

Nip and tuck for definite description

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Abstract Speaking of dental floss contaminated with bacteria, I may separate the dental floss that is sterile from the dental floss that isn't sterile. The definite description "the dental floss that isn't sterile" contracts its reference to just the dental floss near bacteria, although it, the dental floss whole, isn't sterile. To accommodate the definite descriptions that contract their reference, received definitions for 'the Φ ' are amended from (1) to read as in (2):

- (1) 'the Φ ' refers to that which any Φ *is part of* and is the least such.
- (2) 'the Φ ' refers to that which any Φ *overlaps* and is the least such.

If definite description is to be based on a purely logical notion of plural and mass predication, it is further amended. Like overt demonstratives—'this/these Φ ', 'that/those Φ '—any definite description in natural language is also perspectival, scanning everywhere the description Φ is satisfied:

- (3) 'the Φ ' refers to the least Φ that overlap Φ *anywhere* there is Φ .

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Against the received general theory of definite descriptions (Sect. 1) come counterexamples, examples of *contracted* reference, in which the definite description refers to less than it describes. Some bacteria contaminate the dental floss. *It* isn't sterile. So cut away the dental floss that isn't sterile to save the rest that still is. It cannot be done unless *the dental floss that isn't sterile* manages to refer to less than all the dental floss, despite *its* not being sterile. A nip and tuck, three amendments, rescue one meaning for *the* that works for singular, plural and mass definite description. The first (Sects. 1, 2) replaces *partitivity* with *overlap*, so that 'the Φ ' refers to the least Φ that any Φ *overlap*, instead of to the least Φ that any Φ *is part of*. The second (Sect. 3) replaces *universal sampling* with *a universal scan*, to refer then to the least Φ that Φ *anywhere* overlap. The distribution of contracted reference (Sects. 5, 6) mandates the third amendment (Sect. 7), according to which modification within Φ is 'layered', so that scope ambiguities allow for both contracted and uncontracted reference.

1 A more general theory of definite descriptions

Since Sharvy (1980) and ever after,¹ one meaning for the definite article *the*, has unified singular, plural and mass definite description, 'the Φ ', defined as a *universal sampling* and *accumulation* of what Φ describes, so that:

(1) *Any Φ be some of the Φ .*

For the plural 'the threads that are the length of the fabric' or the singular or mass 'the thread that is the length of the fabric', *any* thread or threads the length of the fabric *are some of* what the definite description refers to. Universal sampling (*any*) and accumulation (*be-some-of*) is the burden of clause (ii) in definitions (2)–(3), which differ only in how they formalize this relation *be-some-of* between what is described and what the definite description refers to:

- (2) (2nd-Order Logic) $[\neg X: \Phi] \Psi \leftrightarrow_{\text{def}}$
- | | |
|---|-------|
| $[\exists X: \Phi[X]$ | (i) |
| $\& \forall Y(\Phi[X/Y]^2 \rightarrow \forall x(Yx \rightarrow Xx))$ | (ii) |
| $\& \forall Z(\forall Y(\Phi[X/Y] \rightarrow \forall x(Yx \rightarrow Zx)) \rightarrow \forall x(Xx \rightarrow Zx))]$ | (iii) |

¹ Including Link (1983). Sharvy (1980) is an incisive and yet unassuming contribution to the canon, where it joins his (1978, 1979, 1983), gems of grace and clarity, startling in their prescience. An unsung hero, whose affecting obituary (Richard Eric Sharvy 1942–1988. Memorial Minutes. *APA Proceedings*, Vol. 61, pp. 315–316) underscored my regret not to have known him. May his memory be a blessing, to which this paper is offered in homage.

² $\Phi[X/Y]$ is the alphabetic variant of Φ that substitutes all occurrences of free variable ' X ' with ' Y '.

- (3) (Monosortal Plural Logic³) $[\neg X: \Phi] \Psi \leftrightarrow_{\text{def}}$
- | | |
|--|-------|
| $[\exists X: \Phi[X]$ | (i) |
| $\& \forall Y(\Phi[X/Y] \rightarrow Y \leq X)$ | (ii) |
| $\& \forall Z(\forall Y(\Phi[X/Y] \rightarrow Y \leq Z) \rightarrow X \leq Z)] \Psi$ | (iii) |

Clauses (ii) both say that if *any* Y be Φ —*thread(s) the length of the fabric*—, Y be *some of* the X that the definite description refers to. The first clause (i) in (2)–(3) says that what a definite description refers to is itself as described, *thread(s) the length of the fabric*,⁴ and, (iii) says that what is referred to is the least to satisfy (i) and (ii).⁵

The intended relation—“ Y be *some of* X ”, “ $\forall x(Yx \rightarrow Xx)$ ”, or “ $Y \leq X$ ” in (1)–(3)—between any thread accumulated and what the definite description refers to is always meant to track bedrock predication, validating (restricted) Comprehension, the principle that what the definite description refers to is exactly what its predicate denotes. That is, to be of the so-and-so is to so-and-so:

³ Better called Monosortal Non-singular Logic, if I am not to defer to its sources’ nomenclature. Second-order logic, Monosortal Plural Logic, and First-Order Plural Logic, mentioned below, are alternatives all meant to unify mass, plural count, and singular terms.

In Monosortal Plural Logic, there is only one type of variable, and it is non-singular. The relation “ $X \leq Y$ ” is paraphrased “ X be *some of* Y ” (as Sharvy (1980) recommends), which works nicely for mass and plural count terms—*The decaf coffee is some of the coffee*, *The decaf coffees are some of the coffees*—and almost nicely for singular terms—*The decaf coffee is some (one) of the coffees*. To avoid even a hint of unwanted structure, I favor the more faithful paraphrase “ X be *of* Y ” (v. Schein 2006), reviving an archaic and poetic usage that survives at least into the twentieth century (*Oxford English Dictionary*): “Shakespeare was of us, Milton was for us; Burns, Shelley were with us” (Robert Browning 1845), “He was not of those who can talk of what moves them without caring whether it bores or not the people they talk to” (W.S. Maugham 1915). And, again, for a more faithful gloss, an atemporal and amodal *be* in “*if* X be Φ , X be *of* Y ” is revived from earlier usage, “If she be shapely of legg, then she be upstairs maid” (*The Diary of Samuel Pepys*, 30 October 1661), “For if a church be called in Moses’ name then it be Moses’ church” (3 *Nephi* 27:8, 1879).

First-Order Plural Logic has two variable types, singular ‘ x ’ and plural ‘ xx ’ and also an overt partitive relation, ‘ $x \leq xx$ ’, $xx \leq yy$ ’. See Schein (2006: §29.1.2) and references therein for discussion. In natural language, it is difficult to escape distinguishing singular and non-singular, demanding in the monosortal language supplemental morphology such as ‘ $\text{sg}(X)$ ’ in (28).

Note that the syntax and semantics for second-order logic, Monosortal Plural Logic, and First-Order Plural Logic do not of their own distinguish mass and plural count terms, which also needs supplemental morphology, e.g., ‘ $[\text{NP coffee}(X) \& \text{count}(X)]$ ’ and ‘ $[\text{NP coffee}(X) \& \text{noncount}(X)]$ ’.

⁴ As in n. 6, the *thread that is in no more than half the length of the fabric* illustrates the need for clause (i) (v. Sharvy 1980; Cartwright 1996).

⁵ Sharvy (1980) simplifies to eliminate (iii), which I retain and enlarge upon for reasons that become clear below.

Against this the received view of definite description for over three decades come examples in natural language (Sects. 2, 3) that defeat *universal sampling* and *accumulation under partitivity*. These are examples of contracted reference, as mentioned at the start, in which the definite description refers to less than it describes. Bacteria contaminate the dental floss. *It isn't sterile*. Yet, I may try to cut away the dental floss that isn't sterile to save the rest that still is, which cannot be done unless *the dental floss that isn't sterile* manages to refer to less than all the dental floss, despite *its* not being sterile.⁸

⁸ If, as I maintain, the contracted reference of *the dental floss that isn't sterile* is fault of the definite article, then a nip and tuck is all that will be needed. But, I thank an anonymous reviewer (April 2018) who has asked if the contracted reference may rather be an effect of domain restriction to dental floss that is all un-sterile. It's the definite article, as the following illustrates. Suppose that dental floss is sterile if and only if it is not cotton, so that dental floss partly sterile and partly not blends anti-bacterial polyester and cotton. Referring to the batch of contaminated dental floss, it may be said of it all, using a definite description without contracted reference, that:

- (i) The/this dental floss that isn't sterile contains cotton.
- (ii) The/this dental floss that isn't sterile is polyester and cotton.

But, if the dental floss that isn't sterile is to be cut away from the dental floss that is,

- (iii) The dental floss that isn't sterile is (all/ only) cotton.
- (iv) The dental floss that isn't sterile isn't polyester and cotton.

The definite description in (iii)–(iv) contracts its reference, as in the text above. It remains however that (v)–(vi) are unambiguously false, without the reading expected and equivalent to (vii)–(viii) if domain restriction were at fault for the contracted reference in (iii)–(iv):

- (v) F All/any dental floss that isn't sterile is (all/ only) cotton.
- (vi) F All/any dental floss that isn't sterile isn't polyester and cotton.
- (vii) All/any dental floss that is all un-sterile is all cotton.
- (viii) All/any dental floss that is all un-sterile isn't polyester and cotton.

