Translators' Introduction

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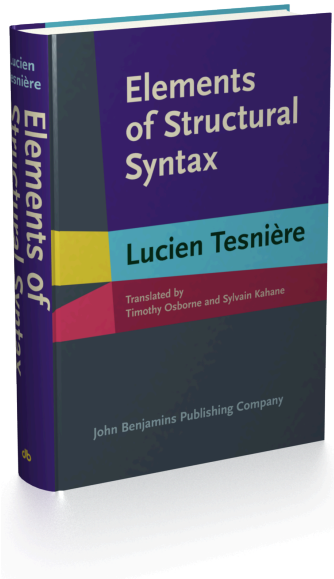

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Lucien Tesnière
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Translators' Introduction

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1. Why now?

The appearance of this translation occurs sixty years after Lucien Tesnière's death and fifty-five years after the original publication of his *Éléments* (the term we use to refer to the French original of this translation). Given the tremendous developments in the field of syntax in the decades since, the question arises as to why now: why a translation of a work that appeared decades ago and that must certainly be outdated in its view of the theory of syntactic structure? There are of course a number of considerations that make up the answer to this question. Above all, Tesnière's theory is generally taken to be the starting point for our modern understanding of dependency syntax and dependency grammar (DG), and with the upsurge in interest in DG in recent years – coming mainly from the use of dependency as the basis for parsing natural languages in the field of computational linguistics – a fresh look at Tesnière's theory of syntax is warranted.

Tesnière died in 1954, and his *Éléments* appeared first five years later in 1959. Noam Chomsky's *Syntactic Structures* appeared in 1957, and from that point on, the study of syntax has been greatly influenced by Chomsky's ideas. While some took note of Tesnière's *Éléments*, the impact of Chomsky's works has certainly overshadowed all other developments in the field of syntax on the international stage. Tesnière died at the relatively young age of 61, and in the later years of his life, he was not healthy, a situation that slowed the work toward the publication of his *Éléments*. The fact that Tesnière was no longer alive when his ideas were being received and evaluated in the 1960s and that at that time Chomsky's ideas were taking full hold of the syntax world helps explain the reduced awareness of Tesnière's contribution to the field. Given Chomsky's tremendous influence, it was easy to overlook Tesnière's work.[1]

Tesnière was a Frenchman writing in French. Since the Second World War, the influence of English (as the international language) on academia and linguistics cannot be underestimated. For a theory of language to gain a large audience, access to that theory has to be available in English. Tesnière's *Éléments* is a massive work, 670 pages, and it

1. For instance, the French linguist M. Arrivé (1969), discussing whether Tesnière's syntax was transformational, writes: "For the linguist of today, Tesnière's theory is only of historical interest […] Devised in relative solitude, the essential concepts of structural syntax are far removed from the trends in linguistics of the time" [translated from the French]. Cf. also Kabano (2000).

contains examples from dozens of languages. It relies particularly heavily on data from Latin, ancient Greek, German, and Russian, whereby Tesnière employed the Greek alphabet for the Greek examples and the Cyrillic alphabet for the Russian examples; this practice probably reduced the accessibility of the work to a general audience. Further, Tesnière often provided examples taken from classical French literature to illustrate many of the points he was making. These examples can be difficult to understand, even for native speakers of French. To increase the accessibility of the translation in these areas, we have transliterated the Greek and Russian examples to the Roman alphabets and we have modernized the transliteration of the Chinese, Arabic and Hebrew examples. We have also added many literal translations, and at times we include a comment to help explain the point at hand.

Tesnière's main contribution to the study of syntax is indisputably the concept of dependency and the use of a dependency tree, i.e. a *stemma*, as the backbone of what he calls the *structural order*, that is, the hierarchical part of the syntactic representation, as opposed to the linear order. Tesnière was not the first linguist to draw dependency structures (see Coseriu 1980 and Rousseau 1995); certain aspects of his theory of syntax, such as verb centrality, overlap with the pioneering work of Jespersen (1924, 1937). But Tesnière was the first one to elaborate a complete linguistic theory based on the dependency concept and to propose dependency-based representations for the main constructions in numerous and varied languages. Tesnière devoted much effort to discussing the adequacy of dependency as the organizational principle underlying numerous phenomena. He augmented his dependency-based representations in several ways, introducing many additional concepts, such as a contrast between vertical and horizontal links for coordination (Chapter 134–150), apposition (Chapter 69), and dislocation (Chapter 72), special devices for transfer (Chapters 151–271), "weighted" dependencies (Chapter 169), and even dependencies between dependencies for scope phenomena (Chapters 65 and 68).

While dependency is the most profound concept that Tesnière introduced and built on, his contribution to the field of syntax is acknowledged in one specific area above all, regarding the concept of *valency* (Chapters 97–133). Most modern theories of syntax acknowledge and build on the notion of verb valency, and this is true even for theories that posit phrase structure – in a certain sense, phrase structure is the opposite of what Tesnière understood syntactic structure to be. The distinction between head-initial and head-final structures and languages (Chapters 28–32) is a second area where Tesnière's contribution to our modern understanding of syntax has been great, yet Tesnière rarely receives the credit he is due for his work in this area. With the appearance of this volume, we hope that Tesnière's influence on these and other areas of our modern understanding of syntactic structures can be fully appreciated.

Beyond the two areas just mentioned, the *Éléments* contain lesser known concepts and ideas that deserve more evaluation than they have heretofore received. This is particularly true of the theory of *junction* (Fr. *jonction*), Part II of the *Éléments*, and the theory

of *transfer* (Fr. *translation*), Part III of the *Éléments*. In his relatively short discussion of coordination (35 pages, Chapters 134–150), which he gathers under the term *junction*, Tesnière produces an insightful analysis of particular mechanisms associated with coordinate structures, such as *gapping* and *right node raising* (RNR). These mechanisms were then later identified and explored in the 1970s. The fact that Tesnière had already insightfully examined these phenomena was overlooked. The theory of transfer (Chapters 151–271) is Tesnière's effort to reduce the number of word categories of content words to a bare minimum; he posited just four (nouns, verbs, adjectives, and adverbs). He also identified two categories of function words, *junctives* and *translatives*. The role of translatives is to transfer content words of one category to content words of another. Tesnière devotes 270 pages to the theory of transfer, developing the concept in great detail and producing examples of many possible types of transfer. This area of his theory merits more scrutiny than it has heretofore received, since it is a unique contribution to how humans employ language productively, multiplying the number of possible utterances to infinity.

The rest of this introduction considers the author who produced the *Éléments* (biographical information about Tesnière), the genesis of the book from 1932 to 1959, some of the main ideas in the œuvre, and the impact of the œuvre, i.e. the development of syntactic theory that takes the *Éléments* as its starting point. The greater goal here is to further increase the accessibility of Tesnière's theory beyond what the translation alone would provide.

2. The author[2]

Lucien Tesnière was born on May 13, 1893 in Mont-Saint-Aignan, a village that is now part of the suburb of Rouen, the main city of Normandy on the north-west of Paris on the Seine. His father was a notary and his mother was interested in the fine arts and practiced sculpture. From his mother he may have inherited "the creative instinct that motivates one to seek explanation further afield than conventional wisdom general goes

2. The present biography is mainly based on a résumé written by Tesnière himself for his application to the Université de Montpellier in 1937 (Tesnière 1937), a report on his activity probably written two years later (Tesnière 1939), and a necrology written by the egyptologist François Daumas (1957), who was his friend and colleague in Montpellier. We have also used his personal notes and letters found in the Fonds Tesnière from the Bibliothèque National de France (BNF) (reference NAF 28026, Boxes 1 to 69), as well as material from his granddaughter Marie-Hélène Tesnière (Tesnière 1995), who prepared the Fonds and has provided us with additional materials. Two other biographies of Tesnière have also been consulted: the preface of Madray-Lesigne and Richard-Zappella (1995) and the communication of the montpellierian grammarian Teddy Arnavielle (1995).

as well as the desire to be engaged on the path of research" [translated from the French] (Daumas 1957).

He studied in Rouen and passed his baccalauréat Latin-Grec in 1910. He was 17. Attracted by the study of languages, he spent the next year in England to learn English and four months in Florence to learn Italian. He already knew German because he had studied it at school and spent several holidays in Germany, where he visited the German housekeeper who had worked for his parents since he was a small boy.

He entered at Sorbonne University in 1912 and graduated (licence-ès-lettres) in 1913 in German, with English as a second major and Old Norse as a minor. In 1913–1914, he continued his studies in Germany and Austria. At the University of Leipzig, he worked on Gothic, Old High German, Middle High German, Old Norse, and at that time he also received his first initiation in the Slavic languages. In Vienna, he took advantage of the numerous Yugoslavian students to learn Croatian. Still a student at Sorbonne, he presented a master's thesis written in German on the German mythologist Wilhelm Mannhardt in June of 1914.

He was 21 when WWI started. He was mobilized on August 12th and sent to the front on October 15th. Becoming a prisoner of war on the 16th of February 1915, he was interned in the camp at Merseburg with 4000 other prisoners from all nationalities. During his 40 months of captivity, he studied Hebrew and read the bible, he learned Russian, Low Breton, Latvian, Hungarian and some elements of Dutch and Finnish, and became friends with the hellenist Mario Meunier. During these years he worked for the German authorities as a French-English-Russian-Italian-German interpreter and practiced these languages every day. Tesnière had a very good ear: he was not only a polyglot, but also a remarkable musician, playing the piano and the zither.

Back in Paris in 1918, he worked at the Foreign Press Service, starting at the English-speaking press, then the German press, and finally he was asked to start a Yugoslavian section. In October of 1919, he was received to the *agrégation* (the top-level competitive examination for recruiting teachers) of German.

He spent the year 1919–1920 studying Russian at the École des Langues Orientales and linguistics at the Sorbonne with Joseph Vendryes and at the Collège de France with Antoine Meillet, who was the most prominent French linguist at this time. Meillet became his thesis supervisor. At the end of the school year, he was nominated German-Slovene interpreter for the French delegation of the international commission on Carinthian Plebiscite.[3] He was then invited as a lecturer to the University of Lubjana (now the capital of Slovenia), which at that time was part of the Kingdom of Yugoslavia. He

3. The voters of the north and west area of Carinthia decided on the 10th of October, 1920 to become part of the newly founded First Austrian Republic.

stayed there four years and founded and ran the French Institute. Working on the dual in Slovene, he accumulated a large amount of various data, whereby he accorded as much attention to spoken data as to the written word. For instance he studied "lonely hearts" advertisements, which focused on girls looking for a husband, seeking to discover how they imagine their future life *à deux* (Fourquet 1996). He thus developed an Atlas of the dual forms in Slovene according to the "geographic method" of Gilliéron. The dual in Slovene was disappearing, but contrary to what was expected according dogma in Indo-European studies at the time, Tesnière showed that there was no correlation between the social level of the speakers and the use of the dual and that the dual could be disappearing in a rural area while still alive in a more industrial area. The cause was elsewhere, partly in the state of the phonological system. His thesis, entitled *Les formes du duel en slovène* [Forms of dual in Slovene], was defended in May 1925 and received the Volney prize of the Académie française in 1926. He also produced a translation of the poems of Oton Župančič in French (Tesnière 1931), considering that "a good linguist must know to be a good translator" (Tesnière 1939).

In January 1921, Lucien Tesnière married Jeanne Roulier in Zagreb; she often participated in his reasearch. Tesnière fathered three children, each of whom excelled in academia (Daumas 1957).

In February 1924, Tesnière became associate professor of Slavic language and literature at the University of Strasbourg (the capital of Alsace on the border to Germany), where he taught Russian and Old Slavic. He took scientific missions to Russia (1926, 1929, 1936) and Czechoslovakia (1927, 1928), where he learned Czech and the rudiments of Slovakian. In 1929 he officially started a big project, an atlas of the Slavic languages with Meillet; he was also involved in statistical studies of Alsacian at the time. His *Petite Grammaire russe* was published in 1934.

One hour per week he taught French to Slavic speakers at the Institut d'Etude Française modernes de la Faculté: "Instructing foreigners is, due to the continual comparisons that it imposes across French and idioms with different structures, an excellent way to increase general linguistic knowledge" (Tesnière 1939). At this time he was above all working on his *Grammaire du français pour étrangers* (1200 pages). In the introduction to this unpublished work – the reason it was unpublished is explained below in Section 3 – Tesnière wrote with humor and insight:

> "A Frenchman can produce a good descriptive and synchronic grammar of the Patagonian language because it is not his mother tongue and does not descend from Latin, simply stated, because he views it from the outside, without being troubled by the fancies of Patagonian grammarians. Conversely, in order to produce a good descriptive and synchronic grammar of French, no one is in a better position to do that than a Patagonian who is ignorant of the body of literature produced by French grammarians and who has only the language in front of him to describe. Concerning

> the current grammar, the author can claim only one merit, i.e. that of imposing on himself the perspective of a Patagonian throughout the exposé."
>
> (Fonds Tesnière, Box 33)[4]

In 1934, Tesnière published his famous *Comment construire une syntaxe ?* 'How to build a syntax?'. This work would become very well known.

Tesnière was promoted to professor of *grammaire comparée* at the University of Montpellier (in the south of France) in 1937. Besides his courses on comparative grammar, he taught structural syntax and saw the transformation of his position into a chair of linguistics. He also continued to teach Russian voluntarily and directed the Institut des Étudiants Étrangers 'Foreign Student Institute'. One of its former students states that Tesnière was "…authentic, a great scholar", who the student remembers "standing in front of his chair, talkative, jovial, often joking and paradoxical, speaking clearly and brilliantly. He seemed to teach only what he himself had discovered" (Arnavielle 1995).

Tesnière worked as a cryptography officer for the Military Intelligence, the so-called Deuxième Bureau, during WWII. He became very sick starting in 1947 and his health remained poor until he died on December 6th, 1954, without having published his *Éléments*. He also left an unpublished *Petite grammaire allemande* (300 pages), which he had completed in 1953.

