

Louis Couturat, modern logic, and the international auxiliary language

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Abstract: To some extent, the early twentieth century revival of universal languages was the work of logicians and mathematicians. Pioneers of modern logic such as Frege, Russell and Peano wanted to overcome the diversity and deficiencies of natural languages. Through the rigour of formal logic, they aimed at providing scientific thinking with a reliable medium free from the ambiguity and inconsistencies of ordinary language. This article shows some interconnections between modern logic and the search for a common tongue that would unite scientists and people of all nations. The French mathematician and philosopher Louis Couturat is a key figure in understanding the interplay between these two movements. Through his work in composing the Ido language as an alternative to Esperanto, Couturat gave a new life to the Leibnizian idea of a universal characteristics. In addition, his multifaceted work provides a valuable insight into some political implications of early analytic philosophy.

Keywords: modern logic, international auxiliary language, Louis Couturat, early analytic philosophy, internationalism, Esperanto (language), Ido (language), universal language, constructed languages.

1. Introduction

The end of the 19th century witnessed considerable developments in language awareness. The emergence of modern logic granted not only mathematicians but also philosophers with a

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formal symbolism of unprecedented rigour. The ‘ideal language philosophy’ associated with the analytic tradition is a noteworthy outcome of the new mathematical logic. However, the resulting linguistic turn had also a more neglected social correlate in the form of a new internationalism: the movement for an international auxiliary language (IAL or interlanguage hereafter).

In his autobiography, Carnap spots a ‘psychological affinity’ between symbolic logic and international auxiliary language (Carnap, ‘Intellectual Autobiography’, 67). Relating these two modern trends as manifestations of the same growing concern for linguistic issues, he places himself in both these movements, alongside his peers like Couturat and Peano, and their unofficial common mentor, Leibniz. Carnap’s familiarisation with interlinguistics² dates back to much earlier than his apprenticeship of modern logic as a disciple of Frege. Having learned Esperanto at the age of 14, he warmly speaks about the ease with which he achieved the mastery of Esperanto, and the human bonding it provided him through socialisation with international peers. Since his first steps in Esperanto, his interest in the language was as much about its ‘humanitarian ideal of improving the understanding between nations’ as its logical structure combining ‘a surprising flexibility in the means of expression with a great simplicity of structure’ (Carnap, ‘Intellectual Autobiography’, 69).

The French philosopher Louis Couturat’s work deserves special attention for understanding the linguistic turn that gave rise to these movements. Couturat engaged in IAL activism, first by setting up the Delegation for the adoption of an international auxiliary language and campaigning with academies, then by suggesting a reformed Esperanto (Ido) as an alternative interlanguage. Yet, he wasn’t the only logician who supported IAL, nor the

² In 1931, ‘interlinguistics’ was defined by Otto Jespersen as ‘that branch of the science of language which deals with the structure and basic ideas of all languages with a view to the establishing of a norm for interlanguages, i. e. auxiliary languages destined for oral and written use between people who cannot make themselves understood by means of their mother tongues’ (Jespersen, ‘Interlinguistics’, 422).

only one to profess internationalism. Today, Russell is known as much for his peace activism as for his pioneering work in logic and philosophy of mathematics. A close friend and long-term collaborator of Couturat, Russell expressed his adherence to the IAL in principle even though he didn't take part in it³. In *Formulario*, Peano renovated the arithmetical notation, influenced by the Leibnizian idea of a universal characteristics. Less well known is his advocacy for IAL, starting from his creation of Latino sine flexione (a modernized Latin without flexions designed for international use) to the founding of the Academy of Interlingua. As mentioned above, Carnap is another major figure in modern logic who supported IAL and felt a unity between these two types of language planning.

In the following, I present Couturat's engagement for IAL in the light of his philosophy of logic. I start with the history of IAL up to Couturat's Ido, from its ascendant Esperanto (2.1) to its emergence as a purportedly more logical alternative (2.2), and I detail how it compares with Esperanto (2.3). After this historical overview, chapter 3 presents some fundamental ideas of modern logic that helped ground the IAL, especially in Couturat's thought. The Leibnizian idea of universal characteristics and its impact on modern logic are shown (3.1), notably through Frege's pioneering *Begriffsschrift*. Universal characteristics had also a considerable effect on Couturat's philosophy of interlinguistics, not the least through its Latin-based corollary project of a practical interlingua. After explaining this Leibnizian influence behind modern logic and the IAL movement, I present Couturat's philosophical stance on logic and language: first, his conception of logic as a distinctively normative discipline (3.2), second, his subsequent hierarchisation of logic and linguistics (3.3). This will

³ 'The international language is a beautiful project to which I adhere completely, but I am so busy that I don't have the time to contribute actively.' (Letter to Couturat, 27/07/1910, in *Correspondance avec Louis Couturat*, 636).

During the last years of his life, Couturat dedicated himself almost entirely to IAL. This shift is noticeable in his later correspondence with Russell, to whom he gave regular updates about his activism. Russell expressed his sympathy for the idea of an interlanguage, but he never got engaged in the movement personally, despite strong initiatives from Couturat.

help us to better estimate his specific contributions to interlinguistics, notably his criticism of Esperanto that resulted in a concurrent IAL. Finally, chapter 4 attempts to elaborate the common intellectual ground that nourished modern logic and IAL in the beginning of the 20th century. I offer two reasons to explain the overlapping between these two movements despite their very different fields of application: a modernist vision of overcoming natural languages (for a rigorous treatment of logic or a fair interethnic communication) with clear references to science and technological development (4.1), and a cosmopolitanist stance on politics built on the idea of the unity of human mind (4.2).

2. History of IAL up to Couturat

Several interlanguages were designed during the first half of the 20th century, culminating in the first two decades (Ido, Idiom Neutral, Interlingua, Novial, Basic English, to name a few). In 1880 there appeared the first handbook of Volapük, the German catholic priest Johann Martin Schleyer's creation that triggered the revival of universal languages. Volapük was the first noteworthy constructed language since the golden age of 'philosophical languages' in the 17th century accompanying the establishment of Royal Society and the scientific revolution. Volapük differs from these by its unprecedented achievement (most of the earlier philosophical languages had remained uncompleted theoretical projects that didn't find active use) and acceptance, together with a serious following and an established academy. It was followed by the indisputable success of Esperanto, which has been the IAL with the highest number of speakers to this day.

