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Notes on Early Chinese Logic (I)

This paper is a short and preliminary report on a more comprehensive study devoted to various aspects of Chinese logic which I hope to publish in French. Since the final working up and polishing of the rather extensive French text will require some time — while the results so far arrived at seem rather new, and scholars working in the field of Chinese philosophy and logic may be expected to find some interest in them — I have thought it useful to publish a short account in English before the full version of my study is ready for publication. For technical reasons it has turned out to be necessary to divide the paper into several parts. The first one, presently published, offers a summary of the first three chapters of my study, — dealing chiefly with the *Kung-sun Lung tsï*. Summaries of chapters dealing with problems concerning the calculus of propositions, the calculus of functions, etc. — as they are represented in the reasonings of the early Chinese thinkers — will successively appear in the subsequent issues of this "Rocznik".

I. Preliminary remarks. — Works and papers on Chinese logic so far produced may be briefly characterised in a rather negative way, namely in the sense that practically all scholars, both Chinese and Western, so far working in the field have never used modern symbolic logic (mathematical logic, logistic) as a tool for their research; instead, they have all adhered to the traditional conception of logic, hardly going beyond syllogistics (in its traditional, not the truly Aristotelian, form), or some kind of 'philosophical logic'. Consequently, compared with the research-work on the history of ancient formal logic, such as has been done for the last decades with regard to Greece, medieval Europe and to some extent India, works and papers on early Chinese logic so far published are not to the point. They have chiefly (and in some cases exclusively) a philological import; on the other hand, statements concerning Chinese formal logic in the strict sense of the term so far prevailing are mostly inaccurate or misleading. The only exception (with regard to method) I know of is the short article *From the History of Chinese Logic* by H. Greniewski and O. Wojtasiewicz (in "Studia Logica", vol. IV, Poznań 1956, pp. 241—243), in which portions of the second chapter (*Pai-ma lun*) of the *Kung-sun Lung tsï* are interpreted in terms of the algebra of sets. This, however, is a case of exaggeration in applying modern methods (mathematical rather than logical) to the problems of early Chinese logic. The authors seem to have been too much influenced by H. Rei-

chenbach's idea of 'rational reconstruction' (or R. Carnap's 'rationale Nachkonstruktion'), and I do not believe that their highly sophisticated analysis, hardly readable for those without a professional training in mathematical logic, may be considered as a contribution to the history of early Chinese logic, — the more so as the paper is entirely deprived of any philological background. I am firmly convinced that in dealing with early Chinese logic we have to reckon only with elementary formal problems, which, consequently, should be stated in elementary terms of modern logic. This, of course, does not mean that the elementary problems in question are easy to discover nor that dealing with them is an easy matter. Actual practice shows that in spite of their simplicity (or perhaps because of their simplicity) they are rather difficult to single out and deal with in an adequate way. It deserves special emphasis that the formal problems spoken of do appear in the actual reasoning of early Chinese thinkers rather than in Chinese logical theory which — as far as extant texts allow us to judge — is nearly non-existent (except for the *Kung-sun Lung tsï* and the 'dialectical' chapters of the *Mo-tsï*).

The task I have set myself may be briefly stated in the following terms: Without losing sight of the philological and historical background (which, I believe, is always the necessary prerequisite in sinological research) I propose to single out some more or less typical forms of reasoning (whether already interpreted by others, or not) occurring in early Chinese philosophers; to define them from the standpoint and in terms of elementary symbolic logic; to find out general logical laws and notions underlying them; and, as far as possible, to compare them with the ancient logical theory of the West. This, of course, presupposes in both the writer and the reader some elementary training in mathematical logic (for which many good textbooks are available) and logistic notation as well as some knowledge of the history of ancient Western logic as is presented, for instance, in the excellent book by I. M. Bocheński, *Ancient Formal Logic* (Amsterdam 1951). Readers without any training of this kind will be a bit handicapped in dealing with the following analysis; it is however my firm conviction that not only every sinologue interested specifically in Chinese logic but also every one working in the field of Chinese philosophy in general should of necessity acquire an elementary training in the methods of logistic analysis. Finally, I wish to acknowledge my indebtedness to the pioneer papers on Indian logic published some thirty years ago by the late Polish scholar S. Schayer (*Z badań nad logiką indyjską — Studien zur indischen Logik* in "Bulletin international de l'Académie Polonaise des Sciences et des Lettres", Classe de Philologie — Classe d'Histoire et de Philosophie, No. 4—6, 1932, pp. 98—102, and *ibidem*, No. 1—6, 1933, pp. 90—96). In the course of my studies on Chinese logic it has been my intention to follow a path similar to that which Schayer had been the first to open in the study of Indian logic.

II. On the alleged "Chinese syllogism". — The problem of the Chinese syllogism was first raised by Chang Ping-lin some fifty years ago, and was nearly forgotten after Hu Shï's criticism of Chang's theory. More recently

it has been taken up again by Kou Pao-koh, *Deux sophistes chinois — Houei Che et Kong-souen Long*, Paris 1953 (*cf.* pp. 125—128). Unlike Chang Ping-lin who speculated on the *Mo-king*, Kou believes that he has found "quelques syllogismes très clairs et très stricts" in the *Kung-sun Lung tsï*. It is with reference to Kou that J. Needham states that "Syllogistic reasoning is of course not infrequently implicit in ancient Chinese texts; the form is complete, for instance, in the *Kungsun Lung Tzu*" (*Science and Civilisation in China*, vol. II, Cambridge 1956, p. 200). I think that both writers have been mistaken.

