'indeterminate' does not express a property, is never pursued; and hence no paradox shows up here. Matilal then puts this argument "in another way." Essentially he considers the following argument: Let p be the proposition that the world of phenomena is indeterminate. Now if p is indeterminate, then p is not true. Furthermore, if p is not indeterminate, then p is not true. But again, there is no paradox here.

In general, because of the limited length of this book, the quotations from and summaries of Indian sources on pure logic and semantics are too vague or fragmentary to bear any more far-reaching explications and comparisons with Western logic. JAN BERG

HERBERT L. SEARLES. *Foreword.* ***Truth and meaning,*** by David Greenwood, Philosophical Library, New York 1957, pp. vii–viii.

DAVID GREENWOOD. *Truth and metalanguage.* Ibid., pp. 1–17.

DAVID GREENWOOD. *Meaning in natural languages.* Ibid., pp. 18–36.

DAVID GREENWOOD. *The completeness of the sentential calculus.* Ibid., pp. 37–46.

DAVID GREENWOOD. *On mathematical definition.* Ibid., pp. 47–56.

DAVID GREENWOOD. *The nature of probability statements.* Ibid., pp. 57–83.

DAVID GREENWOOD. *The pragmatic theory of truth.* Ibid., pp. 84–109.

This book attempts to settle a considerable number of significant issues in the following subjects: formal semantics, empirical semantics, completeness, definition, probability, pragmatic theory of truth. *Truth and metalanguage*—probably the most interesting and able paper of the lot—defends a thesis that continues to be a source of confusion, namely, the thesis that any interpreted metalanguage M which is equipped to talk about both sets and properties is translatable into a language M′ which talks instead about certain "neutral entities."

Below is a formalization of the method of translation sketched in the book. This method will be tested against two characteristic languages M_1 and M_2. M_1 is a first-order language which has two sorts of variables: 'x', 'y', 'z', $\cdots$; 'X', 'Y', 'Z', $\cdots$. And M_1 has two sorts of names: 'a_1', $\cdots$, 'a_n'; 'A_1', $\cdots$, 'A_n'. Lower-case terms are intended to apply to classes and particulars; upper-case terms are intended to apply to properties and particulars. The primitive predicates of M_1 are '$=$', 'ϵ', and 'Δ'. $\ulcorner \alpha = \delta \urcorner$ is a formula; $\ulcorner \alpha \epsilon \gamma \urcorner$ is a formula iff γ is a lower case; $\ulcorner \alpha \Delta \beta \urcorner$ is a formula iff β is upper case. Complex formulas are built up with quantifiers and connectives in the usual way. M_1 is interpreted so that '$=$' expresses the identity relation, 'ϵ' expresses the class-membership relation, and 'Δ' expresses the property-possession relation. In the special case where α is either a name of a particular or a variable to which a particular has been assigned, if α is lower case, $\ulcorner \beta \epsilon \alpha \urcorner$ is true iff $\ulcorner \beta = \alpha \urcorner$ is true, and if α is upper case, $\ulcorner \beta \Delta \alpha \urcorner$ is true iff $\ulcorner \beta = \alpha \urcorner$ is true. Let M′ be a one-sorted first-order language whose variables are: 'x', 'y', 'z', $\cdots$. The names of M′ are: 'b_1', $\cdots$, 'b_n'. The predicates of M′ are '$\approx_L$' and 'is'. These predicates express, respectively, the relation of logical equivalence and a neutral predication relation. Then ordinary equivalence is defined in M′ as follows: $\ulcorner \alpha \approx \beta \urcorner$ for $\ulcorner (\forall \delta)$ (δ is $\alpha \equiv \delta$ is $\beta)\urcorner$. The method of translation proposed in the book apparently consists of two steps. First where γ and δ are lower-case terms, β is an upper-case term, γ_i is the ith lower-case name in M_1, β_i is the ith upper-case name in M_1, and α_i is the ith name in M′: $\ulcorner \delta = \gamma \urcorner \Rightarrow \ulcorner \delta \approx \gamma \urcorner$; $\ulcorner \beta = \eta \urcorner \Rightarrow \ulcorner \beta \approx_L \eta \urcorner$; $\ulcorner \eta = \beta \urcorner \Rightarrow \ulcorner \eta \approx_L \beta \urcorner$; $\ulcorner \eta \epsilon \gamma \urcorner \Rightarrow \ulcorner \eta$ is $\gamma \urcorner$; $\ulcorner \eta \Delta \beta \urcorner \Rightarrow \ulcorner \eta$ is $\beta \urcorner$; $\ulcorner \cdots \gamma_i \cdots \urcorner \Rightarrow \ulcorner \cdots \alpha_i \cdots \urcorner$; $\ulcorner \cdots \beta_i \cdots \urcorner \Rightarrow \ulcorner \cdots \alpha_i \cdots \urcorner$. Then replace upper-case variables with new, unique lower-case variables.

Let 'A_1' name the property of being a creature with a kidney, 'a_1' name the set of creatures with kidneys, and 'a_2' name the set whose sole member is the set of creatures with kidneys. The following are true sentences of M_1: (1) '$-(A_1 = a_1)$' and (2) '$(\exists x)(x \epsilon a_2)$ & $-(\exists Y)(Y \epsilon a_2)$'. Using the method of translation, we obtain: (1′) '$-(b_1 \approx_L b_1)$' and (2′) '$(\exists x)$ (x is b_2) & $-(\exists y)$ (y is b_2)'. Thus, the method of translation proves to be unacceptable, for it translates these self-consistent sentences into self-inconsistent sentences.