The *Éléments* were published posthumously in 1959 due to the constant efforts of his wife Jeanne and the help of colleagues and friends like Jean Fourquet, who wrote the preface to the volume. Due to the success of the book, a second, corrected edition appeared in 1966.

3. Genesis of the *Éléments*

After completing his doctoral thesis, Tesnière planned to write a precise introduction to general linguistics. He left many notes for a book called *Glottologie*, lit. 'study of language' (Fonds Tesnière, Box 31–32), the first part of which, about semantics, was called *Noétique*, where a *noeme* is a signifying unit (Box 33). In a notebook (entitled *Glottologie*, Box 57), Tesnière wrote:

> "The necessary consequence of this uniquely material interpretation of the facts of language has been that one has studied the material aspects of language almost exclusively, that is, phonetics and the concrete side of morphology. As a consequence, syntax, which in my view is part of morphology, and semantics, which is the study of immaterial meaning, i.e. two areas that constitute the spirit of language, have hardly been studied."

4. All citations of Tesnière have been translated from French.

We see in this passage that Tesnière was still under the influence of his primary advisor at the time, Antoine Meillet, who "did not believe in the autonomy of syntax" (Chapter 15, §9).

In a letter dated January 29, 1929 (Box 41), Tesnière's friend Fernand Mossé invited Tesnière to write a grammar of French for foreigners for the publisher Didier.[5] Immediately thereafter Tesnière stopped his previous book projects and buried himself in his *Grammaire française pour étrangers* 'French grammar for foreigners', which was never published, although he left an unpublished manuscript of more than 1200 pages: Part I on semantics (which must be the *Noétique* of his *Glottologie*), Part II on phonetics (192 pages, Box 37), Part. III on orthography (untitled *Graphie*; 652 pages, Box 37), where he studies every spelling of every possible syllable of French), and Part IV on morphology (375 pages, Box 38). In a letter to Charles Bally dated March 17, 1934 (Box 49), Tesnière wrote:

> "I have been working on a French grammar for two years; it is the fruit of 14 years of French language instruction to foreigners. The sections on phonetics and morphology are entirely drafted. Concerning the syntax, I have only planned out some large sections, such as, for example, the tense system, which I wrote a short article about a few years ago and should have sent to you. The abundance of diverse materials has been preventing me from summarizing these scattered elements. I have not yet seen how to integrate everything into an organic whole. I have therefore put my French syntax aside for the time being; the material has been assembled but is not yet organized. And I have devoted myself to producing a small grammar of Russian, hoping to more easily master the much less extensive material."

The *Petite grammaire russe* was indeed published in 1934 by Didier.

In 1932 Tesnière had a revelation that he describes in letters to Fernand Mossé dated June 23 and July 7 (Box 42):

> "Yesterday I was examining a baccalauréat test of Latin-French translation. In seeing the poor candidates get caught up in the complexity of a sentence, I thought of one of my ideas about structure that had been in my head for a few years, but that I had not been able to completely discern. After two or three failed attempts, I finally succeeded at giving the structure a concrete form. Attached is a copy of my insight. It is of great importance for me; it is the key to my view of sentence structure. […] I have now obtained the key to the all-important distinction between subordination and coordination, which are the two great architectural processes of the sentence. I add: a verbal sentence is one in which everything gravitates around the verb. A nominal sentence is one in which everything gravitates around a noun. In the Russian *Dom nov* 'The house is new', the center is *nov* (*dom* → *nov*). In contrast, in *novy dom* 'new

5. Fernand Mossé (1892–1956) was the scientific confident of Tesnière; they exchanged several very interesting letters (see below). Mossé was a specialist of Germanic languages and literature and became professor at the Collège de France in 1949. They met after WWI during their studies at Sorbonne.

> house' the center is *dom* (*novy* → *dom*). I explain the inversion of the word order, a general fact in the Asian languages, by the persistence of the direction indicated with the arrow; it is the principle around which everything is organized. At last this move solves the problem I had with the type *He speaks quickly* becoming *a quick speech*. The passage of the verb to a noun causes the adverb to change to an adjective […] According to all this, you see the importance of this point of view for my syntax. I will first take the central sun with all its modalities of time, mood, etc. Then I will successively examine the different types of vassals in sentences that are more and more complicated. I have the impression that I have found a way forward that will permit me to construct a new syntax." (June 23, 1932)

> "I am in the process of revisiting all my notions of syntax from this point of view. Many things have become clear, and I have the impression that I now have the crux of syntax, or something that is very close to it. In any case, I will organize my entire grammar of French around this notion. Evidently, as you stated, this will take me far afield. But that is not an objection, quite to the contrary." (July 7, 1932)

In May 1934, Tesnière published his paper *Comment construire une syntaxe ?*, in which he presents the outline of his syntax. This outline contained verb centrality, the distinction between actants (called *actors* here) and circumstants, the stemma, the beginning of the distinction between connection and junction, his classification of parts of speech, including sentence words, and transfer involving the notions of source, target, and translative, and the distinction between first and second-degree transfer. It is worth noting that Tesniere's stemma at this point was still "gravitational", with the main verb at the center, like the sun at the center of the solar system.

A first draft of the beginning of the *Éléments* was complete in 1936, and in 1938 the 47 chapters of eventual Book A were achieved (Fonds Tesnière, Box 39). In particular, Tesnière had undertaken a wide typological study of word order, classifying around 190 languages from all around the world. He built huge arrays with languages on lines indicating the following constructions: noun-genitive, noun-possessive, verb-subject (nominal vs. pronominal), verb-object, noun-adjective, prefix vs. suffix vs. infix, preposition vs. postposition. In each case, he indicated whether the governor appears before or after the dependent using an upward or downward arrow. This work is summarized in Chapter 14 of the *Éléments*.

Convinced that his structural syntax was appropriate for teaching grammar at primary school, Tesnière started collaboration with the Ecole Normale d'Institutrice in Montpellier. The first step was to instruct the teachers on producing stemmas, so that they could then use them with the children. The experience was very positive; there were many enthusiastic reports from the teachers to the regional education authority. The experience was repeated each year until 1943. May 13, 1943, Tesnière wrote to Mossé:

> "The method has been adopted in the Languedoc-Roussillon region [area of Montpellier], and it has now become a question of adopting it for all of France, in the Youth department of course. All this is undoubtedly the consequence, direct or

> indirect, of the first experiences that I have been collecting here for a few years now due to the involvement of Drouin. There is reason to believe that there is real success, since the system has been instituted now a few times. This has permitted me to obtain a basis in primary education, which is more flexible than secondary education and less interested personally than higher education. I will of course require every guarantee for when, in a year or two, I am in a position to present my book to the public; the system my book presents will be more advanced, but at the same time less compact, and as a consequence less clear, than the brochure."

The brochure in question was printed in December 1943 in Montpellier: it is a document of 59 pages entitled *Cours de syntaxe structurale* (*Résumé aide-mémoire*), with mention "résumé du cours donné aux moniteurs des centres d'apprentissages de la région Bas-Languedoc-Roussillon" 'abstract of the course given to the students of the learning centers of the Bas-Languedoc-Roussillon area'. This course was published 10 years later, in 1953, by Klincksieck under the name *Esquisse d'une syntaxe structurale*. It is the same text, with some minor changes (*Pierre* and *Paul* become *Alfred* and *Bernard*) and the suppression of the last chapter entitled *Indications pédagogiques – Programme* 'Pedagogical information – Program', which corresponds to Chapter 277 of the *Éléments*.

As stated in the letter to Mossé, the redaction of the *Éléments* was nearly achieved as early as 1943. Tesnière's files (Boxes 46–48) contain typed drafts of the book with minor corrections. The actual version of the *Éléments* that was published is the last typed draft. It contains some hand-written corrections which were not taken into account in the published edition, in particular the Russian and Greek examples had been transliterated to the Roman alphabet, as we have done here in our English translation. Tesnière also planned to reduce the outline of the book, collapsing the chapters by 2 or 3 in order to obtain only about a hundred chapters, instead of 278.

4. Main ideas

Tesnière's *Éléments* develops a number of concepts that have become mainstays for most modern theories of syntax. The following subsections briefly consider some of Tesnière's contributions, touching on 9 main aspects of the theory of syntax presented in the book: (1) connections, (2) verb centrality, (3) stratification, (4) stemmas and trees, (5) ordering and language typology, (6) nodes and nuclei, (7) valency, actants vs. circumstants, and metataxis, (8) junction, and (9) transfer. Our intent is merely to draw attention to some areas where we believe Tesnière's contribution to the study of syntax (and linguistics in general) has been greatest. During the discussion, we continue to cite the relevant passages using a specific convention: first chapter, then paragraph, e.g. Chapter 49, §6. This practice allows one to immediately find the relevant content at the same time that it maintains consistency across the two original French editions of the book (1959 and 1966) and the translations of the book in other languages (German, Italian, Spanish, Russian).

4.1 Connections

Tesnière begins his *Éléments* with the insight that morphological units (words) are not the only elements that make up sentences. A two-word sentence such as *Alfred speaks* consists of more than just the two words *Alfred* and *speaks*; it also contains the *connection* that links the two and makes them into a whole (Chapter 1, §4). The connection establishes a dependency (Chapter 2, §1), whereby the one word, *speaks*, is superior over the other, *Alfred*. Tesnière calls the superior word the *governor*, and the inferior word its *subordinate* (instead of *dependent*, which is commonly used today). The governor *governs* its subordinates (Chapter 2, §3). The connection construed in this manner is equivalent to what modern syntax calls a *dependency*.

For Tesnière the concept of connections was novel. He pointed out that traditional grammars focused much more on concrete forms, i.e. on morphology, than on the combinatorial properties of these forms. He also viewed morphology's influence on the study of syntax as detrimental, since an understanding of syntax demands much more than just the knowledge of the fixed inflection paradigms associated most with the study of classical languages. It demands insights into the role that connections play in grouping words together and thus enabling the conveyance of meaning. Tesnière took the inspiration for his connections in part from Wilhelm von Humboldt's concept of *innere Sprachform* 'inner speech form'. The *innere Sprachform* of a sentence is its syntactic and semantic organization (Chapter 15, §3). Morphology is the study of concrete forms that one can see in writing and hear in speech directly, whereas syntax is the study of the interior form of sentences in terms of connections (Chapter 15, §4ff.). The connections are abstract, and due to this abstractness, the study of syntax is necessarily different from the study of the concrete forms of morphology; it relies heavily on the *introspective method* (Chapter 17, §9).

Since each connection involves a governor and a subordinate, it is directed. Connections are therefore directed links between syntactic elements (words). The convention Tesnière employed was a simple vertical line, e.g.

(1)

Stemma 1

This representation shows the three essential units that make up the sentence *Alfred speaks*. The word *speaks* is governor over its subordinate *Alfred*. The connection is depicted by the vertical line connecting the two. The result is a sentence diagram, which Tesnière called a *stemma* (see Section 4.4 below). In current terminology, a stemma is a tree-like representation that shows the totality of elements of a phrase or sentence and all the dependencies that link those elements into a single structure.

The connection, as represented with an (at times slanted) vertical line, was not the only type of link that Tesnière posited. His analysis of *junction* (coordination) and apposition necessitated further link types, ones that are represented with horizontal lines (Chapter 136, §3), and when he presents his understanding of transfer, he augments the graphic representations further with T-schemas (Chapter 144, §7). Given these additions, Tesnière's stemma is not a pure dependency tree. While the connection is the central concept for Tesnière's vision of syntax, it alone was not sufficient to capture the varied types of syntactic structures that Tesnière identified.

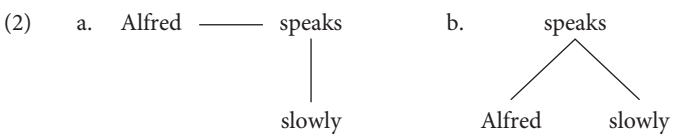
4.2 Verb centrality

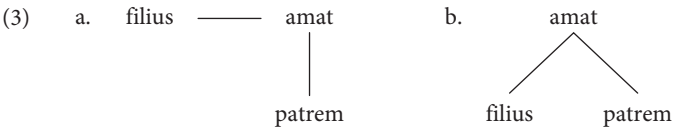
As established above, one of Tesnière's profound insights about the nature of syntactic structures concerns the initial grouping of words at the clause level. Tesnière rejected the subject-predicate division that dominated the understanding of syntax at his time and that is still prominent today in phrase structure grammars. He rejected the initial division of the clause into a subject NP and a predicate VP. He argued that this division stems from term logic as associated with Aristotle and that it belongs in logic, not in linguistics. He writes:

> "Founded on the principles of logic, traditional grammar strives to find the logical opposition between subject and predicate in the sentence, the subject being that about which something is said and the predicate being what is said about it. Hence in the sentence *Alfred speaks slowly*, the subject would be *Alfred*, and the predicate *speaks slowly*, which corresponds to Stemma 79. One can acknowledge that this conception of the sentence is merely a remnant that has not yet been entirely eliminated. This remnant stems from the epoch that extends from Aristotle to Port-Royal, when all grammar was founded on logic. Indeed, all arguments that can be invoked against the concept of the verbal node and in favor of the opposition between subject and predicate come a priori from formal logic, which has nothing to do with linguistics." (Chapter 49, §2–5)

In place of the binary division of traditional grammar, Tesnière positioned the verb as the root of all clause structure. In so doing, he took the subject and object noun phrases to be equi-level dependents of the verb.

The traditional analysis and the analysis that Tesnière chose instead are shown here using an example from English, *Alfred speaks slowly*, and an example from Latin, *Filius amat patrem* '(The) son loves (the) father':





The traditional binary division into subject and predicate is illustrated with the a-examples on the left (from Stemma 79), and the verb-as-root analysis that Tesnière assumed instead are shown with the b-examples on the right (from Stemma 80). Tesnière motivated the analyses in (2b) and (3b) via syntactic and morphological considerations involving case forms and inflectional endings, including the active-passive diathesis. More generally, standard permutation and substitution constituency tests support Tesnière's stance in this area, since these tests fail to identify finite VPs such as *speaks slowly* as constituents (see Osborne et al. 2011: 323f.).

