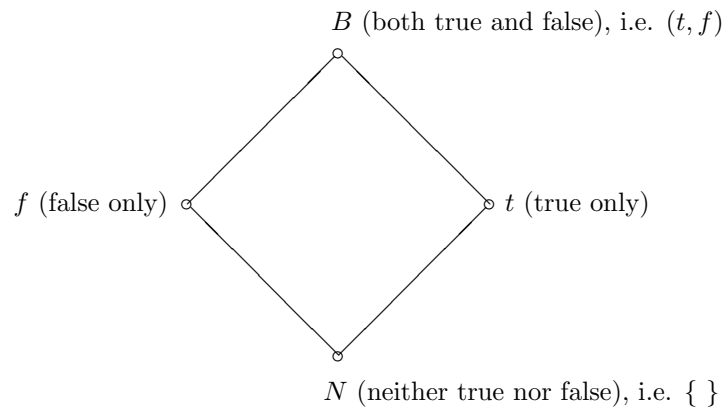


Richard Sylvan

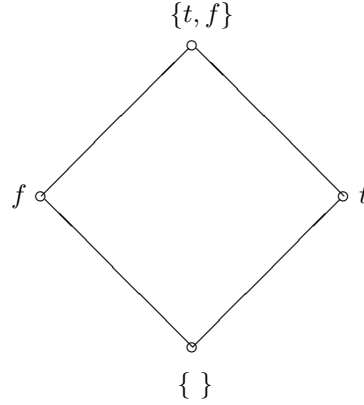
A GENEROUS JAINIST INTERPRETATION OF CORE RELEVANT LOGICS

The “rationalist” structure
 D_0 :



involves not merely classical truth values t and f , but both truth-value gaps and gluts as well. The structure, accounted rationalist and criticised and expanded *b* Buddhism, delivers the Smiley matrices which are characteristic for tautological entailment, upon an obvious representation of connectives: $\&$, $\vee$, $\sim$ and $\rightarrow$ (see *RLR*, p. 114 ff). And the system of tautological entailment, which comprises well-formed expressions of the form $A \rightarrow B$ where A and B are truth-functional (i.e. contain only connectives $\&$, $\vee$ and $\sim$), is a common part of all relevant logics (p. 170 ff). But the 4-valued rationalist lattice, while undoubtedly an improvement upon the 2-element “dogmatist” dumbbell $Fo - oT$ remains inadequate for

logico-philosophical purposes, according to orthodox Buddhism; a further “category” or “value”, i , representing the inexpressible or unsayable (or indescribable or absurd or the like) is required in meeting, or avoiding, various fundamental questions about life, self and the world (see *OP*, p. 16). The resulting 5-element Buddhist structure



is fundamental to relevant significance logic. While it does also afford an interpretation of tautological entailment (considered, e.g. as a weak and inexplicit significance logic), more important it admits an explicit 5-element representation of the characteristic functions of significance logic, thus:-

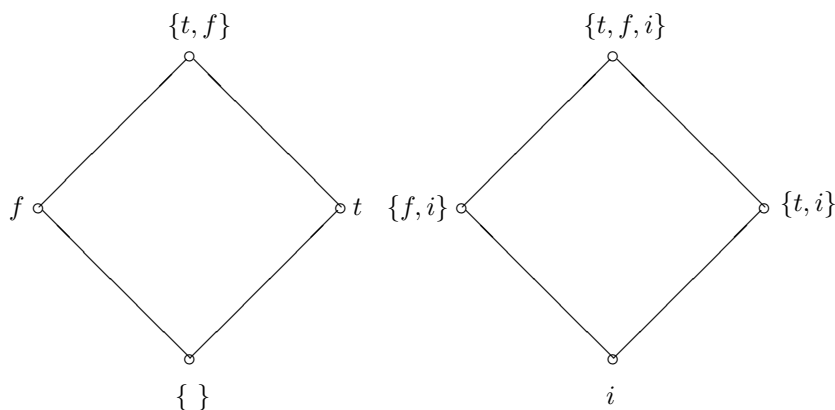
p	T	F	$\overline{S}$	B	N
t	t	f	f	f	f
f	f	t	f	f	f
$\{t, f\}$	f	f	f	t	f
$\{ \}$	f	f	f	f	t
i	f	f	t	f	f

Where these functions can be defined, it is much easier to deliver stronger and more adequate significance logics (cf. the strategy of *SL*, Chapter 5).

