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Notes on Early Chinese Logic (VII)

VIII. Some logical aspects of the problem of 'similarity and difference'. — I briefly alluded to the problem of 'similarity and difference' in connection with a Mohist fragment discussed for another reason in the preceding section, cf. RO XXX, 1; p. 42 and footnote 25. In the present chapter I propose to deal at some length with this problem which itself constitutes an important topic of the Mohist dialectics and which is also not without practical implications for the interpretation of some passages in pre-Han texts of non-Mohist origin. As a matter of fact, it may safely be assumed that the notions of 'similarity' (*t'ung* 同) and 'difference' (*i* 異) had been widely — but arbitrarily and rather vaguely — used in some philosophical circles, especially among the Taoists and the non-Mohist dialecticians, some time before the compilation of the Mohist 'dialectical chapters', and that the Mohists must have taken these notions from outside their own philosophical tradition[1]. Then, in line with their rationalist trend of thought and probably in response to the confusion arising from the use and misuse of these notions by non-Mohist philosophers, the Mohists themselves restated the problem of 'similarity and difference' in their own terms and gave it a prominent place in their dialectical method. Unfortunately, some of the surviving Mohist fragments dealing with (or alluding to) the *t'ung-i* problem are obscure because of their terseness or corruption (or both) — while others must have been entirely lost from the *textus receptus* (cf. infra, p. 128) — and we are bound to say that the Mohist standpoint together with the specific rôle of 'similarity and difference' within the whole of the Mohist dialectics cannot be safely reconstructed in detail[2]. But on the other hand, some of the fragments concerned, especially those in the 'canonical' chapters, are of such a clarity as to permit us to deal with them in terms of formalisation. In other words, s o m e of the Mohist ideas about 'similarity and difference' can be safely reconstructed without too much speculation and at the level of formalisation at that, — and these, fragmentary and incomplete as they are, appear to constitute an important Mohist contribution to

[1] There is no mention of or allusion to the *t'ung-i* problem in the extensive body of the *Mo-tsï* except for its (later) dialectical chapters.

[2] Some purely conjectural and far-fetched interpretations of 'similarity and difference' in the Mohist dialectics will be referred to later.

the elucidation of the notions involved. Furthermore, it appears that the results arrived at through the analysis of the Mohist fragments in question, together with the exegetical notes on the *t'ung-i* problem by some later (pre-T'ang and T'ang) commentators, can throw a new light on the rather obscure non-Mohist passages involving this problem. Accordingly, in the present chapter I am going to deal, first, with the problem of 'similarity and difference' as can be seen in the Mohist fragments (that is, the 'canonical' chapters and, to a lesser extent, the *Ta-ts'ü* chapter of the *Mo-tsï*); second, in connection with the results arrived at in the first part I will try to solve the still controversial problem of Huei Shï's '*t'ung-i* paradox' recorded in *Chuang-tsï* XXXIII. The discussion of these main topics, however, must be preceded by a few semantic and linguistic considerations on the Chinese terms involved and on the very notions of 'similarity' and 'difference' as well.

In view of the linguistic features of Chinese and the specific ambiguity of Chinese words[3] it is not surprising that either of the monosyllables, *t'ung* 同 and *i* 異, has a wider semantic field and also a much wider range of grammatical functions than those of the words 'similar, similarity' and 'different, difference', which are perhaps the closest English renderings of the Chinese terms (both in isolation and in most contexts). From the logical point of view, the ambiguity of *t'ung* must be specially emphasised, since the word was used indiscriminately for both 'identical, identity' and 'similar, similarity', there being in Chinese no purely lexical means to differentiate these two closely related but non-equivalent notions. As is known, in Western philosophy the relation of identity (which, by the way, is to be distinguished from the so-called law of identity in propositional logic, $p \equiv p$) plays an important rôle. The relation of identity between objects is defined (at least since St. Thomas Aquinas) by the formula $(a = b) \underset{df}{=} \underset{\varphi}{\Pi}(\varphi a \equiv \varphi b)$[4]. On the other hand, 'similarity' is a rather loose notion for which there can hardly be any useful application in the logical theory. In the ordinary language, objects are said to be similar if they have a common property (or a set of properties, singled out for some specific, mostly empirical, reason), and this clearly yields the formula: $(a\ sim\ b) \underset{df}{=} \underset{\varphi}{\Sigma}(\varphi a \cdot \varphi b)$. However, the *definiens* of this latter formula is a kind of truism which is valid for all objects, since according to the theorem $\underset{xy}{\Pi}\underset{\varphi}{\Sigma}(\varphi x \cdot \varphi y)$ every two objects have a common property (for instance that of 'being an object') and, consequently, every two objects are similar. It follows that the relation of similarity thus conceived

[3] For a brief discussion of those features in connection with the logical analysis of Chinese, cf. my remarks in *Notes... (IV)*, RO XXVIII, 2; pp. 105 ff.; and also my paper *Język starochiński jako narzędzie rozumowania* [*Early Chinese as a Tool of Reasoning*, in Polish], "Sprawozdania z Prac Naukowych Wydziału Nauk Społecznych Polskiej Akademii Nauk", vol. VII (1964), no. 2(33), Warszawa 1965; pp. 108—133.

[4] I avail myself of this opportunity to correct a misprint in the first section of my *Notes*. The formula concerning the identity of classes given in RO XXVI, 1, p. 12, should read: $(A = B) \equiv \underset{\Phi}{\Pi}(\Phi A \equiv \Phi B)$.

cannot simply be negated; in fact, such a negation, $(a \; sim \; b)'$, would be equivalent to $*[\underset{\varphi}{\Sigma}(\varphi a \cdot \varphi b)]'$ itself equivalent to $*\underset{\varphi}{\Pi}(\varphi a \supset \varphi' b)$, — and these latter formulae stand in contradiction to the theorem $\underset{xy}{\Pi}\underset{\varphi}{\Sigma}(\varphi x \cdot \varphi y)$ previously cited. The notion of similarity can be made more workable if the relation it represents is conceived more specifically as 'similarity in respect to the given function φ' (sim_φ). This yields the definitional formula: $(a \; sim_\varphi \; b) \underset{df}{=} (\varphi a \cdot \varphi b)$, and it goes without saying that in such a case — unlike in that of 'unspecified similarity' — the negation of the relation does not involve contradiction with any of the accepted theorems: $(a \; sim_\varphi \; b)'$ is simply equivalent to $(\varphi a \cdot \varphi b)'$. There is, however, another awkward consequence connected with such a negation of 'specified similarity' thus conceived. According to $(p \cdot q)' \equiv$ $\equiv [(p \cdot q') \vee (p' \cdot q) \vee (p' \cdot q')]$, the formula $(\varphi a \cdot \varphi b)'$ can easily be dissolved in $[(\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b) \vee (\varphi' a \cdot \varphi' b)]$, and thus we see that even identical objects, $(a = b)$, may happen to fall within the negated formula $(a \; sim_\varphi \; b)'$, namely, in the case of $(\varphi' a \cdot \varphi' b)$ which by no means implies the non-identity of a and b. For instance if both $a(= b)$ and $b(= a)$ stand for "this cat", and φ for "is a dog", we obtain $(\varphi' a \cdot \varphi' b)$ as yielding "It is not that this cat is similar to itself in respect to being a dog". Logically, such a consequence is by no means nonsensical, but it strongly deviates from the usual way of speaking and appears to violate the intuitions forbidding us to negate statements to the effect that something is similar to itself[5].