While others also rejected the subject-predicate division, Tesnière was one of the first in modern linguistics to clearly replace this division with verb centrality. He did this in a manner that left no room for doubt about the underlying approach to syntax he was pursuing: his stemmas clearly position the main verb as the root of the structure. As established above, we know from the letters Tesnière wrote to Mossé that he became convinced of verb centrality in 1932. In the letter from July 7, 1932 (see Section 3), Tesnière produced the following answer to a letter Mossé had sent him containing a Reed-Kellogg diagram:[6]

> "I believe that there is something extra in my conception. The English author groups an entire part of the sentence around the subject and the other part around the predicate, conserving a dualism in the sentence that I reject. I never really liked the distinction between subject and predicate. What characterizes my new conception is its universality. Thus the subject also depends on the verb. Isolating a predicate involves acknowledging that the link from the subject to the verb is looser, or of a different sort, than the link from the verb to its other determiners."

He adds:

> "*Peter* (1) *hits* (0) *Paul* (1). *The* (3) *young* (2) *boy* (1) *that your* (4) *brother* (3) *has* (2) *met recently has* (0) *hit Paul*, etc. *Your* (4) is further removed from the center than *brother* (3). I indicate the relation with an arrow that always points in the direction of the center (0)."

The notations Tesnière uses here suggest that he could have been influenced by Otto Jespersen, who had written the following in *The philosophy of Language* (1924, Chapter VII, p. 96–97):

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6. Alonzo Reed and Brainerd Kellogg (*Work on English Grammar and Composition*, Clark and Maynard, 1878) proposed a method for teaching English based on diagrams, which is sometimes still used in North America. The letter to Mossé was archived by Tesnière with a Reed-Kellogg diagram of the sentence *In between the planks which formed the bridge lay the case which he was seeking,* with the reference to Isabel Fry, *A key to language*, 1925.

> "This chief word is defined (qualified, modified) by another word, which in its turn may be defined (qualified, modified) by a third word, etc. We are thus led to establish different "ranks" of words according to their mutual relations as defined or defining. In the combination *extremely hot weather*, the last word *weather*, which is evidently the chief idea, may be called primary; *hot*, which defines *weather,* secondary, and *extremely,* which defines *hot,* tertiary. […] In *a nice young lady* the words *a*, *nice*, and *young* equally define *lady*; compare also *much* (III) *good* (II) *white* (II) *wine* (I) with *very* (III) *good* (II) *wine* (I)."

The similarity between these statements and Tesnière's understanding of connections should be apparent. Tesnière did not, however, credit Jespersen for the idea – Jespersen is not quoted in the *Éléments* at all. We know, though, that Tesnière was aware of Jespersen's work. In a letter to J. Damourette dated January 18, 1936 (Box 69), Tesnière wrote:

> "Thus the idea of the verbal node that we share and that one finds in Jespersen's work is now an objective truth for me, which it was not at first."[7]

4.3 Stratification

Tesnière may have been the first linguist to propose various levels of organization, thus advocating a stratified model of language. At the very beginning of his *Éléments*, he posits a distinction between structural and linear order. Tesnière contrasts the two-dimensional syntactic representation (Chapter 4) with the one-dimensional spoken chain (Chapter 5). Language is described as the correspondence between the two ordering dimensions. He writes: "**speaking** a language involves transforming structural order to linear order, and conversely, **understanding** a language involves transforming linear order to structural order" (Chapter 6, §4). The synthesis direction (the speaker's perspective, the direction from structural order to linear order) is privileged insofar as word order is explored in terms of linearization. Tesnière states: "When two words are structurally connected, there are **two ways** to place them in a linear sequence, according to which of the two is placed before the other" (Chapter 8, §1). Tesnière's stratification and emphasis on synthesis have been defended by Mel'čuk (1988) in the Meaning-Text theory and its seven levels of representation.

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7. Verb centrality remains rather unclear in Jespersen's work. While Jespersen attributed the rank 1 to the object, like to the subject, he never introduced a rank 0 for the verb (unlike what Tesnière does in his letter to Mossé) and Jespersen called it the theory of *three* ranks. Jespersen himself could have been inspired by other authors. Imrényi (2013) gives the following citation from a book from 1863 by the Hungarian linguist Brassai: "Sitting at the beginning, middle, or end of the sentence, wherever it pleases him, is the monarch, the verb, related by meaningful bonds to its vassals, the dependents. […] The rule of the verb is no dictatorship, and its vassals are no slaves but have lawful relations to their lord and to one another; they each possess a degree of autonomy and a certain rank, with a feudalism whose slogan, just as in history, is *nulle terre sans seigneur* 'no land without a lord' [translated from Hungarian by Imrényi].

The synthesis direction is also affirmed in the terminology proposed by Tesnière for the components of the linguistic sign. Instead of Saussure's *signified* and *signifier*, Tesnière prefers *exprimende* and *expressed*, reversing Saussure's terms: "When we speak, our intent is not to find meaning afterwards in a pre-existing string of phonemes, but rather to give an easily transmissible form to a thought that precedes the form and which is its sole *raison d'être*" (Chapter 16, §4).

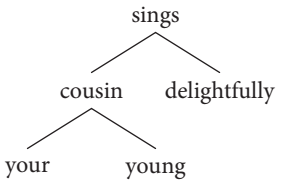
Although Tesnière does not clearly separate a semantic level from the syntactic level, he does make some interesting remarks in this area. He makes a point similar to the one associated with Chomsky's famous sentence *Colorless green ideas sleep furiously* (Chomsky 1957, 3 years after Tesnière's death). Tesnière wrote:

> "The structural plane and the semantic plane are thus entirely **independent** of each other from a theoretic point of view. The best proof of this fact is that a sentence can be semantically **absurd** and at the same time syntactically perfectly correct. Take the meaningful sentence *Le signal vert indique la voie libre* 'A green light indicates right of way', lit. 'The green light indicates the open road'. If I replace all the words charged with meaning by the words of the same type that immediately follow them in alphabetic order in the dictionary, I obtain the sentence *Le silence vertébral indispose la voile licite*, lit. 'The vertebral silence antagonizes the lawful sail', the structure of which remains intact, but which makes no sense whatsoever." (Chapter 20, §16)

4.4 Stemmas and dependency trees

Tesnière included 366 stemmas in the *Éléments*, and these stemmas are perhaps the most distinctive association that one has with his syntax. A stemma is a tree-like diagram that shows the dependency structure of phrases, clauses, sentences, and even texts, e.g.

(4)



Stemma 43

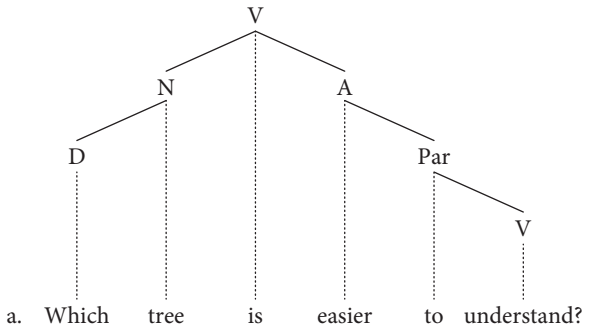
Most of the stemmas in the book are of simple phrases, but some extensive stemmas (which even span paragraphs) are included in Part II (on junction) and toward the end of the book (Chapter 275). These more extensive stemmas include all the features of Tesnière's analysis (including junction, transfer, and anaphora), the result being quite complex visual representations of sentence structure (see Stemmas 354–366). Worth noting in this area is that some aspects of Tesniére's stemmatic representations have (with few exceptions) not been adopted by other DGs. This is true in particular of Tesnière's analysis of transfer (see below). This may be due to the fact that when transfer is incorporated into

the stemmatic analyses, the resulting diagrams become quite complex, so complex that the insights gained by stemmatic analysis are, arguably, obscured.

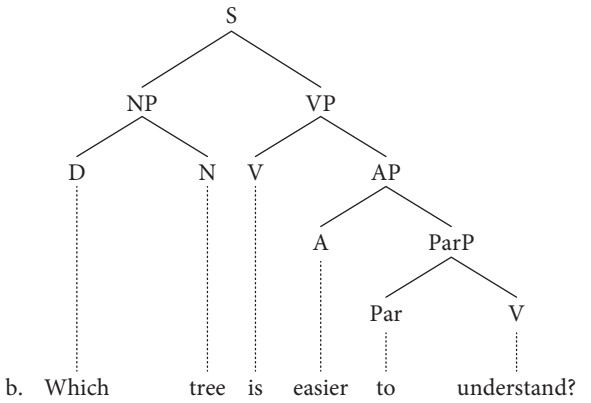
While Tesnière was certainly exposed to various diagramming schemes for representing sentence structure – he mentions one in the footnote of Chapter 3, §9 and in his letters to Mossé in 1932 – his stemmas deviated from many precedents in a major way: they clearly show the verb as the root of all clause structure and thus reject the binary division of the clause into subject and predicate, as discussed above. In his first representations (Tesnière 1934), the verb was even put "in the center of the figure like the sun in the center of the solar system" (see the excerpt from the letter to Mossé in Section 3 above). And when one compares Tesnière's stemmas to modern trees associated with phrase structure grammars, one sees that most of the stemmas are minimal and easy to produce, containing relatively few nodes and edges. This aspect of Tesnière's stemmas is actually true of most dependency-based tree diagrams; they are simple compared to their phrase structure counterparts because they lack the additional groupings that constituency necessitates.

This point is now is illustrated with two modern trees of the same sentence; the first is dependency-based and the second is constituency-based:

(5)



- Dependency



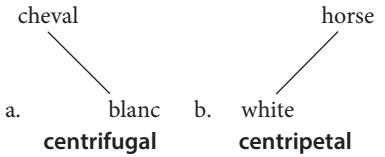
- Constituency

The trees are similar insofar as they both encode actual word order and they both use category labels on the nodes in the tree (A = adjective, D = determiner, N = noun, Par = particle, S = sentence, V = Verb, …P = … phrase). However, the dependency tree is much simpler than the constituency tree. The dependency tree contains just six nodes (= number of words) and five edges, whereas the constituency tree contains eleven nodes and nine edges. The simplicity that we see in this dependency tree is certainly also visible in most of Tesnière's stemmas. As stated above, Tesnière's stemmas become more complex when they are augmented to accommodate further aspects of syntactic structures, such as junction and transfer. These areas are discussed below.

4.5 Ordering and language typology

Another one of Tesnière's contributions concerns our understanding of language typology. Tesnière distinguished between between *centrifugal* (head-initial) and *centripetal* (head-final) structures and languages (Chapter 13). A given syntactic structure is centrifugal if the head of the structure appears on the left, or centripetal if the head of the structure appears on the right (Chapter 8, §5–7).

(6)



a. **centrifugal** b. **centripetal**

The French noun phrase *cheval blanc* illustrates a centrifugal structure, whereas the English equivalent thereof, *white horse*, is centripetal. Worth noting is the fact that Tesnière did not actually produce stemmas like these here to illustrate the distinction. His stemmas intentionally do not encode linear order, since he was clear about his view that structural order (vertical dimension) precedes linear order (horizontal dimension), as mentioned above in Section 4.3.

Tesnière classified languages and language families according to whether their structures are more centrifugal or centripetal, and he provides a table showing his classification (Chapter 14, §6). From his notes we know that he studied almost 200 languages in this regard (Section 3 above). The Semitic languages (e.g. Hebrew and Arabic) are, for instance, classified as centrifugal, and the Ural-Altaic languages (e.g. Japanese and Korean) as centripetal. The structures of many languages are not strictly head-initial or head-final, but rather they are *mitigated* (Chapter 9, §2), meaning that they combine some measure of both centrifugal and centripetal structures. Tesnière classified French as mitigated centrifugal, meaning that it contains more centrifugal than centripetal structures, and he classified English as mitigated centripetal, indicating that it contains more centripetal structures

than centrifugal ones. We can remark that most modern typologies would disagree with Tesnière's classification of English, since English is widely seen as more head-initial than head-final (even though it has more head-final structures than French).

4.6 Nodes and nuclei

Tesnière distinguishes between *nodes* (Fr. *nœuds*) and *nuclei* (Fr. *nucléus*). He first defines the node to be what modern theories of syntax take to be a phrase/constituent:

> "We define a *node* as a set consisting of a governor and all of the subordinates that are directly or indirectly dependent on the governor and that the governor in a sense links together into a bundle." (Chapter 3, §3)

However, he later uses the term *node* to mean just 'vertex'. For instance when he compares the node notion to the nucleus, he writes: "The *node* is nothing more than a geometric point, whereas the *nucleus* is a collection of multiple points,…" (Chapter 22, §12), and indeed most of the time he seems to mean 'vertex' rather than phrase or constituent when he writes "nœud". His inconsistent use of the term is a source of confusion, and it may have contributed to the fallacious assumption that dependency grammars do not acknowledge phrases. Dependency grammars of course do acknowledge phrases, a phrase being a complete subtree consisting of two or more words.

Tesnière defined the nucleus as

> "…the set which joins together, in addition to the structural node itself, all the other elements for which the node is the structural support, starting with the semantic elements." (Chapter 22, §5)

A nucleus plays two roles insofar as it is both a syntactic as well as a semantic unit. This can be illustrated using the following two sentences:

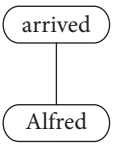
(7) a. Alfred arrived.
b. Alfred has arrived.