2.1. Esperanto

Soon after its conception, Esperanto met considerable success and acquired a mass of active speakers on an international scale. To this day, it has become a generic name for any universal language, in expressions such as 'visual Esperanto' (the growingly standardized

semiotics of advertising and cinema are cited as examples). Esperanto was the work of Ludwik Lejzer Zamenhof, a Russian-Jewish ophthalmologist in Bialystok (present-day Poland). Zamenhof dedicated himself very early to constructing a neutral auxiliary language. The major influence behind the making of Esperanto was autobiographical. Zamenhof grew up in the middle of endless hostilities between ethnic communities speaking Russian, Yiddish, Polish and German. He quickly became convinced that a common neutral language to ensure communication across different ethnicities would bring peace. Throughout his life, Zamenhof welcomed people who came to Esperanto for various reasons, be it only for practical purposes of tourism and commerce ('An Esperantist is a person who knows and uses the language Esperanto, for whatever aim he uses it for', he said in the founding Boulogne declaration of 1905). Nevertheless, he never refrained from stating the genuine vocation of Esperanto as a unifying language for humanity and articulated his propaganda around this 'internal idea' of esperantism. Therefore, it is no surprise that the Esperanto movement attracted supporters predominantly among internationalists and peace activists. During World War 1, conscientious objectors in Britain learned Esperanto in prison. Montagu C. Butler, a pacifist who backed conscientious objectors, was elected secretary of the British Esperanto Association in 1916. Sylvie Flammarion, leader of Women's Association for Peace and Disarmament, was also enrolled in the Esperantist Society for Peace. The International Peace Bureau and WILPF (Women's International League for Peace and Freedom) supported and actively used Esperanto (Garvia Soto, *Esperanto and its Rivals*, 110-111). Inside the Esperanto movement, the World Anational Association is the most notable institution for counter-nationalism and war resistance. Towards the end of his life, Zamenhof significantly distanced himself from his earlier Zionism, and turned down a membership invitation from the Hebrew Esperanto Association for fear of associating himself with any sort of nationalism, be it a relatively justified one by an oppressed people. During the 1910s he

repeatedly wrote about the harms of nationalism on the world peace. Hector Hodler, the founder of the Universal Esperanto Association, supported the League of Nations and advocated its adoption of Esperanto as an official language (that proposal encountered significant resistance from France, who feared the loss of prestige of the French language already losing territory against English, and therefore saw in Esperanto a competitor). Esperanto's claim at peace building through strengthening friendship between communities earned it also hostilities and persecution in Nazi Germany, as well as in USSR starting from Stalin's rule (Lins, *Dangerous Language*). The pacifist and humanitarian ambitions of Zamenhof in creating Esperanto probably attracted Couturat to the movement as much as his admiration for the logical structure of Esperanto, which placed it well above national languages.

According to Couturat and Léau (*Histoire de la Langue Universelle* [History of the Universal Language]), Esperanto combines the advantages of a maximum internationality of roots (selected among the most widespread forms in European languages) with the invariability of lexical elements, resulting in a transparent structure with a minimal number of roots to retain by the beginner. A well-made derivational system reduces dramatically the effort required for memorizing (by learning a single root one can derive from it a large number of related concepts, thanks to an efficient set of affixes) and optimizes the task of vocabulary planning (for the same reason). A reductivist conceptual system à la Leibniz is preferred for practical motives. There is no reason to suppose that Zamenhof studied Leibniz, but most principles that Leibniz required for the universal language are also found in Esperanto. For instance, Zamenhof wanted to keep the grammar minimal to make it quick to learn and easy to use – for that is the *sine qua non* condition for an IAL to fulfil its purpose. Esperanto grammar is remarkable for its regularity, praised by Carnap for combining simplicity with infinite enrichment possibilities. Regularity in Esperanto provides syntactical

transparency, since the function of any word in a sentence can be recognized by its ending. All words' basic forms are roots. The only cases are nominative and accusative (marked by a final -n), the latter permitting a flexibility in the word order while avoiding possible ambiguities. Uniformity of word endings is arranged thus: all substantives end with -o, all adjectives with -a, all adverbs with -e. The infinitive is marked by -i, the present tense by -as, the past tense by -is, the future tense by -os, the imperative form by -u, the conditional mode by -us. Verb endings don't include personal markers. The active participle affix is -nt, and the passive, -t.

Despite some disagreements, Couturat and Léau give a positive account of Esperanto in their history of the universal languages. Invariability of roots and affixes alike makes the language easy to read and use. All words can be analysed into their constituents, all of which can be found in the dictionary (the process of agglutination does not involve alterations such as vowel harmony or consonant mutation). Such a transparency already sought by Leibniz for the universal characteristics makes it even possible to translate Esperanto texts using only a dictionary, without any previous knowledge beforehand (Couturat adds that no living language allows that). Couturat considers replacing cases by prepositions (except the accusative case) a strength of Esperanto in the spirit of Leibniz' linguistic ideal, since prepositions are higher both in number and in precision.

The Esperanto conjugation, says Couturat, is 'a marvel of simplicity and regularity' (Couturat and Léau, *Histoire de la langue universelle*, 340) by virtue of reducing a big spectrum of semantic nuances to a small number of affixes, with the adjunction of *esti* (to be) as the only auxiliary⁴. Regularity and uniformity ruling the tenses of indicative, active participle and passive participle (which share -a, -i and -o for present, past and future tenses,

⁴ For example, the Esperanto phrase 'mi estos amita' contains only 3 words, lower than its counterparts in French, English and German ('j'aurai été aimé', 'I shall have been loved', 'Ich werde geliebt worden sein').

respectively) minimizes the ultimately irreducible arbitrariness in the language. The principle of regularity adopted by Zamenhof and explicitly formulated by Couturat makes use of the later Saussurean concept of secondary motivation⁵, already prescribed by Leibniz.