Besides its absence from (v)–(vi) outside definite description, domain restriction, by some kind of strengthening, to dental floss that is *all* not sterile finds further impediment in a contrast between mass and count definite descriptions (v. (62)–(64) below). As above, the mass definite descriptions in (ix) contract their reference, so that scalpel in hand, the dental floss that isn't sterile may be cut away from the dental floss that is, even if every dental floss string is contaminated with some bacteria:

- (ix) Remove the dental floss that isn't sterile(, and salvage the rest).
Remove the dental floss string that isn't sterile(, and salvage the rest).

If every string is contaminated, and further some strings are completely so, (ix) remains an instruction to salvage from only the partially contaminated strings the floss that rests still sterile.

- (x) Remove the dental floss strings that aren't sterile(, and salvage the rest).
- (xi) Remove the first dental floss string that isn't sterile(, and salvage the rest).

The count definite descriptions in (x)–(xi) are unambiguous. If every dental floss string is contaminated, the definite description in (x) refers to all the strings, and the singular description in (xi) refers to the first string. There is no domain restriction to string that is all not sterile, allowing the plural definite description

Fitting contracted reference under one meaning for *the* requires some amendments to (2)–(3). First, (Sect. 2) replace *partitivity* in (ii) with ‘Overlap’, so that *the thread(s)the length of the fabric* refers to some thread the length of the fabric that any thread the length of the fabric *overlap*. As in (11)–(13), ‘Overlap’ is defined in terms of the partitive relation however formalized⁹:

- (11) $Y \text{ Overlap } X \leftrightarrow_{\text{def}} \text{Some } Z (Z \text{ be some of } Y \ \& \ Z \text{ be some of } X)$
 (12) (2nd-Order Logic) $\text{Overlap}[Y, X] \leftrightarrow_{\text{def}} \exists x(Yx \vee Xx) \rightarrow \exists x(Yx \ \& \ Xx)$
 (13) (Monosortal Plural Logic) $\text{Overlap}[Y, X] \leftrightarrow_{\text{def}} \exists Z(\neg Y \leq Z \vee \neg X \leq Z) \rightarrow \exists Z \exists W(\neg Z \leq W \ \& \ Z \leq Y \ \& \ Z \leq X)$ ¹⁰
 (14) (2nd-Order Logic) $\text{Of}[Y, X] \leftrightarrow_{\text{def}} \forall y(Yy \rightarrow Xy)$
 (15) (Monosortal Plural Logic) $\text{Of}[Y, X] \leftrightarrow_{\text{def}} Y \leq X$

What the definite description refers to overlaps anything it describes, and it refers to the least such, as in Sharvy’s definition. But, the *least-such* condition in (iii) is to be replaced with something that works better with ‘Overlap’ in securing definite reference. In the general case, *the so-and-so* doesn’t always have unique *least Y* that any so-and-so overlap. It may have many *Y* meeting a least-ness condition. In (19) ii., $\ulcorner \text{MIN.OV.}\Phi \urcorner$ says that *Y* is *minimal* just in case any so-and-so overlap *Y* and no less of *Y* is also so. If there are many such minimal *Y*, *the so-and-so* are all of them and nothing else, (19)ii.-iii. As (20) summarizes, *the so-and-so* refers to the least that embraces all minimal overlaps with all so-and-so.

Prefixing morpheme μ to any formula Φ with free variable V_i , i.e., $\ulcorner \mu.\Phi[V_i] \urcorner$, abbreviates:

- (16) $\ulcorner \text{OV.}\Phi[V_i] \urcorner$ for $\ulcorner \Phi[V_i] \ \& \ \forall Y(\Phi[V_i/Y] \rightarrow \text{Overlap}[Y, V_i]) \urcorner$
 (17) $\ulcorner \text{MIN.}\Phi[V_i] \urcorner$ for $\ulcorner \forall Y(\Phi[V_i/Y] \rightarrow (\text{Of}[Y, V_i] \rightarrow Y = V_i)) \urcorner$
 (18) $\ulcorner \text{MAX.}\Phi[V_i] \urcorner$ for $\ulcorner \forall Y(\Phi[V_i/Y] \rightarrow \text{Of}[Y, V_i]) \urcorner$

Footnote 8 continued

in (x) to contract its reference to only the completely contaminated strings and the singular definite description in (xi) to refer to the first among these. Section §3 promises an account of the interplay among contracted reference and mass and count definite description, for which domain restriction seems too blunt an instrument if it is unrestrained outside definite descriptions in (v)–(vi) and inside count definite descriptions in (x)–(xi).

⁹ Using ‘Overlap[*Y*, *X*]’ and ‘Of[*Y*, *X*]’ as defined in (12)–(15) allows me to submerge in (16)–(20) the distinction between second-order and monosortal plural logic, tucked away into (12)–(15).

¹⁰ In validating (i) and (ii), both 2nd-Order Logic and Monosortal Plural Logic, allow “empty” *X* and *Y*:

- (i) (2nd-Order Logic) $\exists x \forall x(Xx \leftrightarrow x \neq x)$
 (ii) (Monosortal Plural Logic) $\exists X \forall Y((\exists Z \neg Y \leq Z \ \& \ Y \leq X) \leftrightarrow Y \neq Y)$

Definitions (12)–(13) say that if either *X* or *Y* is non-“empty”, they Overlap just in case they share a non-“empty” part.

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- (24) “The Φ THERE are
 some Φ THERE- X such that anywhere THERE there be Φ , the Φ there
 overlap X , and for any Z that also be such, the X be Z .”

In effect, definite description culls its referents not from a universal quantification over arbitrary samples of Φ but only over samples that are all the Φ that fill some spatiotemporal region or some region of the perceptual field. This spatiotemporal restriction is what distinguishes the definitions in (29) and (32) (and (24)) from their antecedents in (19)–(20), where ‘within(v , α)’ is the native concept that relates object, event, or spatiotemporal region v to a spatiotemporal region α it is within:

- (25) (2nd-Order Logic) $\text{Within}[X, A] \leftrightarrow_{\text{def}} [\forall x: Xx][\forall a: Aa] \text{ within}(x, a)$
 (26) (Monosortal Plural Logic) $\text{Within}[X, A] \leftrightarrow_{\text{def}} [\forall Z: \text{sg}[Z] \ \& \ Z \leq X][\forall W: \text{sg}[W] \ \& \ W \leq A] \text{ within}(Z, W)$
 (27) (2nd-Order Logic) $\text{sg}[X] \leftrightarrow_{\text{def}} \exists x Xx \ \& \ \forall x \forall y (Xx \ \& \ Xy) \rightarrow x = y$
 (28) (Monosortal Plural Logic) $\text{sg}[X] \leftrightarrow_{\text{def}} \exists Z \neg X \leq Z \ \& \ \forall Y \forall Z (\exists W \neg Y \leq W \ \& \ \exists W \neg Z \leq W) \rightarrow ((Y \leq X \ \& \ Z \leq X) \rightarrow Y = Z)$
 (29) $\ulcorner \text{ov.}\Phi[V_i, A_j] \urcorner$ for $\ulcorner [\exists A': \text{sg}[A'] \ \& \ \text{Of}[A', A_j]](\Phi[V_i] \ \& \ \text{within}[V_i, A'])$
 $\ \& \ [\forall A': \text{sg}[A'] \ \& \ \text{Of}[A', A_j] \ \& \ \exists Y (\Phi[V_i/Y] \ \& \ \text{within}[Y, W])]$
 $\ \exists Y (\Phi[V_i/Y] \ \& \ \text{within}[Y, A']) \ \& \ \text{Overlap}[Y, V_i] \urcorner$ ¹⁴
 (30) $\ulcorner \text{MIN.}\Phi[V_i, A_j] \urcorner$ for $\ulcorner \forall Y (\Phi[V_i/Y, A_j] \rightarrow (\text{Of}[Y, V_i] \rightarrow Y = V_i)) \urcorner$
 (31) $\ulcorner \text{MAX.}\Phi[V_i, A_j] \urcorner$ for $\ulcorner \forall Y (\Phi[V_i/Y, A_j] \rightarrow \text{Of}[Y, V_i]) \urcorner$
 (32) $[\text{Th } X: \Phi \text{ there}] \Psi \leftrightarrow_{\text{def}} [\exists X: \Phi[X] \ \& \ \text{MIN.}\text{MAX.}\text{MIN.}\text{OV.}\Phi[X, \text{there}]] \Psi$

Translated as $\ulcorner \text{Th } \Phi \urcorner$, no definite description in natural language is the spoken counterpart of a spare logical iota-operator. The use of a definite description is an act of reference with more to it than (2)–(3) and (19)–(20) have allowed. What is plain in the meaning of *this/these* and *that/those*, reference to a space or frame of reference, is latent in the meaning of *the* where reference, like the cognitive act itself, is also perspectival.