The first and most representative example of Kou's syllogism is taken from the *Pai-ma lun* chapter (end) of the *Kung-sun Lung tsï*. The Chinese text reads (the bracketed characters supplied by me in sentence (6) are omitted from the original text evidently by ellipsis):

(1) 馬者無去取於色
(2) 故黃黑皆所以應
(3) 白馬者有去取於色
(4) 黃黑馬皆所以色去
(5) 故唯白馬獨可以應耳
(6) 無去〔取於色〕者非有去〔取於色〕也
(7) 故曰白馬非馬

Kou leaves out the sentences (2), (4), (5) and (6), which he considers as 'explanatory elements', picks up the sentences (1), (3) and (7), and obtains thus a whole composed of three members, — of which he gives two logically different interpretations in French and which he believes to be "a strictly Aristotelian syllogism" (p. 126). This conclusion is erroneous for more than one reason. First, the Aristotelian syllogism has the form of an implication between the product of two propositions referring to specific class relations and a third proposition referring to another class relation; it follows that in the Aristotelian syllogism only the validity of the whole implication is asserted, not the truth of its component propositions. Thus, the Aristotelian syllogism is, for instance, $M\ a\ P.\ S\ a\ M \supset S\ a\ P$, in contradistinction to the traditional *Barbara* mood: $M\ a\ P$; $S\ a\ M$; ergo $S\ a\ P$. There is a specific correspondence between the Aristotelian and the traditional form of the syllogism, but there is no identity, and from the logical point of view the difference is considerable. Kou's alleged syllogism can at most claim to be of the traditional type. Second, as it appears from the fact that the component propositions of the Aristotelian syllogism (and the whole syllogism as well) concern class relations (inclusion, intersection or exclusion), only common terms *in suppositione simplici* are allowed to stand as M, P and S, while Kou is compelled to assume 'the concept of horse' and 'the concept of white horse', that is to say, common terms *in suppositione*

formali (or 'universals'); this is not Aristotelian. Third, the omission of the sentence (6) is quite arbitrary. Obvious (or better: pleonastic) as it is in the present case (in the other example analysed below the corresponding sentence will prove non-pleonastic), it was clearly conceived by the Chinese thinker as a premise, not as an 'explanatory element'. After the elimination of what are actual explanatory sentences, (2), (4) and (5), we obtain a form of reasoning which is composed of four propositions and which because of this very fact is not syllogistic. What is more, even if we follow K o u as closely as possible, we encounter serious difficulties in pressing his three-member reasoning, (1), (3) and (7), into the framework of the traditional (not to speak of the Aristotelian) syllogism. K o u, insisting on the syllogistic character of K u n g - s u n L u n g ' s reasoning as he does, none the less does not venture to indicate the mood of the alleged syllogism — and I think can guess the reason for his reserve in this respect. The first of the two versions in French which he gives is not syllogistic since it contains no middle term: in the first proposition (conceived as the 'major premise') we have M' (*non-M*), and in the second ('minor premise') — M; thus, the whole reasoning in K o u ' s first interpretation looks like $P\ a\ M'$; $S\ a\ M$; ergo $S\ e\ P$ — which does not correspond with any mood of the traditional syllogism. Only on transforming $P\ a\ M'$ into $P\ e\ M$ we get a *Cesare* (with 'universals' as P and S). On the other hand, the second version ("plus claire") which K o u gives of the same reasoning can be conceived only as a *Camestres*: $P\ a\ M$; $S\ e\ M$; ergo $S\ e\ P$. K o u must have been conscious of this divergency in the logical interpretation of the same reasoning, and this is probably the reason why he preferred to abstain from a more detailed "syllogistic" analysis of the reasoning under discussion. It is also this divergency which, for its part, clearly reveals the arbitrariness and inadequacy of the "syllogistic" standpoint with regard to the reasoning in question. I think that instead of forcibly pressing K u n g - s u n L u n g ' s reasoning into a syllogistic form we had better analyse it in a way having nothing to do with the syllogism, either Aristotelian or traditional.

Leaving out the explanatory sentences (2), (4) and (5), we obtain a complex composed of four propositions, namely (the translation deliberately deviates from the normal English usage):

(1) Horse has not [the property of] rejecting-selecting colour;
(3) White horse has [the property of] rejecting-selecting colour;
(6) What has not [the property of] rejecting-selecting colour is not what has [the property of] rejecting-selecting colour;
(7) ... White horse is not horse.