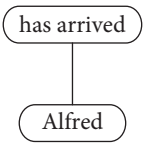
Sentence (7a) contains two words, two nodes, and two nuclei. Each of the two words *Alfred* and *arrived* represents a nucleus occupying a node. Sentence (7b), in contrast, contains three words but still only two nuclei – whether it should be construed as containing two, three, or four nodes is not clear.[8] The auxiliary verb *has* alone constitutes a nucleus

8. Tesnière's statements about the node vs. nucleus distinction are not clear. Given that "the node is nothing more than a geometric point, whereas the nucleus is a group of several points", one might assume that a nucleus consisting of *has arrived* contains two nodes, one corresponding to each word. In the immediately preceding paragraph, however, Tesnière writes: "The node is merely

structurally but not semantically, and the main verb *arrived* constitutes a nucleus semantically but not structurally. The two together, however, do constitute a nucleus insofar as each contributes one necessary part of a nucleus. Many content words alone fulfill both a structural and a semantic role, which means they alone qualify as both a node and a nucleus, as with each of *Alfred* and *arrived* in (7a). Other nuclei, in contrast, consist of two or more elements, as with *has* and *arrived* in (7b). Tesnière called the latter type of nucleus *dissociated* (Chapter 23, §8); *has arrived* is a dissociated nucleus.

When Tesnière wanted to show the presence of nuclei in his stemmas, he employed a bubble convention. He enclosed the nucleus in a bubble, e.g.

(8) a. 

b. 

The auxiliary verb *has* fulfills a syntactic function in establishing the presence of the nucleus syntactically, whereas the full verb *arrived* fulfills a semantic function in establishing the presence of the nucleus semantically. Note that Tesnière employed the nucleus circle in his stemmas only when the point at hand required that he do so (see Chapter 22, §17). Otherwise he preferred to keep his stemmas as simple as possible.

When Tesnière discusses interrogative sentences, he points out that nuclei can be identified by forming questions. He remarks that each nucleus in a given sentence can be questioned in one way or another (Chapter 79, §3), e.g. *Who arrived?*, *What did Alfred do?*, and he stated the distinction between wh-questions, which focus on a nucleus (and which he therefore called *nuclear interrogatives*, Chapter 79–82), and the yes-no questions, which focus on the connections (and which he therefore called *connective interrogatives*, Chapter 83–85). Tesnière makes a similar point concerning negative words, which can negate nuclei as well as connections (Chapter 87–88).

Concerning relative pronouns, Tesnière remarked that they play a double role, as a pronoun inside the relative clause and as the complementizer of the clause (that is, as a translative of a verb to an adjective, Chapter 246, §11). As a consequence, Tesnière grants relative pronouns a double position in the stemma. This very innovative analysis can be compared to later analyses in generative grammar where wh-words were moved from a position inside the clause to the complementizer position.

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the material expression of the nodal function of the nucleus" (Chapter 22, §10). This statement suggests that there can be only one node per nucleus. On this interpretation then, the nucleus consisting of *has arrived* is both just one nucleus and one node, despite the fact that it contains two words. We translators think that this latter interpretation, i.e. one node per nucleus, is more defensible in part based on other distinctions that Tesnière draws later in the book.

4.7 Valency, actants vs. circumstants, and metataxis

Tesnière concept of valency is arguably his most known contribution to the field of syntax. He noticed that there are many regularities across languages concerning how verbs combine with nouns and other syntactic units. The semantics of a given verb tend to be predictive of the number of nouns with which it can combine. Tesnière expresses the valency metaphor as follows:

> "The verb may therefore be compared to a sort of atom, susceptible to attracting a greater or lesser number of actants, according to the number of bonds the verb has available to keep them as dependents. The number of bonds a verb has constitutes what we call the verb's valency." (Chapter 97, §3)

A given verb attracts one or more *actants* (≈ arguments) to form a clause in a manner similar to how a given atom attracts other atoms to form a molecule – see Jespersen (1937) for a similar insight and use of chemistry-based notations for syntactic structure. The vividness of this metaphor helps explain the fact that the concept has become a mainstay for dependency- and constituency-based theories of syntax alike.

The valency notion overlaps of course with other notions that have been used to express the combinatorial properties of verbs and other lexical items, e.g. *transitivity*. According to Tesnière, a verb's valency falls into one of four categories: a given verb is underlyingly *avalent* (*It rained*), *monovalent* (*Alfred slept*), *divalent* (*Alfred saw Bernard*), or *trivalent* (*Alfred gave Bernard a pen*). Verb valency serves as the basis for the exploration of *diathesis* (Chapter 100, §3), a notion similar to grammatical *voice*. Tesnière posits a number of diathesis types (active, passive, reflexive, reciprocal, causative, recessive).

Valency and diathesis are aspects associated with the actants that verbs demand; they do not concern the *circumstants* that can appear with verbs. Tesnière's actant vs. circumstant distinction is of course mostly synonymous with the more modern *argument* vs. *adjunct* terminology (although Tesnière viewed every prepositional phrase as a circumstant (Chapter 57, §5–7) – see Lazard (1995) for a critical discussion. Actants (arguments) are necessary to complete the meaning of a given full verb, whereas circumstants (adjuncts) represent additional optional information, that is, information that is not essential to completing the meaning of the verb. The number and types of actants that can appear with a given verb are strictly limited, whereas the number of circumstants that a verb can take is theoretically unlimited. Concerning types of actants, Tesnière acknowledged *first actants* (subjects), *second actants* (first objects), and *third actants* (second objects) (Chapter 51, §3). Concerning types of circumstants, he classified circumstants in the standard way, that is, according to the semantic content that they contribute to the clauses in which they appear (temporal, locative, causal, final, manner, etc.) (Chapter 37).

The distinctions between types of actants and between actants and circumstants is important for Tesnière's concept of *metataxis* (Part I, Book E, Chapter 120–133). Metataxis concerns the theory of translation. The polyglot Tesnière worked as an interpreter and

translator (see Section 2 above) and was hence very cognizant of the changes that occur in syntax when translating or interpreting from one language to another. Tesnière's theory of metataxis has helped motivate works that model paraphrasing, translation, and machine translation (Schubert 1987, Mel'čuk 1988). Tesnière presents many examples of mismatches in actant structure across languages; some of these have been cited often, such as specific actant conversions (e.g. En. *I miss you* ↔ Fr. *Vous me manquez*, Chapter 123), the equivalence of these conversions with the active-passive alternation (Chapter 125), the inversion of dependency direction (En. *I like to read* ↔ Ger. *Ich lese gern*, Chapter 129), and the distinction between manner-incorporating and path-incorporating motion verbs expressed later by Talmy (1974), 15 years after the appearance of Tesnière's *Éléments* (e.g. En. *Antoine swam across the river* ↔ Fr. *Antoine traverse la rivière à la nage*, Chapter 131, §14).

4.8 Junction

Tesnière considered coordination, as well as apposition (Chapter 69), to be orthogonal to connections (that is, to subordination). Tesnière's analysis of coordination, which he called *junction* (Fr. *jonction*), was ahead of its time, for Tesnière identified aspects of coordination that would not be explored by linguists in the English-speaking world until decades later, as mentioned above in the introduction. His analysis of junction was comparatively brief, just 35 pages (Part II, Chapter 134–50). Despite the brevity, Tesnière sheds much light on complex traits of coordinate structures. Junction is a powerful tool that increases the ability of language to express content efficiently. At a semantic level, junction sums simple sentences. A sentence such as *Alfred and Bernard arrived yesterday* is a much more economical way to express the content that is contained in the two separate clauses *Alfred arrived yesterday, and Bernard arrived yesterday* (Chapter 135, §4).

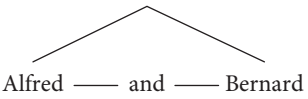
Tesnière viewed junction as fundamentally distinct from subordination. The connections that constitute relationships of subordination are represented in stemmas in terms of vertical lines between words. Junction, in contrast, joins like syntactic units using horizontal lines, e.g.

(9) Alfred —— and —— Bernard (Chapter 136, §3)

The joined units are placed equi-level, and the coordinator, which Tesnière called a *junctive* (Fr. *jonctif*), is placed between them on the same level. By placing the conjuncts equi-level in this manner, Tesnière was locating junction in the horizontal dimension, whereas connections reside in the vertical dimension. The distinction between subordination and coordination is hence established in a principled manner that appeals to intuition. Subordination is a principle of organization that exists in the vertical dimension, whereas coordination is the principle of organization that exists in the horizontal dimension.

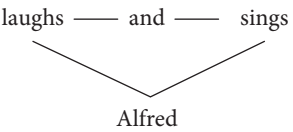
Tesnière distinguished between instances of *total junction* and *partial junction* (Chapter 145, §1). Junction is total when the conjuncts share all their dependents and/or heads, and partial when some head or dependent is not shared. Concerning total junction, Tesnière used the terminology of heraldry to designate three basic types: *coped*, *shod*, and *dressed*, e.g.

(10) a.



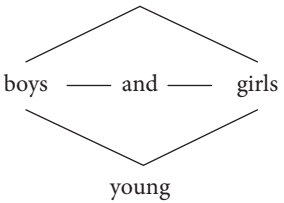
- Coped: *Alfred and Bernard laughed.*

b.



- Shod: *Alfred laughs and sings.*

c.

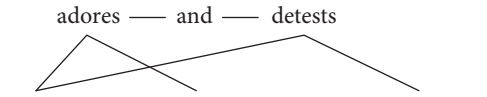


- Dressed: *Young boys and girls played.*

A coped coordinate structure has the joined units sharing a governor; a shod coordinate structure has the joined units sharing a dependent; and a dressed coordinate structure has both a shared governor and a shared dependent. The shapes that these types of coordinate structures take on in the stemma is that of a triangle (coped, shod) or diamond (dressed) – the triangle and diamond terms being recommended in Chapter 257 for teaching coordination in schools.

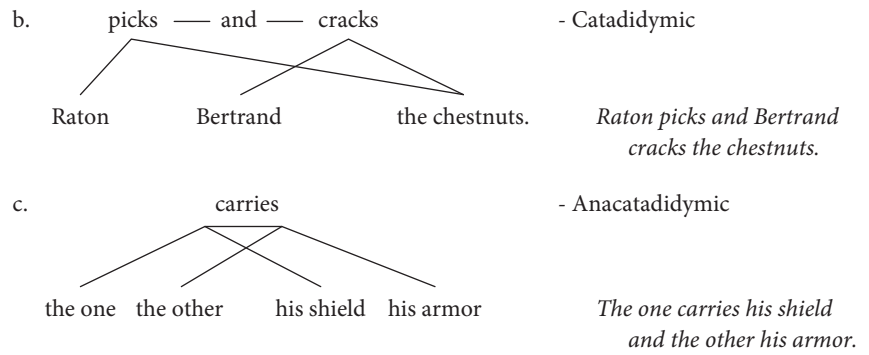
Partial coordinate structures are unlike total structures insofar as they are asymmetric in one sense or another. Tesnière used the term *bifid* from botany to denote these structures because they have a shape that is similar to the shape of certain leaves of plants and trees (Chapter 145, §5). He also acknowledged three different types of bifid coordinate structures, and he employed terms borrowed from biology to denote these types. He distinguished between bifid coordinate structures that are either *anadidymic*, *catadidymic*, or *anacatadidymic*, e.g.

(11) a.



- Anadidymic

Alfred adores cookies and detests punishments.



The joined strings in examples (11a) and (11b) present a non-symmetric shape in the stemma insofar as there is at least one part that is not "shared" by the joined strings. An anadidymic coordinate structure has a shared first actant, *Alfred* in (11a), but the second actants are not shared, *cookies* and *punishments* in (11a). Catadidymic coordinate structure have a shared second actant, *the chestnuts* in (11b), but the first actants are not shared, *Raton* and *Bertrand* in (11b). An anacatadidymic coordinate structure, in contrast, has a shared head, *carries* in (11c), but the first and second actants are not shared.

Anadidymic junction is common and is called VP coordination when it involves verbs. Catadidymic and anacatadidymic junction occur comparatively rarely, and when they do occur, they are marked. Modern syntax denotes catadidymic junction as *right node raising* (RNR) and anacatadidymic junction as *gapping*. Note that Tesnière did not consider multi-constituent coordination, e.g. *Charles gave Alfred a pen and Bernard a sheet of paper,* which would have been problematic for his representations.

RNR and gapping were not explored in English-language linguistic circles until the 1970s (Ross 1970; Jackendoff 1972; Postal 1974), almost two decades after the appearance of Tesnière's *Éléments*. The fact that Tesnière had already identified and named these mechanisms was overlooked, for his work was not cited at the time. Tesnière also analyzed comparative constructions in terms of junction (Chapter 148). The parallel between coordination and comparatives was not acknowledged and explored by others until the early 1980s (Pinkham 1982). While Tesnière's analysis of these phenomena was insightful, the nomenclature he employed did not promote the accessibility of his account. For most, terms such as *anadidymic* and *catadidymic* do not evoke associations that promote understanding. Perhaps his poor choice of terminology is part of the reason why his contribution to our understanding of coordination was overlooked.

4.9 Transfer

Tesnière's theory of transfer (Fr. *translation*) is perhaps the least known but most innovative component of his approach to syntax. He spent much energy developing this subtheory, devoting 270 pages of his *Éléments* to it (Part III, Chapter 151–271). Transfer is the tool that

allows a unit of one syntactic category to occupy a position usually devoted to a unit of another syntactic category. A typical example is the transfer of a noun to an adjective by the preposition *of*, as in *a linguist of France*, where the noun *France* (the *source* of the transfer) has been transferred to *of France* (the *target*), which can modify the noun *linguist*, something that is typically done by an adjective. It is worth noting that transfer is a syntactic device and must not be confused with morphological derivation. In *a French linguist*, *French* is an adjective derived from the noun *France*; it can be modified by an adverb just like any adjective (*a very French linguist*), while in *a linguist of France*, *France* remains a noun, but occupies an adjectival position. Tesnière nevertheless included derivation in transfer as *fixed transfer* (see below).