2.2. The ‘Ido schism’

Couturat’s involvement in IAL starts at the 1900 World’s Fair. In several congresses that took place during that event, it was observed that the absence of a common language hindered communication. Representatives were elected for several learned societies in the view of a collaborative study of the problem of IAL. They first gathered on 17 January 1901 at Léau’s, where they founded the Delegation for the adoption of an international auxiliary language and issued a statement. The statement contains a resolution to make appeal to International Association of Academies (1900) for fixing the problem of interlanguage. Otherwise the committee would assume that responsibility itself. Meanwhile, the Delegation was to reach out more scientific societies to promote the cause of the IAL. In the minutes of 1907, Couturat and Léau mention 310 societies that had been recruited in the past seven years. At the same time, the Delegation launched an international petition addressed to academies. In 1906, the Delegation contacted Viennese Imperial Academy of Sciences to bring up the question of the IAL at the triannual session of the International Association of Academies in 1907. The proposal was turned down. Following the rejection, the Delegation appointed its own committee for the selection of an IAL. The committee included, among others, linguists such as Baudoin de Courtenay, Jespersen and Schuchardt, and the future Nobel-prized chemist Ostwaldt. It gathered at the Collège de France (where Couturat was teaching, invited by Bergson, and where he attended the lectures of Meillet), Paris, from 15 to

⁵ Interestingly, René de Saussure, the brother of Ferdinand, was an eminent Esperantist, to whom Esperanto possibly owes a mention in the ground-breaking *Course in General Linguistics*. René de Saussure was a fervent defensor of the *Fundamento* (the 1905 book where Zamenhof detailed the “intouchable” principles of Esperanto, summarized in 16 rules) against reformatory attempts – notably Ido, that he criticized anonymously under the pseudonym of Antido.

24 October 1907, in 18 sessions. The discussion material included Couturat and Léau's *Histoire de la langue universelle* and its sequel, *Les Nouvelles langues internationales* [The New Universal Languages], in addition to a compilation of suggestions and feedback received by correspondence. Zamenhof sent in Louis de Beaufront (the author of the first Esperanto grammar) to represent him at the Committee.

On the other hand, the first world congress of Esperanto happened in 1905 in Boulogne-sur-Mer (France), beginning a tradition still alive to this day, interrupted only in 1914 due to war. Earlier that year Zamenhof published *Fundamento de Esperanto* [The Fundamentals of Esperanto], where he laid out the 16 'untouchable' rules meant to guarantee the unity of the movement until it reaches a stable growth and governmental support. In the congress, the 'Declaration on the essence of esperantism' was delivered and accepted, which officialised the adoption of *Fundamento*, and a language committee (Lingva Komitato) was set up (to become Esperanto Academy later). Despite keeping the contact with Lingva Komitato, the Delegation criticized the dogmatism of *Fundamento* and felt concerned about the committee's unwillingness to evaluate any legitimate criticism of Esperanto. The inflexibility of *Fundamento* and the resulting lack of acceptance for reform proposals among Esperantists led to the 'Ido schism', when unresolved conflicts about a reform proposal led chiefly by Couturat ended in the Delegation's subsequent promotion of Ido (meaning 'child' in Esperanto, the name designates the reformed Esperanto that the Delegation called for) as a language on its own right. Following the 1907 meeting of the Delegation, Zamenhof issued a letter 'to all esperantists' on 18 January 1908, where he firmly reaffirmed his opposition to any reforms at this stage, on the grounds that it would only hamper the movement's so painfully acquired progress. He declared the Delegation illegitimate, and blamed the reform partisans of divisiveness, stressing a much-needed unity and strength in pursuing the

propaganda. This reaction was definitive in cutting the ties with the internal reformist section and resulted in all parties going their own way.

2.3. From Esperanto to Ido

In his *Etude sur la dérivation* [Study on Derivation] (1910), Couturat exposes some inconsistencies in the use of affixes in Esperanto, despite its morphology being precisely the main strength of this language: ‘The derivation system of Esperanto is undoubtedly the most characteristic trait of this language; it contributes more than all the others to give it a character of logical simplicity and regularity, which renders it not only attractive for the theoretician, but also very easy to learn and handle, even for poorly instructed people’ (Couturat, *Etude sur la dérivation*, 6). Natural languages suffer from the use of a plurality of affixes for the same semantic derivation, and from a plurality of meanings associated to an affix – which makes the derivation system unpredictable. Yet, uncontrolled accumulation of vocabulary in natural languages is not an issue for the interlanguage, precisely constructed to fit our communicative needs in the best possible way. To this effect, to the ‘principle of univocity’ (which posits an isomorphic correspondence between morphemes and concepts) already tacitly in used in Esperanto Couturat joins its ‘logical corollary’, i.e. the ‘principle of reversibility’, following which whenever a word can be obtained by the application of some derivation rule, the initial word also should be derivable back from the second one by the application of the reverse rule. Couturat enumerates counterexamples picked from official texts (both original literature and translations) compiled by Zamenhof in *Fundamenta Krestomatio* [Fundamental Chrestomathy] (1903). For example, replacing the final -i of a verb by the noun-indicating suffix -o, one can obtain a noun corresponding indiscriminately to the action expressed by the verb or to the result of that action: *dekreto* can mean a decree as well as the act of decreeing, *diro* the act of saying as well as what is said, *izolo* the act of isolating and isolation, etc. Even though the suffix -aĵ designating the result of an action

solves the ambiguity in many cases, it is insufficient to distinguish between the agent and the patient when the action expressed by the word has two subjects. Couturat suggest adding the suffix -ur for the passive result of an action, as opposed to -aĵ which would therefore mean the active result only: *rompo* (the process of breaking) – *rompaĵo* (a broken object) – *rompuro* (a break), *imito* (the act of imitating) – *imituro* (an imitation) – *imitaĵo* (the imitated object), *kopio* (the act of copying) – *kopiuro* (a copy) – *kopiaĵo* (the copied thing) etc.