This, to my mind, can be best conceived as a reasoning on classes, and, consequently, should be interpreted as follows (A and B stand for "class 'horse'" and "class 'white horse'" respectively; the function Φ for "has [the property of] rejecting-selecting colour"; "'"is the sign of negation — in the present case referring to the function Φ: Φ' means *non-*Φ, i.e., "has not [the property of] rejecting-selecting colour";

the formula $X.Y = 0$ means that the product of classes X and Y is an empty class, i.e., it states the exclusion of classes X and Y; "$\neq$" is the sign of non-identity):

(1) $\Phi' A$
(3) ΦB
(6) $(\hat{X})\,\Phi' X\,.\,(\hat{X})\,\Phi X = 0$
(7) $A \neq B$

Propositions (6) and (7) as interpreted above need some additional remarks. Let us begin with (7). We have sufficient philological evidence to the effect that Kung-sun Lung firmly believed in the validity of the statement 白馬非馬 'White horse is not horse' and did not consider it as a mere paradox. This means that (7) can be conceived only as stating the non-identity of the classes 'horse' and 'white horse'[1] — just as is indicated by the formula $A \neq B$. The paradox arises from the ambiguity of the 'negative copula' *fei* 非, which was more commonly used to deny class inclusion and was equivalent to $\not\subset$. Those who attacked Kung-sun Lung's conclusion must have taken it for $^*A \not\subset B$, i.e., 'A white horse is not a horse' (as the phrase is often rendered in English)[2]. Reverting to proposition (6) we shall note, first, that the rather complicated symbol $(\hat{X})\Phi X$ represents in our notation the class of classes all of which satisfy the propositional function Φ; respectively, $(\hat{X})\Phi' X$ represents the class of classes all of which satisfy the function *non-*Φ. In view of the fact that in (7) the negative copula 非 is used to deny identity ($\neq$), one might be tempted to render (6) in the same way: $(\hat{X})\Phi' X \neq (\hat{X})\Phi X$ — which, however, would not be sufficient. In the present case the classes (of classes) $(\hat{X})\Phi X$ and $(\hat{X})\Phi' X$ obviously are complementary classes which exclude each other, and thus we have to put $(\hat{X})\Phi' X.\ (\hat{X})\Phi X = 0$ — just as has been done in my analysis. The latter formula simply means: there is no such class X which satisfies both $\Phi' X$ and ΦX, and this is indeed the necessary condition for the conclusion $A \neq B$. On the other hand, as has already been said, the premise (6) in question is pleonastic exactly because of the obviously complementary character of the classes (of classes) involved, which necessarily implies not only their non-identity but also their exclusion. It also appears from the preceding analysis that 非 has different functions in (7) and (6): in (7) it only denies identity while in (6) it is stronger in the sense that it states class exclusion.

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[1] I agree with A. C. Graham, *Kung-sun Lung's Essay on Meanings and Things* ("Journal of Oriental Studies" II, 2, University of Hong Kong 1955, pp. 282—301) in his criticism concerning the alleged problem of 'universals' in Chinese philosophy and in the *Kung-sun Lung tsï* in particular — although I do not share his own interpretation of the *chï* 指 (*cf. infra*).

[2] As a matter of fact, denying class inclusion ($A \not\subset B$) does not necessarily involve class exclusion ($A.B = 0$), and $A \not\subset B$ only means 'At least some individual(s) of the class A is (are) not of the class B'. I think however that in the present case, that of explaining the paradoxical aspect of Kung-sun Lung's conclusion, it is sufficient to posit the $\not\subset$-value of 非. For a more comprehensive enumeration of functions of the 'negative copula', *cf. infra*.

There is no need to emphasise the validity of Kung-sun Lung's reasoning as analysed above. The general formula underlying the reasoning appears to be one belonging to the theory of identity (of classes). In its simplest form it can be given as follows: $\underset{\Phi}{\Sigma}\,(\Phi' A \,.\, \Phi B) \supset (A \neq B)$, i.e., "if for a function Φ we have *non-*Φ of A and Φ of B, then the classes A and B are different". It is true that the formula lacks elegance since *non-*Φ appears before Φ — $\underset{\Phi}{\Sigma}\,(\Phi A \,.\, \Phi' B) \supset (A \neq B)$ would be more elegant — but this does not affect its validity. More important is that, as far as I know, such a formula has not been discovered in early Western thinkers who — unlike the Chinese philosopher — seem to have been interested in the conditions and consequences of identity rather than in those of non-identity. In this connection, for a comparison with the Western methods of approaching similar problems, it is worth while to recall the definition of identity which was given by St. Thomas Aquinas: "Quaecumque sunt idem, ita se habent, quod quidquid praedicatur de uno, praedicatur et de alio". Applying this to classes and putting it into the form of logistic notation we obtain: $(A = B) \equiv \underset{\Phi}{\Pi}\,(\Phi A \supset \Phi B)$. It is to be added that a formula similar to that of St. Thomas was also discovered in Aristotle's *Topics* (see I. M. Bocheński, *op. cit.*, p. 67, No. 11.42; *cf.* also the whole paragraph on Aristotle's theory of identity, *ibid.*). Kung-sun Lung's formula as has been reconstructed above is, of course, implied by that of St. Thomas and can easily be obtained from the latter by means of elementary transformations; none the less it seems to have never been explicitly stated by any early Western thinker.

The emphasis laid on the non-identity of different classes appears to be one of the most characteristic features of Kung-sun Lung's theory. Moreover, strange as it may seem, the Chinese thinker disregards class inclusion and even seems entirely to ignore this kind of class relation. From the logical point of view it is certainly more important to state class inclusion when it really occurs (as in the case of 'white horse' and 'horse') than to insist, as does the Chinese thinker, on the non-identity of the respective classes. Kung-sun Lung's ignorance of class inclusion is probably what Chang Tung-sun had in mind when he improved on Hu Shï's graphic interpretation of the 白馬非馬 problem: Hu Shï's interpretation involves class inclusion while that put forward by Chang is rightly reduced to class intersection (see Chang Tung-sun, *Kung-sun Lung-ti pien-hüe*, "Yenching Journal of Chinese Studies" XXXVII, 1949; especially pp. 45—46). Indeed, as far as I could see, what Kung-sun Lung takes into account in his theory (and in his actual reasonings as well) is only non-identity (rather than identity), exclusion and intersection of classes; the latter is also explicitly stated on another occasion in the *Pai-ma lun* chapter: 白馬者白與馬也 'White horse is white and horse'. In all, Kung-sun Lung's theory of classes appears to be strangely limited and incomplete, but within the limitations the Chinese thinker had for some reason imposed on himself he is rather consistent and his reasonings are correct. The problem of the limitations just spoken of is also important for an

adequate understanding of the other example analysed below, and we shall see later on that it is equally important for the interpretation of the *Chï wu lun* chapter (see *infra*, III).