The word *i* 'difference', too, is not free of specific ambiguities which to some extent reflect those connected with *t'ung* 'similarity' and which deserve to be clearly stated. The rather vague use of the word in ordinary (non-formalised) language may suggest that 'difference' is nothing else but 'non-similarity', that is, the negation of similarity, $(a \; dif \; b)$ as equivalent to $*(a \; sim \; b)'$, — but we see at once that such a conception of the relation of difference is untenable, since unspecified similarity cannot simply be negated. As we already know, whatever two objects are similar, namely, in the sense that $\underset{\varphi}{\Sigma}(\varphi a \cdot \varphi b)$, and, consequently, there cannot be objects 'absolutely different' in the sense that $[\underset{\varphi}{\Sigma}(\varphi a \cdot \varphi b)]'$. It should be clear that at the level of unspecified difference and unspecified similarity the contrast between these two notions cannot be expressed by mere negation. Now, we may reasonably assume that two objects are said to be different if they do not have a property (or a set of properties) in common. If so, we must note at once that such a verbal definition itself is ambiguous: it may mean, first, that only one of the objects concerned has a certain property while the other has not the same property $(\underset{\varphi}{\Sigma}[(\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b)]$,

[5] This awkward consequence can be avoided if specified similarity, $(a \; sim_\varphi \; b)$, be conceived as $(\varphi a \equiv \varphi b)$ instead of $(\varphi a \cdot \varphi b)$. If so, the negation $(a \; sim_\varphi \; b)'$ would be equivalent to $(\varphi a \equiv \varphi b)'$ which itself is equivalent to $(\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b)$. These latter formulae do not hold if $(a = b)$, and thus identical objects are excluded from $(a \; sim_\varphi \; b)'$. However, as we shall see later, the Chinese conception of 'specified similarity' appears to have been $(\varphi a \cdot \varphi b)$ rather than $(\varphi a \equiv \varphi b)$.

which excludes identical objects as arguments of the relation of difference); and second, that it is not that both objects have a certain property ($\sum_{\varphi} (\varphi a \cdot \varphi b)'$, which does not exclude the identity of the objects concerned). These distinctions yield two non-equivalent definitions of (unspecified) difference, namely:

(1) $$(a\ dif\ b) \underset{df}{=} \sum_{\varphi} [(\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b)]$$

(2) $$(a\ dif\ b) \underset{df}{=} \sum_{\varphi} (\varphi a \cdot \varphi b)'$$

Of course, neither of these is a simple negation of (unspecified) similarity, while in the first formula we easily recognise a simple negation of identity: the definiens of this formula is clearly equivalent to $[\prod_{\varphi}(\varphi a \equiv \varphi b)]'$. Thus, according to (1), the relation of difference is, in fact, that of non-identity, $(a\ dif\ b) \underset{df}{=} (a = b)'$, and it must be emphasised that it is precisely in this one sense that the notion of difference is workable in modern logic (although the term itself has been nearly eliminated from logic on behalf of 'non-identity'). It is also in this sense, *different* = *non-identical*, that the equation 異 = 不同 which is given by some Chinese lexicographers is fully acceptable. The second conception of unspecified difference, if consciously accepted, leads to paradoxical consequences, since it admits of identical objects as arguments of the relation of difference. According to definition (2) and in view of the equivalence $(\varphi a \cdot \varphi b)' \equiv (\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b) \vee (\varphi' a \cdot \varphi' b)$, we are allowed to say that an object is different from itself if there is a property (function) which the given object does not possess (satisfy), and since such a function exists for every object, $\prod_{x} \sum_{\varphi} \varphi' x$,— every object may be said to be different from itself. In sum, if one accepts both $(a\ sim\ b) \underset{df}{=} \sum_{\varphi} (\varphi a \cdot \varphi b)$ and $(a\ dif\ b) \underset{df}{=} \sum_{\varphi} (\varphi a \cdot \varphi b)'$, he is entitled to say that, first, all objects are similar, and second, all objects, even if identical, are different. From the point of view of the ordinary use of language, both parts of this conjunction may seem equally paradoxical; as a matter of fact, the first part is a commonplace rather than a paradox, while the paradoxical quality of the second is merely due to the rather awkward conception of difference, a conception which is theoretically possible but practically unworkable. Again, at the level of 'specified difference', that is, 'difference in respect to the given function φ' (dif_{φ}), we have to consider two non-equivalent definitions, namely[6]:

(1a) $$(a\ dif_{\varphi}\ b) \underset{df}{=} (\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b)$$

(2a) $$(a\ dif_{\varphi}\ b) \underset{df}{=} (\varphi a \cdot \varphi b)'$$

It is easily seen that, unlike in the case of unspecified difference, either of these de-

[6] By the way, 'specified difference' in either of its senses spoken of in this paper should not be mistaken for what is called *differentia specifica* in traditional logic.

finitions is a simple negation of the corresponding definition of sim_φ; for (1a) and the equivalence $(\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b) \equiv (\varphi a \equiv \varphi b)'$, cf. also supra, p. 119, footnote 5. In the light of the preceding remarks it should also be clear that definition (2a) admits of identical objects as arguments of the relation dif_φ and inevitably leads to paradoxical statements of the kind "This cat is different from itself in respect to being a dog" (as equivalent to: "It is not that this cat is similar to itself in respect to being a dog", cf. supra, p. 119). Strange as it may seem, the Mohist general conception of difference appears to correspond to our definitions (2) and (2a) — to the exclusion of (1) and (1a).

I think that the foregoing discussion of the semantic aspects of the two Chinese terms together with their semantic interconnections[7] clearly shows both the various possibilities of confusion arising from an inadvertent use of the terms and the kind of difficulties which the early Chinese thinkers must have had to struggle against, if with their limited (non-formalised) means they wanted to examine the *t'ung-i* problem and make it a part of their dialectical method. As a matter of fact, we shall see that much of the foregoing discussion is directly applicable in the analysis of the Mohist fragments. Incidentally, the discussion has also shown that at least some of the difficulties connected with the *t'ung-i* problem as it stands in pre-Han Chinese philosophy are much like those inherent in our notions of similarity and difference (if these were to be used consistently at the logical level). In Chinese however the situation is further complicated by the structural features of the language. The Chinese terms, so far discussed as isolated units, actually may be involved in various syntactic relations[8] and thus subjected to specific semantic shiftings which, although semantically important, are not easily noticeable within the Chinese linguistic system itself. This may well be another source of confusion and difficulty. For our present purpose, it is sufficient to consider the expression *t'ung i* 同 異 conceived as a syntactic grouping.

