The evolution of spatial rationales in Tesnière's stemmas

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Abstract

This paper investigates the evolution of the spatial rationales of Tesnière's syntactic diagrams (*stemma*). I show that the conventions change from his first attempts to model complete sentences up to the classical stemma he uses in his *Elements of structural syntax* (1959). From mostly symbolic representations of hierarchy (directed arrows from the dependent to the governor), he shifts to a more configurational one (connected dependents are placed below the governor).

1 Introduction

The constant use of diagrams is one of the most famous characteristics of Tesnière's *Éléments de syntaxe structurale* (Tesnière, 1959) (henceforth, *Elements*). These diagrams, known as *stemmas* in this work, are visual representations of the syntactic analysis of sentences, i.e. words and the syntactic relations between them. In this paper, I will focus on the comparison between Tesnière's first stemma – observed in his drafts and in (Tesnière, 1934a) – and the « classical » ones he draws in his *Petite grammaire russe* (Tesnière, 1934b, 157, 162 and 164) as well as in his *Esquisse d'une syntaxe structurale* (Tesnière, 1953) and his *Elements*. From the early stemmas to the classical ones, Tenière changed the graphical elements and the configurational rules at work to achieve what he thought was a better representation of his analysis – his pedagogical concerns were prominent (Tesnière, 2015, Chapters 276-277).

Before I delve into the details of the stemmas, I would like to introduce my perspective and my motivation. My perspective is mostly a semiotic one: the description of the mechanics of diagrams as bidimensional graphical formalisms. Semioticians of peircian obedience (Stjernfelt, 2007) describe diagrams as complex *icons*, i.e. signs that share structural characteristics with what they represent.[1] For instance, a map is an icon of the territory it represents, because areas on the map and symbols used are placed in accordance with the location of elements of interest of the territory (Bertin, 2005). This paper will often deal with a recurrent issue in the description of diagrams: the evaluation of the relevance of the observed graphical elements and the way they are laid out on the plane. What is incidental? What does, indeed, qualify as an icon, and is genuinely diagrammatical? For instance, the thickness of the strokes in all the stemmas reproduced in this paper is incidental. It does not represent anything at the conceptual level: some may be thinner than others with no consequences on information.

My motivations are epistemological and methodological. By emphasizing the evolutions of graphical rationales proposed by a major historical author in the field, I intend to draw attention to the fact that most syntacticians apply formal conventions to encode analyses in graphical inscriptions. These conventions actually constraint what can be expressed.

In this historical survey, I will proceed from the classical diagrams of the *Elements* to the earliest ones, mainly because whereas the formers are sometimes remembered, the latters are almost completely forgotten. I will introduce Tesnière's conceptual rationales as well as the theoretical foundations of my analysis alongside the analysis itself. In the conclusion, I will show that the characteristics of the alternative types of stemmas are still relevant to solve specific problems in linguistics.

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[1]In this conception, which I will not investigate here, diagrams are tools that allow for discovering novel knowledge about what they represent (Stjernfelt, 2007, 99-105).

2 Classical stemmas

The foundational idea in the *Elements* is that words are not the only elements of the sentence, but that there exist syntactic relations that can also be qualified as *elements*:

> a sentence of the type *Alfred speaks* is not composed of just **two** elements, *Alfred* and *speaks*, but rather of **three** elements, the first being *Alfred*, the second *speaks*, and the third the connection that unites them, without which there would be no sentence. To say that a sentence of the type *Alfred speaks* consists of only two elements is to analyze it in a superficial manner, purely morphologically, while neglecting the essential aspect that is the syntactic link (Tesnière, 2015, Chapter 1, § 5, emphasis from the author)

In this section, I first describe how these basic elements are represented in the graphical medium (2.1) and how they combine on each axis of the plane (2.2). To do so, I formulate discursive descriptions of the diagrams. The last subsection deals with more complex configurations (2.3).

2.1 Graphical entities

In accordance with his epistemological stance, Tesnière draws stemmas that consist of arrangements of discrete graphical items. In semiotics, the Groupe μ (1992) proposed the concept of *graphical entities* (or *entities*, for short). Entities are *Gestahlt*, i.e. forms that, from a cognitive perspective, can be identified and described as single objects; e.g.: a dot, an arrow, a face, a car, etc. (henceforth, entities will be noted using a fixed-width font). They do not need to have a meaning to qualify as entities; e.g. an `arrow` can be recognized as such without knowing how to interpret it. This characteristic is especially important in learning procedures: one can recognize `strokes` in fig. 1 (Tesnière, 1959, Chapter 3, § 8) before being instructed about how to understand them – although our background knowledge provides us with very good insight.

