious business to list all these homologues, so let it just be granted on formal grounds that they are in the model. A future study can consider this further.

VIII

What, now, is to be done with this model? Various options are open, depending upon how the model is conceived. Considered simply as a sociological model, all salient ingredients of which are contained in what has been said above, the response to the present question is: publish it. This response is surely uncontentious. But given that the present study results, or is meant to result, in an object that may be considered as akin to a piece of sculpture, the question is harder to answer. Generally, such objects are exhibited in galleries. This is a possibility, as the exhibition of kinetic and other works currently (August 1989) running at the Lang Art Gallery in Newcastle upon Tyne, for instance, shows. But then, as Nicola Kennedy, the public art officer of Oxfordshire County Council, is reported as saying (Alberge 1989), it is difficult to justify art in the sanctity of a gallery into which it is always and almost only the converted who venture. This is unsatisfactory in principle; and it does not square with Balinese ideology, which does not distinguish between the products of what we call the artist (art) and of the artisan (craft), so that art, so to say, is continuously on view to everyone. Or else, if the model is not considered apt for such exhibition, it can be dismantled and

packed away to await its next exposure. This way of dealing with a piece such as the present model can be a great convenience, as the (I hope not immodest) contrasting examples of the young Modigliani (who had to tip his accumulated work into the River Livorno when he left for Paris, unable to afford either to move it or to have it stored) and Gabo (who was able to pack up his work and move it to Paris away from the Nazis) demonstrate. More appositely, it would be analogous to the way in which Balinese shadow puppets (*wayang*), which are also together a model of the Balinese moral and physical universes, are packed away in a chest between performances (see e.g. Zurbuchen 1987).

In line with an attitude dominant above, the question should be asked: 'Do the Balinese have anything to suggest here?' One of the symbols upon which the present model is based is, to repeat, the 'flower' offering, used during the burning (*ngabén*) and subsequent rites of a cremation. It is pushed out to sea with the casket (*pengiriman*) in which the ashes of the person cremated are despatched. This is a lovely and moving idea, but the fact that the present model requires a power source raises practical problems which need resolving before the idea can be adopted. And if it were adopted, it does not preclude other solutions to the problem raised by the question.

What do the Balinese do with sculpture? It depends upon the materials used and the reasons why it is made. Stone sculptures do not have much to say to us in the present context, but wooden sculpture does: this is set up high inside a living-room or in the eaves of an open-air pavilion (*balé*) for beautification—rendering the environment finer—and perhaps, contemplation. This is a solution that could be adopted: the model can serve to decorate a communal living-area somewhere.

Would the model say anything, tell people contemplating it, or reveal anything about the Balinese? Alan Campbell's answer to a similar question, in the context of his analysis of Wayāpf relationship terminology and the novel diagram to which his consideration of it leads, is, 'Next to nothing...' (Campbell 1989: 162, Fig. 14; 161). Well, it may be that it tells us nothing specific, but it does show that living closely with people like those who call themselves Wayāpf, or with, in the present case, Balinese people, can have a deep influence upon our lives, rather more than just proving an example (Needham 1981, 1983). In this case, a social anthropologist has produced a model that is claimed to be akin to a sculpture; leaving behind 'our' distinctions, for reasons that can be explicated after the event but which ultimately derive from that deep influence, can produce objects, if not of beauty, then encapsulating the time during which we lived with other, exotic people and the many things that we learnt from them in that time. What exactly such objects say about these people and things—and how far such objects disturb and confront—must be for others to say.

What can be said with more surety is that the consideration of a wide variety of questions concerned directly with models and modelling shows that it is most unlikely that there could ever be a model that satisfactorily (that is, in all regards) explicated all forms of life. Yet the very variety of the models that this

demonstration implies means that the comparison of forms of life is or can be greatly enriched. Considering Japan via a model constructed earlier out of the social facts of Balinese life, for instance, has thrown them both into relief (Duff-Cooper 1988b); and this comparison of Japanese ideologies beside those of another Asian form of life proves a corrective (some might say one that is timely, indeed long overdue) to the stultifying obsession of scholars and a general reading public with what they may have been persuaded to regard as the uniqueness of Japan. These results must be beneficial, if very small, to the quest for some answer to the question, 'What is the nature of humanity?'