The other example deserving analysis is the one taken from the very beginning of the *Pai-ma lun*. The Chinese text runs as follows:

(1) 馬者所以命形也
(2) 白者所以命色也
(3) 命色者非命形也
(4) 故曰白馬非馬

In translation:

(1) Horse is what commands shape [and only shape];
(2) White is what commands colour [and only colour];
(3) What commands colour [and only colour] is not what commands shape [and only shape];
(4) ... White horse is not horse.

K o u P a o - k o h puts the above example into a paragraph on "Fautes commises dans le raisonnement" (*op. cit.*, p. 127) and does not explicitly say that in the present case the reasoning is syllogistic in form. It is clear, however, that he must have taken the reasoning for a (faulty) syllogism since the logical structure in the present case is analogous to that of the alleged syllogism previously analysed. Besides, his objections against the validity of the reasoning ("La conclusion n'est pas juste. Il serait... juste de conclure que blanc n'est pas cheval...") are certainly made from the 'syllogistic' standpoint. Similarly, A. C. G r a h a m considers the reasoning in question as faulty (see his article *The Composition of the Gongsuen Long Tzyy*, "Asia Major" V, 2, 1956, p. 149: "...what has been proved is merely "Whiteness is not a horse", not "A white horse is not a horse""). As a matter of fact, the reasoning is neither syllogistic nor faulty as will appear from the following analysis (A stands for "class 'horse'", B for "class 'white (objects)'", Φ for "commands shape [and only shape]", Ψ for "commands colour [and only colour]"):

(1) ΦA
(2) ΨB
(3) $(\hat{X})\Psi X \,.\, (\hat{X})\Phi X = 0$
(4) $B.A \neq A$

The remarks concerning the preceding example largely apply also in the present case, and they need not be repeated. There are, however, in the present reasoning some specific points deserving emphasis. We shall note, first of all, that premise (3) of the present reasoning closely corresponds with proposition (6) of the preceding example — which fact itself shows that both were conceived by the Chinese thinker as real premises, not as 'explanatory sentences' (of which there is none in the present reasoning). The difference is that in the present case premise (3) is by no means pleo-

nastic nor obvious, since the classes involved are not complementary and their exclusion must be specifically stated. In other words, $(\hat{X})\Phi' X.(\hat{X})\Phi X=0$ of the preceding example is a particular case of $(\hat{X})\Psi X.(\hat{X})\Phi X=0$ (when $\Psi=\Phi'$), in which the exclusion of the two classes (of classes) involved is automatically secured by their complementary character, while classes (of classes) $(\hat{X})\Psi X$ and $(\hat{X})\Phi\hat{X}$ themselves are not complementary and need a particular statement to the effect that they exclude each other. Thus, in the present case (3) is a necessary premise (not a pleonastic one) for the conclusion. Concerning the alleged invalidity of the reasoning as has been objected by K o u and G r a h a m, it must be said that the reasoning is incomplete in form, but it is quite valid. In the present case K u n g - s u n L u n g jumped over one or two intermediate links, but this does not affect the validity of the conclusion. Indeed, what directly follows from (1), (2) and (3) is $B \neq A$ — which is omitted from the reasoning — but we can easily obtain $B.A \neq A$ from $B \neq A$ if we know, as we do in the present case, that $A \not\subset B$ (class 'horse' is not included in class 'white (objects)'). As a matter of fact, $A \not\subset B$ is the only condition the fulfilment of which enables one to multiply both sides of the formula $B \neq A$ by A and obtain the equally true formula $B.A \neq A$ (or, speaking more strictly, $B.A \neq A.A$; of course, in the calculus of classes $A.A=A$, and thus $B.A \neq A.A$ becomes $B.A \neq A$). One may object that K u n g - s u n L u n g had omitted $A \not\subset B$ which is a necessary premise in his reasoning, and such an objection certainly would be justified from the standpoint of the modern calculus of classes — but I think that from the standpoint of K u n g - s u n L u n g ' s narrow and incomplete calculus the reason for the omission is clear. In order to understand it we only have to revert to the problem of class inclusion already touched upon in connection with the preceding example: if we assume that the Chinese thinker had not admitted class inclusion (and, consequently, its negation) into his theory, it becomes clear that there was no place for the statement $A \not\subset B$ in his reasoning. Of course, the reasoning under discussion should have had the following form to be complete from the standpoint of the modern calculus of classes:

(1) ΦA
(2) ΨB
(3) $(\hat{X})\Psi X \,.\, (\hat{X})\Phi X=0$
(3a) $B \neq A$
(3b) $A \not\subset B$
(4) $B.A \neq A$

This, however, is a kind of 'rational reconstruction' (in R e i c h e n b a c h ' s sense of the term) which is given here merely in order to emphasise the validity of the whole reasoning and to show more clearly its non-syllogistic character as well. As we have seen, in the framework of K u n g - s u n L u n g ' s theory the omission of (3b) is legitimate (strictly speaking, we cannot call it 'omission', since in the theory of the Chinese thinker statements of the kind $X \subset Y$ or $X \not\subset Y$ did not exist at all), while the omission of (3a) is evidently due to its obviousness. After all, the reasoning as it stands in the *Pai-ma lun* is valid.