It is worth remarking that the isolated value can perfectly well signify inexpressibility. This does not result in the embarrassing situation of inexpressibles being expressed in the logical system. Nothing unsayable need be said, or attempted. It is enough to have a metatheoretic representation of unsayables.

Whereas the rationalist structure completed the possible combinations of the Boolean elements, t and f involved, in pleasing De Morgan fashion, there is an evident incompleteness in the Buddhist lattice. For the three significance elements would in principle yield 8 ($= 2^3$) combinations – unless, as is commonly supposed, i dominates all else, so $\{i, v\} = i$ for any combination of values v . The Jains in effect rejected this latter assumption. Some predications are both true but inexpressible, false but inexpressible, and both but inexpressible. So results then, or would appear to result, the 8-element structure, doubling upon

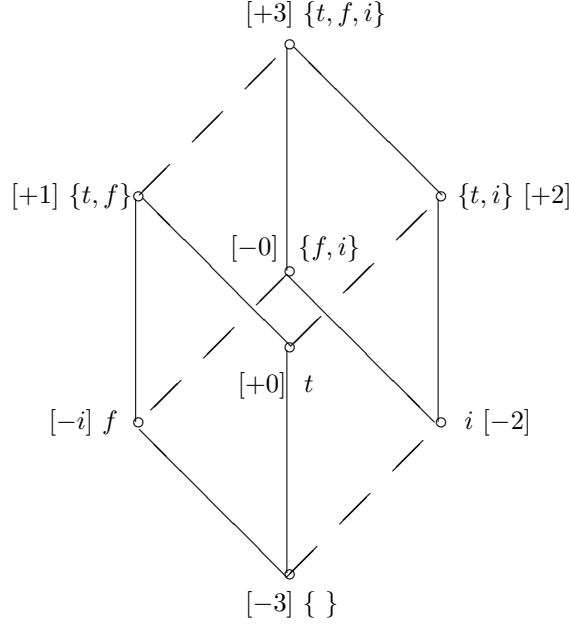
D_0 :



The second i -structure simply copies the first “rationalist” structure D_0 , adding i to each element.¹ (algebraically, it amounts to taking the cross product of D_0 – itself viewable as the product of $\{t, -\} \times \{f, 0\}$ – with $\{i, -\}$.) But obvious inclusions of values have been omitted from the diagram. Sketching in those relations yields the familiar diagram of M_0 , of Belnap’s 8-valued matrices, but differently interpreted [Belnap’s numerical values are shown in square brackets]:

¹ Cannot the Buddhist new element extension game simply be repeated (ad infinitum), and a generous Jainist closure then taken (in earn case)? Yes, of course – though what would these values amount to, beyond the inexpressible? Still there are interesting cases to contemplate or exclude: e.g. hyper-Buddhism issues, to start with, in an obvious 9 valued structure. But such further complications tend to go nowhere really new. For instance, if it is matter of suitably recycling or repeating available values then such extensions lead only to the full first degree of relevant logic (see RLR p.185 ff), not outside the relevant setting.

M_0 :

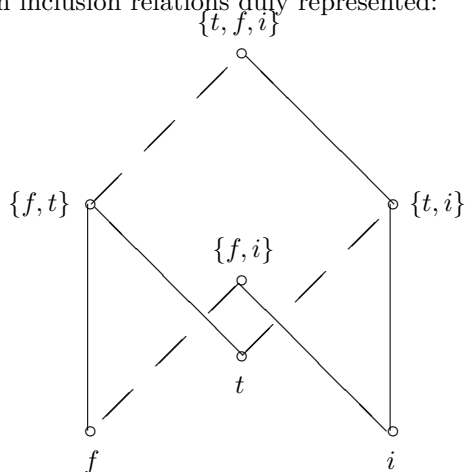


As well as (traditional) Jainist way of arriving at these values, there are quite modern routes, for example, drawing on the mystical and Wittgensteinian theme of unsayability but demonstrability. According to such a theme, much, often of the deepest importance, can be shown but not said. However what is unsayable (and thus at best only indirectly mentionable), but perhaps eventually showable, may nonetheless have truth values. What is unsayable may be true (perhaps like an accurate description of Valhalla) or unsayable but false (like mistaken predictions of what will happen after the Big Bang made before the Big Bang), or unsayable but both true and false (perhaps like Wittgenstein's vision of the sound human condition), or even unsayable but neither true nor false. Jainism does not have then exclusive rights to the values generated; these are shared by various mystical and esoteric cults and philosophies.