Granted that the logical language contains ‘Th’ on behalf of definite descriptions that contract their reference, it remains that sometimes they do and sometimes they don’t (Sect. 5); and, sometimes when they don’t, they default to uncontracted, maximal reference (Sect. 6). A few considerations determine the logic of contraction. The definite description *the partially contaminated dental floss* does

¹⁴ Second-order logic is a little less blinding than the logic-neutral notation in the text—

$\ulcorner \text{ov.}\Phi[V_i, A_j] \urcorner$ for:

$\ulcorner [\exists a: Aa](\Phi[V_i] \ \& \ \text{within}[V_i, a])$
 $\ \& \ [\forall a: Aa \ \& \ \exists Y (\Phi[V_i/Y] \ \& \ \text{within}[Y, a])] \exists Y (\Phi[V_i/Y] \ \& \ \text{within}[Y, a] \ \& \ \text{Overlap}[Y, V_i]) \urcorner$

not contract to the small amount of floss bacteria fully occupy as this is not dental floss partially contaminated: the so-and-so must itself be so-and-so (Sect. 5). Sometimes, contracted reference fails when it would contract to refer to nothing. Of a fabric with a single puncture, *the punctured thread* does not contract to the thread of a puncture. It defaults to refer to all the fabric's thread (Sect. 6). The existence side-by-side of contracted reference and default, maximal reference is an ambiguity in the logical syntax. Blind translation pretends that in natural language *the so-and-so*, the description's entire content *so-and-so* is Φ flat for any of the above definitions—that $\ulcorner_{\text{DP}} \text{the NP CP} \urcorner$ translates as $\ulcorner_{\text{THE}} X: (\text{NP} \ \& \ \text{CP})[X] \urcorner$, where 'THE' is the favored logical operator. The translation is mistaken. Inside definite descriptions, the syntax of modification is 'layered' with iterated application of the definite description operator. Contracted reference and default, maximal reference correspond to alternate ways to parse a description's modifiers (Sect. 7). The more general theory of definite descriptions thus includes (32) in its logical language and a regime for translation into it that includes 'layered' modification.

2 Description by overlap

Demanding that 'Overlap' replace partitivity are those definite descriptions that contain a descriptive condition Φ that is *increasing* on the variable of abstraction:

$$(33) \quad \begin{aligned} \text{increasing}(\ulcorner \Phi[V_i] \urcorner) &\leftrightarrow_{\text{def}} \forall X \forall Y (\Phi[V_i/X] \rightarrow (X \text{ be some of } Y \rightarrow \Phi[V_i/Y])) \\ \text{increasing}(\ulcorner \Phi[V_i] \urcorner) &\leftrightarrow_{\text{def}} \forall X \forall Y (\Phi[V_i/X] \rightarrow (\text{Of}[X, Y] \rightarrow \Phi[V_i/Y])) \end{aligned}$$

If an increasing descriptive condition describes anything X , it describes everything. A definite description $\ulcorner [\text{the } V_i: \Phi[V_i]] \urcorner$ interpreted *via* partitivity ((2)–(3)) thus refers to everything, referring to anything; and, a definite description $\ulcorner [\text{the } V_i: \text{NP}[V_i] \ \& \ \Phi[V_i]] \urcorner$ refers to all the NP referring to any NP. It remains to construct definite descriptions containing increasing descriptive conditions to show that partitivity is catastrophic.

Suppose, for example, that Google project leaders submit their short lists for Google's approval prior to on-campus interviews:

- (34) a. In 10 h, Google vetted the applicants that any of its projects (had reported it) wanted/needed at least one of.
 b. In 10 h, Google vetted the applicants that at least one of its projects (had reported it), wanted/needed at least one of.
 c. In 10 h, Google vetted the applicants that some project or another wanted to hire at least one of.
- (35) Skype interviews go to the applicants that at least one project wants one of (without quite knowing yet which).

Google at a rate of 6 min per applicant vets 100 in 10 h. The above reports vetting a compilation of the projects' lists—100 on 20 lists of 5 each. No applicant is vetted unless named. The definite description in (34)–(35) culls its referents from the 20 lists. It refers to L^{100} , the 100 short-listed applicants, and not to P^{1100} , the 1100 applicants in the pool that the short lists drew from.

But, now note that if the definite description is parsed $\ulcorner$ [the X : applicants(X) & $\Phi[X]$] $\urcorner$ as in (36), it contains a descriptive condition $\ulcorner\Phi[X]\urcorner$ that is increasing on ' X '. As a result, (36) is as much true of $X=P^{1100}$ as it is of $X=L^{100}$:

- (36) applicants(X) & ¹⁵
 $[\exists Z: Z \leq X][\text{some } y: \text{project}(y)] y \text{ wanted } [\text{at least one } z: Zz] y \text{ to hire } z$

If (36) is the descriptive content and yet the definite description is defined *via* partitivity as in (2)–(3), it ought to refer to P^{1100} , occupying Google for 110 h.

Affirming (36), consider that for any one of the 20 individual projects, p_i , $1 \leq i \leq 20$, its desire is about a short list of five L_i^5 :

- (37) applicants(L_i^5) & p_i wanted [at least one $z: L_i^5 z$] p_i to hire z

Applications are shared among projects on a strictly need-to-know basis, and this pool has been partitioned among the 20 projects so that each receives 55 and is otherwise in the dark about the number or identity of the rest. Surely neither (38) nor (39) is true of any one project:

- (38) F applicants(L^{100}) & p_i wanted [at least one $z: L^{100} z$] p_i to hire z
 (39) F applicants(P^{1100}) & p_i wanted [at least one $z: P^{1100} z$] p_i to hire z

No individual project p_i has an attitude *de dicto* or *de re* toward those on other lists, L^{100} , or in the applicant pool at large, P^{1100} , of which it knows nothing, focused as it is on only its own list of five. And, thus too is neither (40) nor (41) true:

- (40) F applicants(L^{100}) & [some $y: \text{project}(y)$] y wanted
 [at least one $z: L^{100} z$] y to hire z
 (41) F applicants(P^{1100}) & [some $y: \text{project}(y)$] y wanted
 [at least one $z: P^{1100} z$] y to hire z

The facts of (37) generalize only to the descriptive condition (36). A definite description with a condition like (42) refers to nothing at all, unless the twenty short lists were the same five names:

¹⁵ For brevity, a mixed notation when harmless. Thanks to an anonymous reviewer (March 2017) and to Sam Carter and Cameron Kirk-Giannini (18 April 2017) for correction of an earlier version.

- (42) * applicants(X) &
 [some y : project(y)] y wanted [at least one z : Xz] y to hire z

As remarked, (36) is however equally true of $\mathbf{L}^{100}$ and $\mathbf{P}^{1100}$, and any definite description defined *via* partitivity ought to refer to them all, that is, to $\mathbf{P}^{1100}$:

- (43) applicants($\mathbf{L}^{100}$) &
 [$\exists Z$: $Z \leq \mathbf{L}^{100}$][some y : project(y)] y wanted [at least one z : Zz] y to hire z
 (44) applicants($\mathbf{P}^{1100}$) &
 [$\exists Z$: $Z \leq \mathbf{P}^{1100}$][some y : project(y)] y wanted [at least one z : Zz] y to hire z

Instead, defining definite description *via* ‘Overlap’, (16) in (19)–(20) (or, (29) in (32)), rules out $\mathbf{P}^{1100}$, as $\mathbf{L}^{100}$ Overlaps any X that (36) describes, including $\mathbf{P}^{1100}$, and yet $\mathbf{L}^{100}$ is strictly less than $\mathbf{P}^{1100}$, as minimality (MIN) requires, (17) in (19)–(20) (and (30) in (32)). Ruling out $\mathbf{P}^{1100}$ is however not sufficient to secure for the definite descriptions in (34)–(35) reference to $\mathbf{L}^{100}$, since many other X also satisfy minimality. Start with the short list of five $\mathbf{L}_i^5$ submitted by any project $\mathbf{p}_i$, $1 \leq i \leq 20$, to which is added one applicant off the list of each of the remaining 19 projects, $\bigcup^{1 \leq j \leq 20 \text{ \& } j \neq i} \{\mathbf{L}_i^5, \mathbf{a}_j\}$, to end with a compiled list of 24 names, $\mathbf{L}_k^{24}$. There are $20 \cdot 19^5$ ($=49,521,980$) such lists $\mathbf{L}_k^{24}$, $1 \leq k \leq 20 \cdot 19^5$. Any $X = \mathbf{L}_k^{24}$ is as (36) describes, because it contains $Z = \mathbf{L}_i^5$, a project’s full short list, and it Overlaps every other short list. It also satisfies minimality in that no lesser list obtained by removing a name continues to both be something (36) describes and satisfy the Overlap condition. Faced with plenitude, minimal maximality (MIN.MAX in (20) and (32)) steps in to restore reference to all and only what the minimized descriptive condition denotes: $\mathbf{L}^{100} = \bigcup^{1 \leq i \leq 20} \bigcup^{1 \leq j \leq 20 \text{ \& } j \neq i} \{\mathbf{L}_i^5, \mathbf{a}_j\}$, capturing the reference of (34)–(35)’s definite descriptions to the 100 applicants on the twenty projects’ short lists of 5.

This definite description in (34)–(35) is an example of *trans-frame-of-reference* (Schein 2016), culling its reference from across perhaps scattered frames of reference, defining it by a point-wise description of its points. Description of the individual point, y in (36), can at best collect there a Z that are only some of the X the definite description refers to, resulting in a descriptive condition that is increasing according to (33) and spells doom for partitivity.

Examples abound. In (45), one bank unloads only all of *its* own bad debt on another, and yet the definite description refers to the aggregate bum mortgages, as only the aggregate debt brought down the banking system and was valued so high.

- (45) The bum mortgages that/of which one bank passed all in its portfolio to the next bank eventually brought down all the banks and were fraudulently valued at \$613 billion.

