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Steffen Ducheyne. Paul Otlet's Theory of Knowledge and Linguistic Objectivism

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and Linguistic Objectivism

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Classer est la plus haute opération de l'esprit, celle qui implique toutes les autres. (Otlet, 1934, 379)

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ABSTRACT: In this paper, I point to the importance of an often neglected objectivist strand in Paul Otlet's (1868-1944) thinking: his linguistic objectivism. Linguistic objectivism consists in the view that linguistic atoms uniquely correspond to certain discrete and well-defined elements in the world and further combinations of these linguistic atoms can objectively capture "the order of the world". This analysis tempers some of the past claims on the influence of positivism on Otlet.

1. Introduction

Paul Otlet's contribution to bibliography and information science in general has been abundantly shown by his biographer, W. Boyd Rayward. In 1895, Paul Otlet (1868-1944), who decided to lead "a life given over completely to the abstractions of science" (quoted from Rayward, 1975, 12), and Henri La Fontaine (1854-1943) erected the International Institute of Bibliography which was registered in Brussels. The institute's catalogue, known as the *Répertoire Bibliographique Universel*, was to be classified with an improved version of Melvil Dewey's (1851-1931) Decimal Classification and this classification later became known as the Universal Decimal Classification (UDC) (Otlet, 1934, pp. 381-383; see Rayward, 1975 (especially chapter 5) and Rayward, 1997

for further details). (In addition to this repertory, Otlet also founded an iconographic counterpart: the *Documentation Iconographique Universelle* (e.g. Otlet, 1934, 193, 195).) Otlet and his colleagues developed a universal linguistic mechanism that could both classify complex subjects as well as provide bibliographic access to the relevant repertories. They introduced complex numbers "by using special signs of association which allowed the addition to the main numbers, of other numbers derived from the auxiliary tables for the common subdivisions or from subdivisions in the main tables themselves" (Rayward, 1997, 292). This was one of the earliest faceted classification systems. Otlet introduced numbers such as 595.77(42), of which 595.77 referred to Diptera and the symbol (42) always refers to England (Rayward, 1990, 52). On Otlet's decisive contribu-

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tion to information science there seems to be broad consensus. However, scholars seem to disagree on the underlying epistemological and ontological pre-suppositions of Otlet's groundbreaking work.

Recently, the putative positivistic character of Paul Otlet's work has been put on the agenda for Otlet scholars (see Rayward, 1994; Day, 1997). While W. Boyd Rayward claims that Otlet's view of knowledge was *reductionist* and *positivistic* (Rayward, 1994, 247) and, furthermore, that Otlet's work was the reflection of "an outdated paradigm: nineteenth century positivism" (ibid.), Ron Day, on the contrary, endorses the view that a positivistic reading of Otlet's work leads to considerable difficulties (Day, 1997, 310). More precisely, Day has defended that Otlet's conception of a book (as set out in in *Traité de Documentation* [1934]) went beyond positivism and, furthermore, that Otlet's encyclopaedic approach is not suited to be read in terms of atomic units of fact. This interesting discussion should not be exaggerated for presentational purposes. The influence of positivism is not an all-or-nothing matter (*cf.* Rayward 1975, 27-28): scholars will need to point to relevant aspects of Otlet's work which can be adequately described in terms of positivism. For one thing, Otlet's biographer, W. Boyd Rayward, has pointed to the importance of *different* traditions which significantly shaped Otlet's thought, such as: nineteenth-century evolutionary positivism (Rayward 1990, 6), Herbert Spencer's (1820-1903) ideal of "unified knowledge" (Rayward 1975, 27-28), Baconian collectivism (ibid., 14, 74; Otlet, 1989, 30; Otlet, 1934, 377), the work of the French encyclopaedists (especially Georges Buffon, Denis Diderot), and seventeenth-century philosophers such as John Wilkins, George Dalgarno and especially Gottfried W. Leibniz (Rayward 1967, 270-73). Nevertheless, given the central role that positivism occupied in European thought and given Otlet's own frequent mentioning of positivism, the question of Otlet's indebtedness to nineteenth-century positivism remains a legitimate scholarly question.

