Aristotle’s “Connecting Term” model of explanation

a. A fact is explained by a given science if it is deducible from the first principles of that science.
b. First principles are necessary truths.
c. Hence what is explained (an explanandum) must also be a necessary truth.
d. An explanandum has a subject-predicate form: A belongs to C.
e. An explanation is a way of connecting A to C by means of a middle term that belongs necessarily to C.
f. Thus, we can explain why necessarily, every C is A by finding a middle term, B, such that:
   \[ \Box AaB \land \Box B aC \]

Example: Why are whales (C) necessarily warm-blooded (A)? Because (explanans): necessarily, mammals (B) are warm-blooded, and necessarily, whales are mammals.
g. The propositions in the explanans, \( \Box AaB \) and \( \Box B aC \), must either be first principles or deducible from first principles.

Some Passages in Posterior Analytics (those marked by * are not in Selections)

I.6, 74b5: “We have found that demonstrative knowledge, \( e \) is derived from necessary principles (since what is known cannot be otherwise) and that what belongs to things in their own right is necessary ….”
I.4, 73a23: “Since what is known \( e \) without qualification cannot be otherwise, what is known by demonstrative knowledge will be necessary.”
I.22, 84a36-37: “… we demonstrate by inserting a term <between two terms>, not by adding another <from outside>…."
I.6, 75a5: “… whenever the middle is necessary, the conclusion will also be necessary, just as truths always result in truth. (For let A be said of B necessarily, and B of C <necessarily>; it is also necessary, then, for A to belong to C <necessarily>.)”
I.6, 75a13: “Since, then, what we know, demonstratively must belong necessarily, it is clear that we must also demonstrate through a middle that is necessary. Otherwise we will not know, either the reason why or that it is necessary for this to be.”
*I.13, 78a22: “Understanding the fact and the reason why differ.”
*I.24, 85b22: “A demonstration is a deduction that reveals (lit., ‘proves’, \( deiktikos \)) the explanation.”
*II.3, 90a35: “It is clear that all questions are a search for a middle.”