Examples include descriptive anaphora (Schein 1993: 183–193; 206–214; 344ff.). Suppose farmer f_i feeds one-pound bag of oats b_k or half of it to donkey d_j as connected by lines in (46), in a situation verifying (47)–(48):

- (46)
- | | |
|--|---|
| $\begin{array}{c} d_1 \\ f_1 < > b_1 \text{ --10 min (early am)} \\ d_2 \end{array}$ | $\begin{array}{c} d_3 \\ f_2 < > b_3 \text{ --10 min (late am)} \\ d_1 \end{array}$ |
| $f_1 \text{--} d_3 \text{--} b_2 \text{--10 min (early pm)}$ | $f_2 \text{--} d_4 \text{--} b_4 \text{--10 min (late pm)}$ |
- (47) a. Exactly two farmers each fed two donkeys one bag of oats. The (bags of) oats weighed two pounds, and the donkeys ate for 20 min.
 b. Exactly two farmers each fed two donkeys one bag of oats. They were two pounds of rolled grain, and they ate for 20 min.
- (48) a. Exactly two farmers each fed two donkeys one bag of oats, in 20 min.
 b. Exactly two farmers each fed two donkeys one bag of oats. It took 20 min.

Anaphoric reference to the events described by the antecedent sentence and to the farmers, donkeys and oats therein omits the last two, solitary events in (46). The descriptive anaphora in (47)–(48) cull donkeys or (bags of) oats from across events of *a* farmer giving two donkeys one bag of oats and from no other events:

- (49) [the Z : bags of oats[Z] & [λE : then&there₍₄₆₎(E)] [Exactly $2x$: farmer(x)]
 [$\exists e$: Ee](Agent(e, x) & feed(e) & [$\exists Y$: 2 donkeys[Y]]To(e, Y) &
 [λW : [$\forall z$: Wz]] Zz & there(e, W)] Theme(e, W))]
the bags of oats that exactly two farmers each fed two donkeys one of

The anaphora in (47)–(48) referring to oats refers to the two bags b_1 and b_3 (or their contents). Yet, here too, the increasing descriptive condition in (49) is as true of all the bags in the context, $b_1, \dots, b_4$, as it is of just the two the definite description refers to. Similarly, the other descriptive anaphors in (47)–(48) refer to just donkeys d_1 , d_2 and d_3 and what they do in just the 20 min of the first two events, although all the donkeys and the 40 min satisfy the corresponding descriptive conditions.¹⁶

These definite descriptions referring to Google applicants, mortgages, farmers, donkeys and bags of oats are all sortal, count descriptions. The argument (Sect. 3) for a *universal scan* and later (Sect. 4) the logic of referential contraction *via* Overlap examine closely the special case of nonsortal definite descriptions (Sect. 3),

¹⁶ Note that more casual descriptions fashioned from antecedent content, e.g., *the bags of oats that (the) farmers fed (the) donkeys, the donkeys that (the) farmers fed (the) bags of oats, etc.* fail either in being too inclusive, including the oats or donkeys fed anywhere in (46) or too restrictive if understood to require of the individual donkey or bag of oats that it relate to both farmers.

which are equally at risk from increasing descriptive conditions. Consider a two-hour flight through intermittent weather across Southern New England from Lawrence Municipal Airport to Westchester County Airport:

- (50) The airspace across Southern New England was not calm.
- (51) The time aloft was not calm.
- (52) a. The communication in flight with Air Traffic Control was interrupted.
b. The communications in flight with Air Traffic Control were interrupted.

The airspace, the time aloft, or the communication(s) in flight were not calm or were interrupted just in case some of it was—with intermittent turbulence or radio interference. The definite descriptions in (50)–(52) refer to the entire 2-h flight and its envelope of airspace across Southern New England. Yet, (50)–(52) may be continued as in (53)–(55) while (56)–(58) remain false, showing that the definite descriptions in (53)–(55) and their counterparts in (56)–(58) do not agree in their reference despite the truth of (50)–(52):

- (53) The airspace (across Southern New England) that was not calm had low visibility throughout.
- (54) The time aloft that was not calm was always under clouds.
- (55) a. The interrupted communication with Air Traffic Control totaled a few minutes.
b. The interrupted communications with Air Traffic Control totaled a few minutes.
- (56) F The airspace across Southern New England had low visibility throughout.
- (57) F The time aloft was always under clouds.
- (58) a. F The communication with Air Traffic Control totaled a few minutes.
b. F The communications with Air Traffic Control totaled a few minutes.

The definite descriptions in (53)–(55) contract their reference, as only description *via* Overlap affords, to just the scattered flight segments totaling a few minutes of turbulence and low visibility under the clouds during which radio transmission was unsuccessful. Note that these few minutes overlap any larger duration meeting the increasing descriptive condition and they are the least to do so.¹⁷

Whether sortal or nonsortal, any definite description that contains an increasing descriptive condition, “the *X* some of which so-and-so,” threatens to refer to everything if it is defined *via* partitivity to include everything that meets the descriptive condition. If there are so-and-so, everything is something some of which so-and-so. The above have illustrated definite descriptions that contract their reference to refer to Google applicants, mortgages, farmers, donkeys, bags of oats, airspace, time aloft, and communications in flight which are less than everything and less than what in their contexts meet their descriptive conditions, for which ‘Overlap’ must replace partitivity in the definition of definite description.

¹⁷ An exercise for the reader is to understand that maximality does no work in these examples.

3 Nonsortal definite descriptions

Nonsortal definite descriptions include both some that omit lexical nouns altogether, e.g., *the stained*, *that which is stained*, *what(ever) is stained* and some where the lexical noun is defective as a sortal, where what is denoted in context is too dense, too entangled, or too indeterminate to be reliably counted: *the stained stuff*, *the things that are stained*, *the stained part or parts of the fabric*, *the amount of fabric that is stained*, *the stained amounts of fabric*, *the stained area of the fabric*, *the areas that are stained*, *the stained thread in the fabric*, *the weave in the fabric that is stained*, etc.¹⁸

The nonsortal definite descriptions at issue are those with an increasing descriptive condition, which express what in the setting of mass terms is taken to be a *counter-dissective* property. A *dissective* property (Quine 1960), is true of (almost) all of whatever it is true of, such as *clean*, *sterile*, *unstained*, *immaculate*, *pure*, *aflame*, *ablaze*, *consumed by fire*, *engulfed in fog*, *covered all over in schmutz*, *soaked in wine*, *drenched in blood*, *saturated with oil*, *steeped in kerosene*, *untouched*, *smooth*, *flat*, etc. It suffices for a *counter-dissective* property to be true of some of whatever it is true of: *dirty*, *unclean*, *not sterile*, *stained*, *not uncontaminated*, *impure*, *not aflame*, *not ablaze*, *not consumed by fire*, *not engulfed in fog*, *not covered over in schmutz*, *not soaked in wine*, *not drenched in blood*, *not saturated with oil*, *not steeped in kerosene*, *dented*, *crooked*, *kinked*, *not smooth or flat*, *scratched*, *flawed* etc. The argument to replace *universal sampling* with a *universal scan* rests on such non-sortal, counter-dissective definite descriptions as *the stained*, *the not sterile*, *the unclean*, *the flawed*, *that which is not engulfed in fog*, *what is not covered in blood*, *what is not surrounded*.

To review again a quick illustration of the problem prior to a more deliberate example, consider some tangled, pre-cut dental floss sold in a sterile package. After its breach, each string in the package comes to host a single bacterium, so that:

(59) The dental floss strings are not sterile.

(60) The dental floss is not sterile.

(61) The dental floss string is not sterile.

But, not all is lost, armed with tweezers and scalpel:

(62) #1 will separate the dental floss strings that are not sterile from the rest that still are.

(63) I will separate the dental floss that isn't sterile from the rest that still is.

(64) I will separate the dental floss string that isn't sterile from the rest that still is.

¹⁸ See Koslicki (1997) for discussion. The existence of such examples suffices for the argument to follow, even without a satisfactory characterization of the sortal/non-sortal, count/mass distinction, which is therefore sidestepped here.

There are no strings still sterile to salvage—hence, the referential failure in (62). Yet, despite contamination of the entire mass ((60)–(61)), definite description in (63)–(64) contracts from it to leave behind something to salvage. The example is another to sustain the argument (Sect. 2) against definite description *via* partitivity; and, for the same reasons, Overlap is essential for the correct semantics, and by the same reasoning, definite description so defined contracts to its correct reference in (63)–(64). So much is common to (20) and (32) and accounts for their resemblance. But, only the definition (32) replacing (20)'s *universal sampling* with a *universal scan* promises a uniform meaning for definite description assimilating sortal and non-sortal alike.

For the more deliberate example, consider a cotton sheet, of which the lower half is saturated in blood and the upper half sterile:

(65)



It is stained in virtue of the blood on some of it, and so is anything coincident with all of it:

- (66) The sheet (65) is stained.
- The sheet's cotton is stained.
- The sheet's area is stained.
- The sheet's threads are stained.
- The sheet's thread is stained.

Yet, nonsortal definite descriptions that describe what is stained in (65) can shrink their reference to the stain itself:

- (67) What is stained equals the area of what isn't.
- (68) The stained area of the sheet is half of it.
- (69) The stained cotton is (a) square.
- (70) The parts that are stained are half and the parts that aren't are the other half of the cotton sheet.
- (71) The thread that is stained is opposite the thread that isn't.
- (72) F The threads that are stained are opposite those that aren't.

If anything is stained just in case some of it is,¹⁹ what nonsortal definite description accomplishes is reference to just that which is *sine qua non* for its stained condition, the stain itself—the witness to the existence of stain. Yet, as in Sect. 2, its interpretation *via* accumulation under partitivity derives reference to only the whole of (65). Stained as it is (66), it must according to (2)–(3) be included in the reference of any of the definite descriptions (67)–(72).