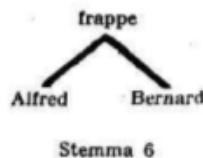(1)   Alfred frappe Bernard
       'Alfred hits Bernard'

Stemma 6

Figure 1: Classical stemma of (1)

In the stemmas of the *Elements*, such as fig. 1, entities represent linguistic signs ("words") as well as relations. In the terminology I will use henceforth, words and relations are analytical concepts that are *reified* (Kahane and Mazziotta, 2015b; Mazziotta, 2016b) in the diagram: entities are used to represent them in a discrete way on the graphical substratum.[2] The basic inventory of graphical entities in these diagrams is thus:

1. Words at use in the sentence are reified by entities that can be called `words`, i.e. a graphical image of the linguistic units.

2. Relations are reified by `strokes`.

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[2] The history of syntactic diagrams demonstrates that it is possible to conceive diagrams that do not reify relations. See, e.g. the diagrams by Clark or Reed and Kellogg (Brittain, 1973; Mazziotta, 2016a).

2.2 Configurational rules and super-entities

For them to work as tools for the linguists, stemmas have to be organized in accordance with a specific syntactic analysis.[3]

> "le stemma note toujours une correspondance point par point avec les opérations qu'il est censé représenter" ['elements in the stemma always strictly correspond to the operations it is supposed to represent'] (Samain, 1995, 131, my translation)

Therefore, to fully understand the rationales of the stemmas, one must achieve a description of the rules that govern the combination of entities in correspondence with Tesnière's syntactic epistemology (i.e. the represented "operations"). To do so, one needs to remember the basic theoretical rationales of tesnierian syntax.

Syntactic rationales.   There are two major kinds of syntactic relations that are reified in classical stemmas. The first one is *connection* (Tesnière, 2015, Part 1). A connection between two words is hierarchized and asymmetrical. It corresponds to a subordination relation and it is very close to the modern concept of syntactic dependency. Connections in (2) are illustrated in fig. 2 (Tesnière, 1959, Chapter 3, § 8). The second type of relation occurs between words that share the same grammatical function, i.e. coordinations and appositions. It is called *junctions* in Tesnière's terminology. The junction between *Alfred* and *Bernard* in (3) is illustrated in fig. 3 (Tesnière, 1959, Chapter 134, § 4).

(2)   Mon vieil ami chante cette fort jolie chanson
       'My old friend sings this very nice song'

(3)   Alfred et Bernard tombent
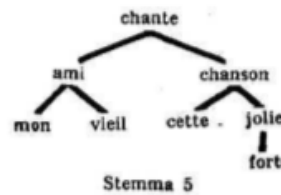   'Alfred and Bernard fall'
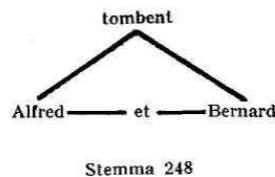

Figure 2: Classical stemma of (2): connections

Figure 3: Classical stemma of (3): junction

`Words` and `strokes` are graphically arranged according to rules that distinguish between connection and junction. As I will explain, the most important rules governing the spatialization (their spatial organization) of the classical stemmas can be described by focusing on the behaviour of entities on the vertical axis.

Vertical axis.   Each extremity of a single `stroke` is close to a `word`. This corresponds to a syntactic relation between words. The distinction between the two types of relations is expressed by the relative vertical coordinates of the two `words`:

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[3] See also (Petitot, 1995).

- Words that are linked together by a connection are reified by `words` that do not have the same vertical coordinates. The one that is located higher on the plane corresponds to the governor; the lower one to the dependent.
- Words that are bound by a junction are reified by `words` that have the same vertical coordinate.
- The corollary of these first two rules is that the topmost `word` represents the root of the syntactic hierarchy.

Such configurations of `words` and `stroke` are super-entities that can be interpreted as wholes (*Gestahlt*). Therefore, a `connection` is a super-entity consisting in two `words` with different vertical coordinate, connected by a `stroke`. Similarly a `root` is the topmost `word` of the stemma.

Two important additions to these rules are necessary. Firstly, in the case of junctions, the description remains unsatisfactory so far. The junctor *et* is not, from a linguistic perspective, coordinated with either of the conjuncts. The second rule I just stated is not sufficient. Furthermore, there are stemmas in the *Elements* (e.g. see stemma 266) where junction occurs without any junctor (asyndesis). In this case, a single `stroke` is drawn between the `words` that reify the conjuncts. To solve this, one must posit that there can be two alternative reifications of junction: (i) the entity reifying the junction is a single `stroke` and; (ii) the entity reifying the junction is a `stroke` interrupted by a `word`.[4] From a cognitive perspective, both entities are `junctions`, i.e. graphical representations of junctions (fig. 4)[5].