The observation that a word of one syntactic category can appear in a position that is usually devoted to another category preceded Tesnière; it appears in the works of Otto Jespersen in terms of his theory of *rank*. Jespersen wrote:

> "There are two series which to some extent, but only to some extent, run parallel; I call them α and β. In α we have separate classes of words (parts of speech), in β separate ranks, thus
>
> | α. Word-classes | β. Ranks |
> |---|---|
> | Substantives | Primaries (1) |
> | Adjectives | Secondaries (2) |
> | Adverbs | Tertiaries (3) |
>
> […] In the easiest and simplest cases, the two series cover one another, thus
>
> | | *terribly* | *cold* | *weather* |
> |---|---|---|---|
> | α. | adverb | adjective | substantive |
> | β. | tertiary | secondary | primary. |
>
> But this simple parallelism does not always hold good. Both substantives and adverbs may under certain circumstances be secondaries; adjectives and adverbs are sometimes primaries; one and the same combination of words, even a whole clause, can be used in each of the three ranks." (*Analytic syntax*, 1937: Section 31.1, p. 109–110)

This citation is from Jespersen's last book, but the theory he was presenting had been established since 1913, and it was presented completely in 1924 in *The Philosophy of language*. As shown in Section 3 above, we know from his letters that Tesnière read Jespersen's book, although he never cites Jespersen in his *Éléments*.

It is possible to transfer a verb to a noun, a noun to a verb, an adjective to a verb, a verb to an adjective, a noun to an adverb, etc. Like junction, transfer is a tool of great productive potential that natural languages employ to create more varied sentences. Sentences that contain transfer are no longer simple, but rather they are complex. Transfer helps explain how it is possible for humans to produce an infinite number of distinct utterances. Due to transfer language structure is recursive and a clause can be embedded in another clause, or in Tesnière's terms, one verb can be subordinated to another.

The distinction between content and function words was central to Tesnière's understanding. He posited just four basic categories of content words: verbs (I), nouns (O), adverbs (E), and adjectives (A). The abbreviations I, O, E, and A correspond to the last letter of the Esperanto designations of these categories (Chapter 33, §3). Tesnière classified many function words as *translatives* (Fr. *translatifs*). The purpose of a translative is to serve as a marker of transfer. Translatives transfer content words across syntactic categories. More precisely, they allow a word of one category to occupy a syntactic position that is generally associated with a word of another category.

Prepositions, subordinators (subordinating conjunctions), auxiliary verbs, and articles are or can be translatives. Typical translatives are semantically empty words like *of*. All other words that lack semantic content can be or are considered as translatives. Typical prepositions are translatives that transfer nouns to adjectives or adverbs, e.g.

(12) a. *the book **on** the shelf*
b. *The book stands **on** the shelf.*

The preposition *on* in (12a) transfers the noun *shelf* to an adjective, because *on the shelf* modifies the noun *book* like an adjective would (*big book*, *interesting book*). The preposition *on* in (12b) transfers the noun *shelf* to an adverb because *on the shelf* modifies the verb *stands* like an adverb would (*The book stands there*, *The book stands lonely*). A typical subordinator transfers a verb to a noun, adjective, or adverb

(13) a. *He stated **that** it happened.*
b. *the statement **that** it happened*
c. *He stated that **before** it happened.*

The subordinator *that* in (13a) transfers the verb *happened* to a noun because as the object of *stated*, *that it happened* serves like a noun would (*He stated many things*); the subordinator *that* in (13b) transfers the verb *happened* to an adjective because *that it happened* modifies the noun *statement* like an adjective would (*the first statement*); and the subordinator *before* in (13c) transfers the verb *happened* to an adverb, because *before it happened* modifies the verb *stated* like an adverb would (*He stated that repeatedly*).

Tesnière also distinguishes between transfer with an analytical marker, that is, a separate word like the preposition *of* as in (14a) or the subordinator *that* as in (15a) and transfer with a synthetic marker, that is, an affix, such as case markers as in (14b) (Chapter 168, 172) or gerundive as in (15b):[9]

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9. At times, however, transfer occurs in the absence of a marker. Tesnière states, for example, that color nouns are often transferred to adjectives without a marker, e.g. *an orange* (*to eat*) vs. *an orange shirt* (Chapter 162, §2). He identifies marker-less transfer in his stemmas with the symbol ⊙ (Chapter 17, §1 and Stemma 358).

(14) a. *the book **of** Peter*
b. Lat. *Petr**i** liber* 'Peter's book'

(15) a. *I expect **that** Peter is coming.*
b. *I expect Peter's com**ing**.*

A key trait of the transfer schema is that it accommodates the fact that words that are transferred from a source category to a target category continue to behave as the source category with respect to their dependents. For instance, a verb transferred to a noun or adjective remains a verb with respect to its dependents. If a transitive verb is transferred, its direct object remains a direct object as in (16a), and this is true even in the case of synthetic transfer as in (16b):

(16) a. *I am pleased that Peter achieved **that**.*
b. *I am pleased with Peter's achieving **that**.*

Forms like *coming* or *achieving* are words which are neither verbs nor nouns singularly, but rather they are nouns with respect to their governor and verbs with respect to their dependents.

These instances of transfer contrast with the derivation of the verb *achieve* in the noun *achievement*. The latter is a true noun and its dependents must be adjectives. It can no longer bear a direct object and its actant must be transferred to an adjective by the preposition *of*:

(17) *I like Peter's achievement **of that**.*

Nevertheless, Tesnière includes derivation as a special type of transfer that he calls *fixed transfer* (Chapter 174). His analysis in this area was motivated by diachronic considerations, because instances of free transfer tend to evolve in derivation. For instance, the verb *interest* can be translated to an adjective by the suffix *-ing*: in this case it can still bear its direct object as in (18a). But this form has also become a true adjective in modern English, since it can take a typical adjective modifier as in (18b):

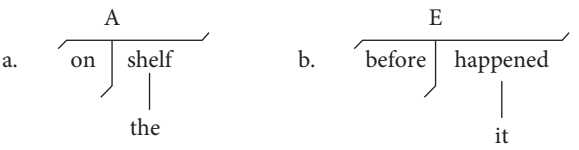
(18) a. *a problem interesting **me***
b. *a **very** interesting problem*

The frontier between derivation and free transfer is certainly permeable, but by failing to clearly separate these two phenomena, Tesnière introduced a certain confusion, and this confusion could explain why transfer has to date not been recognized as an insightful way to address the combinatory potential of lexical items.

Tesnière does not consider the relation between a translative and the source as a connection. The relation is symmetric and not hierarchized; the translative and the source are placed equi-level. The two words together form a nucleus and the connection between the governor of the instance of transfer is attributed to the target as a whole. The transfer schema is

represented using a large T of a sort: the translative and content word are placed underneath the horizontal line, and they are separated by the vertical dividing line. The category that the content word becomes is usually indicated on top of the horizontal dividing line, e.g

(19)



Schema (19a) shows that the translative *on* transfers the noun *shelf* to an adjective (A), and schema (19b) shows that the translative *before* transfers the verb *happened* to an adverb (E). Tesnière's transfer schema cannot be interpreted as pure dependency, because the nucleus that occupies a syntactic position (a node in Tesnière's terms) is itself the combination of a translative and a source. Moreover this combination, although asymmetric, is not hierarchized: neither the source, nor the translative depends on the other element.[10] This point will be developed below in Sections 4.9.1 and 4.9.2.

Tesnière distinguishes between transfer of a verbal lexeme, which he calls *first-degree transfer of verb*, and transfer of a finite verb, which he calls *second-degree transfer of verb*. To show the presence of second-degree transfer, he employed a T schema with a double horizontal line (Chapter 239, §15). The typical first-degree translative of a verb to a noun is the infinitive (*Alfred espère chanter* 'Alfred hopes to sing'), while the typical translative for second-degree transfer is a subordinating conjunction (*Alfred espère* ***que*** *Bernard chante* 'Alfred hopes **that** Bernard sings').

In addition to the distinction concerning the degree of transfer (first degree vs. second degree), Tesnière sees transfer occurring repeatedly within one and the same nucleus. He classifies transfer within the nucleus according to the number of times it occurs. He acknowledges instances of simple, double, triple, quadruple, quintuple, sextuple, and septuple transfer. An instance of quintuple transfer, for instance, has five occurrences of transfer within a single nucleus. Tesnière provides numerous examples of each of these types of transfer on page after page. As Jean Fourquet notes in the preface to the first edition of the *Éléments* (1959), Tesnière seemed to take pleasure in identifying and describing the sequences of transfer.

4.9.1 The transfer schema as constituency

There is controversy about how Tesnière's transfer schema and thus his theory of transfer in general should be interpreted. We translators are in disagreement concerning

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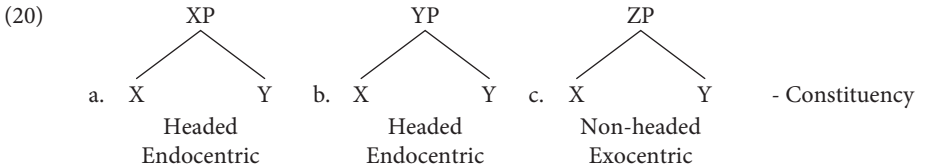
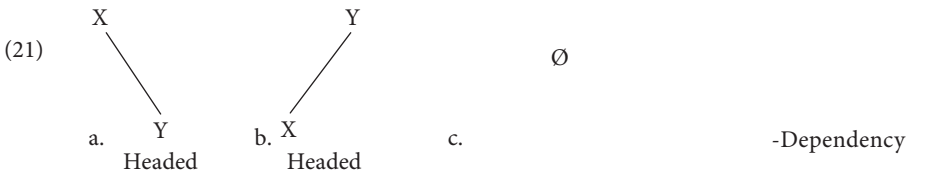
10. It can be noted that sources govern their translatives in Tesnière (1934), while Tesnière seems to be more inclined to treat translatives as heads in his *Éléments* (cf. Stemma 157, Chapter 67 and Stemma 177, Chapter 74).

the best interpretation of the schema. While we agree that the schema cannot be interpreted in terms of pure dependency, we disagree about whether or not it should be interpreted as constituency. Due to our disagreement, this section and the next one present two competing interpretations of the transfer schema. This section presents the arguments for an analysis that views the transfer schema as a manifestation of constituency, representing the opinions of Timothy Osborne, and the next section presents the arguments for an analysis of the schema as dependency, representing the opinions of Sylvain Kahane.

The distinction between dependency- and constituency-based grammars is pronounced for most dependency grammarians, and when constituency grammarians are aware of the distinction, it is also pronounced for them. However, producing clear definitional statements that capture the core distinction between dependency and constituency and that receive widespread support from linguists working in the field is not easy to do. Nevertheless, one means of narrowing in on the core distinction is to focus on the number of groupings (i.e. nodes) in the syntactic structures that one assumes. The following trees show the dependency vs. constituency distinction at a basic level:





The constituency trees (20a-c) show three different ways that a sequence consisting of two elements, X and Y, might be organized structurally in terms of constituency. One can assume that X is head over Y (20a), that Y is head over X (20b), or that neither is head over the other (20c). Headed constituency structures like (20a–b) are sometimes called *endocentric*, and non-headed structures like (20c) are sometimes called *exocentric* (Bloomfield 1933). Dependency, in contrast, is incapable of acknowledging headless structures, hence there is no dependency analysis that corresponds to the constituency analysis in (20c). However, like the constituency-based structure in (20a), the dependency-based analysis in (21a) identifies X as head over Y, and like the constituency-based analysis in (20b), the dependency-based analysis in (21b) shows Y as head over X.

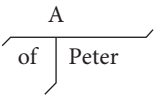
Focusing on the number of nodes present in these trees, the constituency trees assume three nodes each time, whereas the dependency trees assume just two. This insight

points to the/a primary difference between dependency- and constituency-based structures. Dependency is a one-to-one ratio: for every element that one has in the utterance at hand, there is exactly one node in the syntactic structure that corresponds to that element. Constituency, in contrast, is a one-to-one-or-more ratio; for every element in the utterance at hand, there is at least one node in the structure that corresponds to that element, and often there is more than one.[11] Thus one can usually distinguish between dependency and constituency tree diagrams by simply counting the number of elements and nodes.

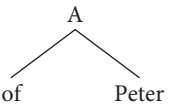
If this means of construing the dependency vs. constituency distinction is on the right track, then Tesnière's transfer schema is more constituency-like than dependency-like. It is more constituency-like because it allows one to acknowledge more nodes than words. The diagram (22a) is a basic example of transfer using Tesnière's transfer schema, and (22b) is a rendition thereof using modern conventions for producing tree diagrams:

(22)

a.



b.



Tesnière's transfer schema in (22a) shows that the translative *of* transfers the noun *Peter* to an adjective. Similarly, the modern rendition of the transfer schema in (22b) shows that the phrase *of Peter* has the status of an adjective (A). There are two things to note about (22b): there are three nodes but just two actual elements and the structure is not headed (i.e. it is exocentric), because neither is *of*, a preposition, nor is *Peter*, a noun, head over the other, but rather the entirety has the category status of an adjective. These two characteristics are traits of constituency, not of dependency, as demonstrated with the examples (20–21). In short then, the transfer schema is constituency-based.

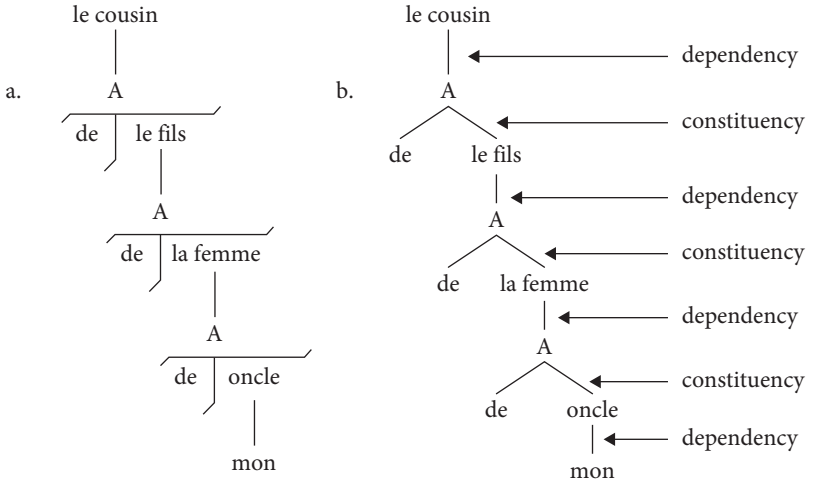
This situation is paradoxical, since Tesnière is widely credited as the father of modern dependency grammars. The insight that he was in fact frequently employing a form of constituency to render his syntactic structures is surprising. Nevertheless, if the transfer schema is indeed a form of constituency, then Tesnière was employing constituency quite frequently. The following diagrams of the French phrase *le cousin de le fils de la femme de mon oncle* 'the cousin of the son of the wife of my uncle' illustrate the analysis further:

---

11. The complete definitions of dependency and constituency favored here are as follows:

> **Dependency**
> A one-to-one ratio (elements to nodes) resulting in headed syntactic structures;
>
> **Constituency**
> A one-to-one-or-more ratio (elements to nodes) resulting in syntactic structures that may or may not be headed.

