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Axioms for Mereology

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In this paper I shall present some related axioms for mereology and outline deductions from them. I presume an acquaintance with ontology, and I make no explicit references to theses of ontology in my proofs.[1]

Section 1 I shall begin by deriving three theses from an ordinary basis of mereology. That basis consists of four theses:

T1.1	$[AB] : A \in el(B) .\supset. B \in B$	
T1.2	$[ABC] : A \in el(B) . B \in el(C) .\supset. A \in el(C)$	
D1	$[Aa] :: A \in Kl(a) .\equiv.\therefore A \in A \therefore [B] : B \in a .\supset. B \in el(A) \therefore$ $[B] : B \in el(A) .\supset. [\exists CD] . C \in a . D \in el(B) . D \in el(C)$	
T1.3	$[Aa] : A \in a .\supset. Kl(a) \in Kl(a)$.[2]	

From these we can prove theses D2, T2.1, and T2.3 as follows:

T1.4	$[ABa] : A \in Kl(a) . B \in a .\supset. B \in el(A)$	[D1]
T1.5	$[ABa] : A \in Kl(a) . B \in el(A) .\supset. [\exists CD] . C \in a . D \in el(B) .$ $D \in el(C)$	[D1]
T1.6	$[Ba] : B \in a .\supset. B \in el(Kl(a))$	[T1.3, T1.4]
T1.7	$[Ba] : B \in a .\supset. [\exists D] . D \in el(B)$	[T1.3, T1.6, T1.5]
T1.8	$[AB] : B \in el(A) .\supset. [\exists CD] . C \in el(A) . D \in el(B) .$ $D \in el(C)$	[T1.7]
T1.9	$[A] : A \in A .\supset. A \in Kl(el(A))$	[T1.8, D1]
T1.10	$[Aa] : A \in Kl(a) .\supset. [\exists C] . C \in a$	[T1.7, T1.5]
T1.11	$[ABa] : A \in Kl(a) . B \in Kl(a) .\supset. A \in B$	[T1.10, T1.3]
T1.12	$[AB] : B \in Kl(el(A)) .\supset. A \in B$	[T1.10, T1.1, T1.9, T1.11]
T1.13	$[AB] : B \in el(A) .\supset. B \in el(Kl(A))$	[T1.1, T1.6, T1.2]
T1.14	$[AB] : A \in A . B \in el(Kl(A)) .\supset. [\exists D] . D \in el(B) . D \in el(A)$	[T1.1, T1.5]

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