In view of the fact that the two monosyllables are antonymic lexical units and that semantic antonymy is usually matched by the relation of co-ordination at the syntactic level, it goes without saying that the grouping *t'ung i* is to be conceived, first of all, as bound up by co-ordination: 'similarity and difference' (or 'similarity or difference', or 'similarity and/or difference', since syntactic co-ordination covers both conjunctive and alternative connections). Such co-ordinative antonymic groupings easily undergo specific lexicalisation which affects the meaning of the grouping itself, as is the case

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[7] Of course, this discussion has been limited to what is strictly pertinent to our mai n problem and what, by the way, cannot be found in dictionaries or grammars. Semantic distinctions within the Chinese terms, which are lexically or grammatically relevant but have no bearing on our problem, have been entirely omitted. For *t'ung* as 'to assimilate, assimilation', cf. infra, p. 122.

[8] For a repertory of syntactic relations occurring in the simplest groupings composed of two plerematic monosyllables (that is, relations expressible uniformly by mere juxtaposition), cf. my paper *Syntax and Word-formation in Chinese*, RO XXVIII, 1; especially pp. 117—120.

with *ta siao* 大小 '(whether) large or small' → 'dimension'; *yüan kin* 遠近 '(whether) far or near' → 'distance'; etc. The same may well be true of *t'ung i*[9], even if there is no single English term to render the nuance: '(whether) similar or different' → 'similarity-or-difference (as a single "synthetic" notion)'. However, granting the expression *t'ung i* the quality of a co-ordinative grouping (a quality which the expression certainly has in most contexts), we must not tacitly assume, as has so far been done by all modern scholars to my knowledge, that the component monosyllables cannot possibly be bound up by a relation different from co-ordination. Even if most types of relations listed in my aforementioned paper (cf. supra, p. 121, footnote 8) as theoretically possible in elementary plerematic groupings actually are to be excluded in the present case for semantic reasons, there is at least one, namely rection, which besides co-ordination deserves to be considered. Now, rective groupings are those in which the first component has the function of a transitive verb and the second that of a nominal object. In the present case we have to assume the transitive-causative meaning of *t'ung* as corresponding to our 'to make similar' or 'to assimilate' (in the etymological sense of this latter term: *ad-similare*), — which shifting, by the way, is entirely in line with the linguistic features of Chinese and is, so to say, contained within the semantic field of the word *t'ung*. Consequently, the expression *t'ung i* conceived as a rective grouping is to be interpreted as 'to assimilate (the) differences'. Furthermore, since in Chinese, as is known, rective groupings easily undergo specific nominalisation which does not affect the relation of rection as binding the components of the grouping[10] and which is hardly noticeable within the framework of the linguistic system itself, the expression *t'ung i* conceived as a rective grouping may well mean both 'to assimilate (the) differences' and 'assimilating (the) differences' = 'the assimilation of differences'. As we shall see later, the present interpretation of the grouping *t'ung i*, although so far overlooked, is not only theoretically possible but also sufficiently substantiated by philological evidence from the medieval commentators. This interpretation will prove to be useful in the discussion of H u e i S h ï's *t'ung-i* paradox.

As is known, the Mohist dialectics has been studied from various points of view by various authors, Western and Chinese, and the fragments to be analysed or cited in the present paper have already been translated (some of them many times) by such

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[9] Cf. P. D e m i é v i l l e's review of K o u P a o - k o h, *Deux sophistes chinois*, "T'oung Pao" XLIII, 1—2, 1954; pp. 108—121.

[10] Such a nominalisation resembles to some extent that obtainable in English by means of the *ing*-transformation on the infinitive-plus-object constructions. Cf., for instance, the (rective) infinitive-plus-object phrase *to write letters* which yields (under the *ing*-transformation) the equally rective phrase *writing letters* itself equivalent to the non-rective and clearly nominal phrase *the writing of letters*. In Chinese, however, the morphological shape of the grouping itself does not change, and the semantic shifting, if any, is hardly noticeable. To formulate it more carefully, we should say that Chinese rective groupings semantically correspond to both infinitive-plus-object and gerund-plus-object constructions in English.

scholars as Hu Shï, Forke, Maspero, Fung-Bodde, Needham and Graham. This fact, of course, largely facilitates dealing with these fragments from our present point of view, different from the previous ones as it is. However, except for A. Forke's *Mê Ti*, pp. 413—535, which is so far the only complete translation of the dialectical chapters of the *Mo-tsï* but which is particularly unreliable[11], none of the studies published in any Western language offers a complete collection of items connected with the *t'ung-i* problem, and none gives such a selection of fragments as appears to be substantial for a formalised treatment[12]. Moreover, the occasional renderings, scattered through various writings and mostly made on the margin of some other problem, sometimes differ considerably, and such is also the case with the interpretations as found in various Chinese studies and critical editions of the Mohist text. Thus, in spite of some repetitiousness, it is necessary to give here my own selection of fragments together with my own translation to serve us as a textual basis for our formal analysis of the problem[13]. The system of references to the most important Chinese editions of the Mohist text is substantially the same as in the preceding section (see RO XXX, 1; p. 40, footnote 21); the only new symbol L_2 (followed by page number) refers to Liu Ts'un-jen, *Mo-king tsien-i* (*hia*), "*Sin-ya hüe-pao*" VII, 1; 1965; pp. 1—134.

The *t'ung-i* fragments of the 'canonical' chapters may be roughly classified into two groups. Those of the first group were clearly intended by the Mohists themselves as definitions of the basic notions, and it goes without saying that they should be dealt with in the first place. The 'canonical' fragment Ks 86 (K 87, W 86, L 107) reads:

同：重，體，合，類

to be rendered as: "As for similarity: identity[14], being parts of one [complex] bo-

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[11] Especially the *t'ung-i* fragments have been badly misinterpreted by Forke.

[12] This also refers to the few authors dealing more specifically with 'similarity and difference' in the Mohist dialectics (Fung-Bodde, *Hist. of Chin. Phil.* I, pp. 262—265; and Chan Kien-feng, *Mo-kia-ti hing-shï lo-tsi*, pp. 13, 26—32 and 41—45), who draw conclusions from some irrelevant or obscure fragments (omitted from the present paper) and, inversely, leave out of consideration fragments which I consider strictly pertinent to our problem.

[13] The novelty of the present approach lies in the specific selection of fragments (especially those of the second group, cf. infra) and the formalisation rather than in the translation, but this does not mean that my renderings, although they take into account those made by others, are mere repetitions. It has not been possible to acknowledge my indebtedness to or emphasise a deviation from the extant interpretations for each particular item, and only a few such cases could be indicated.

[14] In view of the corresponding 'explanation' ("two names but one actuality") there can be no doubt that the word *ch'ung* 重 is to be rendered as 'identity', as has already been done in Hu Shï, *Development*, p. 103. But nobody to my knowledge has noticed that the rather unusual choice of the term throws some curious light on the Mohist conception of identity. Now, *ch'ung* literally means 'double, duplication' — that is, in the present context: 'double naming, duplication of the name' —

dy;[15] being together [in one place]; being of one class." Such a translation is corroborated by the corresponding 'explanation' Kss 86 (K 87, W 86, L 107):

同：二名一實，重同也；不外於兼，體同也；俱處於室，合同也；有以同，類同也

"As for similarity: two names but one actuality — this is the similarity of identity; not being outside (= being within) the given combination — this is the similarity of being parts of one body; all [the things concerned] being in one room — this is the similarity of being together; having [a definite set of] similarities — this is the similarity of being of one class".