The problem of general logical laws underlying the reasoning is a little more complicated here than in the preceding example. One might be tempted to think of the following two formulae belonging to the theory of identity (of classes):

$$\sum_{\Phi\Psi}(\Phi A.\Psi B).[(\hat{X})\Psi X.(\hat{X})\Phi X=0]\supset(B\neq A) \quad \text{and} \quad (B\neq A).(A\subsetneq B)\supset(B.A\neq A)$$

These, however, would correspond with the reconstruction of Kung-sun Lung's reasoning (in accordance with the modern calculus) rather than with the reasoning itself since, firstly, the conclusion (4) was conceived by the Chinese thinker as directly following from (1), (2) and (3), secondly, there is, as we have seen, no place for $A\subsetneq B$ in Kung-sun Lung's theory. Thus, the formula underlying the reasoning as it stands appears to be as follows:

$$\sum_{\Phi\Psi}(\Phi A.\Psi B).[(\hat{X})\Psi X.(\hat{X})\Phi X=0]\supset(B.A\neq A)$$

This formula cannot claim validity within any complete calculus of classes; it seems, however, legitimate within the narrow and incomplete calculus not allowing of class inclusion.

To sum up: As has been shown in the discussion of the most representative examples taken from the *Pai-ma lun*, Kung-sun Lung's reasonings can be best interpreted within and in terms of a specifically narrow kind of theory of classes, — a theory emphasising the relation of non-identity and not allowing of class inclusion. This theory, which is to be considered as the early Chinese anticipation of the calculus of classes, differs considerably from syllogistics, either Aristotelian or traditional; accordingly, Kung-sun Lung's reasonings themselves are not syllogistic in form. Contrary to Kou Pao-koh and J. Needham, I do not know of any clear example of syllogistic reasoning in ancient Chinese texts. Moreover, Kung-sun Lung's theory of classes and the form of his reasonings as well are by no means typical of early Chinese philosophy; they appear to have been characteristic of the group of 'dialecticians' in which Kung-sun Lung was a prominent figure, if not characteristic of this particular thinker alone. As will be seen later on, much more common and typical methods of reasoning actually to be found in ancient Chinese texts are those which can be best interpreted in terms of the calculus of propositions and the calculus of functions.

At least two corollary problems arise in connection with the subject-matter of the present chapter. The first of them is both logical and linguistic in nature and concerns the word 非. As is known, the word has many meanings (including pleremetic ones: 'wrong', 'to disapprove of', etc.) and functions; what we shall consider is only its functioning as a grammaticised copula of negation roughly equivalent to 'is not'. W. A. C. H. Dobson, *Late Archaic Chinese* (Toronto 1959), p. 111, defines this rôle of 非 as "A is not of the class B" — which is neither accurate nor sufficient, at least from the logical point of view. As a matter of fact, Dobson's own example (taken from *Chuang-tsï*, ch. XVII, end) 子非我 'You, Sir, are not me' does not fit his formula since it certainly is a case of denying identity (or stating non-identity) of individuals. On the other hand, we have seen in the discussion of Kung-sun

Lung's reasonings that the negative copula has two different logical functions within the reasonings themselves, and also a third one (outside the reasonings) which made Kung-sun Lung's conclusion look like a paradox, if not like an evident falsity. It seems useful clearly to differentiate all these functions of 非 according to whether it stands between terms designating individual objects (x, y), between an individual term and a common (class) term (x, X), and between class terms (X, Y). Thus, from the logical point of view we have to distinguish the following functions of 非 within its grammatical rôle as copula of negation: in x 非 y it denies identity of individual objects ($x \neq y$, as in Dobson's example just quoted); in x 非 X it denies class membership ($x \varepsilon' X$, as e.g., in *Chuang-tsï*, ch. XVII, end: 子非魚 'You, Sir, are not a fish'); in X 非 Y the negative copula either denies identity of classes ($X \neq Y$, as in Kung-sun Lung's 白馬非馬), or denies class inclusion ($X \not\subset Y$, as, e.g., has been assumed with regard to those who rejected Kung-sun Lung's conclusions; this function of 非 does not appear in the theory of the Chinese thinker), or states class exclusion ($X.Y=0$, as in the propositions (6) and (3) analysed above, where however we had to do with classes of higher type, thus $\boldsymbol{X.Y}=0$ rather than $X.Y=0$; this function must have been common in ordinary language, and it probably coincides — together with $x \varepsilon' X$ already spoken of — with Dobson's "A is not of the class B"). Finally, it also appears that 非 can deny the relation of membership between an ordinary class X and a class of higher type (class of classes) $\boldsymbol{X}$; thus X 非 $\boldsymbol{X}$ would mean: $X \varepsilon' \boldsymbol{X}$. For this I have no genuine example at hand, but I think that such examples can easily be derived from Kung-sun Lung's reasonings analysed in this chapter. It may safely be assumed that the Chinese thinker would approve of the statements *馬者非有去取於色也 'Horse [i.e., class 'horse'] is not what has [the property of] rejecting-selecting colour' or *馬者非所以命色也 'Horse [class 'horse'] is not what commands colour' — which are precisely cases of X 非 $\boldsymbol{X}$. Let it be recalled in this connection that in the interpretation of the respective propositions (6) and (3) of the two reasonings we had to do with classes of classes, i.e., classes of higher type (as e.g. $(\hat{X})\Phi X$, etc.) and that, for instance, $(\hat{X})\Phi' X.(\hat{X})\Phi X=0$ implies that if $X \varepsilon (\hat{X})\Phi' X$, then $X \varepsilon' (\hat{X})\Phi X$. By the way, the relation now in question should be carefully distinguished from that of class inclusion, since if class X is included in class Y (both being of the same type), every individual member of X is a member of Y, while if class X itself is a member of $\boldsymbol{X}$ (class of higher type), the members of X are themselves not members of $\boldsymbol{X}$. In our examples this means, for instance, that it is class 'horse' which is a member of the class of classes 'what has not the property of rejecting-selecting colour', while particular horses, being members of the class 'horse', are themselves not members of the class of classes involved. One will note that all this is in perfect accord with Kung-sun Lung's line of reasoning.

