

## Mechanizing Logic I: Map Logic Extended Formally to Relational Arguments

JOHN RYBAK and JANET RYBAK\*

***Formal extensions: Conjunctive and disjunctive terms*** Our concern is to show a new simplified approach to mechanizing logic, including the logic of multiply quantified relational propositions.

First, the diagrammatic method of our earlier paper [11] is used to set up four formal rules which extend the “traditional” or “Aristotelian” logic into the field of arguments with conjunctive, disjunctive, and negative terms. Then with one further central “axiom” (an adaptation of relational conversion) we bring into the same system in a fairly concise and perspicuous fashion arguments involving multiply quantified relational propositions. The limits of this system (we presume it has limits) are not yet known.

It is this extended formal system that will be used in Part II as a base, together with Karnaugh maps, from which to demonstrate the *effective* mechanization of relational arguments by computer.

Arguments such as:

$$\begin{array}{l} A a B \cdot C \\ \underline{A i D} \\ \therefore \underline{D i B} \end{array} \quad \begin{array}{l} \text{(see Appendix 1} \\ \text{for the symbolism)} \end{array}$$

are frequently cited as being beyond the range of traditional logic, and it is true that unaided syllogistic is unequal to some of them, but in the 1880s Keynes [6]

---

\*The substance of these papers, Parts I and II, was originally presented at a Traditional and Modern Philosophy Department seminar, Sydney University, on March 30, 1981.