Another problematic derivation process in Esperanto as mentioned by Couturat concerns the verbification of adjectives or substantives by replacing their final vowel (-o or -a, respectively) with -i: *avidi* (to be greedy), *egali* (to be equal), *fieri* (to be proud), *malkviati* (to be worried). But the principle of reversibility (lacking in Esperanto) requires that *profeto*, derived from *profeti* (which is first derived from *profeto*) can't simultaneously mean a prophet and a prophecy (*profetaĵo*). Concerning substantives that express qualities associated to an adjective, Esperanto has the suffix -ec that turns adjectives into nouns. Therefore, only *boneco* should mean goodness, but not *bono* (which should mean someone good, but this makes the -ul suffix redundant). It also follows that to be equal should be *egaleci* (not *egali*), and to be useful *utileci* (not *utili*).

That's how Couturat adds new affixes to render finer nuances in meaning without illogical derivations that one would have to learn as such from a dictionary. His main critical contribution to Esperanto per Ido aligns with the ideal language philosophy that came to be associated with the analytic tradition. However, on other points, Couturat took the opposite stance: for instance, he criticized the Esperanto alphabet, while granting that it is 'excellent in theory' and 'justified from a scientific point of view', on the grounds that 'it is in the practice that it is revealed to be inconvenient and counterproductive' (Delegation, *Conclusions*, 5). Regarding this, Couturat reminds us of Zamenhof's own statement about the priority of practical usability over theoretical considerations in matters of IAL. Couturat argues that

accented letters (ĉ, ĝ, ĵ, ŝ, ŭ) are not only harder to read due to their close similarity with their non-accentuated counterparts, but they also require extra work for typesetting and the replacement of linotype machines and typewriters entirely. When possible, keyboard shortcuts for adding a circumflex on the top of a letter slows down the typing process. Likewise, handwriting is interrupted for adding accents. For all these reasons, Couturat suggests replacing diacritics by digrams ('ŝ' by 'sh', for instance, conforming to the English pronunciation), even at the expense of a slight loss in univocity that ideally requires using a single letter to represent a single phoneme. Couturat explains Zamenhof's higher tolerance for diacritics by his ethnicity, Slavic languages having a higher number of postalveolar fricatives and an associated number of diacritics. He even claims that 'it is more or less the Czech alphabet that Esperanto has adopted' (Delegation, *Conclusions*, 14). Another shortcoming of Esperanto phonology signalled by Couturat is its excess of diphthongs (-oj, -aj, -ojn, -ajn) due to the marking of plural by a final -j (pronounced like the English y). It is for this reason that he proposed pluralizing substantives by replacing their final -o with -i, a form that is also reminiscent of Latin.

In addition, Ido made the accusative case facultative, and ultimately expendable: the direct object marker is not needed with the use of a subject-verb-object word order, but it would be used for clarity only when the standard (SOV) word order is not respected. This would rid a great number of words of a bulky nasal ending (-n, the accusative marker, used not only for the object of the verb but also for directional complements). Another objection to Esperanto is directed at its table of 45 correlatives (see annex), an 'ingenious' model of regularity that Couturat considers 'a fragment of a priori language misplaced in an a posteriori language'⁶ (Delegation, *Conclusions*, 20). Here, too, Esperanto sticks to logic at the

⁶ The a priori/a posteriori distinction in constructed languages was introduced by Couturat and Léau in *Histoire de la langue universelle*. From the end of the 19th century, universal languages evolve from a priori construction schemes towards a posteriori products that incorporate linguistic material found in ethnic

expense of practicality: not only Esperanto correlatives have insufficient connection with international forms, but their excessive similarity with each other makes them very easy to confuse, all the more so because they have very close meanings.

3. Modern logic and the idea of a universal language

Couturat's contribution to IAL is best understood through the lens of his commitment to rationalism, that he shares in many ways with early analytic philosophers. Couturat adopted some core assumptions of modern logic, such as a Leibnizian model of ideography and an extralinguistic conception of logic, and used them in the defence of IAL. Another formative influence on Couturat's interlinguistics is the linguistic theory of Meillet, who argued for the convergence in the historical evolution of all languages. The universalism underlying Meillet's teachings in comparative linguistics provided an empirical ground to Couturat's logical universalism and reinforced his belief in the feasibility of an interlanguage.

3.1. From *Characteristica Universalis* to *Begriffsschrift*

The initiator of a logically aware international language and the major inspiration behind modern logic is Leibniz who, as a young man, drafted the principles of a 'real characteristics' – an ideography that would form the basis of a universal language. Frege introduced his *Begriffsschrift* as an attempt in this sense, following the guidelines set up by Leibniz. He familiarized himself with universal characteristics via Trendelenburg, from whom he borrowed the term 'Begriffsschrift'. A major motive of Frege in creating *Begriffsschrift* along the lines of Leibniz is to provide an adequate medium of expression for formal reasoning. For

languages. The first significant IAL of this period, that also brought a more widespread acceptance of the IAL, was Volapük, that Couturat and Léau classify as a mixed language, somewhere in between earlier a priori languages and later a posteriori ones. Though they admired the rational structure of a priori languages and their embodiment of the Leibnizian ideal of a universal characteristics, Couturat and Léau judged them impractical, since the absence of connections with familiar languages makes them impossibly hard to learn and use effectively. This practical consideration of feasibility is why they joined 'the principle of maximum internationality' in vocabulary planning to the already established tradition of 'the principle of univocity' in grammar.

Frege, this appears as a necessity, given the discrepancy that he observes between logical laws and linguistic laws. Since the two don't always overlap, says Frege, observing a correct grammar is often insufficient to guarantee correct reasoning: 'Language is not governed by logical laws in such a way that mere adherence to grammar would guarantee the formal correctness of thought processes.' (Frege, 'On the Scientific Justification', 84-85) This is a core tenet of early analytic philosophy, which guided Russell's logical analysis of definite descriptions and Carnap's treatment of Heidegger's statements on nothingness, to mention some classic examples. Moreover, Russell and Couturat studied Leibniz almost simultaneously, resulting in notable contributions to Leibniz scholarship. Couturat's *Logic of Leibniz* contained detailed information about universal characteristics, and it is likely that his interest in IAL stemmed originally from his study of Leibniz. Leibniz aimed at constructing a 'real characteristics' able to adequately represent relations between composite ideas and their simple constituents. Its scientific utility as an 'instrument of reason' would make it much more valuable than as a facilitator for international trade: 'But I say that a rational writing will become the most powerful instrument of reason, and it ought to be judged that its least application is commerce among men separated by language' (quoted in Couturat, *The Logic of Leibniz*, ch. 3, fn. 36).