In view of the ambiguity of the word *t'ung*, covering both 'identity' and 'similarity' it is not surprising that identity is put forward as a specific kind of similarity. What imports here is that identity, evidently conceived as similarity *par excellence*, is given a prominent place in the Mohist definition. From our point of view, only the second, third and fourth item ("being parts of one body"; "being together"; and "being of one class") are concerned with similarity in the narrow sense of the term, and we do not know why precisely these three specific instances were considered so typical (or so important) as to be included, together with identity, in the 'canonical' formula[16]. Among them, it is the 'similarity of being of one class' which deserves special emphasis,

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and thus identical objects are put forward as those which differ only in name. The implicit equation *duplication* (*sc. of the name*) = *identity* shows that the Mohists must have been aware of the principle that a difference only in name is no factual difference at all, — and this nearly amounts to Leibniz's dictum "non dari posse in natura duas res singulares solo nomine (Leibniz has: solo numero) differentes". In Modern Chinese, however, the expression *ch'ung-ming(-êr)* 重名(兒) means 'different persons of the same name, namesake(s)'.

[15] The word *t'i* 體, in Mohist terminology 'part, or member of one body' rather than 'body', has been rendered in this context by D. Bodde first as 'part and whole relationship' and subsequently as 'corporeal relationship', see Fung-Bodde, *Hist. of Chin. Phil.* I, 2nd ed., p. 263 and xxix. But in view of the 'explanation' ("not being outside the given combination (of parts)") and Ks 2 (K 2, W 2, L —): 體，分於兼也 "*t'i* is part(s) as involved in one combination", the second kind of 'similarity' is clearly that between parts of one (complex) body.

[16] As a matter of fact, the *Ta-ts'ü* chapter goes further than the 'canonical' definition and enumerates some ten kinds of 'similarity', but most of them are obscure names without any explanatory note or example, so that their interpretation is mere guessing. The instance of similarity termed *fu-t'ung* 鮒同 may be illustrative in this respect. The term itself is considered to stand for *fu-t'ung* 附同 'attached (or: dependent) similarity', and Chan Kien-fêng (*Mo-kia-ti hing-shï lo-tsi*, p. 27) thinks that it denotes such a kind of similarity as that between the whiteness of white feathers and the whiteness of white snow. To substantiate his view, Chan might have cited *Mêng-tsï*, VI, i, 3, where precisely such a problem is considered (cf. Legge, *Chin. Cl.* I, pp. 396—397; it can easily be seen that Chan's own wording is a simple quotation from the *Mêng-tsï* passage). The *Ta-ts'ü* itself has a few scattered entries

since it clearly involves the notion of class as associated with a set of 'similarities', that is, of properties common to all the members of one class[17]. But the most important fact is that all three kinds of similarity (in the narrow sense) spoken of in Kss 86 are actually reducible to the existence of a property (or a set of properties) which is common to the objects said to be similar: 'being part(s) of one body' (φ_1), 'being together in one place' (φ_2), etc., are specific instances or exemplifications of some function, $\underset{\varphi}{\Sigma}$, to be satisfied by the arguments a and b: $\underset{\varphi}{\Sigma}(\varphi a \cdot \varphi b)$. In sum, granting the word *t'ung* its ambiguity (identity, or similarity in the narrow sense of the term) and representing the relation *t'ung* by the symbol *sim*, we obtain the following Mohist definition of the relation:

$$(a \; sim \; b) \underset{df}{=} (a = b) \vee \underset{\varphi}{\Sigma}(\varphi a \cdot \varphi b)$$

In the definiens of this formula, the first item, $(a = b)$, corresponds to identity

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of a similar kind, for instance: 小圜之圜與大圜之圜同 "The circleness of a small circle is similar to (identical with?) that of a large circle". But neither in *Mêng-tsï* nor in *Ta-ts'ü* are such examples associated with the (terminologically obscure) *fu*-similarity, and thus Chan's interpretation remains purely conjectural. On the other hand, T'an Kie-fu, considered by some the greatest authority on the Mohist dialectics, offers an entirely different and very fanciful interpretation of the same term. According to him (*Mo-pien fa-wei*, p. 228), the *fu-t'ung* would be a kind of parallelism between things and situations elsewhere strongly different, as in Wang Ch'ung's dictum (*Lun-hêng*, ch. 43): 人在天地之間猶蚤虱之在衣裳之內 "Man's position between Heaven and Earth is like that of fleas and lice between the upper and the lower garments". Let this single example justify the exclusion of such uncertain materials from the present investigation.

[17] I do not share Graham's recent objections (in "Asia Major" XI, 2; 1965; p. 143) against rendering *lei* 類 in its technical sense as 'class', and I fail to see the benefit of translating the term always as 'sort, kind', — although it is obvious that the Chinese notion of class was not quite clear and certainly was not the same as in modern mathematical logic. In brief, our 'logical classes' are nearly identified with properties (in the sense that a property determines the class of objects, heterogeneous as they might be, all of which possess the given property), and such an abstract conception of classes, dominated by the notion of property, is practically independent of the 'natural classes' such as are indicated by common (general) names present in language. For the Chinese philosophers, on the contrary, classes (of objects) were mostly dependent on the extant lexical classification of things rather than on arbitrary choice of properties. In other words, the Chinese classes were, first of all, 'natural classes' corresponding to general terms ('classifying names', *lei-ming* 類名), and the main problem must have been to derive common properties ('similarities') from the linguistically pre-established classes (and occasionally to find out the differences between such classes) rather than to construe 'artificial classes' by means of arbitrarily selected properties. By the way, the lack of explicit quantification in structures like "*X Y* 也" and "*X* 非 *Y*" (Graham, ibid.) may have been one more source of ambiguity and also a hindrance to the perception of all possible class relationships, but it hardly affects the idea of class as a totality of objects covered by a general term. Cf. also RO XXVI, 1; pp. 18—21.

(*ch'ung-t'ung*), and the second, $\sum_{\varphi}(\varphi a \cdot \varphi b)$, to the three kinds of similarity spoken of in the Mohist definition (and to all possible kinds of similarity *sensu stricto* as well). The present formal interpretation of Ks 86 is substantially confirmed (especially with regard to the three items dealing with similarity in the narrow sense) by another important fragment together with its 'explanation', Ks and Kss 88 (K 39, W 88, L 69):

同，異而俱於之一也. (*Expl.*) 同：二人而俱見是楹也；若事君

"Similarity is that with respect to which different [objects] are as one. (*Expl.*) As for similarity: [for instance] two different people both seeing this pillar; [it is also] like serving the prince".