<div align="center">Alfred —— Bernard   Alfred —— et —— Bernard</div>

Figure 4: Variety of the `junction`

Secondly, `words` that are at the same level of distance of the `root` have the same vertical coordinate. This convention is implicit in the *Elements*, and probably due to the requirement of printing a visually pleasing book.[6] The cognitive consequence of co-dependents consistently having the same vertical coordinates is that syntactic distance between a word and its descendents is iconically represented, and can be grasped in a single glimpse.

Horizontal axis. The semiotic values of the horizontal coordinates of the `words` is not similar to the values of the vertical coordinates.

First of all, the horizontal axis plays a major ergonomic role. For the sake of readability, entities may not overlap.[7] In accordance with configurational rules and with this ergonomic constraint, the following are simple corollaries:

- Junction `strokes` are horizontal.
- Connection `strokes` are vertical or slanted.

Despite being corollaries, these properties have major cognitive consequences: the slope of a `stroke` can be used to instantly tell apart the two types of entities in structures that look like trees.[8]

Tesnière insists that the stemma is a representation of the syntactic structure (or *structural order*), rather than the *linear order* of the words (Tesnière, 2015, Chapter 4 sqq.). The horizontal positionning of the `words` that represent co-dependents of the same verb actually corresponds to a distinction between the kinds of dependencies between them: the subject, the object and the oblique complement are placed, in this order, before the adjuncts, with no respect to the linear order – fig. 5 depicts (4). Such a convention only affects the dependents of the verb.

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[4]"If the junction is marked by a junctive, the junction line will be constituted by two parts. The junctive appears between these segments." (Tesnière, 2015, Chapter 136, § 3) See also (Mazziotta, 2014, 145-146).

[5]The first stemma is reconstructed to provide simple comparison material. The second one is extracted from fig. 3

[6]Tesnière hardly ever suggests that a distinction between the vertical coordinates of co-dependent could be meaningful – see stemma 296, Chapter 169, §§ 19-20 for a unique discussion on the subject.

[7]In sciences, diagrams may display some tolerance with respect to this constraint (e.g. scatterplots often have overlapping elements).

[8]Although stemmas are not trees from a mathematical perspective (Kahane and Osborne, 2015; Mazziotta, 2014).

(4) Marie vous   rendra   sûrement votre livre demain
     Mary you.DATIVE will give back certainly your book tomorrow

     'Mary will certainly give you back your book tomorrow'
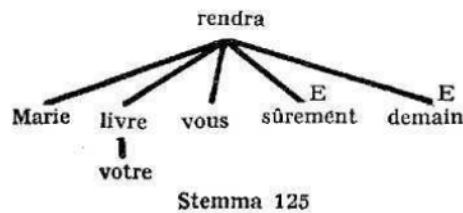

Figure 5: Horizontal order in classical stemmas. See *infra* (2.3) about the letter "E" occurring next to connection `strokes`.

Aside from that, horizontal coordinates have hardly any structural values: the only other constraint is ergonomic (entities cannot overlap). By default, the `words` are horizontally arranged according to the linear order of the sentence, but since this convention is not bound to the theoretical foundations, it remains mostly incidental.[9]

2.3 Complex configurations

The main configurational rules between `words` and `strokes` are somewhat minimalistic, but as Tesnière wants to refine the analysis, he adds complexity to the system in two ways: by using entities that look like `words` as labels and by introducing a special entity to encode a special syntactic operation: *transfer*.

Labels.   The fact that relations are reified make it possible to make visual statements about them.[10] Some strokes have `labels`. Letters or numbers that are placed in the direct proximity of the `stroke`. For instance, in fig. 5, the `label` "E" qualifies a `stroke` as a representation of an adjunct relation (Fr. *circonstant* in Tesnière's terminology). In many cases, `words` and `labels` share the same components (`letters`): only their positions in the stemma can help distinguishing between them.

Transfer.   Tesnière also uses another complex graphical entity to represent an operation that he calls *transfer* (Fr. *translation*) (Tesnière, 2015, Part 3). In Tesnière's model, words have a natural syntactic potential that corresponds to the word classes they belong to; e.g., an adjective naturally depends on a noun and a noun naturally depends on a verb. By the means of grammatical markers such as case endings, prepositions and conjunctions, words can be transferred from one class to another in order to depend on a word belonging an incompatible class. For instance, a word like *Peter* is a noun, that cannot depend on another noun, unless it is transferred, by the genitive case, to become an adjective. Tesnière gives (5) as an example.