Of course, the functional polyvalence of the copula of negation as evidenced in the distinctions just spoken of is not a peculiarity of Chinese since it largely resembles, for instance, the functional ambiguity of the corresponding English expression 'is not'. This fact probably is one of the reasons why the distinctions in question seem to have

been so far overlooked by grammarians. On the other hand, it appears that there are no sufficient linguistic (grammatical) criteria for such a differentiation of functions within the copulative use of 非, which fact itself justifies the grammarian's reticence in this respect. None the less, as has been shown in the analysis of Kung-sun Lung's reasonings, the logical (even if not grammatical) distinctions which have been made within the copulative rôle of 非 can be helpful in the interpretation of texts having philosophical interest.

The other problem arising in connection with the subject-matter of the present chapter is that of the interpretation of the *chï* 指. It deserves to be dealt with in a separate chapter of this study (ch. III).

III. The problem of the 指. — After the publication of A. C. Graham's excellent and fully documented study *The Composition of the Gongsuen Long Tzyy*, "Asia Major" V, 2, 1956, pp. 147—183 (already referred to *supra*, p. 13), we know that only two chapters, the second and the third, that is to say, the *Pai-ma lun* and the *Chï wu lun*, of the present *Kung-sun Lung tsï* are authentic documents of the period of the Warring Kingdoms, while chapters 4—6 are a haphazard compilation by the hand of an unknown forger, a compilation probably as late as the 6th century of our era. The introductory chapter 1, being a narrative of Kung-sun Lung's life and doctrine, is generally considered as a kind of preface subsequently added to the work. If so, the *Pai-ma lun* and the *Chï wu lun* constitute a whole — fragmentary as it is (the bibliographical chapter of the *Han-shu* speaks of a *Kung-sun Lung tsï* in fourteen chapters), — a whole representing the same trend of early Chinese thought, that of 'dialecticians', and probably written by one and the same representative of the school, if not by Kung-sun Lung himself. It also appears that the main ideas underlying both the *Pai-ma lun* and the *Chï wu lun* should have been the same.

Now, as is known, there is no general agreement with regard to the interpretation of the *Chï wu lun* and the interpretation of its key word, *chï* 指, in particular. The identification of the *chï* as 'universals', due to Fung Yu-lan and given wide currency in the West through D. Bodde's translation of Fung's *History of Chinese Philosophy* (vol. I, 2nd ed., Princeton 1952; see pp. 205 ff.), has been rightly criticised by A. C. Graham in his study (already referred to *supra*, p. 11) *Kung-sun Lung's Essay on Meanings and Things* (*cf.* also *ibidem*, p. 282, for other interpretations of the *chï*). But Graham's own identification of the *chï* as 'meaning(s)', put forward in the same study, is, to my mind, too sophisticated to be convincing. I also think that the evidence Graham has so laboriously collected from various sources speaks against rather than in favour of his hypothesis and leads to an interpretation different from his — an interpretation which is also suggested by what we know from the *Pai-ma lun*. I hope to have demonstrated in the preceding chapter that the reasonings contained in the *Pai-ma lun* can be best interpreted in terms of a specific calculus of classes and that, consequently, the idea underlying the *Pai-ma lun* was a kind of theory of classes, narrow and incomplete as it was. If this interpretation be correct, one may expect the same underlying idea in the *Chï wu lun*. Indeed, I think that the much

debated problem of the *chï* finds its best solution if the *chï* are conceived as 'classes (of things)'; thus, the *Chï wu lun* appears to be a theoretical essay on 'classes and (particular) things'. The evidence for this interpretation is threefold: the actual reasonings in the *Pai-ma lun* (already spoken of), the *Chï wu lun* itself, which, as we shall see, allows of this kind of interpretation, and — last but not least — external evidence from other sources to the effect that the dialecticians were specially interested in the problem of classes. This last kind of evidence deserves brief consideration before we revert to the *Chï wu lun* itself.