Unlike Ks 86 (which is an enumeration rather than definition), Ks 88 is, in fact, a general definition of similarity between non-identical objects, and one logically nearly perfect at that. Similarity is explicitly identified with a function φ which holds equally good with regard to the given two or more (non-identical) objects. Thus, two different men, a and b, are similar not only *qua* men (according to class similarity, spoken of in Ks 86), but also, for instance, with respect to 'seeing this pillar', 'serving the prince', etc., if and only if (a sees this pillar) and (b sees this pillar), etc., — and the given function itself is put forward as the point of similarity between them. This not only leads again to the formula $\sum_{\varphi}(\varphi a \cdot \varphi b)$ as corresponding to (a *sim* b), but also to the formula of 'specified similarity' (cf. supra, p. 119), which, I think, renders still more adequately the intent of Ks 88:

$$(a \; sim_{\varphi} \; b) \underset{df}{=} (\varphi a \cdot \varphi b)$$

From our point of view, it would be better to have $(\varphi a \equiv \varphi b)$ instead of $(\varphi a \cdot \varphi b)$ in the definitions of both unspecified and specified similarity (cf. supra, p. 119, footnote 5), but there is nothing in the Chinese text to substantiate the assumption that "that with respect to which different things are as one" should be conceived as an equivalence of φa and φb rather than a conjuction of both. On the contrary, the exemplification given in Kss 88, limited to 'positive' functions as it is ("two different people both seeing this pillar", without any mention of negative cases like "...both not seeing this pillar"[18]), rather clearly points to a conjunction, and we shall see later that there is additional (indirect) evidence for such an interpretation. On the other hand, as we know, such an interpretation of similarity leads to awkward consequences if the

[18] The lack of negative exemplification in Kss 88 is important in so far as equivalence, to my knowledge, was never expressed by early Chinese thinkers in the form $(p \supset q) \cdot (q \supset p)$, but always as $(p \supset q) \cdot (p' \supset q')$. For the time being, cf. my remarks in *Notes (IV)*, RO XXVIII, 2; p. 97 (but the problem deserves a more extensive treatment and shall be dealt with in a special paper). Thus, positive examples like *seeing this pillar* (φ_1) by themselves do not allow of an interpretation in terms of equivalence (or reciprocal implication: $(\varphi_1 a \supset \varphi_1 b) \cdot (\varphi_1 b \supset \varphi_1 a)$, itself equivalent to $(\varphi_1 a \equiv \varphi_1 b)$); for such an interpretation we should have $(\varphi_1 a \supset \varphi_1 b) \cdot (\varphi_1{}' a \supset \varphi_1{}' b)$ as

relation should be negated, cf. supra, p. 119 and 121. As a matter of fact, we shall find that the Mohist notion of difference as is defined and applied in some further fragments actually involves the difficulties arising from the negation of $(\varphi a \cdot \varphi b)$, — and this also appears to be another piece of indirect evidence for our present interpretation of similarity in terms of logical conjunction.

Proceeding to the analysis of fragments concerning difference, we must emphasise that they are remarkably parallel to those dealing with similarity. Thus, Ks 87 (K 88, W 87, L 107) clearly is the 'negative' counterpart of Ks 86:

異：二，不體，不合，不類

"As for difference: duality; not being parts of one body; not being together [in one place]; not being of one class".

The corresponding 'explanation', Kss 87 (K 88, W 87, L 107) largely reflects Kss 86 and reads:

異：二必異，二也；不連屬，不體也；不同所，不合也；不有同，不類也

"As for difference: two [things] are necessarily different — this is duality; not being connected — this is not being parts of one body; not being in one place — this is not being together; not having [a set of] similarities — this is not being of one class".

It goes without saying that the first item called 'duality' (*êr* 二 = 'twoness') actually corresponds to non-identity, $(a \neq b)$, while the three other items represent specific instances of difference (parallel to those of similarity, listed in Ks 86). These three instances of difference are reducible to the existence of a property (or a set of properties) which is n o t common to the objects said to be different, but it must be remarked at once that such a formulation is ambiguous. Statements to the effect that there is a property which is not common to the given objects, say a and b, may be taken to mean either $\sum_{\varphi} [(\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b)]$, or $\sum_{\varphi} (\varphi a \cdot \varphi b)'$. Now, the first of these interpretations is equivalent to non-identity (according to $(a = b) \equiv \equiv \prod_{\varphi} (\varphi a \equiv \varphi b)$, hence $(a = b)' \equiv [\prod_{\varphi} (\varphi a \equiv \varphi b)]' \equiv \sum_{\varphi} [(\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b)]$) — which is in fact the first item in the fragment now in question — and I think that the very parallelism with Ks 86 itself shows that it is the second interpretation which should be chosen. If so, the Mohist conception of the relation of difference as expressed in Ks 87 yields the formula:

$$(a \; dif \; b) \underset{df}{=} (a \neq b) \vee \sum_{\varphi} (\varphi a \cdot \varphi b)'$$

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yielding $(\varphi_1 a \equiv \varphi_1 b)$ — and this obviously is not the case. By the way, I doubt whether the Mohists would say that φ is "that with respect to which a and b are as one" if not-φ of a and not-φ of b. We should remember that the equivalence $(\varphi a \equiv \varphi b)$, if any, itself is also equivalent to the alternation $(\varphi a \cdot \varphi b) \vee (\varphi' a \cdot \varphi' b)$.

In view of specific structural resemblances between Ks 86 and Ks 87, and the obviously parallel treatment of similarity and difference by the Mohists, it is to be assumed that they also had a more abstract and general definition of difference, parallel to that of similarity (Ks 88, cf. supra, p. 126). Such a definition is actually lacking in the *textus receptus*, but this only means that the entry must have been lost from the extant text, and the fragment itself can easily be reconstructed after Ks 88[19]:

*異，同而俱於之不一也

*"Difference is that with respect to which even similar [objects] are not as one" — and this, of course, would lead us to the formula of specified difference, dif_φ (cf. supra, p. 126, for the parallel formula of specified similarity):

$$(a \; dif_\varphi \; b) \underset{df}{=} (\varphi a \cdot \varphi b)'$$

The definiens in this formula, as we know, is equivalent to $(\varphi a \cdot \varphi' b) \vee (\varphi' a \cdot \varphi b) \vee$ $\vee (\varphi' a \cdot \varphi' b)$ and thus, owing to the last item of the alternation, it directly involves the consequence that even a single object may be said to be different from itself with respect to a property which the given object does not have (cf. supra, p. 121). We do not know whether the Mohists were aware of such an undesirable consequence — probably they were not fully aware of it — but we shall see that they actually made use of a formula specifically corresponding to the item $(\varphi' a \cdot \varphi' b)$ in connection with their notion of difference.

The foregoing discussion nearly exhausts the series of fragments which are of a definitional character and which at the same time are so clear as to yield rather unambiguous interpretations. One more fragment, Ks 89 (K 89, W 89, L 107), is usually reckoned to belong to this series, but it must be emphasised that the entry deserves less confidence than others so far cited. The corresponding 'explanation', although rather long in this case, is useless because of its extreme corruption (I share Hu Shï's opinion that the 'explanation' is, on the whole, unintelligible), and the short 'canonical' entry itself is not quite clear. As it stands, Ks 89 runs:

同異交得，放有無

— and this appears to mean: "The joint obtention of similarities and differences reveals what is present and what is absent [in things]". If so, the entry appears to corroborate the foregoing analyses, since it connects the notion of similarity with "what is present in things" (that is, a property which is common to the given things, according to $(\varphi a \cdot \varphi b)$), and the notion of difference with "what is absent in things" (that is, a property which is not common to the given things, according to $(\varphi a \cdot \varphi b)'$)[20].

[19] I follow Hu Shï who had the ingenious idea to reconstruct the lost 'canon of difference', *Chung-kuo chê-hüe-shï ta-kang*, p. 221, although my reconstruction slightly differs from his (not to speak of Hu Shï's interpretation of the whole problem of similarity and difference in terms of Mill's *Canons* of inductive logic).