(5) le livre d' Alfred
     the book of Alfred

     'Alfred's book'

Hence *le livre Alfred vs. le livre d'Alfred*. The transfer relation is reified by a `stylized` T, such as the one in fig. 6.

Tesnière describes two types of transfer (Tesnière, 2015, Part 3). The ones similar to the aforementionned example *d'Alfred*, and the ones that imply the subordination of a clause, i.e. a structure governed by a finite verb. The former are "first-degree transfers" and the latter are "second-degree transfers".

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[9]Scholars of different disciplines have suggested to use the horizontal axis exclusively to encode linear order (Ihm and Lecerf, 1963; Bertin, 2005; Groß, 1992).

[10]See note 2 about systems that do not reify relations.
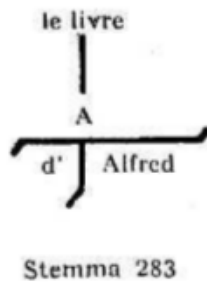
le livre

A

d' Alfred

Stemma 283

Figure 6: Classical stemma of (5): transfer

The `stylized T` is a complex super-entity consisting of many arranged subentities. From a cognitive perspective, this entity is perceived as a whole (*Gestahlt*) and the description of its parts is only relevant with respect to configurational conventions:

- The `word` representing the transferred word is placed on below the `horizontal bar` of the `stylized T` on the side where the lower part of the `stylized T` is slanted.
- The `word` representing the grammatical means used to transfer the word is placed on the other side.
- A `label`, identifying the resultig word class,[11] is placed on top of the `stylized T`
- The `horizontal bar` is doubled in order to represent second-degree transfer.

The super-entity formed by the `stylized T` and the two aforementionned `words` behaves like a `word` with respect to all configurational rules.

3 Early stemmas

In this section, I study early stemmas in comparison with classical ones, in order to emphasize the contrasts between two different diagrammatic conventions of similar analyses.

The epistemological grounding and the main theoretical choices characterizing Tesnière's early stemmas are similar to the ones of the classical stemmas: relations are reified (Section 2) and connection and junction are distinguished (2.2). The first handcrafted stemma is found in the correspondence between Tesnière and Fernand Mossé in 1932.[12] The first – and to my knowledge only – printed early stemmas appear in "Comment construire une syntaxe" ['How to build a syntax'] (Tesnière, 1934a). Only two stemmas of this kind have been published, and we have yet to find other drafts using the same conventions in Tesnière's archive (BnF NAF 28026).

Tesnière (1934a, 225) draws the stemma of (6) – fig. 7.[13]

(6) De même qu'on voit un grand fleuve qui retient encore, coulant dans la plaine, cette force violente et impétueuse qu'il avait acquise aux montagnes d'où il tire son origine; ainsi cette vertu céleste, qui est contenue dans les écrits de saint Paul, même dans cette simplicité de style, conserve toute la vigueur qu'elle apporte du ciel d'où elle descend. (Bossuet, *Panégyrique de saint Paul*)
'As we see a large river that still retains, running across the plain, this violent and impetuous strength it had gained in the mountains it originates from; similarily, this celestial virtue found in the scriptures of saint Paul, even when the style is simple, keeps all the vigor it brings from the heaven it comes down from.' (my translation)

I will now review the graphical entities of this early stemma (3.1) as well as their configurational rules (3.2). The last part of this section will focus on transfer (3.3).

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[11] Tesnière uses the following labels: "I" for "verb", "O" for "noun", "A" for "adjective" and "E" for "adverb" (Tesnière, 2015, Chapter 33).

[12] See (Mazziotta and Kahane, Forthcoming). Tesnière has written a letter on the matter on the 26th of July 1932 and the box at the BnF (NAF 28026) contains an early stemma analyzing the Latin sentence that candidates of the French *baccalauréat* had to translate.