Correspondingly, in the present essay, I shall re-open the problem of Otlet's relation to positivism. I shall argue that Otlet's conception of scientific knowledge differs significantly from what could be considered as a positivistic epistemology (in the sense I will specify in section 2). I shall also point to Otlet's view on language: more precisely, to his objectivism or realism on this matter (see section 3). I will refer to this strand in Otlet's thinking as *linguistic objectivism*. It will be shown that Otlet's work is

more adequately seen as last voice of the seventeenth-century objectivists and encyclopaedists *à la* Leibniz.

2. Otlet's "Genetic" View of Knowledge

In his 1935 *Monde*, Otlet sought to expound the world in terms of its essential principles (Otlet, 1935, xiii), that is, in terms of its primary conception and its laws (*ibid.*, 351). Such exposition would, according to Otlet, reveal the world in its most economic, pure and abstract manner. This *"exposition de la conception du monde"* is undertaken in three successive steps which correspond to three different systems (*ibid.*, pp. xiv-xv):

1. The *first system* deals with establishing the basic facts about the world provided strictly by experimentation. This part of the exposition of the concept of the world is analytical.
2. In the *second system*, these core data gained in (1) are synthesized by means of the laws of logic and other (mostly ampliative) reasoning strategies (such as: hypothesis-formation, interpolation and limiting-procedures).
3. The *third system* is that of religious thought and correspondingly deals with revelation.

Let us investigate whether Otlet's endeavours in *Monde* are consistent with positivism. Positivism renounces the quest for metaphysical knowledge (and hence, of all attributions of essential characteristics), the discovery of causes and the search for finality in the world (Otlet, 1935, x, *cf.* 353-355). It limits itself strictly to the facts, i.e. to what is (*"de ce qui est"*) (*ibid.*, *cf.* p. 11). One of the fiercest defenders of positivism, the Frenchman Auguste Comte (1798-1857) (see Rayward, 1975, pp. 25-29), explicitly rejected the meaningfulness of the concept of causality: the proper business of science is to classify phenomena in terms of relations of succession or resemblance and not to engage in any causal explanations (Comte, 1855, 28). Ultimately, this results in the discovery of the laws of nature. Otlet, by contrast, clings to the meaningfulness of causal explanation and metaphysics. Scientific method consists in establishing the relevant intervening factors and then in clarifying their influence by isolating them (Otlet, 1989, 22). In his discussion of how science has changed since the nineteenth century, Otlet claims that our modern concept of science is "genetic" ("*génétique*"), in the sense that it focuses on the

causal substratum that brings about a certain state of affairs. When discussing the progress (or, more precisely, the lack of it) in sociology, Otlet (1935, 124) criticised the old, pre-"genetic" methodology of science – all translations are mine:

> The old method of observation of facts, the old documentation that registers them, the old logic that guides them, the old classification that arranges them, are unsatisfactory.
> *La vieille méthode d'observation des faits, la vieille documentation qui les enregistre, la vieille logique qui les raisonne, la vieille classification qui leur fait prendre rang dans ses classements sont insuffisantes.*

Whereas the previous generation of scientists was content to analyse natural phenomena, and to arrange them under laws and where possible under mathematical formulas (*cf.* Rayward, 1990, pp. 11-12), the scientist nowadays has a different conception of science:

> The scientist nowadays is more and more interested in the ways in which the laws (of nature) have actually operated (and) in the effects that are produced by them. To us the mere finding that if a certain cause is given, then the following consequence will result from it, is not satisfactory. (By contrast,) one poses questions, such as: if a certain cause is given, how is its effect produced? And, where do we participate in that causal chain? (Otlet, 1935, 3, *cf.* Otlet, 1989, 31)
> *Le savant actuellement s'intéresse de plus en plus à la manière dont ces lois ont agi en fait. Aux effets qu'elles ont produit jusqu'à nous ne suffit pas la constatation: telle cause étant donnée, telle conséquence en résulte. On s'est pose la question: la cause a-t-elle été donnée, la conséquence a-t-elle été produite? Et où en sommes-nous de cet enchaînement causal?*