There is then to be found a stark contrast, already in (62) *versus* (64) and in (71) *versus* (72), between the nonsortal definite descriptions at issue here and the sortal definite descriptions at the focus of most discussions about definite description. Suppose that in (65), every thread in the sheet's length runs its entire 40 cm length and every thread in its width runs its entire 20 cm width:

- (73) a. The threads that are stained with blood are 400 cm² of the sheet.
 b. The threads that are stained with blood cover only its lower half.
 c. The threads that are stained with blood are (a) square.
- (74) a. The threads that are not covered over in blood are 400 cm² of the sheet.
 b. The threads that are not covered over in blood cover only its upper half.
 c. The threads that are not covered over in blood are (a) square.

The sentences (73)–(74) with sortal definite descriptions are here all false. The stained threads are all the 40 cm threads in the sheet's length and half the 20 cm threads in its width, those in the width of the sheet's lower half, which threads length-wise and width-wise altogether span the entire 800 cm² sheet. Likewise, the threads not covered over in blood are all the 40 cm threads in the length and half the 20 cm threads in its width, those of the sheet's upper half, again spanning altogether the entire 800 cm² sheet. Sentences (75)–(76) distill the contrast between nonsortal and sortal descriptions:

- (75) The stained thread is 400 cm² of the sheet.
- (76) The stained threads are 800 cm² of the sheet.

Crucial to the contrast are some observations about the sheet's stained 400 cm² lower half. Its threads are only the 20 cm threads that lie across its width. None of the half-threads or shorter in its length is *a* thread. In no sense do the stained threads of the sheet's lower half, all horizontal, overlap the stained 40 cm threads in the sheet's vertical length: neither is any thread of the one a thread of the other, nor is any thread of the one even a material part of a thread of the other. It thus comes about that the sortal *the stained threads*, either including ((2), (3)) or overlapping ((20), (32)) all the stained threads, refers to all the sheet's threads spanning 800 cm², as (76) reports, a point on which definition *via* partitivity ((2), (3)) and Overlap agree ((20),

¹⁹ As an anonymous reviewer has noted, this is an idealization true only in the narrow context. The shirt stain that ruins my wardrobe does not render the world's cotton stained. If Boston Harbor is polluted, it does not follow that the Atlantic Ocean is.

(32)). The nonsortal *the stained thread*, in contrast, refers to only the sheet's lower half, as in (75). That it should be so starts from the observation that the thread [*sic*] of the sheet's stained lower half is thread of the threads in its width and of the half-threads in its length. And, it should seem *obvious* that the stained thread of the sheet's stained lower half overlaps all the stained thread of the sheet, the least such amount of stained thread and therefore what *the stained thread* refers to according to the definition (20) founded on Overlap. But, it comes down to this: whether it is true that the thread of a stained 20 cm half-thread in the length of the sheet's lower half overlaps the thread of the stained 40 cm thread in the sheet's length of which the half-thread is a *material* proper part. If so, it suffices that this thread overlaps that thread if a material part of one is (a material part of) the other. This stands in contrast to partitivity, according to which this thread overlaps that thread just in case some of this *is* some of that, and these threads overlap those threads just in case some of these are some of those (v. (12), (13)). But, no thread half the sheet's length is thread its full length; all such half-length thread is merely material part of full-length thread. If Overlap remains as in (12)–(13) defined in terms of partitivity, the amended definition (20) does no better than definition *via* partitivity in distinguishing *the stained thread* from *the stained threads*. Both end up referring to thread that spans the entire 800 cm², failing the contrast recorded by (75)–(76).

In the sheet, there is 800 cm² of stained thread, but the definite description in (75) contracts its reference to the lower half of it, 400 cm². The stain that is the lower half does indeed overlap in material constitution all that is stained, the whole sheet. But, Overlap in its setting in (20) requires rather that some of what is referred to *be* some full-length thread, since the full-length thread is stained thread. But, nothing in the lower half is full-length. Despite the move from partitivity to 'Overlap', the amended definition (20) does not yet achieve the contracted reference seen in (75), for which further amendment is necessary, the move from universal sampling to a universal scan promised in (32).

4 Universal scan: definite descriptions as latent demonstratives

It is not open to us to divorce mass and plural definite description from mass and plural predication or to corrupt the latter with a metaphysics of material parts if the contrast between the false (77) and the true (78) and the affinity between quantification and definite description within each of (77) and (78) are to be respected and preserved:

- (77) a. i. All thread stretching halfway from the bottom is thread stretching the full length.
 ii. All thread stretching halfway from the bottom is some of the thread stretching the full length.
- b. i. The thread stretching halfway from the bottom is thread stretching the full length.

- ii. The thread stretching halfway from the bottom is some of the thread stretching the full length.
- (78) a. All thread stretching halfway from the bottom is part of thread stretching the full length.
 b. The thread stretching halfway from the bottom is part of thread stretching the full length.

Overlap is inter-definable with partitivity ((12), (13), n. 13). Partitivity tracks predication conforming to Comprehension (v. (4)–(6)) and delivers the equivalence of *any of the thread(s) the length of the fabric* and *any thread(s) the length of the fabric*. We are then left to look elsewhere for a repair that will render the contrast in (75)–(76) between non-sortal *the stained thread* and sortal *the stained threads*.

If demonstrative articles *this/these versus that/those* can point to a space or frame of reference within which are distinguished proximal and distal reference, it can be asked of any other article in natural language—*the*—whether it too happens to resort to perspective, even if the pointing is less rude.²⁰ Rather than a definite description that fixes its reference by *universal sampling* in the manner of (79) or (80), the perspectival turn turns to a universal scan or survey as in (81):

- (79) *Anything* Φ be part of the Φ (v. (2)–(3)); or,
 (80) *Anything* Φ overlap the Φ (v. (12), (13)).
 (81) *Anywhere* there be Φ , the Φ *there* overlap the Φ .

As before, definite reference is to the maximal least such Φ overlapping what Φ there is in the given spatiotemporal context *THERE* (e.g., (65)):

- (82) “The Φ *THERE* are
 some Φ *THERE*-*X* such that *anywhere* *THERE* there be Φ , the Φ *there*
 overlap *X*, and for any *Z* that also be such, the *X* be *Z*.”

In effect, definite description culls its referents not from a universal quantification over arbitrary samples of Φ but only over samples that are all the Φ that fill some spatiotemporal region or some region of the perceptual field. This will enable *the stained thread* to contract its reference to just the thread of the stain, without sacrificing Comprehension or a partitivity that tracks predication rather material parthood. Of the full-length thread that is only half stained, only its stained half length is included. It is included not because the half length is a material part of the full length. It is because the spatiotemporal region that the half-length thread

²⁰ In an extensive survey, Schwarz (2013) observes that German, Fering, Akan, Mauritian Creole, Lakhota, Hausa and Haitian Creole split English *the* in two with surprising agreement on how to divide up its uses. Neither of what Schwarz (2013) calls the weak and strong definite articles survives, in my view, as the expression of the logical iota-operator, both imposing further and different epistemic or perspectival conditions.

occupies is part of the spatiotemporal region that the full-length thread occupies. This shift from directly sampling everything described to scanning everywhere it is and taking from what is there is what distinguishes the definition in (90) from its antecedent in (19)–(20):

- (83) (2nd-Order Logic) $\text{Within}[X, A] \leftrightarrow_{\text{def}} [\forall x: Xx][\forall a: Aa] \text{ within}(x, a)$
 (84) (Monosortal Plural Logic) $\text{Within}[X, A] \leftrightarrow_{\text{def}} [\forall Z: \text{sg}[Z] \ \& \ Z \leq X][\forall W: \text{sg}[W] \ \& \ W \leq A] \text{ within}(Z, W)$
 (85) (2nd-Order Logic) $\text{sg}[X] \leftrightarrow_{\text{def}} \exists x Xx \ \& \ \forall x \forall y ((Xx \ \& \ Xy) \rightarrow x=y)$
 (86) (Monosortal Plural Logic) $\text{sg}[X] \leftrightarrow_{\text{def}} \exists Z \neg X \leq Z \ \& \ \forall Y \forall Z ((\exists W \neg Y \leq W \ \& \ \exists W \neg Z \leq W) \rightarrow ((Y \leq X \ \& \ Z \leq X) \rightarrow Y=Z))$
 (87) $\ulcorner_{\text{OV}}. \Phi[V_i, A_j] \urcorner \text{ for } \ulcorner [\exists A': \text{sg}[A'] \ \& \ \text{Of}[A', A_j]] (\Phi[V_i] \ \& \ \text{within}[V_i, A']) \ \& \ [\forall A': \text{sg}[A'] \ \& \ \text{Of}[A', A_j] \ \& \ \exists Y (\Phi[V_i/Y] \ \& \ \text{within}[Y, W])] \exists Y (\Phi[V_i/Y] \ \& \ \text{within}[Y, A'] \ \& \ \text{Overlap}[Y, V_i]) \urcorner^{21}$
 (88) $\ulcorner_{\text{MIN}}. \Phi[V_i, A_j] \urcorner \text{ for } \ulcorner \forall Y (\Phi[V_i/Y, A_j] \rightarrow (\text{Of}[Y, V_i] \rightarrow Y=V_i)) \urcorner$
 (89) $\ulcorner_{\text{MAX}}. \Phi[V_i, A_j] \urcorner \text{ for } \ulcorner \forall Y (\Phi[V_i/Y, A_j] \rightarrow \text{Of}[Y, V_i]) \urcorner$
 (90) $[\text{Th } X: \Phi \text{ there}] \Psi \leftrightarrow_{\text{def}} [\exists X: \Phi[X] \ \& \ \text{MIN. MAX. MIN. OV. } \Phi[X, \text{there}]] \Psi$