(23)



The diagram (23a) is Tesnière's Stemma 294. It contains three instances of transfer. The tree (23b) is the modern rendition thereof. Each of the three instances of transfer is an occurrence of constituency. The result is a tree diagram that is a clear hybrid, combining both dependency and constituency.

An examination of the full stemmas at the end of the book (Stemmas 354–366) reveals just how frequently the transfer schema appears in the stemmatic representations. Stemma 364, for example, contains 17 instances of transfer. These observations lead to the conclusion that Tesnière's theory of syntax is not a pure dependency grammar, but rather it is a hybrid that makes frequent use of both dependency and constituency.

4.9.2 The transfer schema as dependency

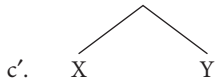
We have seen that the combination of two elements can be represented in two ways:

- the combination of the elements X and Y can be described in terms of constituency: in this case, we do not really represent the combination of X and Y but rather the part-whole relations between X or Y and the phrase XP (or YP) that they form;
- the combination of the elements X and Y can be described in terms of dependency: in this case, we explicitly represent the combination of X and Y by an edge between X and Y.

The dependency-based representation is regular when the combination of X and Y is endocentric: in this case one of the two elements, for instance X, is the head of the phrase XP they form and X governs Y. This is the origin of the term *dependency*: Y *depends* on X in this case. The usual convention is to place the governor on the topmost position and the edge between the two elements is more or less vertical. Such an edge is called a *dependency*.

The dependency representation is less evident when the combination of X and Y is exocentric, that is, when neither of the elements dominates the other. The combination of X and Y can still be represented by an edge, but a convention is needed that does not favor either of the two elements. Usually the convention employed places X and Y equi-level and links them with a horizontal edge (see also Kahane 1997 for a formalization in terms of "bubble trees").

(20)



Constituency-based

(21) c′.

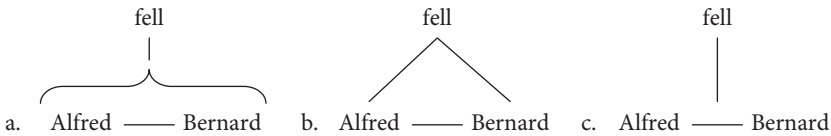
Dependency-based

As established above in Section 4.8, Tensière uses the horizontal edge shown in (21c′) for his account of coordinate structures. The phrase *Alfred and Bernard* is represented as a symmetric combination of *Alfred* and *Bernard*:[12]

(24) Alfred —— Bernard

But such a representation becomes problematic when one considers the governor of a coordinate structure in a case such as *Alfred and Bernard fell*.

(25)



The representation (25a) is used in Stemma 63 and could be interpreted as a constituency-based representation (see Section 4.9.1) because the vertical edge (i.e. the dependency) is connected to a brace, which is an extra object. But Tesnière only uses the graphic convention of (25a) once, in Chapter 38; thereafter he adopts the representation in (25b) where the dependency is split into two edges, one for each conjunct. A third representation is possible, one that Tesnière did not use for junction: in (25c) the vertical edge is directly related to the horizontal edge. Such a structure, called a polygraph, is exploited in Kahane and Mazziotta (in preparation): in a graph edges are between words; in a polygraph you can have edges between a node and an edge. In some sense, the edge acts as a "node", but it is nevertheless an edge, and there is no extra-node.

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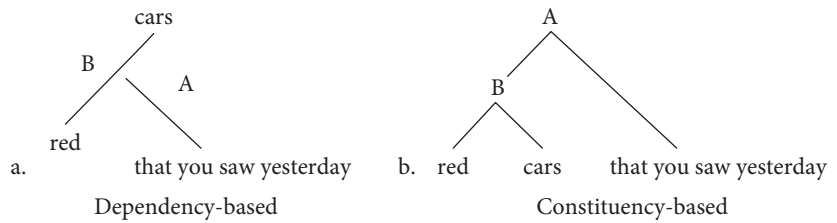
12. The position of the junctive *and* is a real problem for Tesnière. In his 1934 paper he placed the junctive above the edge, as a marker of the edge, that is, a marker of the combination. In his *Élements*, he places the junctor between the conjuncts, cutting the edge in two parts, but he specifies that the junctor is extra-nuclear and does not occupy a node (see Stemmas 62, 63 and 249 and Chapter 136, §6). We do not represent *and* here for the sake of simplicity.

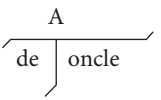
Interestingly, Tesnière explicitly uses a polygraph for the representation of scope effects. He produces the stemma shown in (26a) for *red cars that you saw yesterday* (Stemma 149); he explains that *that you saw yesterday* determines *red cars* rather than *cars* alone. This stemma is nevertheless dependency-based in the sense that the two combinations (combination A between *cars* and *red* and combination B between *red cars* and *that you saw yesterday*) are represented by edges, without any extra-node. We can convert (26a) into the constituency-based representation (26b) by "reifying" each edge, that is converting it into a node and two part-whole relations: as shown in (20) and (21), a dependency-based representation can be converted into a constituency-based representation by adding a node for the combination and representing the relation between the combination and the combined elements by part-whole relations.

(26)



The two representations in (26) say exactly the same thing; they say that *cars* combines first with *red* and thereafter with *that you saw yesterday*. In a pure dependency representation, the combinations would not be ordered and both edges A and B would be equi-level. In other words, the dependency tree for (26) (not shown here) would not specify in which order *cars* combines with its dependents.

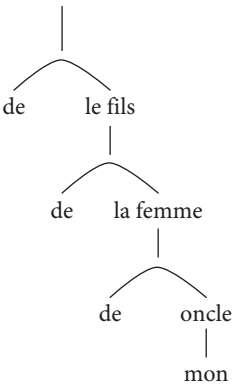
Now if we examine Stemma 294, reproduced as (23a) above, we see that for each transfer, the translative and the source are placed equi-level with a T-like symbol between them and a category name (A for adjective) on top of the T:



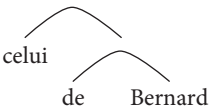
This special graphic convention indicates that the translative *de* combines with the source *oncle* in a special way, which Tesnière does not want to represent with a vertical line (i.e. a dependency). He places the two elements equi-level, which means that he considers the combination of *de* and *oncle* to be exocentric. The label A indicates that their combination behaves as an adjective. He cannot use a horizontal line for representing the transfer combination for two reasons: first he has already used this graphic convention for junction; second, transfer is recursive. Indeed an instance of transfer can apply to the result of a preceding instance of transfer, which would be difficult to represent with a horizontal line (see the dependency-based representation of double transfer in (27b), adapted from

Stemma 234). In order to show the dependency-based interpretation of Stemma 294, we propose representing the T combination by a horizontal curved line:

(27) a.



b.



Tesnière's use of the term *node* (Fr. *nœud*) is important for the interpretation of these graphs. Tesnière viewed the node as a particular kind of structural position. One could say a "nodal position" rather than a node. Tesnière explains that in case of transfer, neither the source, nor the translative occupy the nodal position, but their combination does. This combination is represented by an edge in a dependency-based representation. Therefore, if we interpret the stemma as a dependency-based representation, it is the edge that occupies the nodal position.

As demonstrated in this section and the previous one, how Tesnière's Stemma 294 should be interpreted is debatable. Tesnière did not formalize the stemma completely. The lack of formalization allows for more flexibility of interpretation.

5. Dependency after Tesnière

DG as it is understood by many today differs in certain ways from the theory of syntax that Tesnière presented in his *Éléments*. It is interesting and instructive in this regard to consider which of Tesnière's ideas did and did not take hold, and furthermore, which aspects of our modern understanding of DG were and were not present in Tesnière's oeuvre. When evaluating the impact of Tesnière's contribution on the later development of DG, it is important to keep in mind that Tesnière himself was not aware of the distinction between dependency and constituency. That distinction was first established in the 1960s during the reception of Tesnière's ideas. Hence Tesnière did not set out to produce a DG, and we can only speculate about how he might judge the merits

of dependency and constituency were he alive today. Dependency has developed into an entire subfield of the study of grammar, known as *dependency linguistics*. Within this subfield, further divisions can be acknowledged, e.g. dependency syntax, formal dependency grammars, and dependency parsing (cf. Gerdes, Hajičová & Wanner 2011, 2013).

The following subsections briefly consider some aspects of most modern DGs that were not addressed or assumed in Tesnière's *Éléments*.

5.1 Characterization of dependency

Tesnière did not produce a falsifiable definition of dependency. His approach was, rather, mentalist. He motivated one of his primary concepts, the connection (see Section 4.1 above) as follows: "The mind perceives connections between a word and its neighbors" (Chapter 1, §3). While he described the structural order of many constructions in a coherent way, he did not provide criteria that could allow us to falsify his choices. For instance, prepositions could have been dealt with as transitive adverbs (that is, as adverbs with direct objects as in Mel'čuk 1988) rather than as translatives, but we have no means to validate one choice over the other under Tesnière's framework.

This aspect of Tesnière's system stands in contrast to DGs that have followed the *Éléments*, and it is also unlike the efforts of constituency grammars to identify constituents using constituency tests, these tests shedding light on the segments that should or should not count as phrases and as constituents in general (Bloomfield 1933; Harris 1951; Hockett 1958). Indeed, one way to define dependency structure is to base its construction on a constituency structure: one need merely decide for each constituent which word is its head, that is, one need merely discern which word controls the distribution of that constituent (Bloomfield 1933; Zwicky 1985). A word *y* depends on a word *x* if and only if *y* heads a phrase which is an immediate constituent of the phrase headed by *x* (Lecerf 1961).

Another means of filling the hole that Tesnière left concerning how dependency is defined is to work with combinations of two-words. Given a two-word utterance or prosodic unit, one can safely assume that they are linked by a dependency (Garde 1974, Mel'čuk 1988). To decide which of the two governs the other, one need then simply discern which determines the distribution of the two together. The governor is the word that determines the environments in which the two together can appear. In fact the word notion is not necessary to define dependency: as soon as two syntactic units combine, one can posit a dependency between them, whereby the dependency structure is the set of dependencies between the most granular syntactic units (Gerdes & Kahane 2013).

In addition to a lack of a falsifiable definition of dependency in general, Tesnière mostly overlooked the distinction between dependency types. While he did acknowledge the difference between semantic and syntactic connections, his discussion of the distinction was brief (Chapter 21f.), and he did not acknowledge aspects of semantic dependencies that many modern DGs take for granted. He remarked that syntactic dependencies generally correspond to semantic dependencies:

> "…in the phrase *The small streams make the big rivers*, *small* depends on *streams*, and so the meaning of *small* bears on that of *streams*, and I understand that the smallness is a quality of the streams. […] The semantic impact is thus exercised in the opposing direction to the structural connections." (Chapter 21, §4, 7)

Tesnière did not recognize that semantic dependencies can sometimes point in the same direction as syntactic dependencies and sometimes in the opposite direction (Mel'čuk 1988), e.g. *the stone freezes* vs. *the frozen stone*: in both cases the meaning 'freeze' is predicated of 'stone', so 'stone' semantically depends on 'freeze', whereas *stone* syntactically depends on *freezes*, but it governs *frozen*.

Tesnière noted that mismatches between syntactic and semantic dependencies are possible, which motivated him to introduce the notion of *nucleus*:

> "…if there are semantic connections that are distinct from structural connections, it is because in the positions where they are joined there are semantic centers distinct from the structural centers." (Chapter 22, §2)

But he did not see that some mismatches are more complex, like in cases of so-called *tough*-movement: *a book easy to read*. Here *a book* is the semantic argument of *read*, but there is no corresponding syntactic dependency connecting the two: in surface syntax, *to read* depends on *easy*, which depends on *book*.

Dependency-based semantic representations have been around since the late 1960s under the names tectogrammatical trees (Sgall 1967; Böhmová et al. 2003), semantic networks (Žolkovskij and Mel'čuk 1967, Mel'čuk 1988), and conceptual graphs (Schank 1969; Sowa 1976).

5.2 Grammatical functions

In modern linguistics, the notion of syntactic dependency is attached to the notion of grammatical function (subject, object, oblique, etc.). Grammatical functions are essential in dependency-based approaches because their presence is the only way to distinguish between the various roles that dependents play vis-à-vis their common governor. This contrasts DGs with Chomskyan phrase structure approaches, which derive the grammatical functions from the syntactic configuration instead of viewing them as primitives of

the syntax.[13] Nevertheless, the main post-generativist models, LFG (*Lexical-Functional Grammar*, Bresnan 2001) and HPSG (*Head-Driven Phrase Structure Grammar*, Pollard & Sag 1994), have reintroduced grammatical functions as primitives, and thus have something important in common with DGs, all of which have always taken the grammatical functions to be primitives of the theory.[14]

However, the grammatical functions do not play a large role in Tesnière's syntax, unlike in other DGs where their importance is elevated. For instance functional transfer is just sketched in the *Éléments* (Chapter 72), although it is perhaps as important as categorical transfer (Lemaréchal 1989). Tesnière posits just three actantial grammatical functions, which he calls the *first*, the *second*, and the *third actant*; the other dependents of the verb are circumstants – see Section 4.7 above. While some frameworks also posit just a small set of grammatical functions, e.g. Lexical Functional Grammar (see also the deep syntactic functions of Mel'čuk 1988), most DGs assume dozens of grammatical functions: two elements have the same grammatical function only if they have the same syntactic properties, that is, the same kind of markers, the same linear position, the same agreement properties, and the same distribution. Several sets of grammatical functions have been proposed for formal DGs, parsers, and treebanks. For English, see for instance Mel'čuk and Pertsov (1987), Johnson and Fillmore (2000), or De Marneffe and Manning (2008).