Graham probably is right when he states that the problem of common names "was never prominent in Chinese philosophy" (*Essay on Meanings and Things*, p. 283), and he certainly is right when he says that in the early sources there is no suggestion "that the difference between proper and common names presents a metaphysical problem" (*ibid.*, p. 284). This, however, does not exclude the fact that common names must have been a semantic and logical problem for those interested in logic or dialectics, and all evidence we have is to the effect that they had been such a problem for the dialecticians. Graham himself remarks (*ibid.*, pp. 283—284) that in ch. 40 of the *Mo-tsï* there is a classification of names (*ming* 名) into 'comprehensive' (*ta* 達), 'classifying' (*lei* 類) and 'proper' (*sï* 私); in *Mo-tsï*, ch. 42, these are exemplified respectively by *wu* 物 'thing' ('Whatever actuality must bear this name' — as is explained in the text), *ma* 馬 'horse' ('Whatever is like this actuality must take this name'), and *Tsang*, a personal name ('This name is limited to this actuality'). These distinctions are a quite good semantic basis for the logical problem of classes, so closely connected with that of 'classifying' names. In fact, we have a clear and quite early statement from outside the school of dialecticians unambiguously saying that 辯者別殊類使不相害 "The dialecticians distinguish separate classes [*lei* 類] so that they shall do no harm to each other..." This statement forms part of an opinion on the methods of the dialecticians, opinion which is conserved in three different and otherwise diverging versions dating back at least to the Former Han period. In Liu Hiang's *Pie-lu* (1st century B.C.) this opinion is put into the mouth of Tsou Yen (head of the *in-yang* school, about 300 B.C.) and is presented as a direct criticism of Kung-sun Lung (whom Tsou Yen had met in Chao) and his 白馬非馬 argument[3]. One will note that the statement about 'distinguishing

[3] Liu Hiang's *Pie-lu* has long been lost, but is partly preserved in quotations; the passage in question is quoted in P'ei In's commentary (5th cent. A.D.) on chapter 76 of the *Shï-ki*, see the K'ai-ming shu-tien ed. of the *Er-shï-wu shï*, p. 01993$_3$, and Takigawa Kametarō, *Shï-ki hui-chu k'ao-cheng* (repr. Peking 1955), vol. VII, 76, p. 11. For the other versions, see Han Ing's *Han-shï wai-chuan* (2nd cent. B.C.), *Sï-pu ts'ung-k'an* ed., VI, f. 3v-4r; and *Teng Si tsï* (attributed to Teng Si, of the 6th cent. B.C., but unauthentic; a late compilation of uncertain date), *Sï-pu ts'ung-k'an* ed., f. 4r. *Cf.* also Graham, *Essay*, p. 287, who quotes a slightly longer fragment from Liu Hiang's version. Graham's purpose, however, is different from mine, and the passage has been cited by him only as a support for his interpretation of the word 指 as 'meaning': the word is involved in the phrase

classes' is materially the same in all the three versions, divergent as they are in other points, and is always put in the first place — which can only mean that the point in question was generally recognised as the most characteristic feature of the methods of the dialecticians. One also sees that all this corroborates both the interpretation of the reasonings in the *Pai-ma lun* in terms of a calculus of classes (as has been done in the preceding chapter) and the interpretation of the key word of the theory, *chï*, as 'classes'. The very fact that the problem of classes (and not that of 'meanings') was so prominent with the dialecticians — classes being, of course, a category next to that of particular things — inevitably makes us think that the contrast 指 : 物 which is the subject-matter of the *Chï wu lun* corresponds with *classes of things*: *particular things*. It is true that the choice of the term 指 'finger → to point → what is pointed to' for 'class' seems unusual, but etymologically no objection can be made against the use of the term if we assume that classes were conceived by the dialecticians as something 'which is pointed to' by particular things belonging to them.

Reverting to the *Chï wu lun* itself it should be emphasised that if the equation *chï* = = *class(es)* be assumed, the interpretation of the text becomes comparatively smooth — of course not in the sense that every phrase of this partly corrupted text becomes clear, but in the sense that at least some of the otherwise very enigmatic statements as they stand in the text appear to be clear allusions to specific points of Kung-sun Lung's theory as we know it from the analysis of his reasonings. The French version of my study will bring an annotated translation of the whole of the *Chï wu lun*, in which I hope to show that my interpretation is less sophisticated and more convincing than any other hitherto produced; in this place I must limit myself to a few particulars.

I think that the opening sentence of the *Chï wu lun*: 物莫非指而指非指 — which seems to summarise the main points of the theory — should be rendered as follows: "No thing is without class, but classes themselves are without classes"[4]. The meaning of the first part of this statement is plain: every particular thing

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抒意通指 conceived by Graham as "by elucidating their ideas and making their *meanings* intelligible..." Leaving out the question whether the translation of the phrase as it stands in the *Pie-lu* is adequate or not (and I think it is not, the gradation 意 — 指 — 物, attested also in the first three paradoxes ascribed to Kung-sun Lung in ch. IV of the *Lie-tsï*, being that of 'ideas' — 'classes' — 'particular things'), it must be emphasised that the wordings of the corresponding phrases in the two other versions of the text (*Han-shï wai-chuan*, *Teng Si tsï*) are entirely different from that of Liu Hiang (and also different from each other), and there is no word 指 in the passage as it stands in those versions. I think that Graham pays too much attention to a rather problematic and otherwise unsupported phrase of the passage he quotes, while he overlooks the importance of the opening phrase, remarkably clear and supported by all the three versions.