Leibniz imagines an ideography that relates written symbols directly to concepts, without the mediation of the spoken sound. A direct connection between the sign and the idea, estimates Leibniz, would enable everyone to read them in their own language, associating them to different sounds. His examples of ideographic systems include musical notation, chemical signs, Egyptian hieroglyphs and Chinese characters. Moreover, his language would be a calculus, an 'algebra of thought'. Leibniz compares the combination of simple ideas to the composition of numbers from prime factors. From that analogy he drafts a model of combination where prime numbers symbolize elementary ideas (those that don't

lend themselves to further analysis through definition), and their products, an analogous combination of the corresponding ideas. Couturat saw in the formal deduction anticipated by Leibniz the origin of modern logic, operating with highly formal transformation rules without consideration for the semantic content of the statements analysed. Likewise, Frege and Peano aimed at a level of generality sufficient to express all propositions of arithmetic, in *Begriffsschrift* and *Formulario*, respectively.

More interestingly, Leibniz later felt the need to make use of a temporary language to bridge between the future characteristics and living languages for the making of the former. That is how he came to the idea of universalizing Latin, the scientific *lingua franca* of his time. It would be made as regular as possible: exceptions, logically irrelevant details and redundancies would be eliminated, resulting in only one declension, a single uniform conjugation without distinction for person and number (these are sufficiently indicated by the subject), invariable adjectives, and prepositions to replace the cases. Leibniz prefers an analytic structure to an agglutinative one for easier analysability and higher transparency of the parts of speech (transparency is the ultimate target of a universal language meant to clarify thought by visualizing its composition into simple constituents). In 1903, Peano realized this derivative project by designing *Latino sine flexione* (LSF). His article ‘*De Latino sine Flexione. Lingua Auxiliare Internationale*’ starts in Latin and enumerates all the rules and specifics of LSF with quotations from Leibniz. As each point is explained, it is immediately adopted, so that the text ends in LSF. Peano used LSF in later editions of his *Formulario*, but he made clear that the two projects were distinct from each other.

3.2. Logic as a normative discipline

Couturat strongly criticized what he perceived as radical empiricist deviations in the study of logic and put forward an authoritative conception of reason against descriptivist trends. This

standpoint emerges partly from a concern for the dangers of mind control by means of a deliberately affective language. Couturat opposes 'rational logic' to 'logic of feelings', too often substituted to the former for manipulation:

It is way easier and way more efficient, as is well known, to move passions than to enlighten the mind, to persuade than to convince; and, while former logic languishes under the shadow of schools and the dust of libraries, the logic of feelings operates and occurs on the widest and shiniest arenas: in courthouses, in the parliament, in theatre, in forum, in a word everywhere the eloquence triumphs and the clever exploitation of passions and interests compensates for the weakness of arguments.

(Couturat, 'La logique et la philosophie contemporaine', 323-324)

In his inaugural speech at Collège de France in 1905, Couturat defends a normative logic prescribing the ideal forms of thought rather than validating its empirical manifestations. Couturat lauds the integrity of independent logical thinking and dialogue based on rational understanding against the manipulative use of emotive language, notably in propaganda. For Couturat, like the early analytic philosophers he was in contact with, the influence of natural languages over thinking is a negative effect to be overcome by means of a logical language. In this view, analysis equals critical examination of received views expected to result in emancipation from tradition. From Locke's considerations on meaningless words to Bacon's *idola fori*, this idea has a long past in the history of philosophy. Joining empiricists in their attempt at 'clearing up' the interference of our thinking by our defective natural languages, ideal language philosophies went so far as to suggest that a logical analysis of language is the primary task of philosophy.

Couturat blames psychologism and sociologism for reducing logic to a natural science limited to the observation of real occurrences. For Couturat, logic is rather about ideal norms,

often in contradiction with actual thinking. Couturat insists that logic is objective, 'correct' thinking, and goes beyond the limits and contingencies of existing natural languages:

Logic judges and criticizes all languages, not in the name of any of them, but in the name of the mind, of which they are very imperfect and very rough instruments. Also, formal logic has been brought by its own progress to build itself an artificial language made up of well-defined symbols, to be able to express in a precise and adequate way ideas and relations that it studies, and to emancipate itself from the vagueness and ambiguities with which all our languages are tarnished. (Couturat, 'La logique et la philosophie contemporaine', 328)

Like any empirical science, psychology studies factual determinisms ruling the mental phenomena. Of course, Couturat doesn't deny the reality of psychological, sociological, moral or practical factors affecting, or even determining, our judgment. But, in opposition to empiricism, he considers these rather like undesirable perturbations on rational thought. His conception of logic is unapologetically normative, against the naturalizing trends of his time (in that, Couturat is closer to the anti-psychologism of Frege and the neo-Kantian tradition). According to Couturat, the denial of an authentic realm of norms above the contingency of (often objectionable or downright incorrect) facts twists the very idea of logic. Those guilty of that 'sophism' 'start from the observation that our beliefs are, in fact, determined less by intellectual reasons than sentimental and practical motives; then they turn fact into norm (by a sophism typical of psychologism), and they claim that our beliefs *ought to* take into consideration our affective tendencies, our sentimental needs and our moral interests.'