Consider even the language M_2, which is more restrictive than M_1. M_2 is like M_1 except that $\ulcorner \alpha = \beta \urcorner$ is a formula iff α and β are both upper-case terms or both lower-case terms; $\ulcorner \alpha \epsilon \beta \urcorner$ is a formula iff α and β are both lower-case terms; $\ulcorner \alpha \Delta \beta \urcorner$ is a formula iff α and β are both upper-case terms; the interpretation is such that no member of a set is a property, and no instance of a property is a set. Class equivalence is defined in M_2 as follows: $\ulcorner \gamma \approx_\epsilon \gamma' \urcorner$

for $\ulcorner(\forall\delta)(\delta \in \gamma \equiv \delta \in \gamma')\urcorner$. Property equivalence is defined as: $\ulcorner\beta \approx_\Delta \beta'\urcorner$ for $\ulcorner(\forall\delta)(\delta \,\Delta\, \beta \equiv \delta \,\Delta\, \beta')\urcorner$. Now although the previous problems do not arise for M_2, there are new problems. Let 'A_2' name the property of being the property of being a creature with a kidney; 'A_3', the property of being the property of being a creature with a heart. The following are true sentences of M_2:

(3) $(\forall x)(\forall y)\{[(\forall u)(u \in x \supset (\exists v)(v \approx_\epsilon u \,\&\, v \in y)) \,\&\, (\forall u)(u \in y \supset (\exists v)(v \approx_\epsilon u \,\&\, v \in x))] \supset x \approx_\epsilon y\}$;

(4) $(\forall U)(U \,\Delta\, A_2 \supset (\exists V)(V \approx_\Delta U \,\&\, V \,\Delta\, A_3)) \,\&\, (\forall U)(U \,\Delta\, A_3 \supset (\exists V)(V \approx_\Delta U \,\&\, V \,\Delta\, A_2))$;

(5) $-(A_2 \approx_\Delta A_3)$.

Using the method of translation, we obtain:

(3′) $(\forall x)(\forall y)\{[(\forall u)(u \text{ is } x \supset (\exists v)(v \approx u \,\&\, v \text{ is } y)) \,\&\, (\forall u)(u \text{ is } y \supset (\exists v)(v \approx u \,\&\, v \text{ is } x))] \supset x \approx y\}$;

(4′) $(\forall u)(u \text{ is } b_2 \supset (\exists v)(v \approx u \,\&\, v \text{ is } b_3)) \,\&\, (\forall u)(u \text{ is } b_3 \supset (\exists v)(v \approx u \,\&\, v \text{ is } b_2))$;

(5′) $-(b_2 \approx b_3)$.

However, from (3′) and (4′) we can derive '$b_2 \approx b_3$' which contradicts (5′). Thus, the method of translation again proves to be unsatisfactory, for it translates a consistent set of sentences into an inconsistent set. Consider another problem. Let 'a_4' name the set of creatures with hearts; 'A_4', the property of being a creature with a heart. The following is a true sentence of *both* M_1 and M_2: '$(\forall x)(a_1 \in x \equiv a_4 \in x) \,\&\, -(\forall Y)(A_1 \,\Delta\, X \equiv A_4 \,\Delta\, Y)$'. Given the translation method, it translates into an inconsistent sentence of M′: '$(\forall x)(b_1 \text{ is } x \equiv b_4 \text{ is } x) \,\&\, -(\forall y)(b_1 \text{ is } y \equiv b_4 \text{ is } y)$'.

The translation method fails because it was designed to handle sentences of the form $\ulcorner\alpha_i = \alpha_j\urcorner$, where either α_i and α_j are both names of classes, or α_i and α_j are both names of properties. The problems created by (1) sentences of the form $\ulcorner\alpha_i = \alpha_j\urcorner$ where α_i is the name of a class and α_j is the name of a property, (2) elementary sentences concerning the comprehensions of various sets and properties, and (3) complex sentences exhibiting the logical features of 'Δ' and 'ϵ' were either neglected or not foreseen. Although restricted languages such as M_2 avoid the first two types of problems, the last type still remains.

The foregoing is intended in criticism of Greenwood's treatment and is not meant to decide either way the soundness of Carnap's method of translation (§§34, 36 in XIV 237) from which it is evidently derived. But in the reviewer's opinion consideration of Greenwood's unsatisfactory approach suggests tests which count against the method of Carnap if that method is intended to apply to non-neutral languages whose expressive powers are comparable to M_1 or M_2.

The inadequacies of *Truth and metalanguage* are typical of those found throughout ***Truth and meaning***. The book can only be characterized as sketchy and derivative.

GEORGE BEALER

JACQUES BOUVERESSE. *Carnap, le langage et la philosophie.* ***L'âge de la science***, vol. 3 (1970), pp. 117–154.

This is a knowledgeable and competent summary of recent philosophy of language, centering on Carnap and ranging from Wittgenstein to Katz but not further, hence omitting, e.g., discussion of the great impact of logical semantics on the development of generative semantics during the last five years or so.

A few minor comments: (1) On page 119, the invocation of Jakobson is unnecessary, since the distinctions drawn by him were drawn, simultaneously and independently, by Carnap himself.

(2) On page 121, the reviewer did not understand what is so "curious" about Carnap's suggestion that, in spite of the absolute priority which he assigns to pragmatics in the case of *natural languages*, we understand a *language system* when we know the semantic rules of that system. Though many people have questioned the seriousness of the distinction between a natural language and a constructed language system, if one accepts this distinction, Carnap's suggestion is utterly intelligible and close to trivial.