Both of the ‘principal philosophical theories’ by which Jainism is commonly distinguished², relative pluralism (anekantarada) and qualified scepticism (syavada) involve 7-fold lists. In the first there is a categorization of 7 perspectives, while, under the second, more important here, 7 modes of predication are marked out. ‘About a given object, we may assert [with respect to a given feature, or existentially] (1) “Maybe it is”; (2) “Maybe it is not”; (3) “Maybe it both is and is not”; (4) “Maybe it is inexpressible”; (5) “Maybe it both is and is inexpressible”; (6) “Maybe it is not and is inexpressible”; and (7) “Maybe it both is and is not, and is inexpressible”. The maybe’s here are intended to show that dogmatic assertions are out of place ... (Smart, p. 160). Often the maybe’s are omitted from lists of the modes of predication, and other variations are found e.g. ‘inexpressible’ is alternatively translated as ‘indescribable’, etc.

Thus, given Jainism apparently entailed a correspondence theory of truth (Smart p. 160), for every statement p – (inevitably) or subject predicate form – there are the following assignments of values, all of which may be attained: (1) true, i.e. t , where (maybe) it is; (2) false, i.e. f , where (maybe) it is not; (3) t and f ; (4) inexpressible, i.e. i , where (maybe) it is inexpressible; etc. Therefore, in general, there are the propositional values diagrammed, with inclusion relations duly represented:

J_0 :



²To be a little more precise than Smart, those are the main epistemological theories which distinguish Jainism. For Jainist bio-conativism, which anticipates Schweitzer and a reverence-for-life position in contemporary environmental philosophy, is certainly a philosophical theory, and apparently that for which Jains are best Known.

Straightaway then, in this route of relevance, there is the puzzle of the missing value, $\{ \}$. Nothing has been left out (like zero in Roman numbering systems).

So logically there is a conspicuous incompleteness in the 7-fold lists. For there is an obvious omission highlighted through the diagram from what it is said we may assert about a given object, namely (8) “Maybe it neither is nor is not”, or, to come at the same point differently, “Maybe it is none of those”. It is an incompleteness that is easily exploited by a sceptic, for instance a sceptic about Jainism. The incompleteness is especially evident from the Jainist diagram J_0 , which contains no bottom(s). Since lattice conditions fail, the 7-valued framework will not, whatever logical directions it leads in, yield a relevant system, or any system of contemporary interest. Worse, a sceptic could well doubt that it yields anything very pleasant.

The relevant way to proceed is plain. It is to reincorporate the missing value in propositional assignments in one way or another, e.g. as an ideal or dummy value. Most simply, a standard terminal clause can ϵ added to the seven clauses assigning value already given: namely, (8) $\{ \}$ otherwise. That takes care of the sceptic about Jainism (and meta-sceptics too, if we are careful). Thus no attempt is made to mess directly with the intractable J_0 . In this logically trifling elaboration of Jainism. J_0 is accordingly completed by embedding in M_0 .³

The real generosity in relevant elaborations of Jainist metaphysics comes in determining matrices for connectives; for there appears to be little corresponding to such logical enterprise in earlier Indian thought. But maybe directions of generosity have been confused. Some generosity has to be extended to relevant investigations also. For while matrices for connectives $\&$ and $\vee$ are easily read off the lattice diagram, suitable matrices for $\sim$ and $\rightarrow$ are not so easily reached, and, to be frank, were largely guessed by their pioneer, Belnap. But the great reasonableness of these guesses can now be explained, using worlds technology (see RLR p.178 ff., where too the relevant matrices are displayed).