[13] Swiggers (1994, 215) provides a copy of the stemma, but neither this paper nor the original publication are easily accessible. There are several errors in this early stemma (probably made by the publisher). *Un* should connect with *fleuve* (not with *grand*), the direction of the arrow connecting *elle* to *apporte* should be inverted, and *vigueur* should connect with *apporte* (and not *elle*).
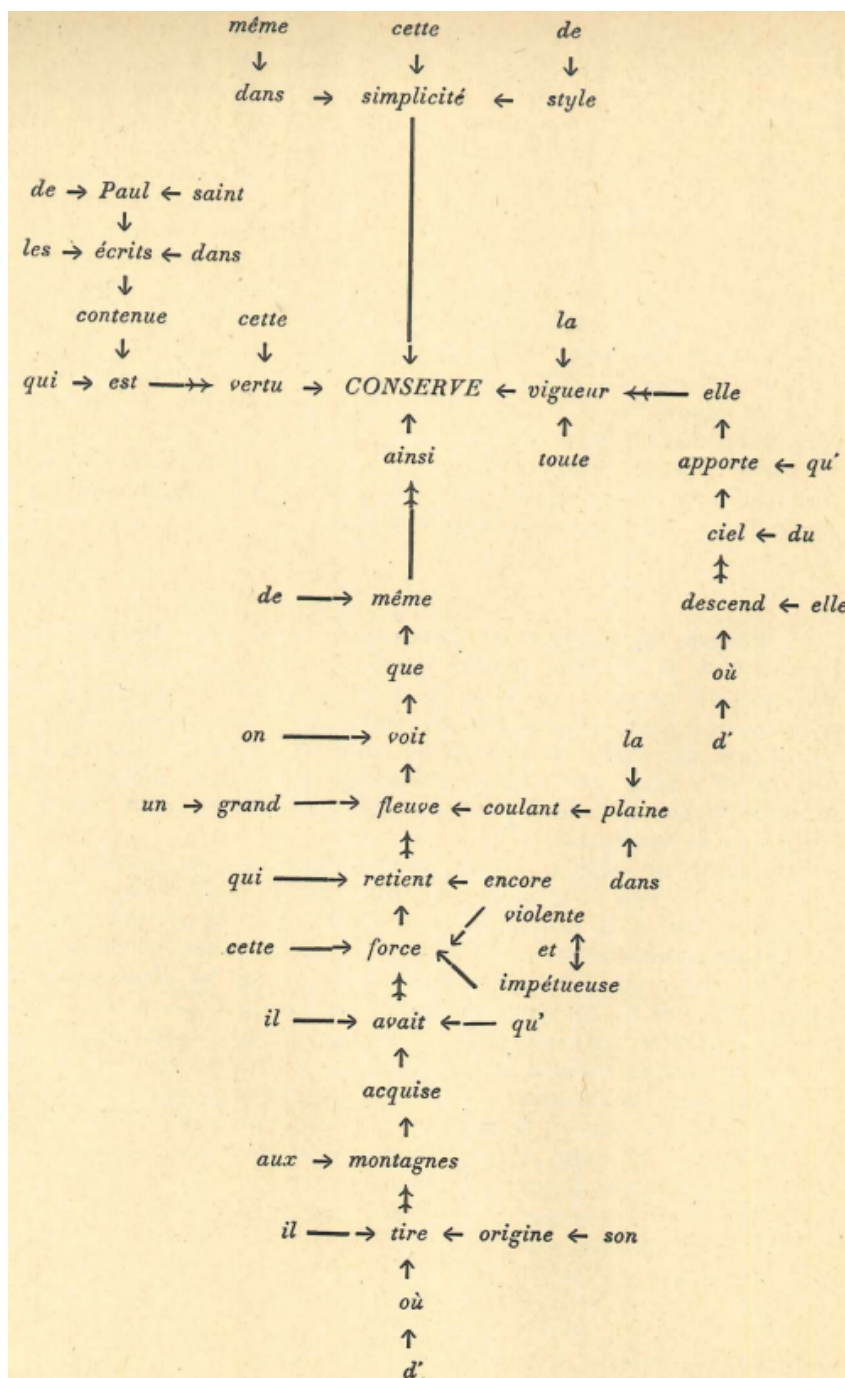
```
              même        cette        de
               ↓            ↓           ↓
             dans  →   simplicité  ←  style
                           │
                           │
de → Paul ← saint          │
      ↓                    │
les → écrits ← dans        │
      ↓                    │
  contenue    cette        │            la
      ↓         ↓          ↓            ↓
qui → est ——→ vertu  →  CONSERVE ← vigueur ←—— elle
                           ↑          ↑          ↑
                         ainsi       toute    apporte ← qu'
                           ↕                    ↑
                           │                  ciel ← du
                           │                    ↕
             de ——→ même                    descend ← elle
                     ↑                         ↑
                    que                        où
                     ↑                         ↑
           on ——→ voit              la        d'
                     ↑               ↓
     un → grand ——→ fleuve ← coulant ← plaine
                     ↕                 ↑
         qui ——→ retient ← encore    dans
                   ↑      ╱ violente
   cette ——→ force ↙      et ↕
                   ↕      ╲ impétueuse
       il ——→ avait ←—— qu'
               ↑
            acquise
               ↑
       aux → montagnes
               ↕
     il ——→ tire ← origine ← son
              ↑
             où
              ↑
             d'
```