This is a clear indication that Otlet's epistemological ideal transcended the anti-causal features of positivism. Otlet frequently stressed the importance of quantification. Correspondingly, he stressed the importance of bibliometric research. According to Otlet the following equation contains the relevant factors of the book as an object of scientific study: book = elements/structure × specification of place × specification of time (Otlet, 1934, 46). Otlet also

stressed the importance of laws in bibliography (Otlet, 1934, 422). Similarly, in his discussion of mechanics, Otlet claims *contra* the famous German positivist Ernst Mach (1838-1916), to whom he refers somewhat further (*ibid.*, 16), that in mechanical explanations causes go under the name of "forces" (*ibid.*, 14). Mechanical forces were thereby considered as causally meaningful concepts by Otlet. Mach, on the other hand, applauded Heinrich Hertz's (1857-1894) attempt to formulate a theoretical framework of mechanics in which there was no longer a meaningful concept of force, since it was to be reduced to strictly empirical parameters (distance, time and mass) (Mach, 1974, 320). Mach famously defended the idea that in nature there are no causes, and that scientist should renounce the idea of giving causal explanations and restrict themselves to giving functional explanations (Mach, 1974, vi). Nature simply *is*. All metaphysical or causal interpretation of nature is mere idle speculation. In striking contrast, Otlet did not hide his sympathy for metaphysical endeavours. Compare this with Otlet's sympathy for Henri Bergson's metaphysics (Otlet, 1935, 11). Moreover, as a true metaphysician, Otlet presents us his equation of the world ("*équation du monde*"). The formula goes as follows (ibid., pp. xxi-xxii, 335, 359, 401): World = {(1) *objective components* (which consists of the following three types: (1.a) Things (including Nature, Man, Society and Divinity), (1.b) Space, and (1.c) Time)} × {(2) *subjective components* (including (2.a) the ego, (2.b) (human) creations, and (2.c) expression)} × {(3) the (3.a) *Unknown* and the (3.b) *Mysterious* (x + y)}. Otlet's "(x + y)" refers to what is yet undiscovered but exists objectively and to what is fundamentally indeterminate respectively. This equation consists of the fundamental concepts, i.e. the analytic atoms, which constitute the world and represent the inner essence of things (*ibid.*, vii). It should be noted that Otlet's formula changes during the course of his book and its varying formulations are not quite consistent.

3. Otlet's Objectivist View of Language and Encyclopaedia

In this section, I shall begin with briefly reviewing some historical predecessors of Otlet's encyclopaedic project. My aim is not so much to suggest a direct historical influence, but rather to point to some shared assumptions with respect to objectivism on language/reality (see 3.1). I shall focus on some relevant similarities. In subsection 3.2, I indicate how

Wittgenstein thought these objectivist tendencies right through to their ultimate conclusion. In subsection 3.3, I discuss Otlet's ideas on these matters in more detail.

3.1. Some Precursors

During the seventeenth-century, several attempts at a universal and philosophical language were made (see e.g. Rossi, 1995; Cram & Maat, 1991, pp. 1-79). I refer to both endeavours separately, since they each point to a significant difference. The aim of a *universal* language was to "devise a set of language-independent written symbols of universal writing" (Cram & Maat, 1991, 4). A *philosophical* language was a language that was better suited than natural language for "the accurate representation of knowledge" (*ibid.*, 6). The first refers to the construction of *main classes*, i.e. abstract categories which are presumably suited to classify each and every element of our human knowledge, while the second rather refers to the construction of a suited *notational language* to represent these classes and the relations between them (see Rafferty, 2001 on this difference).