In (83)–(90), ‘within(v, α)’ is the native concept that relates object, event, or spatiotemporal region v to a spatiotemporal region α it is within. For expedience, the spatiotemporal regions that are the range of this relation are taken to be a spatiotemporal mereology. But, if I am correct in the speculation that the universal quantification mirrors a perceptual scan, no region scanned at any moment is likely to be the mereological fusion of scattered spatiotemporal regions, and no completed scan is likely to be the result of scanning the mereological closure of some spatiotemporal regions.²² The spatiotemporal regions are not assumed to be regions of absolute space and time but rather regions within such frames of reference—large and small, stationary and mobile, egocentric and allocentric in their coordinate systems—as are called upon in a language for spatial orientation and navigation (Schein 2017, chapter 9).²³ It may seem that spatiotemporal location needs apology for that which has no spatiotemporal extension, such as tainted evidence in contrast to stained thread. Yet, it is already conceded that *this tainted evidence* is within a proximate region and *that tainted evidence* isn’t. When there is more tainted evidence than untainted evidence, when the tainted evidence outweighs the

²¹ Second-order logic is a little less blinding than the logic-neutral notation in the text—

$\ulcorner_{\text{OV}}. \Phi[V_i, A_j] \urcorner \text{ for:}$

$\ulcorner [\exists a: A_j a](\Phi[V_i] \ \& \ \text{within}[V_i, a])$

$\ \& \ [\forall a: A_j a \ \& \ \exists Y (\Phi[V_i/Y] \ \& \ \text{within}[Y, a])] \exists Y (\Phi[V_i/Y] \ \& \ \text{within}[Y, a] \ \& \ \text{Overlap}[Y, V_i]) \urcorner$

²² I cannot anticipate what commitments would arise in properly characterizing the relevant domain—whether a formal mereotopology (v , e.g., Casati and Varzi 1999) would suffice or it requires appeal to a full-throated theory of spatial perception and orientation.

²³ Much thanks to an anonymous reviewer, whose question prompts the following remarks.

untainted evidence, the when and where of measurement, its reference to and arrangement of what is to be measured imposes *pro tempore* spatiotemporal location on that which has none of its own. This is just as well. The spatiotemporal dimensions of measurement and acts of reference afford spatiotemporal language, *this* and *that*, a uniform semantics without the pretense of a uniform metaphysics for tainted evidence, stained thread, and sullied virtue.²⁴ In setting out two bodies of tainted evidence, measuring *this* tainted evidence *here* against *that* tainted evidence *there*, the distance between them may exist, if there are no dossiers on the table, only in an imaginary frame of reference. The proposal is just to classify *the* with *this* and *that* as just some more spatiotemporal language with like applications. Analysis is then calibrated to the concrete in the expectation that the proposed axioms for spatiotemporal language will also have application across-the-board to the abstract, as usage insists.

Return now to the nonsortal *the stained thread* and the sortal *the stained threads*, and to the disposition of any a 40 cm thread in the length of (65), which earlier thwarted an account of the contrast in (75)–(76). It is stained thread and a stained thread, in virtue of the 20 cm blood stain in its lower half. It remains under (90), as before, that the stained threads of the sheet's lower 400 cm² half are all horizontal in its width and thus do not overlap vertical threads in its length, in any sense canvassed.²⁵ Hence, the stained threads in (65) are nothing less than 800 cm² if they are to overlap the stained threads of its length—correctly so, (76). Consider next the solitary 40 cm thread and that region α , 40 cm in length and some micrometers in width, which coincides with this thread. According to (90), what *the stained thread* refers to must overlap the stained thread within α . Certainly, the stained thread within α includes the solitary strand coincident with α ; but, it also includes the 20 cm stained half-thread within α and any smaller amount thereof, too. The region is populated with much stained thread, many amounts of it. It suffices that these amounts enter into the reference of the definite description as witness of the region's stain. These amounts are of course within and therefore overlap the *region* α ; but, such an amount neither is some of nor overlaps any other amount of thread there to which it isn't identical. The reference of *the stained thread* is to only the lower 400 cm² of the sheet, as in (75), as it is the least stained thread to overlap all the *regions* of stained thread in (65).

Section 2 has rejected *universal sampling* in consort with accumulation *via partitivity*. The above rejects *universal sampling* with *Overlap* and instead combines a *universal scan* with *Overlap*. It remains to reject the combination of a *universal scan* and *partitivity*. Were one to accept quantification over spatiotemporal regions and instead revert in (83)–(90) to the original partitive relation in (2)–(3), the semantics for nonsortal definite description, *the stained*, would again fail, for the same reason. The stained thread within any region would then be said to *be some of* the stained thread referred to—not merely to overlap it—with the result that the

²⁴ So it is that one may verify that more beauty is in a rose than in all your museums, by measuring the beholders' excitation calibrated with the direction and location of attentional focus, without comment—thank goodness—on the constitution of beauty. See Koslicki (2008) for skeptical remarks about a universal constitution relation.

²⁵ That is, horizontal threads are neither themselves vertical threads nor parts of them.

nonsortal *the stained thread* again ends up referring like sortal *the stained threads* to all 800 cm² of (65). Counter-dissective properties are true of what they are true of in virtue of something about some of it. Special to nonsortal, counter-dissective definite description is the contraction of reference to what in the field is the *sine qua non* for the property to be true of what it is true of—the stain in the stained fabric of (65). This contraction in reference is an effect of the definition in terms of overlap and the least that overlaps. This contraction is restrained and obscured if the least is described to be whole threads, as in the sortal *the stained threads*. It has an effect that becomes apparent when the domain is dense and fine-grained enough—any and all the thread—and reference shrinks to fit all of what is stained and none of what is not stained. The special nature of nonsortal, counter-dissective definite description can be accommodated in a general theory of definite descriptions only with a two-fold amendment: the substitution of *Overlap* for *partitivity*, and the shift in perspective to quantification over spatiotemporal regions, a *universal scan* as in (83)–(90).

5 The logic of contraction

The contraction in reference is constrained by an essential feature of definite description inherited from Sharvy's original definition²⁶—that *the* Φ Φ . In (65), as any of its bloody lower half may be the half of something *half-stained*, the reference of *the half-stained* must include within its perimeter the 400 cm² lower half. But, then the half-stained is half-stained only if its reference also includes the sheet's upper half. The 800 cm² of (65) is thus the least half-stained that all that is half-stained there overlaps, and so *the half-stained*, *the half-stained thread*, *the half-stained area(s)* and *the half-stained part(s)* refer to all of (65). In contrast, *the mostly stained* equivocates in its reference. If it is understood that *mostly stained* does not exclude the entirely stained, then *the mostly stained* refers in (65) to the entirely stained, to its 400 cm² lower half, as do *the mostly stained thread*, *the mostly stained area(s)*, *the mostly stained part(s)*, etc. Reference contracts to the least mostly stained that overlaps all the mostly stained, as (90) says. If instead definite description were defined *via* partitivity, only failure can be expected, in that the least that anything mostly stained is some of is not itself mostly stained. All of that is all of (65), which is merely half-stained. If, next, it is rather understood that *mostly stained* excludes the entirely stained, then definite reference to *the mostly stained*, *the mostly stained thread*, *the mostly stained area(s)* or *the mostly stained part(s)* fails on all accounts, as it does in fact, as there is now no least, mostly-but-not-all stained that all the mostly but not all stained is either some of or overlaps. For any alleged such, there is an even lesser, closing in asymptotically on the entirely stained.²⁷ Reference or failure of reference for *the stained*, *the half-stained* and *the mostly stained*, their predicates variously understood, follows from (90) alone and what it says about the Φ overlapping

²⁶ The importance of which Cartwright (1996) emphasizes. See n. 6 above.

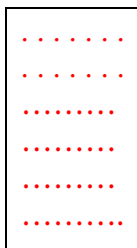
²⁷ As an anonymous reviewer notes, this asymptotic approach assumes unbounded divisibility of the unstained region, which is how it looks even if one knows better. A more mathematical example would bring fact and appearance into alignment.

whatever Φ there is. Any case of successful definite reference that is also contracted reference is dispositive in favor of (90)'s amendment in terms of Overlap.

6 Default to maximal reference

The contraction in reference that Overlap induces in definite descriptions interacts with the denotation of nonsortal lexical nouns and noun phrases. Instead of (65), imagine that the sheet is pin-pricked with blood:

(91)



Of (91), the sortal *the stained threads* refers cleanly to just those threads that happen to intersect a bloody pin-prick. But, the reference of the nonsortal *the stained thread* quivers under one's commitment to (92):

(92) All thread is longer than it is wide.

It is indeterminate how contracted the reference to stained thread can be while it remains thread-y enough to be thread rather than a small amount of bloody cotton. In contrast, the nonsortal *weave* supervenes on intersections, and *the stained weave* refers snugly to just what coincides with the pin-pricks in (91).²⁸

There are also cases where (90) unsupplemented predicts a failure of reference that is not seen. What is seen is a default to maximal reference, which is not explained without the refinements to natural language translation proposed in the next section. Take *partly stained* not to be true of the entirely stained, which fits how it is understood. As with *the mostly stained*, there is in (65) no least, partly stained that all the partly stained overlaps, since reference to any alleged such is always defeated by a lesser that closes in on the entirely stained. Yet, here there is the partly stained that all the partly stained Overlaps, viz. the entire 800 cm^2 , to which it seems *the partly stained*, *the partly stained thread*, *the partly stained weave*, *the partly stained area*, etc. refer. The empirical generalization is: if contracted reference fails according to (90), contracted reference fails; but, the definite description *the so-and-so* is rescued if there is instead so-and-so that all so-and-so Overlap, to which its reference then defaults.