Figure 7: Early stemma (see note 13 for corrections)

3.1 Graphical entities

The graphical entities at use in the early stemmas correspond to the words and the relations represented in the classical stemmas:

- `Words` reify words of the sentence in a similar manner as they do in classical stemmas (2.1). The `word` that corresponds to the root is capitalized.
- Three kinds of `arrows` reify syntactic relations. The internal structure of `arrows` is worth considering. The discontinuities in the `stroke` composing some `arrows` are incidental, but `arrow heads` are similar to labels that identify different types of `arrows`, and, consequently, of relations:
  - `simple arrows` "→" correspond to connections;

- double arrows "↔" correspond to junctions;[14]
- two-headed arrows "↠" correspond to a special type of connection (see 3.3).[15]

It is already clear that early stemmas use symbolic conventions to distinguish between different types of relations. By contrast, classical stemmas use simple `strokes` that need to be spatialized in order to be identified as the reification of specific relations. Configurational rules are set accordingly.

3.2 Configurational rules

The configurational conventions between `words` and `arrows` of all kinds are:

- Similarily to `strokes` in classical stemmas, `arrows` connect `words` that appear at both extremities.
- `Single arrows` and `two-headed arrows` express a hierarchy. The `word` representing the governor is placed near the `arrow head` and the one representing the dependent at the other extremity.

As in classical stemmas, coordination also deserves a closer look. There is no hierarchy between the words and the first of the two aforementionned rules is sufficient to describe the behavior of the entities reifying conjuncts. The specific convention is that the `word` that reifies the coordinator is used similarily as `labels` in classical stemmas: it is placed beside the `dual arrow` (*et* in fig. 8).
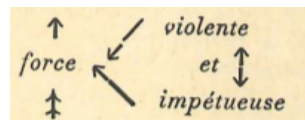

Figure 8: Junction in early stemmas

The recursive application of the configurational rules in early stemmas leads to a *gravitational* representation of the sentence – Tesnière uses the French term *gravitation* to describe the relationships in his system (Tesnière, 1934a, 224). Words that depend on a governor are represented by `words` surrounding the `word` corresponding to the governor. Both axes of the plane are used simultaneously: it is not possible to identify a specific function for one, that the other would not share. Furthermore, the two corollaries identified in classical stemmas (namely that junctions are represented by `strokes` that look horizontal and connections by `strokes` that look vertical or slanted) cannot be used to easily locate different kinds of relations. No configurational contrast can encode this difference, which is expressed by symbolic means: the kind of `arrow` at use.

Another major consequence of this behavior is the way syntactic distance is made visible (2.2). As a first approximation, it might seem that graphical distance iconically represents this syntactic distance. However, the graphical distance between words is never sufficient to express the syntactic hiearchy: it must be supplemented by `arrows`, the length of which is not relevant. For instance, in fig. 7, the arrow between *simplicité* and *CONSERVE* is longer than both arrows linking *même* to *voit* through *que*. Graphical distance may incidentally correspond to syntactic distance, but only the count of `arrows` implied and their directions are relevant.

Additionally, the slopes of the `arrows` do not correspond to anything in the syntactic analysis. The `arrow` between *vigueur* and *CONSERVE* is orthogonal to the one between the latter *simplicité*. This contrast has no value in the diagrammatic system, as stated by Tesnière:

> Ses subordonnés directs sont placés devant, derrière, au dessus ou au dessous, peu importe. ['Its direct subordinates are placed in front, behind, below or on top [of the governor]; it does not matter.'] (*Letter to Mossé*, 26 Jul. 1932; BnF NAF 28026)

The direct consequence of this free placement is that the `word` corresponding to the root element of the sentence cannot be identified by its positionning in the diagram alone: the central position of *CONSERVE*

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[14]Note that in the first draft of an early stemma, Tesnière uses a simple `stroke` instead (BnF NAF 28026, B42, 148B).

[15]In his drafts, Tesnière uses a `crossed-out arrow` rather than a `two-headed arrow`: "Nous l'indiquons par une flèche barrée [...]" [' We note this by the means of a crossed-out arrow'] (Tesnière, 1934a, 228, note 1).

is also incidental. Therefore, the root is identified by the means of a symbolic convention (the use of capital letters). Configurational rules would suffice to identify it, not in a cognitive-efficient way, but rather by evaluating the direction of each `arrow` in the diagram.