[4] The translation assumes in the present case the privative function of 非, different from those spoken of in the preceding chapter; *cf.* J. Needham's rendering: "There are no things... that are without *chih*, but these *chih* are without *chih*" (*Science and Civilisation*, II, p. 186).

belongs to a class (or even establishes a class of similar things, classes being 'what is pointed to' by particular things; one will note that this is different from the modern theory according to which classes are 'pointed to' by properties, *cf. infra*). The other part, "classes themselves are without classes" must be a rather clumsy statement of the fact already known to us that Kung-sun Lung's theory does not allow of class inclusion. Both the wording and the context (parallelism with the first part referring to the relation of membership between any particular thing and the corresponding class) are a little bit confusing, and "classes themselves are without classes" might well refer not to class inclusion, but the specific relation of membership between a class and a class of classes (class of higher type). This latter relation, as we know (see *supra*, p. 16), is involved in Kung-sun Lung's theory and his reasonings as well (which does not necessarily mean that the Chinese thinker was conscious of the fact). The author of the *Chï wu lun* evidently makes no distinction between the two relations as he speaks of the one in terms of the other, but I think that we cannot expect too much of so early a thinker, the more so as the difference, although logically important, is rather subtle. It goes without saying that if the *chï* are conceived as classes, the author is right when he repeatedly emphasises that they have no real existence such as particular things have; in this Kung-sun Lung clearly takes the nominalist position. Another important point is that we discover in the text an indirect reference to the possible linguistic sources of Kung-sun Lung's peculiar theory of classes together with its limitations concerning class inclusion, namely in the statement 天下無指者生於物之各有名不爲指也 "That classes have no existence in the world arises from the fact that every particular thing has a [common] name, but is not itself a class." As already said, the theory of the Chinese thinker does not have its origin in abstract speculations on 'properties' (which latter in the modern theory are sometimes nearly identified with classes) — the construction of 'properties' or 'classes' disregarding the more or less complicated structure of the corresponding linguistic expression — but it appears to be, first of all, a generalisation of the empirical fact that particular things can be classified according to their similarity. This is precisely what ordinary language does in using common ('classifying') names, and the latter must also have been an important suggestion for Kung-sun Lung's theory. On the other hand, general 'classifying' names (corresponding with classes) were as a rule monosyllabic in early Chinese, while more specific common names (corresponding with sub-classes in our terminology) mostly had a compound form and were combinations of simple 'classsifying' names[5]. This linguistic procedure directly

[5] This, of course, is not an absolute rule, and other dialecticians must have been aware of the fact that some simple common names are more specific and less general than other simple names. They also adopted, at least in practice, the common sense standpoint that less general classes are included in more general ones regardless of the linguistic structure (simple or compound) of the terms involved; *cf. Mo-tsï*, ch. 41 and 43: 狗犬也 'A puppy is a dog', and ch. 45: 白馬馬也 'A white horse

suggests the intersection of classes (which, as we know, is present in Kung-sun Lung's theory), while the linguistically less manifest fact that the product of two classes (corresponding with the compound term) is itself a sub-class of each of the classes involved remained unnoticed (or was rejected) by Kung-sun Lung. In his theory, classes *par excellence* are only those which are 'pointed to' by particular things as having common 'classifying' (and also simple, monosyllabic) names (as 馬 'horse', etc.), while what corresponds with a compound term (as 白 馬 'white horse', etc.) is conceived as a mere product (*kien* 兼 , 'a combination') of two classes rather than a class for itself (and a class capable of being a sub-class of another class). This narrow conception of classes, closely connected with superficial linguistic suggestions (which in Chinese, owing to its peculiar structure, must have been stronger than in other languages), probably accounts for the otherwise strange absence of class inclusion in Kung-sun Lung's theory. I also think that the evidence we have from Liu Hiang and other sources to the effect that the dialecticians "distinguish separate classes so that they shall do no harm to each other" (*cf. supra*, p. 18, and footnote 3) refers to this absence of class inclusion. It cannot possibly refer to the other kind of class interference, namely class intersection, which — besides being clearly involved in common linguistic procedure of forming compound names — is actually present in Kung-sun Lung's reasonings and his theory as well. As we have seen, the *Pai-ma lun* contains the explicit statement: "White horse is white and horse" (see *supra*, p. 12), and there is also a direct reference to class intersection in the *Chï wu lun*: 且指者天下之所兼 "Moreover, classes are what the world combines" (as in using compound names).

To sum up: I believe that what can be known of the logical theory attested in the authentic chapters of the *Kung-sun Lung tsï* — and also what can be known through external evidence, scanty as it is — allows us to consider this theory as an early Chinese anticipation of the theory of classes. The *Pai-ma lun* gives examples of its application in actual reasoning, while the *Chï wu lun* is a rather clumsy and partly corrupted exposition of the theory itself. There is no need to emphasise that this Chinese anticipation of the theory of classes is entirely different from that of Aristotle and that it has nothing to do with syllogistics.

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is a horse' — which appears to be a direct criticism of Kung-sun Lung's theory. However, very little is known of the theories of the group of dialecticians who produced the 'dialectical' chapters of the *Mo-tsï* (very chaotic and badly corrupted as they now stand), and it is not certain whether they had a theory of classes of their own, similar to and better than that which we know of through the *Kung-sun Lung tsï*.