A REFOUNDATION OF MODAL LOGIC

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1 In this paper, we continue the work begun in [1], refounding modal logic. In [1] we constructed some systems of propositional modal logic and saw how the technique involved resolved many of the awkward problems surrounding such logics. The technique was then extended to modal predicate logics in a natural (but we now think philosophically insignificant) way. In this paper we extend the technique to modal predicate logics in a different way which, we think, resolves many of the problems associated with quantified modal notions.

Modal logic as presently conceived is ill-founded. And it is precisely for this reason that it seems to have run into a blind alley. When Lewis constructed the first modal logics, he constructed them as extensions of first-order languages (i.e., as first-order languages with one new connective ◇), since these were the only logics formalized at the time. No one has since questioned this assumption, which we think is wrong. As we argued in [1], necessary truth, like truth, is a semantic concept. It is hence impossible to formalize it properly within an extended first-order theory, and now that we have formalized semantic theories (since [9]), we are in a position to correct Lewis's mistake. Had, in fact, modal logic been invented in the 1960's instead of the 1920's, then it would have been originally formulated as a semantic theory. Now, reading necessity as a semantic operator is in accordance with Quine's first grade of modal involvement (see [4]), which he considers safe but uninteresting. We will show it to be far from uninteresting. Since quotation is referentially opague, he considers quantified modal logics impossible on this reading. We will show that this is not the case. Further, he regards all sentences of the third degree of modal involvement (i.e., quantified modal statements) as confused, meaningless, and leading to metaphysical commitment. We will show how we can make perfectly good sense of quantified modal statements without endangering such unpleasant ends. Finally, in the introduction, we note that one of the arguments we used in [1] to show that modality is a meta-concept, viz. the compulsive Liar paradox, is used by Prior in [6] to refute exactly this position. He assumes however, that modal logic must