3.3 Representation of transfer

Although Tesnière had already elaborated the concept of transfer by the time he published his first stemmas (Tesnière, 1934a, 227-228), the entities and the configurational rules do not encode transfers in a straightforward way.

> [I]l faut, à côté des régissants et des subordonnés de toute sorte, prévoir une place pour les subordonnants, c'est-à-dire pour les éléments qui, n'étant eux-mêmes ni régissants ni subordonnés, ont pour mission de marquer la subordination des autres éléments. Cette réserve faite, toute phrase peut être représentée par un stemma qui indique la hiérarchie de ses connexions. ['Aside from governors and subordinates of any kind, there must be a place subordinators, i.e. elements that are neither governors nor dependents, but that make subordination possible for other elements. Apart from that, any sentence can be depicted as a stemma that represents the hierarchy of its connections.'] (Tesnière, 1934a, 225, my translation)

Fig. 9 is the fragment of the stemma that depicts the analysis of "cette vertu qui est contenue dans les écrits de saint Paul" ['this virtue found in the scriptures of saint Paul']. From a linguistic point of view, the construction *de saint Paul* is similar to *d'Alfred*: both are PPs, and both are analyzed as transfers by Tesnière.
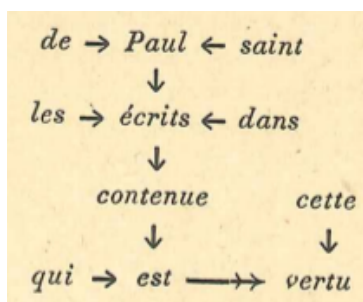

Figure 9: Dependents and translatives in early stemmas

However, there is no difference between a dependent and a translative in stemmas such as fig. 9: *de* (translative) and *saint* (adjective) are both connected to *Paul* by the means of "→".

Only second-degree transfers can be identified, since a special type of `arrow` "↠"[16] connects a subordinate finite verbs to their governors.[17] However no convention can tell apart the translative from any other dependent: in fig. 9, the translative *qui* 'who' has the same satus as the dependent *contenue* 'contained, found'.

4 Conclusion

Classical and early stemmas use two different sets of diagrammatical entities and rules of spatialization. Tab. 1 summarizes the comparison. Both systems have in common that words are reified by `words` and that relations are reified by specific line-like entities drawn from one `word` to another. Classical stemmas confer a greater importance to *configurational* means of representing syntax, whereas earlier ones favor *symbolic* means. This has cognitive consequences. The conventions of the classical stemmas allow for a straightforward identification of key elements of the analysis by the means of geometric properties:

- the root of the stemma is reified by the topmost `word`;

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[16] See footnote 15 about this entity.

[17] See footnote 13 about the errors in the stemma.

	Classical stemmas	Early stemmas
word	`word` (2.1)	`word` (3.1)
relation	`stroke` (2.1)	`arrow` (3.1)
relation type	relative position and slope (2.2)	`arrow head` (3.1 and 3.2)
syntactic distance	vertical distance (2.2)	arrow count (3.2)
transfer	`stylized T` (2.3)	(hardly present, 3.3)

Table 1: Classical *vs.* early stemmas

- dependents of the same level are reified by `words` on the same horizontal line;
- the distinction between connection and junction corresponds to the slope of the `strokes`.

These straightforward arrangements are not available in early stemmas, which use symbolic conventions, such as the use of capitals for the root, the use of different arrow heads, etc.

Furthermore, surveying the evolution of diagramming systems actually helps understanding issues that are still relevant today. Tesnière's `stylized T` and flexibility in the choice of diagrams are two illustrations of the link between diagram use, theoretical debate, and efficiency of expression. As exposed in this paper, Tesnière tried to elaborate minimalistic conventions, but he somewhat failed in the case of transfer. The `stylized T` remains the most idiosyncratic entity he uses, and I have not heard of any colleague using it to make diagrams. Nevertheless, it is striking that the invention of such bizarre entities is actually possible without breaking the rest of the system. The `stylized T` behaves like a `word`, and it solves the distinction problem between dependent and translatives (3.3). By positionning translatives in a specific way on the stemma, Tesnière brings his own answer to the problem of function words in dependency syntax[18] – a problem that still cannot be solved in a consensual way (Kahane and Mazziotta, 2015a; Osborne and Gerdes, 2019).

