An Exercise in Quantification using Aquinas' Fifth Way

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I. First Crack at Reconstructing the Argument:

The Fifth way is based on the directedness of things. We observe that some things which lack awareness, namely natural bodies, act for the sake of an end. This is clear because they always or commonly act in the same manner to achieve what is best, which shows that they reach their goal not by chance but because they tend towards it. Now things which lack awareness do no tend towards a goal unless directed by something with awareness and intelligence, like an arrow by an archer. Therefore there is some intelligent being by Whom everything in nature is directed to a goal, and this we call 'God.'

(1) It is either (a) by random chance or (b) the direction of something with intelligence that unconscious natural bodies regularly reach the same end.

(2) Things that regularly reach the same end do not do so randomly.

So: (3) All unconscious bodies regularly reaching the same end are directed by something with intelligence.

Ergo: (4) There is something with intelligence directing every unconscious body that regularly reaches the same end.

II. What is a Quantifier?

(i) Quantifiers are terms that specify a quantity on entities in an enumerable domain satisfying an open formula.

Domain:	Natural Numbers	1,2,3,4,5,6,7…
	Beers Left at the Party	A Coors and a Guinness
Open Formula:	__has a successor	One-Place Predicate
	__is colder than__	Two-Place Predicate……
Universal Quantifier:	For all x	(∀x)
Existential Quantifier:	There exists at least one x	(∃x)

(ii) Quantified Expressions are those expressions where variables are bound by a quantifier. Thus for the Domain of Natural Numbers, the Quantifiers are in bold, the open-formula (the predicate) is in italics:

True	**For all x**, x *has a successor*
True	**There exists at least one x such that** x *has a successor*.
True	For all x, there exists at least one y, such that *y is a successor to x*.
False	There exists at least one y, such that for all x, *y is a successor to x*.

III. A Bad Inference in the Fifth Way?

(i) Consider a Paraphrase of the Inference from (3) to (4) that makes explicit the range of the quantifiers:

(3a) For each thing x, such that x is an unconscious body and x is a thing that regularly reaches the same end, there exists some y such that y is intelligent and y directs x. [1]

(4a) There exists at least one y, such that y is intelligent, and for any x, such that x is an unconscious body and x is a thing that regularly reaches the same end, y directs x.

(ii) Substitute the following predicates for (3a) and (4a) to form (3b) and (4b) below:

(a) Substitute: 'a number' for 'an unconscious body'.
(b) Substitute 'is prime' for 'regularly reaches the same end'.
(c) Substitute 'is an integer' for 'is intelligent' throughout.
(d) Substitute 'is the successor of' for 'directs.'

True (3b) For each x, such that x is a number and x is prime, there exists at least one y such that y is an integer and y is the successor of x.

False (4b) There exists at least one y, such that y is an integer and for any x, such that x is a number and x is prime, y is the successor of x.

(iii) While (3b) is true, as every number that is prime has a successor, (4b) is false, as there isn't some number that is the successor of every prime. Thus, (3b) and (4b) constitute a counter-model to the inference from (3) to (4).

IV. Exercises:

Exercise One: provide your own predicates to substitute for those in (3a) and (4a) that render the premise true and the conclusion false to show that the inference is not truth-preserving:

T (3u) For each x, such that x is a……………… and x is………………….. .there is at least one y such that y is a…………………… and y……………………x.

F (4u) There is at least one y, such that y is a…………….., and for any x, such that x is a ……………………, and x is………………., y……………….. x.

Exercise Two: Consider the following statement (inspired by the opening lines of Aristotles' *Nichomachean Ethics*). Using (3u) and (4u) as a model, translate this

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[1] Logicians symbolize these expressions further as:

(3a) ∀x∃y (Ux & Rx & Iy & Dyx) (4a) ∃y∀x (Iy & Ux & Rx & Dyx) statement so as to construct a counter-model, using the space denoted by (3v) and (4v) below:

[E]very action that is chosen is thought to aim at something good, and for this reason it has been rightly declared that there is something good at which all actions that are chosen aim…

(3v)……………………………………………………………………………………………………..

(4v)……………………………………………………………………………………………………..

Exercise Three: Some scholars have taken the Fifth Way to be an Inductive Argument rather than a Deductive Argument. (Deductive Arguments are those where it is intended that it be impossible for the premises to be true while the conclusion is false. Inductive Arguments are those where it is thought to be unlikely that the conclusion is false given the truth of the premises.) Is this view tenable? Explain and defend your answer:

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