[20] Let me add that the extant emendations of the key word *fang* 放 'to loosen,

Besides the fragments already discussed — those in which the Mohists attempted to define the notions of *t'ung* and *i* — there is in the 'canonical' chapters another group of (scattered) entries in which the notions of similarity or difference (or both) are merely involved or applied to particular cases or problems. We may expect that fragments of this second group, complementary to the first as it is, should corroborate our deductions drawn from the first group, and also that they should reveal some aspects of the *t'ung-i* problem, which were omitted from the 'definitional' entries. However, it would be useless to attempt to give here a full survey of this second group which, by the way, contains fragments of unequal clarity and importance. In this place we shall consider at some length only three fragments (one 'canonical' entry and two 'explanations') of the second group, which so far have not been considered in the discussion of the *t'ung-i* problem (they are lacking in the paragraph on 'similarity and difference' in Fung-Bodde, *Hist. of Chin. Phil.* I, pp. 262—265) although they are strictly pertinent to this problem for more than one reason. In brief, the few fragments selected are important since, first, they show that the notions of similarity and difference were also applied to functions and classes (not only to individual objects of the thing type); second, they reflect to some extent the ambiguity of the two notions (identity vs. similarity, and especially non-identity vs. difference); and third, one of them strongly, even if indirectly, confirms the most paradoxical points of our analysis concerning the general Mohist conception of both similarity and difference.

As we have seen, entries of the first group are formulated in such terms as if similarity and difference were relations between arguments of the thing type, to the exclusion of arguments of other types; in this respect Kss 88 is particularly relevant. Consequently, our definitional formulae extracted from the first group of fragments are all limited to arguments of the thing type, (*a sim b*), etc. However, in spite of these limitations imposed on the definitional entries, there can be no doubt that the Chinese dialecticians and the Mohists in particular actually used the notions of similarity and difference in connection with arguments of various kinds and especially those which we would term functions[21]. Thus, it appears to be our task to reconstruct the

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let go, liberate', do not affect the substance of my interpretation to the effect that the 'canonical' entry now in question establishes a close relation between similarity and such properties as are common to the given things and, on the other hand, between difference and such properties as are not common to the given things. However, the few understandable phrases of the 'explanation' hardly agree with such an interpretation which, consequently, remains conjectural. In sum, the fragment is rather obscure, and it has been cited here only for the sake of completeness.

[21] Cf. supra, p. 124, footnote 16. Unfortunately, the *Ta-ts'ü* entries dealing with similarity and difference as relations between arguments of the function (or class) type are mostly corrupted and obscure. One such entry however deserves citation in this place, even if we do not have much confidence either in its reading or its translation. Now, in the reading proposed by Sun I-jang the entry would be: 不至尺之不至也與不至千里之不至不異；其不至同者

main definitional formulae of similarity and difference conceived as relations between arguments of the function type, although such definitions — unlike those involving arguments of the thing type — appear not to have been explicitly stated by the Mohists in any way.

It seems reasonable to assume that the intuitively extended use of the notions of similarity and difference in reference to arguments of the function type must have been largely conditioned by the Mohist conception of similarity and difference in relation to arguments of the thing type and, consequently, by the corresponding definitions extracted from the first group of fragments. If so, in the present reconstruction we have to proceed by analogy. Now, if we know that in the case of arguments of the thing type, a and b, (a *sim* b) *ex definitione* means that for some function φ the product $(\varphi a \cdot \varphi b)$ holds good (cf. supra, p. 125)[22], it appears that in the case of arguments of the function type, φ and ψ, (φ *sim* ψ) means that for some o b j e c t x the product $(\varphi x \cdot \psi x)$ holds good. Analogically, if (a *dif* b) means *ex definitione* that for some function φ the negated formula $(\varphi a \cdot \varphi b)'$ holds good (cf. supra, p. 127), it appears that (φ *dif* ψ) means that for some o b j e c t x the equally negated formula $(\varphi x \cdot \psi x)'$ holds good. Thus, proceeding from the formal interpretation of the explicit Mohist definitions of similarity and difference as relations between objects, we have arrived at two tentative definitions of similarity and difference conceived as relations between functions:

$$(\varphi \; sim \; \psi) \underset{df}{=} \underset{x}{\Sigma} (\varphi x \cdot \psi x)$$

$$(\varphi \; dif \; \psi) \underset{df}{=} \underset{x}{\Sigma} (\varphi x \cdot \psi x)'$$

遠近之謂也, and this appears to mean: "Failing to attain as in failing to attain one foot is not different from failing to attain as in failing to attain one thousand *li*; the similarity (identity?) between these [two instances of] failing to attain consists in [not attaining a certain] distance". The example is not very illuminating, the more so as S u n I - j a n g' s reading itself is rather speculative and the entry as it stands in the *textus receptus* admits of various conjectures; for another reading and interpretation, cf. T' a n K i e - f u, *Mo-pien fa-wei*, p. 225. None the less, in the present case the variant readings and interpretations, although strongly divergent in details and leaving us in doubt as to the exact meaning of the passage, do not affect the substance of the entry as dealing in some rather sophisticated way with similarity and difference in relation to the function *failing to attain* (*pu chï* 不至, literally 'not attaining, not reaching') — and it is in this respect that the fragment is worthy of note from our point of view.

[22] In the present reconstruction both similarity and difference are taken into consideration only in the narrow sense of these terms, to the exclusion of identity and non-identity (which latter, as we know, are included in the Mohist definitions). This means that only the second item in the definiens of the two main definitions is actually referred to. Another limitation is that only unspecified similarity and unspecified difference are considered. Definitional formulae for specified similarity and difference as relations between functions might easily be devised, but they are not substantiated by our text.

These definitions, constituting a close parallel to those previously formulated for arguments of the thing type and representing a conception of similarity and difference which is essentially the same as that underlying the first group of entries, necessarily involve the same awkward consequences as those spoken of in connection with our previous analyses. Thus, as far as similarity between functions is concerned, we know that it would be 'better' to have $\sum_x (\varphi x \equiv \psi x)$ in the definiens instead of $\sum_x (\varphi x \cdot \psi x)$, cf. supra, p. 126. The definiens of $(\varphi\ dif\ \psi)$ deserves our special attention because of its rather complex character hidden in the apparently simple formula. As a matter of fact, this definiens, $\sum_x(\varphi x \cdot \psi x)'$, yields the equivalence:

$$\sum_x (\varphi x \cdot \psi x)' \equiv \sum_x [(\varphi x \cdot \psi' x) \vee (\varphi' x \cdot \psi x) \vee (\varphi' x \cdot \psi' x)]$$

The right-hand side formula becomes clearer if transformed according to the rules of what is called 'division of the operand'; thus we get:

$$\sum_x (\varphi x \cdot \psi x)' \equiv \sum_x (\varphi x \cdot \psi' x) \vee \sum_x (\varphi' x \cdot \psi x) \vee \sum_x (\varphi' x \cdot \psi' x)$$