(Couturat, 'La Logique et la Philosophie Contemporaine', 331)

Yet, IAL relates to modern logic more in its innovative approach to language than with an absolute sense of extralinguistic logic such as Couturat's, as attested by the absence

of epistemological or ontological theses in the works of interlinguists. Even Carnap's view of logic is far from being universal or univocal as in Couturat, for whom 'there are no more two logics than there are two morals' (Couturat, 'La logique et la philosophie contemporaine', 324). Carnap was first introduced to the construction of symbolic systems by Frege's *Begriffsschrift* while he was his pupil in Jena. He later got acquainted with other alternatives, each relevant in their own way and purposes. Among these, he mentions Russell's symbolism in *Principia Mathematica*, C. I. Lewis' modal logic, Brouwer and Heyting's intuitionistic logic and the typeless systems of Quine. This variety led him, eventually, to formulate his famous 'principle of tolerance': 'On the one hand, I became aware of the problems connected with the finding of language forms suitable for given purposes; on the other hand, I gained the insight that one cannot speak of "the correct language form", because various forms have different advantages in different respects.' (Carnap, 'Intellectual Autobiography', 68) This is a significant departure from his earlier *Aufbau*, where he had attempted a rational reconstruction of knowledge and granted a central role to symbolic logic in doing so: 'The application of the theory of relations to the formulation of a constructional system is closely related to Leibniz' idea of a *characteristica universalis* and of a *scientia generalis*'. (Carnap, *Aufbau*, 8) Later, in accordance with his syntactic pluralism emerging from his exchanges with Neurath on the question of protocol sentences, Carnap stressed the 'planning' aspect of such constructive work as logical symbolism or interlinguistics over a rigid view of a common universal logic, to be discovered beneath all natural languages: 'Planning means to envisage the general structure of a system and to make, at different points in the system, a choice among various possibilities, theoretically an infinity of possibilities, in such a way that the various features fit together and the resulting total language system fulfills certain given desiderata.' (Carnap, 'Intellectual Autobiography', 68)

3.3. Logic over linguistics

In the obituary of his partner in writing *Vocabulaire technique et critique* [Technical and Critical Vocabulary] published by the Society of Philosophy, Lalande didn't omit the rationalist background of Couturat's work for the IAL: 'It is in this same spirit of rationalism hungry for intellectual progress, impatient of all error or logical fallacy, that the historian of Leibniz became first a partisan of Esperanto, then of esperantist reforms, and, finally, of Ido, of which these were the outcome' (Lalande, 'L'œuvre de Louis Couturat', 680-681). Indeed, Couturat's views on the specifics of the right language to elect for this purpose are guided mainly by this belief in the superiority of reason over its empirical manifestations in natural languages. The relationship that Couturat established between logic and natural languages determined his standpoint concerning the principles of language construction, more specifically his criticism of Esperanto. Couturat stressed the precedence of logic over linguistics in the construction of an interlanguage and criticized Esperanto for being 'accustomed to copy idioms of our languages slavishly' (Couturat, 'Des rapports de la logique', 515). Without claiming to forge an a priori language created ex nihilo without any resemblance whatsoever to natural languages, he nevertheless maintained that imitation of (inter)national forms shouldn't be pushed at the expense of losing the advantages of a rational, regularized and easy interlanguage over barbarisms characteristic of traditional languages.

Couturat contrasts the apparent diversity of natural languages with the underlying unity he assumes across them. This unity, he wrote, reveals itself in shared patterns of evolution. The Indo-Europeanist scholar Antoine Meillet's teaching at Collège de France forms the kernel of Couturat's knowledge of linguistics. Couturat considered Meillet's latest findings as a proof of the unity of the human mind across its various linguistic manifestations: 'Despite the extreme diversity of their structure and grammars, all languages

evolve in the same direction, towards simplification, towards reduction of grammatical forms into the most general and essential categories' (Couturat, 'Des rapports de la logique', 510). Against ethnologists and sociologists who tend to relativize logic, Couturat puts forward 'the fundamental unity of the human mind'. Admitting a universal common ground in human reason across different societies is not only an important theoretical ground for the IAL, but also a very strong argument (one supposedly backed by the most up-to-date science of his time) in favour of its feasibility. The whole IAL movement adopts the Enlightenment belief in the possibility of universal communication, as opposed to radical relativist theses that celebrate cultural differences and national specificity (Humboldt, Herder, Whorf). For Couturat, convergence in the lines of the same principles attests to the de facto compatibility of logic and linguistics – an ideal language vs the current imperfect material we need to start from for constructing the former. Couturat always believed in the autonomy of logic and the importance of adapting the empirical reality to the ideal norms of the supra-empirical reason. More specifically, he endorsed the primacy of logic over empirical data in the process of designing an interlanguage (Couturat, 'Des rapports de la logique', 516). Nevertheless, the tendency empirically found in natural languages towards more logical forms is a 'favourable circumstance' that would eventually help the interlanguage to succeed. Extracting the logical rules of the interlanguage from the observation of the long-term evolution of natural languages (instead of following their current specific form) makes it 'as little artificial as possible'. But the benefits of this shouldn't be exaggerated, says Couturat: for pressing too hard to make the interlanguage as natural as possible would only result in the production of a 'pastiche' of a random existing language, depriving us from the very benefits of an interlanguage.

Couturat's universalist view of logic contrasting with linguistic diversity plays a decisive role in the planning of Ido, in particular. With Ido, which stems initially from a

reform proposal for Esperanto, Couturat aimed at repairing what he perceived as naturalistic defects in Esperanto, mainly by reinforcing two logical principles – univocity and reversibility. Following Leibniz, Couturat states the main rule of the interlanguage as the principle of univocity. The correspondence between signifier and signified is what makes language possible, despite being too often obscured in long-established traditional languages. In the making of an interlanguage logic and utility go hand in hand, for the principle of univocity has also a practical benefit of facilitating the learning of an interlanguage by considerably diminishing the amount of knowledge to acquire. A regular, simple, all-encompassing derivation system is needed for the same reason: without a proper derivation system, one would need to learn a totally new word for each concept, as close as it may be to an existing one.

4. The ideological background of modern logic and IAL

We have shown in the previous section Couturat's views on logic, language and human mind and their influence in the making of Ido. Yet, Couturat's logical universalism does not suffice in itself to establish an intellectual kinship between these two projects, since the rest of the IAL literature comprises mainly of political and otherwise practical considerations, without an elaborate discussion of epistemological problems. Instead, following Carnap, we will situate the connection between these two modernist movements in their embodiment of what Vienna Circle called 'the scientific world-conception', defined by a commitment to rational planning in all aspects of life and a leaning toward internationalism in politics.