5.3 Projectivity

A key concept that is not present in the *Éléments* but that is central to how dependency syntax understands word order is *projectivity*. Projectivity is the basis for identifying and defining *long-distance dependencies*, also known as *discontinuities*. The concept of projectivity was first defined by Lecerf (1960, 1961), shortly after his reading of the *Éléments*. When employing dependency trees like examples (28a–b) below, the projectivity concept is easily illustrated. A tree that contains no crossing lines is *projective*, whereas a dependency tree that contains crossing lines is *non-projective*; it contains a projectivity violation. These points are illustrated with an example of wh-fronting:

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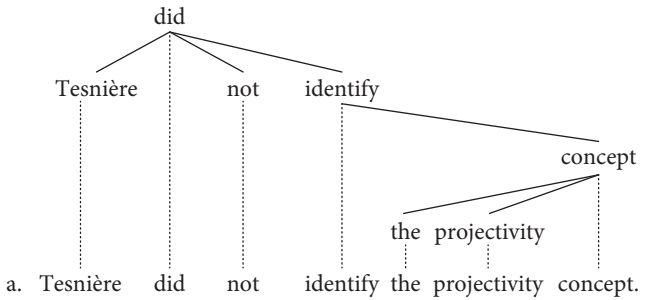
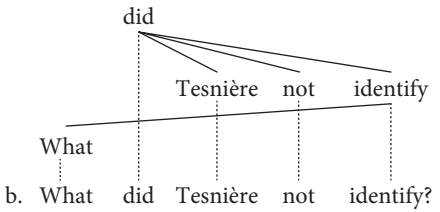
13. In X-bar syntax, the subject and the object are distinguished by their position in the phrase structure tree: the object is the NP under VP, while the subject is the NP under IP/TP, the projection of the verbal inflection.

14. The grammatical functions are primitives of functional structure (f-structure) in LFG – as opposed to of constituent structure (c-structure). This fact has motivated some to point to similarities across dependency-based representations and the f-structures of LFG in general (see for instance Broeker 1998 and Owczarzak et al. 2007).

(28)



- Projective tree



- Non-projective tree

Tree (28a) is projective because there are no crossing lines, whereas tree (28b) contains a projectivity violation due to the fact that the dependency edge connecting the fronted wh-word *what* to its governor *identify* crosses three of the vertical projection lines. The tree structures of most if not all discontinuity types (wh-fronting, topicalization, scrambling, extraposition) contain crossing lines in this manner, a fact that makes discontinuities easy to identify.

The projectivity principle has been explored in great depth by numerous theoretical and computational linguists. Tesnière, however, hardly acknowledged the phenomena and issues linked to projectivity. As discussed above, Tesnière separated linear order from hierarchical order, whereby he focused much more on the latter than the former. His stemmas are mostly unordered in the horizontal dimension, which means they largely ignore actual word order. Tesnière's emphasis on hierarchical order certainly influenced the development of many DGs, in part because it left the impression that DG has little to say about word order. Many modern DGs focus intently on word order, however, and when they do so, they inevitably begin their accounts with the principle of projectivity.

5.4 Function words

Despite the insightfulness of Tesnière's theory of transfer, the transfer schema he employed has not been adopted by most DGs.[15] The reason for this may have to do with the particular

15. Taking a quick look at the dependency trees produced in the DG literature reveals that DGs almost unanimously take most function words as heads over content words (e.g. Mel'čuk 1988;

hierarchical analysis that transfer entails, since it does not grant translatives (auxiliary verbs, prepositions, subordinators) autonomy, but rather their status is secondary insofar as they are function words and hence alone cannot be constitutive of a nucleus. The issue can be reduced to basic assumptions about the hierarchical status of many function words. If one adopts a purely dependency-based approach to syntax, one has to grant function words node status.

The following representations illustrate some possibilities for the analysis of the function word *has* in the sentence *Tom has departed*:

(29) a. has departed — Tom b. has — Tom, departed c. departed — Tom, has

The analysis in (29a) is what Tesnière proposed in Part I of the *Éléments* (Chapter 23, Stemmas 27 and 28). The auxiliary verb *has* is enclosed in a nucleus circle with the full verb *departed*. The two together qualify as a dissociated nucleus, which means that neither alone is granted the status of a nucleus. In contrast to Tesnière's analysis in (29a), the analyses in (29b) and (29c) grant the auxiliary verb autonomy, since in each case, there are three distinct nodes shown. The analysis shown in (29b) is closest to what most modern DGs assume, and it corresponds to what many modern phrase structure grammars assume insofar as it shows the auxiliary verb as head over the full verb. The important thing to acknowledge in this regard concerns Tesnière's analysis of the function word, i.e. the auxiliary verb. He did not grant it syntactic autonomy.

In Part III of the *Éléments*, Tesnière reinterprets dissociated nuclei in terms of the transfer schema (Chapter 155ff.). Tesnière's analysis of function words using the transfer schema is illustrated here with three examples, each of which is shown first according to Tesnière's analysis, and then according to what many modern DGs assume:

(30) a. I: has | departed b. E: on | Monday c. E: before | happened — it

Starosta 1988; Engel 1994; Jung 1994; Eroms 2000; Hudson 1984, 1990, Osborne & Groß 2012, among many others). There is, however, one prominent exception to this rule. Richard Hudson has argued for determiners as heads (e.g. Hudson 1984: 90–92). The majority of DGs, in contrast, continue to assume the traditional NP analysis of noun phrases (noun as head).

(31) a. has — departed b. on — Monday c. before — happened — it

In examples (30a–c), the semantically impoverished function word is viewed as a translative and placed equi-level with the content word. The more modern analyses in (31a–c), in contrast, take the function word to be head over the content word. The modern approach is motivated in various ways, for instance by the results of permutation and proform-substitution tests. These tests identify the function word as head over the content word.

In sum, Tesnière's hierarchical analysis of many function words in terms of dissociated nuclei and the transfer schema has not survived into later DGs for the most part. Most modern analyses prefer to position the function word as head over the content word.[16]

5.5 Formalizing valency

Tesnière had great intuitions, but most of the notions he introduced were not formalized. He did not produce a falsifiable definition of dependency as discussed above, and he did not formalize the concept of valency. Concerning the latter, one can note that there were efforts to erect a concept of valency in formal terms before the appearance of the *Éléments* and thus before Tesnière used the valency metaphor to denote the combinatory potential of verbs. Extending the pioneering work of Ajduckiewicz (1935), an early implementation of the valency concept can be acknowledged in the tradition of categorial grammar. A monovalent verb form like *slept* is encoded as N\S ("N under S"); *slept* forms a sentence S if we combine it with a noun N on the left:

(32) *Alfred* *slept*
N N\S = S

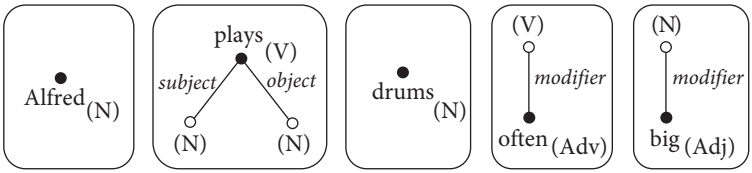
The combination of N and N\S reduces to S like the product of 3/5 and 5 reduces to 3. A bivalent verb form like *hit* can be encoded as N\S/N, which means that *hit* forms a sentence if it combines with one noun on the right and one noun on the left. It should be apparent

16. See nevertheless Croft (1996), among others, who argues "that there is a case for headhood for both the "content word" (e.g. N in NP, V in a clause) and the relevant "functional category" (e.g. Det in NP, AUX/INFL in a clause)."

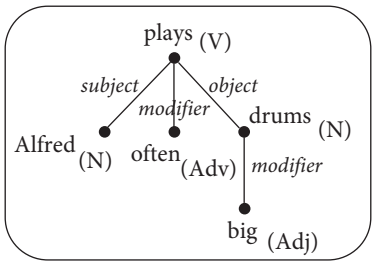
that the concept of valency is present in this approach, since the combinatory potential of verbs and other lexical items is an inherent, inseparable trait of those items.[17]

Another noteworthy attempt to formalize aspects of dependency can be acknowledged in the tradition of Tree Adjoining Grammar (TAG), following the work of Joshi (1987). An elementary tree describing a part of the dependency tree and a whole tree is obtained by combining elementary trees. The following rules, which are consistent with the conventions proposed by Nasr (1995) allow one to obtain the dependency tree of (33):

(33) *Alfred often plays big drums.*



Each rule corresponds to a word and describes its valency: The white nodes indicate valency slots and must unify with black nodes with compatible labels. For instance the second rule, the elementary tree for *plays* indicates that *plays* is a verb and that it requires two dependents, both being nouns, one is its *subject* and the other is its *object*. The elementary tree for *often* indicates that it is an adverb that must be adjoined to a verb that it will modify. The six rules can combine to produce the following dependency tree:



Of course the goal of a linguistic model is not only to generate dependency trees, as shown in this simple DG. The goal of a linguistic model is to be able to associate to every text its possible meanings and conversely to associate every meaning to all the texts that can express it. This program is present in the *Éléments* (cf. Section 4.3 above), as it was in the *Cours de linguistique générale* of Ferdinand de Saussure (1916). It was formalized during the 1960s by the Pragians and their *Functional Generative Description* (Sgall 1967;

17. While the concept of valency is present in early works associated with the tradition of categorial grammar – see for instance Bar-Hillel (1953) – the framework of categorial grammar as it is commonly understood is seen by most syntacticians as being constituency-based.

Sgall et al. 1987) and the Russian and their *Meaning-Text Theory* (Žolkovskij & Meľčuk 1967, Meľčuk 1988). Among the most influent dependency-based linguistic models, *Word Grammar* (Hudson 1984, 2007) must be mentioned.

5.6 Automated text processing

Another area in which DG has developed far beyond Tesniere's ideas and efforts concerns the use of dependency as the principle underlying automated text processing, i.e. for computational applications such as computer-aided translation. Tesniere was likely not aware of the potential of his theory in this area, because serious efforts toward automated text processing did not got started until shortly after his death. Hays (1960, 1964) was the first to formalize dependency grammar, his goal being to use dependency for automated text processing. Hays' work was directly inspired by the rewriting systems of Chomsky (1957). Gaifman (1965) showed that Hays' formalism was equivalent to Chomsky's context-free grammar, as well as to the categorial grammar of Bar-Hillel (1953).

But the potential of dependency as the basis for automated text processing did not really come into focus until the 1990s. The first efficient dependency-based parser was the Link Grammar parser of Sleator and Temperley (1993). In the 2000s, dependency parsing has really boomed, becoming more popular than constituency-based parsing. Among the most popular tools are the MaltParser (Nivre et al. 2007) and MATE (Bohnet 2010), as well as constituency-based parsers that convert the parse into a dependency tree, like the Stanford parser (De Marneffe et al. 2006). Several techniques for dependency parsing are presented in Kübler et al. (2009).

Parallel to dependency parsing, dependency treebanks have been developed for testing and training the dependency parsers, as well as for purely theoretical purposes. A treebank is an electronic text consisting of syntax trees that are assigned to the sentences of the text. The first treebank, the Penn Treebank (Marcus et al. 1993), was constituency-based, but dependency treebanks are now more widespread. The best-known of these is the Prague Dependency Treebank (Hajič 1998), which was first created for Czech, but that now includes an English section as well.

One of the advantages of dependency parsers for natural language parsing (NLP) it that the parses can be easily encoded in a table, like the CoNLL format (Nilsson et al. 2007), which has now become a standard. Each word is on a different level and receives an identifier (first column). Its governor is identified by its identifier (fourth column). Other information can be encoded in other columns, like here the part of speech (third column) and the grammatical function (fifth column). The analysis in the table is for the sentence *Alfred often plays big drums*.

ID	Word	POS	Governor	Function
1	Alfred	N	3	subject
2	often	Adv	3	modifier
3	plays	V	0	root
4	big	Adj	5	modifier
5	drums	N	3	object

6. Outlook

The influence and reach of dependency as a concept upon which theories of syntax can be developed and syntactic phenomena explored is expanding at present. The upsurge in interest appears to have one or two main sources. Above all, the simplicity and hence practicality of dependency is increasingly acknowledged in the field of computational linguistics, as just stated in the previous section. It is likely that this trend toward dependency in computational circles will continue to grow stronger as more linguists become aware of its potential.

Tesnière was very interested in the pedagogical potential of his syntax. He viewed the practices of grammar instruction in the schools of his day as deficient in more ways than one. He judged much of the grammar terminology to be inaccurate and at times contradictory, and as a remedy to this unfortunate situation, he was interested in seeing his system supplement and eventually replace the faulty practices of grammar instruction of his time. He actually received the opportunity in the late 1930s to see the pedagogical value of his system tested in classrooms in the Montpellier area, as discussed above in Section 3. Apparently, the children were quite capable of learning and employing the stemmatic analysis of simple sentences (see Chapter 276). Unfortunately however, the potential of stemmatic analysis for pedagogical applications does not seem to have been realized, since Tesnière's stemmas did not catch on more widely in French schools.

This is a regrettable situation, since the ease with which one can produce analyses of basic sentences using dependency is difficult to overlook. We translators see great potential in this area. This potential is particularly evident when one considers the approach to teaching sentence grammar that has been widely employed in the past and is still employed by some today in middle schools in North America, i.e. Reed-Kellogg sentence diagrams.[18] Our sense of the Reed-Kellogg diagrams is that they are more complex and difficult to

18. Concerning the Reed-Kellogg system for diagramming sentences, see note 6 above.

master than Tesnière's basic stemmas, mainly because the Reed-Kellogg system arguably maintains a measure of constituency in the form of the initial subject-predicate division. The basic stemmas of the sort Tesnière employed would be easier for young minds to understand and employ than the mixed diagrams of the Reed-Kellogg system. Pedagogical approaches to teaching sentence grammar can then benefit from this simplicity. Insights into the nature of syntax and grammar can and should become more accessible to both young and old.