In his 1661 *Ars Signorum, vulgo Character Universalis et Lingua Philosophica*, George Dalgarno (1626-1687) stressed that the characters of his universal philosophical language "immediately represent both things themselves and the notions of the mind" ("*Characterum, quatenus rerum ipsarum & mentis Conceptuum immediate significativi sunt*") (Cram & Maat, 1991, 157; Dalgarno, 1661, 2). (Dalgarno's categories were of Aristotelian inspiration (Cram & Maat, 1991, 41). The most general category was that of entity, under which subsumed substance, accident and the concrete. The concrete was further divided into the corporeal (which included the mathematical, the physical and the artificial), the spiritual and the composite.) He claimed that his system of "*Character Realis*" will restore the confusion after Babel and that *all* notions of nature and art can be defined on the basis of this system (see Dalgarno's introduction to the reader, Dalgarno, 1661). As he put it, "it's meaning would become known to all men simply by intuition and without instruction" (Cram & Maat, 1991, 131). The signs are established not at random but according to reason (*ibid.*). The central concepts in Dalgarno's system were arranged methodologically ("*methodicae Rerum dispositioni*" (Cram & Maat, 1991, 130)). As one notices, Dalgarno presupposed that there could be a one-to-one mapping between his universal characters and reality.

In his 1688 *An Essay Towards a Real Character and Philosophical Language*, John Wilkins (1614-1672) attempted to construct a universal philosophical language by means of which all things and notions could be expressed in terms of "their natural order, dependence and relations" (Wilkins, 1688, 1). (See Emery, 1948 for a clear and adequate presentation of Wilkins's system.) Such new kind of character would similarly remedy the confusion after Babel and restore the former Adamic language (*ibid.*, 2). Wilkins distinguishes between two ways in which characters might signify: (1) either *naturally* (by means of pictures or other symbolical representation or (2) *by institution* (*ibid.*, 385). He notes that it would be highly desirable that the names of things should bear "in them some *Analogy* to their *Natures*," so that men could in principle grasp the meaning of a sound upon the first hearing of it (*ibid.*, 386). However, how this could be done is unclear and, therefore, Wilkins assumes that the real character should be "by Institution" (*ibid.*).

Gottlfried W. Leibniz criticised Dalgarno and Wilkins for the arbitrariness of the categories they introduced. (Leibniz studied Dalgarno system quite intensively, see Cram & Maat, 1991, pp. 64-65. Otlet refers to Leibniz's *characteristica universalis* in *Traité de Documentation* (Otlet, 1989, 92).) A proper philosophical language should analyse all concepts into their simplest elements, i.e. into the "alphabet of thought" (*cf.* Leibniz 1666 *Dissertatio de arte combinatoria*). A proper symbol should indicate a thing's nature, in other words, it needs to define it by means of its appearance. Leibniz's attempt presupposed that (1) ideas can be analysed into primitive notions, that (2) ideas can be represented symbolically, and that (3) it is further possible to represent the relations between these ideas (Rossi, 1983, 177). Paolo Rossi (1983, 159-160) remarks that the seventeenth-century attempts to construct a universal philosophical language presupposed that a complete enumeration of human knowledge could be given:

> There is a univocal relation between signs and things, and every sign corresponds to a particular thing or action (…): the project of a universal language, then, presupposes an encyclopaedia; it presupposes, that is to say, a complete and orderly enumeration and rigorous classification of all those things and concepts which were to correspond to a sign in the perfect language. Since the efficacy of the universal language depends on how much of the field of ex-

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perience it aims to encompass and describe, it requires a preliminary classification of everything which exists in the universe and all objects of discourse – it requires, in fact, a total encyclopedia, the contruction of 'perfect tables'.

Indeed, the attempts of the seventeenth-century encyclopedists supposed that: (1) a *universal classification* of all human knowledge could be given and that (2) a *notational system* could be constructed which (2.1) would yield a *one-to-one correspondence* between language and reality, and which (2.2) would further guarantee that this one-to-one correspondence was objective: that is, the symbols would refer to the objects in the world in terms of their essences and natures. 2.2 reveals the *objectivism* underlying the thought of these seventeenth-century encyclopedists.

