MINDING ONE'S X'S AND Y'S

HUGUES LEBLANC

— A correction to I.M. Copi's *Symbolic Logic,* second edition —
Copi's quantification rules in the second edition of his *Symbolic
Logic* (The Macmillan Company, 1965) read ([1]):

QUANTIFICATION RULES

The expression '$\Phi\mu$' will denote any propositional
function in which there is at least one free occurrence
of the variable denoted by 'μ'. The expression '$\Phi\nu$' will
denote the result of replacing all free occurrences of μ
in $\Phi\mu$ by ν, with the added provision that when ν is a
variable it must occur free in $\Phi\nu$ at all places at which
μ occurs free in $\Phi\mu$.

1. *Universal Instantiation*

$$\textbf{UI:} \frac{(\mu)\ \Phi\mu}{\overset{*}{*}\ \Phi\nu}$$

2. *Existential Generalization*

$$\textbf{EG:} \frac{\Phi\nu}{\overset{*}{*}\ (\exists\mu)\ \Phi\mu}$$

3. *Existential Instantiation*

$$\textbf{EI:} \frac{(\exists\mu)\ \Phi\mu}{\overset{*}{*}\ \Phi\nu}$$

provided that ν is a variable that occurs free in no
earlier line.

4. *Universal Generalization*

$$\textbf{UG:} \frac{\Phi\mu}{\overset{*}{*}\ (\nu)\ \Phi\nu}$$

provided that $\Phi\mu$ contains no free variable introduced
by **EI**, and that μ is a variable which does not occur
free in any assumption within whose scope $\Phi\mu$ lies.

([1]) The passage quoted is from the end papers of Copi's book.

The last one of these rules is clearly unsound. Consider indeed the following eight lines, in which 'Vxy' is short for 'x voted for y' and 'm' is short for 'Moe':

1	$(x)Vxm$		
→ 2	$(x)Vxy$		
3	Vxy	2, **UI**	
4	$(y)Vyy$	3, **UG**	
5	$(x)Vxy \supset (y)Vyy$	2-4, C. P.	
6	$(y)((x)Vxy \supset (y)Vyy)$	5, **UG**	
7	$(x)Vxm \supset (y)Vyy$	6, **UI**	
8	$(y)Vyy$	1, 7 M. P.	

The inference abides by Copi's truth-functional and quantificational rules. Suppose though, that 'x' and 'y' are susceptible for the occasion of at least one extra value besides Moe, say, Lefty, and that every one did vote for Moe. Then Lefty cannot have voted for himself. Hence 1 may be true, and 8 be false. Hence 1 does not imply 8. Hence the inference is invalid. But C. P. (Conditional Proof), M. P. (Modus Ponens), and Copi's **UI** are sound. Hence Copi's **UG** isn't.

Bryn Mawr College   Hugues LEBLANC

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