4.1. Planning

For Frege and his followers, despite its indispensability for the emergence of high-level reasoning, ordinary language proves itself inadequate for rigorous scientific thinking. This need, in turn, requires the design of an improved language. Just like the hand is supplemented

by machines to accomplish further elaborate tasks, natural language should inspire us for the design of a logical language unaffected by the fluctuations and ambiguities of the former. This technological metaphor of a specialized tool prolongating our natural transformative activity was central in Leibniz' ambitious project: 'Once the characteristic numbers of most notions are determined, the human race will have a new kind of tool, a tool that will increase the power of the mind much more than optical lenses helped our eyes, a tool that will be as far superior to microscopes or telescopes as reason is to vision.' (Leibniz, 'Preface to a Universal Characteristics', 8) Frege described *Begriffsschrift* likewise:

We build ourselves artificial hands, tools for particular purposes, which work with more accuracy than the hand can provide. And how is this accuracy possible?

Through the very stiffness and inflexibility of parts the lack of which makes the hand so dexterous. Word-language is inadequate in a similar way. We need a system of symbols from which every ambiguity is banned, which has a strict logical form from which the content cannot escape. (Frege, 'On the Scientific Justification', 84)

For Frege, misunderstandings and poor reasoning 'have their origin in the imperfection of language, for we do have to use sensible symbols to think' (Frege, 'On the Scientific Justification', 83). Frege gives an overall positive account of our linguistic ability despite all its limits. As imperfect as it might be, language is our indispensable cognitive link with the world, and we can only overcome its shortcomings by perfecting it for the technical task of analysis: 'Symbols have the same importance for thought that discovering how to use the wind to sail against the wind had for the navigation' (Frege, 'On the Scientific Justification', 84). *Begriffsschrift* was meant to be a tool in replacement of the ordinary language, for the execution of a specific task (testing of logical proofs) more efficiently than its human counterpart could do – like a microscope that enhances the visual capabilities of the human eye, even though the latter is more versatile and better suited for a wider range of everyday

needs. Frege's tool-making approach to language strikes for its modernist spirit that also shaped logical empiricism. Despite a difference of purpose between formal languages (for mathematics and, to some extent, philosophy) and interlanguages (for international communication), they both sought to legitimate language engineering in the view of scientific or social progress, respectively.

Carnap's support for language planning fits in the wider neo-Enlightenment framework of logical empiricism. As early as in 1929, the signatories of the famous Vienna Circle manifesto emphasized conscious planning of and democratic participation in social affairs as a characteristic of the scientific world conception: 'we have to fashion intellectual tools for everyday life, for the daily life of the scholar but also for the daily life of all those who in some way join in working at the conscious re-shaping of life' (Carnap, Hahn and Neurath, 'The Scientific Conception of the World', 305). Carnap supports planning for being superior to natural evolution in terms of efficacy, just like Couturat appealed to a planned, improved language to serve as a neutral auxiliary in international communications:

It was and still is my conviction that the great problems of the organization of economy and the organization of the world at the present time, in the era of industrialization, cannot possibly be solved by 'the free interplay of forces', but require rational planning. (Carnap, 'Intellectual Autobiography', 83)

In defending IAL, Couturat adopts a similar defence of constructed languages. Against objections of artificialness, he ranges language construction among other perfecting human behaviour such as urban planning or technological innovation. As examples he mentions planned cities in America, other formalized sign systems such as Morse code or Braille alphabet, railways, wireless telegraphy and medical imagery: for, all these inventions were once met with incredulity before becoming an ordinary part of our everyday life. For

Couturat, accepting only natural languages as legitimate results from a false inductive reasoning, easily refutable by any scientific innovation: 'It is the argument of routine, it is the negation of all progress' (Couturat, 'Pour la langue internationale', 24). Furthermore, Couturat points at 'artificial' elements that have been consciously introduced to our natural languages, such as scientific terminology and sophisticated grammatical rules (grammatical gender, declinations – those were borne out of 'refining of literates and fantasies of grammarians rather than popular usage', Couturat, 'Pour la langue internationale', 24). The natural evolution of ordinary language includes conscious reshaping and improvements.

But, above all, the two movements share a common concern for the advancement of science, beyond the difference of their fields of application. Improved communication between scientists is cited as one of the major motivations of the IAL by the Delegation. Emerging from the World Fair, the Delegation appeared as a product of the 'organizing turn' (Rasmussen, 'Le Moment Internationaliste', 34) of the early 20th century, comprising political, humanitarian, juridical, intellectual – and scientific, in particular – levels: this stage in the scientific internationalism of that period is marked by a dramatic increase in the number of international scientific institutions contrasting with the decline of national ones (notably superstructures like International Association of Academies), congresses, and the simultaneous emergence of an ideology of science as a social force capable of uniting humanity and advancing global civilisation. This leads us to another ideological component of IAL: a belief in the inherent internationalism of science.

For IAL advocates, such as the chemist Richard Lorenz, the continual growth of an internationally intelligible scientific nomenclature makes the language of science a solid basis for the interlanguage to come: 'It cannot, therefore, be denied that there actually exist already, particularly in science, the beginnings of an international (and largely artificially created) auxiliary language which is written, spoken, and read. We find here ready made the

first provisional lexicon of the scientific international language.’ (Lorenz, ‘The Relationship of the IL to Science’)⁷ For Couturat, IAL has an enormous advantage to offer for science as a solution to ‘the lack of concordance of concepts’ between languages. The reason is that, in the IAL, ‘the meaning of words will be defined rigorously, diverse meanings of our terms will be dissociated and represented by different words, to avoid any ambiguity; and, above all, we will be able to strip them off associations of ideas borne out of popular usage, that complicate and distort their meaning.’ (Couturat, *Pour la Langue Internationale*, 21-22) This is an important service to science, for ‘the characteristic of a scientific or technical concept is to be *absolutely international*, that is, the same for all minds, without which it would not be objective and truly *scientific*’ (Couturat, ‘Pour la Langue Internationale’, 22). Overall, Couturat’s advocacy for an IAL reflects the same concern for a reformed language with clarified concepts in the view of extending the scope of the scientific method, that characterizes Frege’s *Begriffsschrift* and Peano’s formalization of arithmetic.