APPENDIX: LIGHTING SCHEDULE

Tier One: All relations depicted in central point

- Symmetry: $t_1, t_2+, t_3-, t_4, t_5+, t_6-, \dots$
 Asymmetry: $t_1, t_2+, t_3-, t_4, t_5, t_6+, t_7-, \dots$
 Reflexive: $t_1, t_2+, t_3-, t_4, t_5+, t_6-, \dots$
 Irreflexive: $t_1, t_2+, t_3, t_4-, t_5, t_6+, t_7, t_8-, \dots$
 Non-reflexive: $t_1, t_2+, t_3-, t_4, t_5+, t_6-, t_7, \dots, t_n, t_{n+1+}, t_{n+2}, t_{n+3-}, t_{n+4}, t_{n+5+}, t_{n+6}, t_{n+7-}, \dots$
 Transitive: $t_1, t_1+, t_2-, t_3, t_4+, t_5-, t_6, t_7+, t_8-, t_9, t_{10+}, \dots$
 Intransitive: $t_1, t_2+, t_3-, t_4+, t_5, t_6-, t_7, \dots$
 Non-transitive: $t_1, t_2+, t_3-, t_4, t_5+, t_6-, t_7+, t_8-, t_9, t_{10+}, \dots, t_n, t_{n+1+}, t_{n+2-}, t_{n+3}, t_{n+4+}, t_{n+5}, t_{n+6-}, t_{n+7}, \dots$

Other Tiers:

- Symmetry: $t_1, t_2+, t_3-, t_4, t_5+, t_6-, t_7, t_8+, t_9-, \dots$
 Asymmetry:
 1st degree: $t_1, t_2+, t_3, t_4-, t_5+, t_6-, t_7+, t_8+, t_9, t_{10-}, \dots$
 2nd degree: $t_1, t_2+, t_3-, t_4, t_7+, t_8-, t_9, t_{10+}, t_{13-}, \dots$
 3rd degree: $t_1, t_2+, t_6-, t_7, t_8+, t_9-, t_{10}, t_{11+}, t_{15-}, \dots$
 4th degree: Random flashes of lights, one longer than 5 units (t) of time followed after 1 unit by the other light for 1 unit (e.g. t_1).
 Transitive: One light brighter than two others, alternating between being the brighter. Note that this depiction also expresses alternation, another basic concept.
 Intransitive: One light flashing as though connected faultily. Another light steady. A third also flashing.
 Non-transitive: One light flashing as though connected faultily. Another light steady. A third alternates between flashing and not flashing.

Reflexive: $t_1, t_2+, t_3-, t_4, t_5+, t_6-, t_7, t_8+, t_9-, t_{10}, t_{11}+, t_{12}-, t_{13}, t_{14}+, t_{15}, t_{16}+, t_{17}-, \dots$

In this sequence, the first two sets of flashes are accomplished by one light, the second two by a second light; the third two sets of flashes are to take place on both lights simultaneously.

Irreflexive: $t_1, t_2+, t_3-, t_4, t_5+, t_6-, t_7, t_8+, t_{10}, t_{12}, t_{13}+, t_{17}-, t_{18}, \dots$

In this sequence, the first two sets of flashes are accomplished by one light; the second two by a second light.

Non-reflexive: This relation is to be depicted as its related mode Irreflexivity is depicted above, but random changes of time units between the second, fourth, sixth etc. sets of flashes from 2 units or more to one unit. When sets randomly employ one unit between one set of the flashes (i.e. between ignition (+) and extinction (-)), both lights are to show together.

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