²⁸ Unless of course the pin-pricks are so tiny that the blood inhabits the interstices without soaking through any intersecting thread.

Some further examples modulate between contracted reference and its default to maximal reference. In (65), the stain's boundary coincides with the sheet's center line—like the 50-yard line on a 100-yard football field. Suppose that what is *centered* in (65) is any of it that also has the stain's boundary for its center line. Whereas as above, *the stained*, *the stained thread*, *the stained part(s)*, *the stained area(s)*, etc. contract reference to (65)'s lower half, *the stained and centered*, *the stained centered thread*, *the stained centered part(s)*, *the stained centered area(s)*, etc. default to refer to what covers all of (65) (unless there is also a worry that the intended referent is to a proper part of (65), in which case definite reference again fails). But, as with *the mostly stained* (not excluding the entirely stained), *the stained and off-center*, *the stained off-center thread*, *the stained off-center part(s)*, *the stained off-center area(s)*, successfully contract their reference to the lower 400 cm^2 , in accordance with (90).

The default to maximal reference when contraction fails is broadly observed. Recall the 2-h flight across Southern New England and its radio communication. On the first such flight, constant radio chatter was interrupted with intermittent static transmission. On another such flight, a military exercise, radio silence was also interrupted with intermittent static transmission with the same frequency and duration as the first flight:

(93) The broken radio transmission totaled a few minutes.

(94) F The broken radio silence totaled a few minutes.

As above, the first flight's two hours of communication was radio transmission broken by intermittent breaks, and (93) contracts reference to that static transmission. But, in (94), as the breaks in radio silence, static transmission, are not silence, contraction fails, failing to refer to radio silence. In (94), *the broken radio silence* defaults to what Overlaps all broken radio silence, viz. the 2 h of radio silence intermittently broken. Colonized mold is mold that contains within its precincts some colonies of foreign mold. Consider a Petri dish of mold within which is a single foreign colony that is itself uncolonized. *The colonized mold* refers to all the mold in the Petri dish rather than contract to something that isn't colonized mold. It is similarly difficult for *the cracked glass*, *the chipped surface*, *the flawed granite*, *the punctured rubber* to contract its reference from the surrounding expanse to the crack in the glass, the chip in the surface, the flaw in the granite or the puncture in the rubber. It becomes quite subtle, I think, in the following contrast. Consider two parallel threads twisted at one point in a 180° twist, and another two parallel threads joined in the simplest knot. It seems to me that *the twisted thread* refers to all the thread, without contraction; but, *the knotted thread* manages to refer to just the thread of the knot. The contrast seems in accord with the extent to which a knot is felt to be an object in its own right but a twist, just a geometry for its host without its own volume.

As just recounted, definite description *the so-and-so* fails to contract reference when there is no least so-and-so that remains so-and-so. For any broken silence that is some silence broken with static noise, there is a lesser broken silence with less silence surrounding the noise, which in the limit is not silence at all. Contracted reference fails for such definite descriptions according to (90)—correctly so. But, such definite descriptions do not end in referential failure, defaulting instead to uncontracted, maximal reference, where *the broken silence* refers to all silence

broken with static noise. To derive the distribution of contracted and uncontracted reference requires amendment in the logical syntax of definite descriptions.

7 Translation in natural language

When applied blindly to natural language, common to all the definitions, (2)–(3), (19)–(20) and (90), is that descriptive content, whole and unstructured, simply Φ in the definitions, applies equally to the Φ that the description refers to and to everything Φ or everywhere Φ that goes into it. Commonly, $\lceil_{[DP} \text{the NP CP} \rceil$ translates as $\lceil_{[THE X: (NP \& CP)[X]]}$, where ‘THE’ is the favored operator. Already this fails translation of definite descriptions that contain cardinals (Schein 2006: §29.2.2):

- (95) The 365 custards that blanketed no more than two buffets were served in a cup with a cherry on top.

Suppose that there are two buffets, one blanketed in 248 custards and the other, in 365 custards. The definite description in (95) has an interpretation such that it fails to refer, where it is intended to refer to all the custards that blanket no more than two buffets. It therefore cannot refer to the custards on just one buffet omitting those on the other; and yet it cannot refer to the custards on both, as these are 613 not 365. In this respect, the prenominal cardinal in (95) is outside the restriction, thus unlike (96) and more like (97), where the definite description refers felicitously to the custards on just the one buffet^{29,30}:

²⁹ One reader has balked at too close an analogy between the cardinal modification in (95) and the appositive relative clause in (97), suggesting that the former may not fit recognized taxonomies for the latter (Loock 2007) that sort them according to their information status. If (95) fits at all, it would fit what Loock (2007) calls Relevance apposition rather than Continuative or Subjectivity apposition. Such correction is welcome. The crucial point is that the cardinal in (95) not be absorbed into the restrictive modification, as it is in (96). This holds *a fortiori* if a more elaborate cartography maps different positions internal to DP to different types of (non-) restrictive modification.

³⁰ More recently I have heard from a few readers and reviewers about another interpretation for (95), about which there seems to be some disagreement and variation. It can be illustrated more simply with *the 365 custards*. Construing it as above and attempting to use it, one is met with: “What do you mean? There are 613.” On this interpretation, *the 365 custards* means “the custards—which are 365”, which fails as above in that it refers to all the custards and says they are 365 when they are 613. The rumored interpretation, which I think intonation modulates—*the 365 custards* not *the 248*—means “the custards in a (salient) group of 365”, which manages to refer to the custards on the one buffet. I myself imagine this under roughly the same conditions I might utter pre-nominally what it is usually post-nominal, *the in-a-group-of-365 custards*. The contrast can be enhanced:

- (i) The no more than 248 custards that blanketed no more than two buffets were served in a cup with a cherry on top.
- (ii) The custards that blanketed no more than two buffets and numbered no more than 248 were served in a cup with a cherry on top.

The definite description in (ii) refers to the 248 custards on the other buffet. The definite description in (i) fails as above, purporting to refer to 613 custards, all those that blanket no more than two buffets, and yet saying they are no more than 248.

- (96) The custards that blanketed no more than two buffets and numbered 365 were served in a cup with a cherry on top.
- (97) The custards that blanketed no more than two buffets, which numbered 365, were served in a cup with a cherry on top.

Thus, the translation of *the 365 custards that blanketed no more than two buffets* is (99) rather than (98)³¹:

- (98) * [ThX: 365(X) & custards that blanketed no more than two buffets(X)]
- (99) [ThX: custards that blanketed no more than two buffets(X) &
[ThX: custards that blanketed no more than two buffets(X)] 365(X)]

Crucially, (99) parses the description so that the cardinal predicate *365* is segregated from the accumulative *custards that blanketed no more than two buffets* and applied only to the accumulated referent.³²

More generally, even among modifiers all of which are restrictive, modification is ‘layered’, iterating application of the definite description operator:

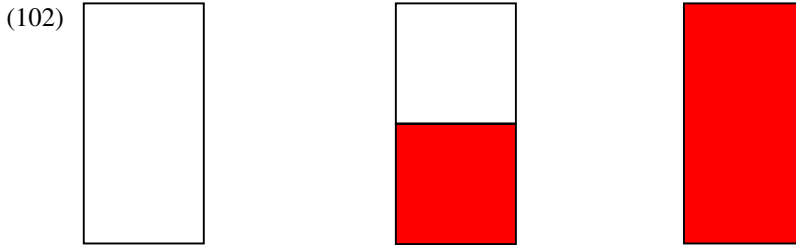
- (100) a. The stained thread (that is) woven together into whole sheets is 800 cm² of the fabric.
b. The thread not covered over in blood that is woven together into whole sheets is 800 cm² of the fabric.
c. The woven-into-sheets, stained thread is 800 cm² of the fabric.
- (101) a. The woven-into-sheets thread (that is) not covered over in blood is 1200 cm² of the fabric.
b. The thread woven together into whole sheets that is not covered over in blood is 1200 cm² of the fabric.
c. The stained, woven-into-sheets thread is 1200 cm² of the fabric.

³¹ The point holds equally under translation *via* any of the operators, (2)–(3), (19)–(20).

³² The structure here of an accumulative condition that omits a modifier that is then in turn applied only to the accumulated referent recurs in a puzzle posed in von Fintel et al. (2014: 169f.). Suppose three Tolstoy novels, *War and Peace*, *Anna Karenina* and *Resurrection* are all read the same Sunday and *War and Peace* and *Anna Karenina* are read again without *Resurrection* the next Sunday. The definite descriptions *the novels read the same Sunday*, *the novels read on a single Sunday* fail to refer. But, for Φ = ‘novels read the same Sunday[X]’ or Φ = ‘novels read on a single Sunday[X]’, the definitions above concur that they ought to refer felicitously to the three novels. If all noun phrases express relations to events, and so $\Phi[E, X]$ = ‘novels read on the same Sunday[E, X]’, predicates of events may come to describe only accumulated reference. Analogous to the cardinal in (99), a temporal frame adverbial may as in (i) apply to the accumulated events of novels being read:

(i) [ThX: $\exists E$ novels read (E.X) & [ThE: read(E, X)] on the same Sunday(E)]

As desired, (i) fails to refer any of the Tolstoy novels in the described context. It also fails to refer, as von Fintel et al. (2014) say it ought to, when one Sunday’s reading is not contained within the other’s or when they are entirely disjoint, like the two buffets of custard. See Schein (2016) for argument that adverbial modifiers in clauses, embedded in noun phrases or not, apply systematically either to the framing events *E* or point-wise to the frame events *e* therein.