Beyond computational and pedagogical applications, the potential of dependency to serve as the basis of more or less formalized theories of syntax and grammar is well established. The works of prominent linguists such as Richard Hudson in the framework of Word Grammar (Hudson 1984, 2007) and Igor Mel'čuk in the framework of Meaning-Text Theory (Mel'čuk 1988) have demonstrated that comprehensive and detailed approaches to the study of syntax can be mostly or entirely dependency-based. Indeed, we believe that the academic study of syntax can benefit greatly from the increasing awareness of the alternative that dependency-based approaches to the theory of syntax and grammar offer. It is in this respect that we have been motivated to translate Tesnière's main oeuvre to English. The tremendous breadth of syntactic phenomena Tesnière explores in numerous languages and the insightful analyses of these phenomena that he offers can now serve as inspiration to all those established and aspiring linguists for whom Tesnière's ideas were previously largely inaccessible due to the language barrier.

Literature

Ajdukiewicz, K. 1935. Die syntaktische Konnexität. *Studia Philosophica* 1, 1–27.

Arnavielle, T. 1995. Lucien Tesnière à Montpellier. In Madray-Lesigne and Richard-Zappella (1995), 83–86.

Arrivé, M. 1969. Les éléments de syntaxe structurale de Lucien Tesnière. *Langue française* 1, 36–40.

Bar-Hillel, Y. 1953. A quasi-arithmetical notation for syntactic description. *Language* 29, 1, 47–58.

Bloomfield, L. 1933. *Language*. New York.

Böhmová, A., J. Hajič, E. Hajičová, and B. Hladká 2003. The Prague Dependency Treebank. In A. Abeillé (ed.) *Treebanks: Building and Using Parsed Corpora*, pp. 103–127. Netherlands: Springer.

Bohnet, B. 2010. Very high accuracy and fast dependency parsing is not a contradiction. In *Proceedings of the 23rd International Conference on Computational Linguistics (Coling)*, pp. 89–97.

Brassai, S. 1860–1863 [2011]. *A magyar mondat.* [The Hungarian sentence.] Edited by Elekfi L. and Kiefer F., Budapest: Tinta.

Bresnan, J. 2001. *Lexical-Functional Syntax*. Blackwell.

Bröker, N. 1998. The formation of comparative clauses in French and English. University of Stuttgart. arXiv:cmp.I/9807009.

Chomsky, N. 1957. *Syntactic Structure*. Cambridge: MIT Press.

Coseriu, E. 1980. Un précurseur méconnu de la syntaxe structurale : H. Titkin, *Recherches de linguistique : Hommages à Maurice Leroy*, Editions de l'Université de Bruxelles, 48–62.

Croft, W. 1996. What's a head?. In J. Rooryck and L. Zaring (eds.), *Phrase Structure and the Lexicon*, 35–75. Dordrecht: Kluwer.

Daumas, F. 1957. Lucien Tesnière (1893–1954). Jalons biographiques, *Orbis – Bulletin International de Documentation Linguistique* 6, 1, Louvain, 253–258.

De Marneffe, M.C., B. MacCartney, and C. Manning 2006. Generating typed dependency parses from phrase structure parses. In *Proceedings of LREC,* 449–454.

De Marneffe, M.C. and C. Manning 2008. Stanford typed dependencies manual. http://nlp.stanford.edu/downloads/dependencies_manual.pdf.

Engel, U. 1994. *Syntax der deutschen Gegenwartssprache*, 3rd revised edition. Berlin : Erich Schmidt Verlag.

Eroms, H.-W. 2000. *Syntax der deutschen Sprache*. Berlin: Walter de Gruyter.

Fourquet, J. 1996. Ce que je dois à Lucien Tesnière. In Gréciano and Schumacher (1996), 1–6.

Gaifman, H. 1965. Dependency systems and phrase-structure systems, *Information and Control* 18, 304–337. Rand Corporation (1961), RM-2315.

Garde, P. 1977. Ordre linéaire et dépendance syntaxique: Contribution à une typologie. *Bulletin de la Société Linguistique de Paris* 72, 1, 1–26.

Gerdes, K., E. Hajičová, and L. Wanner (eds.), 2011. *Proceedings of the first international conference on Dependency Linguistics* (*DepLing*), Barcelona.

Gerdes, K., E. Hajičová E., and L. Wanner (eds.) 2013. *Proceedings of the second international conference on Dependency Linguistics* (*DepLing*), Prague.

Gerdes, K. and S. Kahane 2013. Defining dependency (and constituency). In K. Gerdes, E. Hajičová, and L. Wanner (eds.), *Computational Dependency Linguistics*, IOS Press.

Gosselin, L. 1995. Connexion structurale et incidence sémantique : le cas des circonstant. In Madray-Lesigne and Richard-Zappella (1995), 137–142.

Gréciano, G. and H. Schumacher (eds.) 1996. *Lucien Tesnière – Syntaxe structurale et opérations mentales* (Proceedings of the German-French colloquium for the 100th anniversary of his birthday, Strasbourg, 1993). Tübingen: Max Niemeyer Verlag.

Hajič, J. 1998. Building a syntactically annotated corpus: The Prague Dependency Treebank. In E. Hajičová (ed.), *Issues of Valency and Meaning. Studies in Honour of Jarmila Panevová*, Karolinum, Charles University Press, Prague, Czech Republic,106–132.

Hays, D. 1960. Grouping and dependency theories. Technical report RM-2646, Rand Corporation.

Hays, D. 1964. Dependency theory: A formalism and some observations. *Language* 40, 4, 511–525.

Harris, Z.S. 1951. *Methods in Structural Linguistics*. Chicago University Press.

Hockett, C.F. 1958. *A Course in Modern Linguistics*. New York: The Macmillan Company.

Hudson, R. 1984. *Word Grammar*. Oxford: Blackwell.

Hudson, R. 1990. *An English Word Grammar*. Oxford: Basil Blackwell.

Hudson, R. 2007. *Language Networks: The New Word Grammar*. Oxford University Press.

Imrényi, A. 2013. Constituency or dependency? Notes on Sámuel Brassai's syntactic model of Hungarian. In P. Szigetvári (ed.), VLlxx. *Papers Presented to László Varga on his* 70th *Birthday*. ELTE: Department of English Linguistics, 167–182.

Jackendoff, R. 1972. Gapping and related rules. *Linguistic Inquiry* 2, 21–35.

Jespersen, O. 1924. *Philosophy of Grammar*. New York: Henry Holt and Company.

Jespersen, O. 1937 [1984]. *Analytic Syntax.* University of Chicago Press.

Johnson, C. and C. J. Fillmore 2000. The FrameNet tagset for frame-semantic and syntactic coding of predicate-argument structure. *Proceedings of the first North American chapter of the Association for Computational Linguistics conference*. Association for Computational Linguistics, 56–62.

Joshi, A.K. 1987 An introduction to Tree Adjoining Grammars. In A. Manaster-Ramer (ed.), *Mathematics of Language*, John Benjamins, Amsterdam, 87–115.

Jung, W.-Y. 1994. *Syntaktische Relationen im Rahmen der Dependenzgrammatik*. Hamburg: Buske.

Kabano, A. 2000. Le destin de la théorie syntaxique de Lucien Tesnière (1893–1954). *Historiographia linguistica* 27, 1, 103–126.

Kahane, S. 1997. Bubble trees and syntactic representations. *Proceedings of the 5th Meeting of the Mathematics of Language (MOL)*. Association for Computational Linguistics, 70–76.

Kahane, S. and N. Mazziotta. (in preparation) Syntactic polygraphs: A common representation for constituency and dependency.

Kaplan, R.M. and J. Bresnan 1982. Lexical-functional grammar: A formal system for grammatical representation. *Formal Issues in Lexical-Functional Grammar*, 29–130.

Kübler S., R. McDonald, and J. Nivre 2009, *Dependency parsing*, Synthesis Lectures on Human Language Technologies.

Lascarides, A. and N. Asher 1991. Discourse relations and defeasible knowledge. *Proceedings of the* 29th *annual meeting on Association for Computational Linguistics*, Association for Computational Linguistics, 55–62.

Lazard, G. 1995. La définition des actants. In Madray-Lesigne and Richard-Zappella (1995), 151–158.

Lecerf, Y. 1960. Programme des conflits, modèle des conflits. *Bulletin bimestriel de l'ATALA* 1, 4, 11–18.

Lecerf, Y. 1961. Une représentation algébrique de la structure des phrases dans diverses langues naturelles, *Compte Rendu de l'Académie des Sciences de Paris* 252, 232–234.

Lemaréchal, A. 1989. *Les parties du discours*. Paris: PUF.

Madray-Lesigne, F. and J. Richard-Zappella 1995. *Lucien Tesnière aujourd'hui*, (Proceedings of the international colloquium, Rouen, 1992), Editions Peeters, Louvain-Paris.

Marcus, M.P., M. A. Marcinkiewicz, and B. Santorini 1993. Building a large annotated corpus of English: The Penn Treebank. *Computational linguistics* 19, 2, 313–330.

Meľčuk, I. 1988. *Dependency Syntax: Theory and Practice*. Albany: State University of New York Press.

Meľčuk, I. and N. Pertsov 1987. *Surface Syntax of English: A formal Model within the Meaning-Text Framework*. Benjamins.

Nasr, A. 1995. A formalism and a parser for lexicalised dependency grammars. *Proceedings of the* 4th *International Workshop on Parsing Technologies* (*IWPT*). State University of NY Press.

Nilsson, J., S. Riedel, and D. Yuret 2007. The CoNLL 2007 shared task on dependency parsing. In *Proceedings of the CoNLL Shared Task Session of EMNLP-CoNLL*, 915–932.

Nivre, J., J. Hall, J. Nilsson, A. Chanev, G. Eryigit, S. Kübler, S. Marinov, and E. Marsi 2007. MaltParser: A language-independent system for data-driven dependency parsing. *Natural Language Engineering* 13, 2, 95–135.

Osborne, T., M. Putnam, and T. Groß 2011. Bare phrase structure, label-less trees, and specifier-less syntax: Is Minimalism becoming a dependency grammar? *The Linguistic Review* 28, 315–364.

Osborne, T. and T. Groß 2012. Constructions are catenae: Construction Grammar meets dependency grammar. *Cognitive Linguistics* 23, 1, 165–216.

Owczarak, K., J. van Genabith, and A. Way 2007. Evaluating machine translation with LFG dependencies. *Machine Translation* 21, 95–119.

Pinkham, J. 1982. *The Formation of Comparative Clauses in French and English*. Doctoral dissertation, Harvard University.

Pollard, C. and I. Sag 1994. *Head-Driven Phrase Structure Grammar.* University of Chicago Press.

Postal, P. 1974. On Raising: One Rule of English Grammar and Its Theoretical Implications. Cambridge, MA: The MIT Press.

Reed, A. and B. Kellogg 1877. *Higher Lessons in English: A Work on English Grammar and Composition*. Clark and Maynard.

Ross, J. 1970. Gapping and the order of constituents. In M. Bierwisch and K. E. Heidolph (eds.), *Progress in Linguistics: A Collection of Papers*. The Hague: Mouton.

Rousseau, A. 1995. Le graphe de Tesnière : origines et originalités. In Madray-Lesigne and Richard-Zappella, 75–82.

Schank, R. 1969. Conceptual dependency as a framework for linguistic analysis. *Linguistics* 49, 28–50.

Schubert, K. 1987. *Metataxis: Contrastive Dependency Syntax for Machine Translation*. Dordrecht: Foris,

Sgall, P. 1967. *Generativní popis jazyka a česká deklinace* [Generative description of language and Czech declension]. Prague: Academia.

Sgall, P., E. Hajicová, and J. Panevová 1986. *The Meaning of the Sentence in its Semantic and Pragmatic Aspects*. Springer.

Sleator, D. and D. Temperley 1993. Parsing English with a Link Grammar. *Third International Workshop on Parsing Technologies,* Carnegie Mellon Univ. Comp. Sc. Techn. Report CMU-CS-91-196, 1991.

Sowa, J. 1976. Conceptual graphs for a database interface. *IBM Journal of Research and Development*, vol. 20, 4, 336–357.

Starosta, S. 1988. *The Case for Lexicase: An Outline of Lexicase Grammatical Theory*. New York: Pinter Publishers.

Tesnière, L. 1931. *Oton Joupantchitch, Poète slovène, l'homme et l'œuvre*. Paris.

Tesnière, L. 1934. Comment construire une syntaxe. *Bulletin de la Faculté des Lettres de Strasbourg, 7*, 12ème année, 219–229.

Tesnière, L. 1937. *Curriculum vitae de Monsieur Tesnière*, reprinted in Madray-Lesigne and Richard-Zappella (1995), 410–412.

Tesnière, L. 1939. *Eléments d'un rapport sur l'activité scientifique de Monsieur Tesnière*, reprinted in Madray-Lesigne and Richard-Zappella (1995), 405–409.

Tesnière, L. 1953. *Esquisse d'une syntaxe structurale*. Paris: Klincksieck.

Tesnière, L. 1959. *Éléments de syntaxe structurale*. Paris: Kincksieck.

Tesnière, L. 1966. *Éléments de syntaxe structurale*, 2nd edition. Paris: Klincksieck

Tesnière, M.-H. 1996. Le fonds Lucien Tesnière à la Bibliothèque national de France. In Gréciano and Schumacher (eds) 1996, 7–14.

Žolkovskij A. and I. Mel'čuk 1967. O semantičeskom sinteze [On the semantic synthesis (of texts)], *Problemy Kybernetiki [Problems of Cybernetics]* 19, 177–238. [Fr. transl.: Sur la synthèse sémantique (de textes),1970, *T.A. Information* 2, 1–85.]

Zwicky, A. 1985. Heads. *Journal of Linguistics* 21, 1, 1–29.