4.2. Cosmopolitanism

From the modernist framework of symbolic logic and IAL that aimed at extending the scope of scientific innovation through language engineering, technological progress is perceived as inherently conducive to social progress, not only in terms of increasing prosperity, but also in unifying the world population beyond national borders⁸. For instance, by rational planning Carnap means ‘socialism in some form’ in economy, and ‘a gradual development toward a world government’ in global politics. Indeed, active struggle against national divisions was a central motivation in the IAL movement of the early 20th century, starting from Esperanto.

⁷ Later, Lancelot Hogben will use the Greek and Latin roots dominating modern scientific terminology as a lexical source for his language Interglossa (Hogben 1943).

⁸ This idea of a positive correlation between scientific progress and human progress will be strongly challenged during the Second World War, notably with the emerging nuclear threats. The political developments from the middle of the 20th century will render the IAL’s modernist paradigm obsolete.

Couturat's politics were heavily influenced by Kantian cosmopolitanism. In an open letter in the newspaper *Le Temps*, he defended Kant against the misappropriation of De Brunetière in reaction to his appeal to Kant to justify war in its purported utility in perfecting the civilisation (Couturat, 'Correspondance' [Correspondence], *Le Temps*, 27/03/1899). Yet, Kant saw in war an abomination that belongs to the state of nature. Transposing the theory of social contract from an interpersonal (as in Hobbes, Locke and Rousseau) to an international level, he foresaw the emergence of a supranational juridical entity. So states the fifth proposition of 'Idea for a Universal History from a Cosmopolitan Point of View': 'The greatest problem for the human species, the solution of which nature compels him to seek, is that of attaining a civil society which can administer justice universally.' (Kant, 'Idea for a Universal History', 45) Further in the seventh proposition Kant openly positions himself against wars – a barbary that holds back the humanity from fully realizing its capacities. From a historical point of view, wars are perturbations meant to lead humanity to a final unification that will be accomplished by 'abandoning a lawless state of savagery and entering a federation of peoples' (Kant, 'Idea for a Universal History', 47). The establishment of a world government to regulate international conflicts juridically, as an alternative to the use of armed forces, would be a historical progress comparable to leaving the state of nature to enjoy the safety and benefits of a civil society. War could only be seen under a relatively positive light if placed in a larger historical perspective, in the sense that it is expected to lead to ultimate world peace by accelerating the common drive to a much desirable unification. In *Toward Perpetual Peace*, Kant writes that 'there must be a special sort of league that can be called a league of peace, aiming to make an end to all wars forever', a 'federation that is gradually to spread to all states and thus lead to perpetual peace' (Kant, 'Perpetual Peace', 10). Couturat, too, was vocal about the preferability of a diplomatic resolution of conflicts over war, which only meant for him the rule of the strongest in the tradition of Hobbes and

his modern-day empiricist successors. One year later, echoing this vitriolic exchange with De Brunetière, Couturat attacked Russell's position on the Boer War and firmly stated his Kantian plea for diplomatic resolution of conflicts through a supranational world organization:

No matter what, I remain faithful to my principles of international law, which are those of Kant and not those of Bismarck or Napoleon, and which are in conformity with the most noble and generous traditions of the French spirit. Every nationality has the right to exist and be independent, and the suppression of a nation is a crime analogous to that of the killing of a person; all brutal conquest is armed robbery. As to conflicts of interest among nations, they can and must be resolved by judicial procedures, and not by war, which is as absurd and barbarous as duels among individuals. (Letter to Russell, 6.4.1900, qtd. in Blitz, 'Russell and the Boer War', 128)

After their heated exchange of that year, Russell was definitely won to the cause of pacifism⁹. His anti-war propaganda caused his dismissal from Trinity College in 1916 and cost him a five-month prison term in 1918. With Einstein he issued the Russell-Einstein manifesto in 1955, and he led the Campaign for Nuclear Disarmament in the following years. His later work for peace includes the establishment of the Bertrand Russell Peace Foundation (1963) and the International War Crimes Tribunal (1967). Despite the famous counter-example of Frege, whose late diary reveals nationalistic and anti-Semitic views (Frege 1996), cosmopolitanism was common among the founders of modern logic, as attested by the writings of Peano, Russell, Couturat and Carnap. Couturat's philosophy of logic and politics suggests that this connection might be due to the belief in a universal human mind

⁹ Blitz argues that Couturat's debunking of his reasoning is what actually caused Russell's conversion to pacifism and anti-imperialism, as opposed to Russell's own account in his autobiography.

presupposed by the ideals of a standardized formal language and rational reconstruction of the concepts of ordinary language. Likewise, logical empiricists condemned the nationalistic terminology of Nazis. They didn't refrain from using logical analysis to discredit problematic abstractions such as *Volksgeist* or *Deutschtum* (see Galison, 'Aufbau/Bauhaus'). In a letter to Russell, Carnap confirms this affinity that unites logical clarity with anti-war politics:

I am particularly happy that it is you, as the first Englishman, with whom I can join hands in the scientific field, since already during the time of the war you stood up so openly against the intellectual enslavement resulting from hatred between peoples and in favor of a humane and pure way of thinking. When I remember that the same conviction was also held by Couturat, who unfortunately died so prematurely, I ask myself: Is it mere coincidence that the people who achieve the greatest clarity in the most abstract area of mathematical logic are also those who oppose, clearly and forcefully, the narrowing of the human spirit by means of affect and prejudice in the area of human relations? (letter to Russell, 17.11.1921, quoted in Reck, 'From Frege and Russell to Carnap', 160)

5. Conclusion

The history of modern logic and the IAL movement reveals a shared mission of linguistic reformation based on an instrumentalist view of language. In some of their most reputable partisans, criticism of ordinary language is accompanied by pacifist and internationalist leanings which, while not being on the agenda of modern logic nor necessarily occupying a major place in the intellectual production of its practitioners, appear to be linked to a progressive and emancipatory view of science. The case of Couturat is particularly significant in its original synthesis of rationalism, logical universalism and pacifist cosmopolitanism into an avant-garde linguistic project.

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