3.2. Wittgenstein's Logical Atomism

The idea of one-to-one correspondence between reality and language culminated in the early work of the philosopher Ludwig Wittgenstein (1889-1951). In his 1921 *Tractatus Logico-Philosophicus*, Ludwig Wittgenstein presented a logical atomist view of language and reality (Wittgenstein, 1974). According to Wittgenstein, the world is the totality of all states of affairs (1.1). States of affairs consist of the combination of some objects (2.01), which have a simple nature (2.02). To these simple objects *primitive signs*, i.e. linguistic atoms, correspond; they cannot be dissected any further by definition (3.26). Such linguistic atoms can be combined into more complex expressions (2.0201). Now, simple objects stand in various logical relations to each other, which are determined by an object's nature (2.0123). If language "mirrors" – it would be more precise to say that a proposition is "isomorphic" to the state of affairs it represents – the logical form of these simple objects correctly, then we have meaningful communication.

3.3. Parallels with Otlet

The seventeenth-century encyclopedists, Wittgenstein and Otlet (as we shall shortly see) subscribed to the doctrine of *linguistic objectivism*. Linguistic objectivists subscribe to the following principle:

(LO): *Linguistic atoms uniquely correspond to certain discrete and well-defined elements in the world and further combinations of these linguistic*

atoms can objectively capture "the order of the world".

This thesis is at odds with positivism, since it assumes that "the order of the world" is derived from the essences of things. In other words, the order of things objectively corresponds to reality and does not refer to something we, as human beings, merely impose on it. After all, according to Otlet, reality is objective (Otlet, 1989, 10, 30). Science has the goal of establishing knowledge about reality (Otlet, 1934, 373). In their endeavour to construct an ideal representational system, linguistic objectivists frequently attempted to cleanse natural language from its inherent ambiguities. Otlet indeed made statements that referred to this type of purification of natural language. After the discussion of his world formula in *Monde*, for instance, Otlet notes that his notation is international and does not depend on any language: "it refers to concepts and not to words and their fluctuating synonyms" (Otlet, 1935, xxiii, *cf.* vii). Scientific names (e.g. chemical names) express things in terms of their fundamental concepts:

> The chemical names express the material and formal reasons of molecules. From this, one may therefore deduce their composition and their structure, and on the basis of these, the secondary qualities of bodies, once the state of science has progressed sufficiently. (Otlet, 1935, 34)
> *Les noms chimiques expriment les raisons matérielle et formelle des molécules. On peut, par suite, en déduire la composition et la structure et de-là les qualités secondes des corps quand l'état de la science est assez avancé.*

Similarly, in the UDC, the symbols not only refer to their primary concepts but also to the relations between them. The relations between objects and ideas are contained in their corresponding UDC-expression:

> The links, the genealogy even, of ideas and objects, their relationships of dependence and subordination, of similarity and difference find suitable representation in the bibliographic expression formed in this way. (Rayward, 1990, 34)

Each category of basic ideas should correspond to a form with distinct appearance and a permanent

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meaning (Rayward, 1990, 52, 59). Each idea corresponds to a unique UDC-symbol and *vice versa*:

> The *definition of words* must be based on the *definition of things*, the facts and the notions themselves which they serve to express. A definition has to expose in a precise way the *necessary and sufficient qualities* in order to create a class to indicate the objects which belong to this class. (…) Definitions lead to (scientific) laws. The definitions here considered are the expression of the relations between things. An expression can only be as clear as the related things themselves have been clearly defined. (Otlet, 1934, 12; emphasis added)
>
> *La définition des mots doit reposer la définition des choses, des faits et des notions elles-mêmes qu'ils doivent server à exprimer. Une définition doit être un exposé précis des qualités nécessaires et suffisantes pour créer une classe afin d'indiquer les choses qui appartiennent à cette classe. (…) Les définitions conduisent aux lois. Celles-ci sont l'expression de rapports entre des choses. Il n'y a aura d'expression claire que si les choses mises en rapport ont été elles-mêmes clairement bien définies.*

The result would be a veritable "pasigraphy" that is "able to translate into a number any idea to be classified and to cope with all the details of bibliographical analysis" (*ibid.*, 53, *cf.* Otlet, 1989, 91). In order to construct an universal bibliography, the following steps should be undertaken:

> a. a complete enumeration of the objects to be classified;
> b. an examination of the specific characteristics of these objects;
> c. choice of one of these characteristics as the basis of classification; the subordination of other characteristics to this;
> d. arrangement of objects in classes and subclasses by proceeding from the general to the specific and from the simple to the complex. (Rayward, 1990, 64, *cf.* Otlet, 1934, 379)

Here, we see Otlet adopting some of the crucial presuppositions of the seventeenth-century encyclopedists. He assumed that a universal classification of all human knowledge could be given (Otlet indeed was "the man who wanted to classify the world") (a), that objects can be analysed in terms of their es-

sences, i.e. their specific characters (b), and that the numbers and the relations between them can represent "the order of things" (c-d). Otlet's strong belief in the ability of human beings to enumerate all objective features of a book is reflected in his *monographic principle*, according to which each intellectual element contained in a book corresponds to a distinct material element (Otlet, 1934, 385). (I admit that Otlet weakens this point somewhat when he writes, at least at one occasion, that thought and the external world correspond "more or less adequately" (Otlet, 1989, 107). At several occasions, Otlet stressed the fallibilism of human epistemology (e.g., Otlet, 1935, vii, *cf.* p. xxv). In 1895-1896, Otlet wrote 'Errors and omissions are inherent in all human works. They are inevitable in a work as a Universal Bibliographic Repertory. Any system that is adopted should permit the easy *correction of errors and omissions* without the general repertory being affected.' (Rayward, 1990, 26).) In the UDC, ideas could be mechanically composed and linked (*ibid.*, 27). In their 1896 joint paper, Otlet and Henri la Fontaine stressed that:

> This representation [by means of the Dewey decimal system, first published in 1876] nearly excludes the conventional and the arbitrary. Not only does each figure express in its fashion an essential idea, but the combination of figures, that is to say, their order in the series and their place in the number, are produced even according to the laws of scientific logic. In this sense they constitute a true new language in which phrases (here numbers) are formed according to constant syntactical rules from figures (here numbers). (quoted from Rayward, 1967, 273)

Both the seventeenth-century encyclopedists and Otlet – and classification theorists in general (*cf.* Rafferty, 2001) – assumed that there is a kind of "order of things" and that this order, which is a conceptual notion, can be materialized by means of symbolic classifications.

4. In Conclusion: *The Objectivity of Reading* as a Correlate to *The Objectivity of the World*

Otlet frequently stressed that books have an objective content: he made a clear distinction between the "*contenu*", the ideas expressed in a text, and the "*contenant*", i.e. the concrete means by which ideas are expressed, of a book (Otlet, 1934, 47, 106, *cf.* 94). According to Otlet, proper reading of a text, leads to a unique interpretation. Let me quote him:

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Proper reading is not the result of a spontaneous act. It has to be organised; the mind has to be formed. It needs to be done methodologically. A well-written book is a true intellectual edifice, a synthesis of ideas and not only a classified collection of information. Words, phrases, chapters succeed each other as a way of expressing, of making understandable and making sensible a *unique thought*, albeit complex, divided and ramified. As long as, the thought of the book hasn't been perceived, understood and assimilated, it hasn't been read (properly) (*ibid.*, 317; emphasis added).

La bonne lecture n'est pas le résultat d'un acte spontané. Elle doit être organisée; l'esprit doit être formé, il faut une méthode. (…) Le livre bien fait est un véritable édifice intellectuel, une synthèse d'idées et non uniquement une collection classée des renseignements. (…) Les mots, les phrases, les chapitres, se succèdent comme moyen d'exprimer, de faire comprendre et sentir une pensée unique, mais complexe, divisée, ramifiée. Tant que la pensée du livre n'est pas perçue, comprise, assimilée, le livre n'est pas bien lu.

This might perhaps be considered as the unifying theme of all of Otlet's intellectual endeavours: *expressing a unique thought by means of a unique symbol.*

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