Of the three sheets in (102), the stained thread, the thread not covered over in blood, is half of it. Of this thread, only the thread of the right sheet is woven together into whole sheets, covering 800 cm^2 , as in (100), where the inner modifier first derives reference to the stained thread, which the outer modifier in turn further restricts. Permuting in (101) the inner and outer modifiers, the thread woven together into whole sheets in (102) is all of it—no wasted or scrap thread there—of which the stained thread is 1200 cm^2 , the right sheet and half the center sheet:

(103) [ThZ: [Th X_0 : thread(X_0)] [Th X_1 : Of[X_1 , X_0] & stained(X_1)]
[Th X_2 : Of[X_2 , X_1] & woven(X_2)] Of[X_2 , Z]]³³

(104) [ThZ: [Th X_0 : thread(X_0)] [Th X_1 : Of[X_1 , X_0] & woven(X_1)]
[Th X_2 : Of[X_2 , X_1] & stained(X_2)] Of[X_2 , Z]]

Iterated modification thus shows semantic scope effects, asymmetric in their truth-conditional import.³⁴

³³ "Of[V_i , V_j]" as in (14)–(15).

³⁴ Compare the scope effects of modification in (i)–(ii):

M1 M2

M3 M4

- (i) a. The left right object is Messier Number 3.
b. The large small object is Messier Number 3.
- (ii) a. The right left object is Messier Number 2.
b. The small large object is Messier Number 2.

And, contrast (i)–(ii) with the contradictory, referential failure in (iii)–(iv):

- (iii) * The left and right object is Messier Number 3.
- (iv) * The small and large object is Messier Number 3.

Also, contrast (100)–(101), with the symmetric modification in (v):

- (v) a. The stained and woven-into-sheets thread is 1600 cm^2 of the fabric.
The stained and framed/edged thread is 1600 cm^2 of the fabric.
- b. The woven-into-sheets and stained thread is 1600 cm^2 of the fabric.
The framed/edged and stained thread is 1600 cm^2 of the fabric.

Inner and outer modification are further divided by the content of the modifiers assigned to these positions. Modifiers taken to attribute dispositional properties are all interior to the modifiers that are episodic in meaning or indexical to the context, which occur in more peripheral position (Bolinger 1967; Larson 1998; Larson and Marušić 2004; Larson and Takahashi 2007):

- (105) a. On Mt. Wilson that night, the invisible visible stars were shrouded in the Los Angeles smog.
 b. On Mt. Wilson that night, the visible stars (that were) invisible were shrouded in the Los Angeles smog.
- (106) a. # On Mt. Wilson that night, the visible invisible stars were shrouded in the Los Angeles smog.
 b. # On Mt. Wilson that night, the invisible stars (that were) visible were shrouded in the Los Angeles smog.

Thus, the sentences in (105) may report without contradiction that the stars listed in an atlas of visible stars were invisible that night; but, (106) only means that the standardly invisible were visible that night through the smog—not very likely. Note that the very same modifiers, *visible and invisible*, vary in their apparent meaning according to their syntactic position. Such positional variation in meaning holds the explanation, I suspect, for an observation I owe to Anna Szabolcsi (p.c., 22 December 2014), who finds that (107) and (108) differ in what they prefer to refer to in (65):

- (107) the stained fabric, the stained cloth
 (108) the fabric that is stained, the cloth that is stained

The definite descriptions in (107) contract their reference, as above, to the sheet's lower 400 cm²; in contrast, (108) favor reference to the entire sheet. The relative clause, in peripheral position, contains present tense, indexical to context, which distinguishes the modification in (108) from (107). Recognize that demonstrative reference is contingent on spatiotemporal perception, and spatiotemporal perception

Footnote 34 continued

The cross-sentential anaphora of tense and anaphoric event reference destroys symmetry and wreaks ambiguity when clauses are conjoined:

- (vi) a. The thread not covered over in red dye after the spill and then woven into whole sheets is 800 cm² of the fabric.
 b. The thread stained by the spill and then edged all around its perimeter is 800 cm² of the fabric.
- (vii) a. The thread that is not covered over in blood and is woven into whole sheets is 1600 cm² of the fabric.
 b. The thread that is stained with blood and is edged all around is 1600 cm² of the fabric.

is already a parse of the perceptual scene (v, e.g., Spelke 1990) that sorts out events, objects, their motions and locations in a background 3D frame of reference. That is, the act of demonstrative reference into a scene is itself sortalizing. These remarks combine with the positional variation in meaning just noted to suggest an account of the contrast between (107) and (108). If the meaning of the modifier is dispositional—and so, without grounding in any particular scene—definite description as in (40) accumulates its reference from anywhere at all where there be stained fabric in (65). If the meaning of the modifier is instead indexical to context, (108), definite description scans everywhere salient in the current scene where there be stained fabric, and the locations scanned and salient are just those where there is perceived something whole, as it were. Note that the contrast between (107) and (108) fades between (109) and (110), correlative with the denotation in (65) of *whole fabric*, *whole cloth* versus *whole thread*, *whole weave*:

- (109) the stained thread, the stained weave
 (110) the thread that is stained, the weave that is stained

The noun phrases *whole fabric* and *whole cloth* do not divide their reference in that scene. The only amount of fabric or cloth there that is whole is all of it. Any bias toward wholes in demonstrative reference into that scene is bias towards (65) itself, which is indeed stained, and where there are no lesser wholes which it might overlap leading to contracted reference. In contrast, the noun phrases *whole thread* and *whole weave*, if they mean anything, mean thread or weave that isn't frayed, indiscernible in (65) at the given resolution. Moreover, any resolution fine-grained enough to reveal fraying scans locations in (65) (almost) as dense as the scan for the dispositional meaning, thus effacing contrast between (109) and (110). As *whole* is itself episodic, applicable to what is whole only when it is found to be so, any modifier in a more peripheral position is driven also to be episodic, so that (111) now contrasts with (107) and comes to resemble (108) in referring to all of (65), without contracting reference to just the stain:

- (111) the stained whole fabric, the stained whole cloth
 (112) the whole stained fabric, the whole stained cloth

The definite descriptions in (112) are rather ambiguous: either both prenominal modifiers are taken to be episodic and again reference is to all of (65); or, *stained*, innermost, is taken to be dispositional, contracting reference to the stain, and since this is not whole, definite reference in fact fails on this meaning.

- (113) the stained whole thread, the stained whole weave
 (114) the whole stained thread, the whole stained weave

In (113), *whole thread* and *whole weave* again divide their reference among those locations where thread or weave is unfrayed, which are in turn the locations, everywhere among which there is stained thread or weave relevant for the reference

of the definite description. These are fine-grained enough to allow reference to contract to the stained lower half of (65), provided the thread or weave there is unfrayed. Unlike (111) and (112), not much tells apart (113) and (114). In (114), *stained* dispositional, the stained thread is that of just the stain, which (62) refers to if its thread is again unfrayed.

These remarks now afford most of an explanation of the empirical generalization in Sect. 6 about the default to maximal reference: if contracted reference fails according to (90), contracted reference fails; but, the definite description *the so-and-so* is rescued if there is instead so-and-so that all so-and-so Overlap, to which its reference then defaults. Such minimal pairs were cited as *the stained off-center thread*, which contracts to refer to just the lower 400 cm² of (65), and *the stained centered thread*, which defaults to all of (65). Contracted reference fails when *the stained centered thread* is parsed so that at least *centered* is taken to be an inner, dispositional modifier. The definite description so parsed simply fails to refer according to (90), as there isn't a least stained and centered region that Overlaps all stained and centered regions as one contracts reference toward the center line. An alternative parse in which *stained* and *centered* are peripheral, episodic modifiers derives a definite description that refers felicitously to all (65). So, contracted reference and default maximal reference correspond to an ambiguity in the logical syntax. What is left unexplained is any feeling that the one is preferred and the other accepted in default. Perhaps it is, as in the contrast between (107) and (108), that pronominal modifiers uninflected for tense are favored to be inner, dispositional modifiers if it is coherent to do so. One way or another, there is no purchase on the ambiguity unless modification within definite descriptions is 'layered' as above rather than flattened out in a single restriction, * $\ulcorner$ [THE *X*: (NP & CP)[*X*]] $\urcorner$, as has been the common coin.

8 Summary

The argument for a nip and a tuck to the general theory of definite descriptions is the *existence* of a few that contract their reference to the *sine qua non* that makes their description true, as canvassed above. In the definition, the contraction in reference demands the substitution of Overlap for partitivity, (ii) in (19)–(20) and in (90) (= (32)), and an adjustment in (iii) to how definite description culls its referents. If definite description is still to conserve plural and mass predication, definite reference in natural language, like the cognitive act itself, must always be perspectival, as in (90), scanning *everywhere* the description is satisfied. The definite descriptions on which the argument rests are relatively rare in the wild—first those containing increasing descriptive conditions and then among these those that are nonsortal. It doesn't help the chase that most definite descriptions in use are incomplete and the implicit, demonstrative reference to context that completes them is itself sortalizing. Mostly, the amended and original definitions of definite description agree that most definite descriptions do not contract their reference, for one interfering factor or another of natural language translation. The decisive

(thought) experiments that expose their underlying logic have rather to be carefully constructed, like any other experiment.

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