The equivalence arrived at is a close counterpart of the non-quantified formula of specified difference, cf. supra, p. 128. This equivalence shows that the Mohist conception of difference (between functions) actually allows us to qualify the given functions, φ and ψ, as different not only if there is an object x which satisfies $(\varphi x \cdot \psi' x)$ or $(\varphi' x \cdot \psi x)$, but also if for some x the product $(\varphi' x \cdot \psi' x)$ is true. This latter case, involved in the Mohist conception as it is, is rather paradoxical, since it does not exclude identical (or equivalent) functions as arguments of the relation of difference. Let us take, for instance, identical functions $\varphi(=\psi) =$ (*is a*) *dog* and $\psi(=\varphi) =$ (*is a*) *dog*, and the object $x =$ *this cat*; then the product $(\varphi' x \cdot \psi' x)$, that is, "This cat is not a dog and this cat is not a dog" is true, and thus, in accordance with the definiens of $(\varphi\ dif\ \psi)$ the function $\varphi = \psi =$ (*is a*) *dog* turns out to be different from itself[23]. We have to say once more that we do not know whether the Mohists were aware of such paradoxical consequences of their conception of difference, but we can positively show that in one important passage they actually resorted to the case corresponding to the formula $\sum_x (\varphi' x \cdot \psi' x)$, and that they did so in close connection with predicates (one-place functions) explicitly qualified as different.

I refer to the fragment Ksh 35 (K 135, W 134, L_2 46), already cited, translated and analysed on another occasion in the preceding section, see RO XXX, 1, pp. 42—45. There is no need to revert here to all the details of the previous discussion, and I shall limit myself to what is strictly pertinent to our present problem. Now, it deserves emphasis that the fragment Ksh 35 deals with pairs of predicates (one-place functions) explicitly qualified as similar (*t'ung*) in the first case (*puppy* vs.

[23] The example is, of course, a close parallel to that given supra, p. 121, in connection with difference conceived as a relation between arguments of the thing type.

dog, in sentence (b) of the fragment) and different (i) in the second (*ox* vs. *horse*, in sentence (c)). In our terminology, this means that the fragment actually involves similarity and difference conceived as relations between arguments of the function type. What is more, and what should be specially emphasised from our present point of view, the results of our previous analysis (an analysis which, incidentally, was quite independent of the *t'ung-i* problem and served a purpose different from that of the present section) are entirely in line with the tentative definitions of similarity and difference such as have been extracted or reconstructed from the Mohist fragments discussed in this section. First, our formal analysis of the specific form of reasoning involved in Ksh 35 led us to represent the case of predicates (functions) exemplified in (b) and explicitly qualified as similar by means of the formula $\Sigma_x (\varphi x \cdot \psi x)$. As a matter of fact, this formula is precisely that of the definiens of (φ *sim* ψ) as it has been reconstructed supra, p. 130, — and thus our tentative definition of similarity (between functions) appears to be wholly confirmed by the actual Mohist practice in dealing with what they considered similar predicates[24]. Second, our analysis led us to represent the case of predicates (functions) exemplified in (c) and explicitly qualified as different by means of the formula $\Sigma_x (\varphi' x \cdot \psi' x)$. This latter formula, in turn, actually forms part of the reconstructed definiens of (φ *dif* ψ), that is, $\Sigma_x (\varphi x \cdot \psi x)'$, since, as we know cf. supra, p. 131), this definiens itself is equivalent to the alternation $\Sigma_x (\varphi x \cdot \psi' x) \vee \vee \Sigma_x (\varphi' x \cdot \psi x) \vee \Sigma_x (\varphi' x \cdot \psi' x)$. We also know that it is precisely the item $\Sigma_x (\varphi' x \cdot \psi' x)$ which — paradoxically enough — admits of identical (or equivalent) functions being qualified as different and which, consequently, is responsible for the weakness of the Mohist conception of difference[25]. Thus, the only vulnerable point of our tentative definition of difference (between functions) finds its confirmation in the actual practice of the Mohists. In other words, the fragment Ksh 35 as previously analysed directly confirms both our reconstruction of the Mohist conception of similarity between functions and the paradoxical aspect of our reconstruction of the Mohist conception

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24 In connection with my preceding remarks on similarity (cf. supra, pp. 126 and 131), it is worthy of note that the formula of similar predicates (functions) resorted to in Ksh 35 (b) is clearly not one with equivalence in the operand, $\Sigma_x (\varphi x \equiv \psi x)$, but one with conjunction, $\Sigma_x (\varphi x \cdot \psi x)$.

25 The first two items inherent in the definiens $\Sigma_x (\varphi x \cdot \psi x)'$, that is, $\Sigma_x (\varphi x \cdot \psi' x) \vee \vee \Sigma_x (\varphi' x \cdot \psi x)$, cannot be objected to, since they exclude identical functions and jointly constitute, in fact, the definiens of non-identity (of functions). If identity of functions, ($\varphi = \psi$), is conceived as $\Pi_x (\varphi x \equiv \psi x)$, for non-identity, ($\varphi \neq \psi$), we obtain $[\Pi_x (\varphi x \equiv \psi x)]'$. As can be shown by means of elementary transformations, this latter formula is equivalent to the alternation $\Sigma_x (\varphi x \cdot \psi' x) \vee \Sigma_x (\varphi' x \cdot \psi x)$.

of difference between functions. Since, however, the definitions here in question have been reconstructed by way of analogy with those extracted from the Mohist 'definitional' fragments dealing with similarity and difference between objects of the thing type, — I think that Ksh 35, in fact, confirms more or less directly all our assumptions concerning the Mohist conception of similarity and difference. In sum, the fragment which is specifically concerned with the validity of the *pien* and which, to my knowledge, so far has never been considered in connection with the *t'ung-i* problem, turns out to be of paramount importance to this problem. By the way, the fragment also appears to show that the Mohists discovered the uselessness of their conception of similarity and, in particular, the inadequacy of their general conception of difference for the procedure of what they considered a valid *pien*. As a matter of fact, what underlies the disjunctive formula of the Mohist *pien*, $(\varphi\hat{x} \underline{\vee} \varphi'\hat{x})$, is a specific and particularly strong kind of difference between functions (predicates), $\Pi_x [(\varphi x \cdot \psi' x) \vee (\varphi' x \cdot \psi x)]$, which is not only stronger than the otherwise paradoxical general formula of difference, $\Sigma_x (\varphi x \cdot \psi x)'$, but also much stronger than the elsewhere workable formula of non-identity of functions, $(\varphi \neq \psi)$ as corresponding to $\Sigma_x [(\varphi x \cdot \psi' x) \vee (\varphi' x \cdot \psi x)]$ or (with division of the operand) $\Sigma_x (\varphi x \cdot \psi' x) \vee \Sigma_x (\varphi' x \cdot \psi x)$.