³This is virtually the only logical way to go. For a complete computer assisted search of relevant structures (for system R) up to 11 elements lattices has now been made (see Meyer and Slaney). There are no 7 element structures remotely resembling J_0 , and the nearest 8 element structures is M_0 .

The pioneer's guesses can also be accounted for in terms of the set-based representation of M_0 ascribed to Jainism – or, for that matter other 3 element set interpretations. Observe, firstly, that in addition to elementary set-theoretic interconnections of values in M_0 , there is a symmetry about the centre line from $\{f, t, i\}$ through $\{f, i\}$ and t to $\{i\}$. The off-centre values reflect one another, with f simply replacing i and vice versa. There is a significant arbitrariness here too in the way Belnap's numerical values are assigned: where $|2|$ is assigned $|i|$ could have been and vice versa. Define the reflection $r(v)$ of value v in terms of this symmetry, i.e. values of the centre line reflect themselves, and off-centre reflection is determined by replacing f by i and vice versa, exactly as if f and i represent two sort of nontruth. Then matrix values for truth-functional connectives are defined as follow, where v_i and v_2 are matrix values: $\&(v_i, v_2) = v_i \cap v_2; v(v_i, v_2) : v_i \cup v_2; \sim(v_i) = r(v_i)$, with $\cap, \cup, ^-$ set-theoretic operations of intersection, union and exclusion respectively. Only the assignment for matrix operation $\sim$ will surprise dogmatists. Why this is a correct way to characterise negation is explained in detail elsewhere (e.g. NC); but it may help to suggestively rediagram non-narcissistic (i.e. off-centre) values:

$$\begin{array}{cc} \{t, f\} & . \\ \{x, f\} & . \end{array} \quad \begin{array}{c} | \\ | \\ | \end{array} \quad \begin{array}{cc} . & \{t, i\} \\ . & \{x, i\} \end{array}$$

Just those values containing t , a suitable element of truth are designated. It remains then to account for implication, (which, at the first degree is not iterated and, for formulae for which M_0 is characteristic, never occurs more that once). So far this is not easy feat, whether within the Jainist framework or outside it. But one method which works is a variation of the superposition procedure (cf. RLR, p. 179). The idea is to compute the matrix assignment at each element, t , f and i . Just in terms of that element (applying a modified Philonian recipe) and then to superpose these partial matrices.

Whatever the appeal of these or like procedures, things are now far removed from Jainist theory. What Jainism supplier is but a framework for interpretation, a set of interconnected values; but upon this sparse framework a generous logical hermeneutics can reconstruct and ornament, after the fashion of pre-history.

Concluding unscientific note, on seven: - The number seven held a fascination not only for Jains, who had a substantial logical basis for their dose of numerology, but to the east in China and further West. For other subcultures, seven and certain groups of seven figured prominently, not merely for logical reasons, but on natural or mythological grounds. For example, seven was manifested in nature according to the Arabs, for whom the dawn approached in 7 steps. Indeed the number was indelibly written into nature according to the late medieval preconceptions. 'There are seven windows in the head, two nostrils, two ears, two eyes and the mouth; so in the heavens there are two favourable stars, two unpropitious, two luminaries, and Mercury alone undecided and indifferent. From which, and many other similar phenomena of nature such as the seven metals, etc., which it were tedious to enumerate, we gather that the number of planets is necessarily seven...' So argued the astronomer Sizi against Galileo (Holton, p.160) Medieval assumptions were in turn founded on classical perceptions, where 7 had a conspicuous role in important matters: there were, for instance, 7 pillars of Wisdom, 7 arts (in Greek times), 7 elements in the classical curriculum, 7 seals (e.a. in the Bible), 7 circles of ideal cities, 7 wonders of the world and of course 7 deadly sins.

All these assignments reflect, in one way or another, values: they can all be integrated under values. Often however these values were not logically grounded, as in Jainism, but (neglecting their plurality) adhered to dogmatically. It is a cause for much regret that the dominant earth culture, increasingly imposed, is now that of the dogmatists.

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[5] R. Routley and others, *Relevant Logics and Their Rivals*, Ridgeview, California 1982, referred to as RLR.

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[7] N. Smart, 'Indian Philosophy', *Encyclopaedia of Philosophy* (ed. P. Edwards), Macmillan, New York, 1967.

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