We have seen that there are good reasons to assume that the Mohist conception of similarity and difference in relation to predicates (functions) was essentially the same as that of similarity and difference in relation to objects of the thing type. Incidentally, some of the difficulties arising from the application of the two notions, logically imperfect as they were, to particular problems have been pointed to. It is obvious that any attempt intuitively to apply the *t'ung-i* notions to classes must also have presented special difficulties to the Chinese dialecticians, not only because of the inadequacies inherent in their general conception of similarity and difference, but also in view of the complexity of the problem of class-relationships. As we know, for any two (non-empty) classes, A and B, there are four main types of possible relationships, namely, identity $(A = B)$; inclusion of one class by the other (either $(A \subset B)$ but not vice versa, or $(B \subset A)$ but not vice versa); intersection $((A \cdot B \neq 0)$ and $(A \not\subset B) \cdot (B \not\subset A))$; and exclusion $(A \cdot B = 0)$. Thus, the qualification of any two given classes as similar or different appears to be unambiguous only in the first and the fourth case (similarity of identity in the first and difference in the fourth), while in the second and the third case (that of inclusion and that of intersection) we have to do, in a sense, with both similarity and difference of classes[26]. I am far from suggesting that the Mohists in their dealing with classes in the framework

[26] Of course, this means that the concepts of similarity and difference themselves are of little use in the theory of classes (and in logic in general, cf. supra, p. 118), and that they had better be dispensed with altogether. But it is to be remembered that the Mohists had to operate with stock concepts of the Chinese dialectics and that, consequently, their attempts to deal with classes were necessarily connected with the *t'ung-i* problem.

of 'similarity and difference' arrived at a kind of theory of classes or even succeeded in differentiating the main class-relationships that are logically important. However, it must be emphasised that we have an important fragment which — besides clearly showing that the Mohist dialecticians actually were interested in the problem of classes — also shows that in spite of the inadequacies inherent in the stock concepts of 'similarity and difference' the Mohists were rather successful in dealing with classes in *t'ung-i* terms. In particular, it is precisely in the case of classes that the Mohists appear to have rid themselves of the logical inadequacies inherent in their basic conception of similarity and difference, and it is also in this case that they arrived at logically more workable concepts of the two relations. Unlike in the case of predicates (functions), the Mohist conception of similarity and difference as relations between classes was not analogical to that extracted from the 'definitional' fragments, but one closely connected with the logically tangible and unambiguous notions of identity and non-identity. It goes without saying that such an approach might have been suggested to the Mohist dialecticians by the very nature of classes as (abstract) collections of individual things[27]. On the other hand, an application of the general concepts of similarity and difference to classes by way of analogy does not appear so simple as in the case of predicates, since it would require the use of expressions of the kind $\underset{\Phi}{\Sigma}(\Phi A \cdot \Phi B)$ and $\underset{\Phi}{\Sigma}(\Phi A \cdot \Phi B)'$, that is, specific higher functions of arguments of the class type[28], — not to speak of the fact that such a procedure, unnecessarily shifting the problem onto a higher logical level, would also involve the same logical inadequacies as those inherent in the basic conception underlying the 'definitional' entries. Thus, it is to the Mohists' credit that they preferred to connect intuitively the concept of similarity between classes with that of identity between s o m e members of the one class and s o m e members of the other, and that — what I should like to emphasise specially — they founded the concept of difference between classes on that of non-identity between a l l members of the one class and a l l members of the other. This is precisely what can be extracted from the fragment to be subsequently analysed in detail, and I have to add that if the reconstruction of the concept of similarity between classes is, after all, conjectural (the fragment itself deals specifically with difference, not with similarity), that of the concept of difference is nearly certain. In connection with this let it also be noted that the concept of difference appears to be more important than that of similarity and that it is this concept which in its 'definitional' use turns out to be particularly unworkable.

[27] A class, *lei*, was certainly conceived by the Mohists as a totality of individual similar objects covered by a general or 'classifying' term (*lei-ming* 類名, cf. RO XXVI, 1; p. 18). Cf. also supra, p. 125, footnote 17.

[28] The reader will note that it is precisely at such a level that we previously analysed K u n g - s u n L u n g' s reasoning on classes, see RO XXVI, 1; pp. 13—17. Incidentally, the present analysis of the Mohist way of dealing with classes in *t'ung-i* terms will show that K u n g - s u n L u n g' s approach to the problem of classes was essentially different from that of the Mohists.

In sum, it is my contention that the Mohist intuitive conception of similarity and difference between classes can be adequately summarised in two rather sophisticated definitions (involving restricted quantification) which are structurally much unlike those previously extracted or reconstructed and which in spite of evident limitations are logically workable. The definition of similarity between two classes, (*A sim B*), can be given the following form:

$$(A\ sim\ B) \underset{df}{=} \sum_{x\epsilon A} \sum_{y\epsilon B} (x = y)$$

The definiens is to be read: "for some x which is A and some y which is B, x is identical with y". In less sophisticated language, the definition means that two classes are similar if and only if some members belonging to the one class also belong to the other (and vice versa). Such a definition clearly covers both inclusion and intersection (without differentiating these two class-relationships), but it does not exclude the identity of classes (since "some" may well mean "at least some"). In other words, our tentative definition shows that the Mohist conception of similarity between classes was rather vague, so vague as to efface the elsewhere important logical distinctions of identity, inclusion and intersection. These shortcomings, however, do not make the concept logically useless, especially in view of the Mohist conception of difference between classes, which concept in this case was particularly strong and complementary to that of similarity[29].

The definition of difference between two classes, (*A dif B*), — which is put forward with more confidence than that of similarity, since it directly underlies the fragment to be analysed, — in its simplest form is as follows:

$$(A\ dif\ B) \underset{df}{=} \prod_{x\epsilon A} \prod_{y\epsilon B} (x \neq y)$$

The definiens is to be read: "for every x which is A and every y which is B, x is not identical with y". In ordinary language, such a definition means that two classes are different if none of the members belonging to the one class belongs to the other (and vice versa). As is easily seen, this definition is logically stronger than that of similarity, since it covers only one of the main class-relationships, that is, total exclusion. As a matter of fact, the definiens of (*A dif B*) is a simple negation of that of (*A sim B*). Thus, our tentative definitions of the Mohist concepts jointly establish a bipartite division of class-relationships, a division in which similarity (covering identity of classes, inclusion and intersection) is complementary to difference (corresponding to exclusion), and vice versa.

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[29] As has already been remarked, the very reconstruction of the Mohist concept of similarity between classes is conjectural, but this does not mean that the reconstruction is entirely without foundation. We shall revert to this problem later, in connection with the analysis of the corresponding text-fragment.

Furthermore, since, as we know, $(x \neq y)$ itself is equivalent to the formula $\sum_{\varphi} [(\varphi x \cdot \varphi' y) \vee (\varphi' x \cdot \varphi y)]$, we easily obtain by substitution a more complex formula of difference:

$$(A \; dif \; B) \underset{df}{=} \prod_{x \varepsilon A} \prod_{y \varepsilon B} \sum_{\varphi} [(\varphi x \cdot \varphi' y) \vee (\varphi' x \cdot \varphi y)]$$

It is precisely in such a sophisticated form that the concept of difference between classes is involved in the fragment still to be analysed. I also hope to show that the foregoing 'rational reconstruction' of the Mohist approach to classes in *t'ung-i* terms, conjectural on the whole as it is, is sufficiently substantiated by our analysis of the fragment, or, at least, proves to be consistent with this analysis. The fragment itself, dealing with difference between classes in connection with what the Mohists termed *k'uang-kü* 狂舉 'confused statements', will also require some philological remarks, since it has so far been misunderstood by most editors and translators.

(*To be continued.*)