The choice between configurational and symbolic means to express components of syntactic analysis is still a constant issue in modern dependency linguistics. Careful linguists try to select the diagrammatic conventions that suits their demonstration. For instance, Mel'čuk usually uses a configurational system (fig. 11a),[19] but he favors symbolic conventions to represent dependencies when he wants to evaluate projectivity (fig. 10). By doing so, he makes it possible to visualize crossing `arrows` (Mel'čuk, 1988, 37).[20]
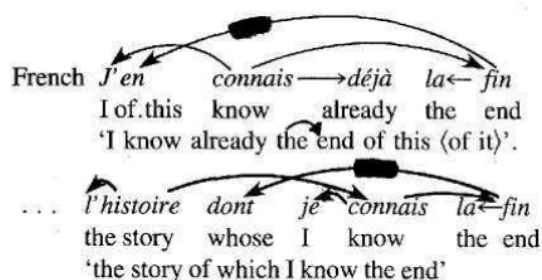

Figure 10: Symbolic conventions express projectivity violations

Symbolic devices are convenient, since not relying on spatialization gives more freedom for geometric arrangement. For instance, as illustrated by fig. 11 (Mel'čuk and Iordanskaja, 2015, 26 and 34), the authors' usual way to draw a dependency tree combines the main configurational principles of classical

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[18] Although such an answer may actually be seen as a constituency-based solution (Osborne, 2013). For a presentation of the possible structural interpretations of transfer, see (Kahane and Osborne, 2015, l-lx).

[19] The use of `arrows` (the convention is the opposite of Tesnière's) is redundant, because the vertical arrangement already expresses the direction of dependencies.

[20] Of course, this is not the only way to visualize projectivity violation; e.g. the early diagrams by Ihm and Lecerf (1963, 10) duplicate the `words` and align them on a projection `stroke`, which is still a common practice.
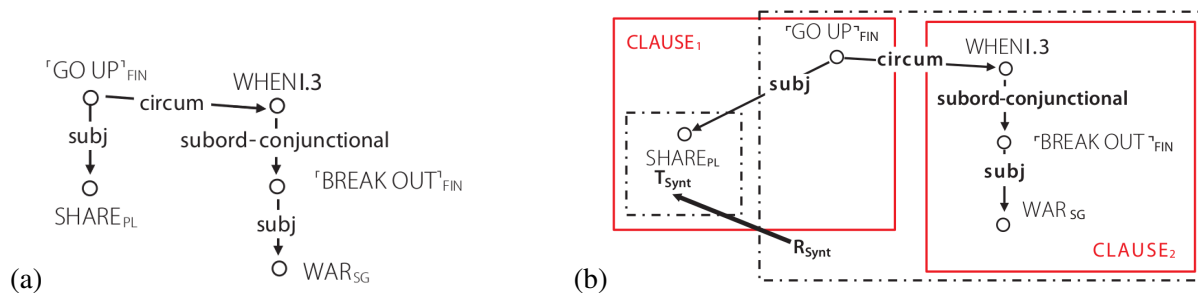
Figure 11: Expanding a diagrammatic system

stemmas with arrows and labels interrupting them. When adding boxes and arrows reifying the communicative structure to a dependency tree, they actually move the first dependent of *go up* further to the left, with absolutely no consequence on the meaning of the diagram, thus leaving space for adding a new box.

In his stemmas, Tesnière had to cope with some theoretical issues that still find concurrent solutions in modern linguistics. Sometimes these various solutions are incompatible, because they acknowledge different views of syntax. Sometimes diagrammatic flexibility is a way to achieve a better visualization of the reasoning. Differences may be incidental from a formal point of view, but they are of utmost importance from a cognitive perspective.

Acknowledgements

References

Jacques Bertin. 2005. *Sémiologie graphique: Les diagrammes – Les réseaux – Les cartes*. EHESS, Paris.

R. C. Brittain. 1973. *A Critical History of Systems of Sentence Diagramming in English*. University of Texas [Unpublished Ph. D. dissertation].

Groupe μ. 1992. *Traité du signe visuel*. Seuil, Paris.

Thomas Groß. 1992. Konstruktive Stemmatologie. *Papiere zur Linguistik*, 42(2):115–139.

P. Ihm and Y. Lecerf. 1963. *Éléments pour une grammaire générale des langues projectives*. European Atomic Energy Community, Joint Nuclear Research Center, Ispra Establishment (Italy), Scientific Data Processing Center.

Sylvain Kahane and Nicolas Mazziotta. 2015a. Dependency-based analyses for function words – introducing the polygraphic approach. In *Proceedings of the Third International Conference on Dependency Linguistics (Depling 2015)*, pages 181–190, Uppsala, Sweden, August. Uppsala University, Uppsala, Sweden.

Sylvain Kahane and Nicolas Mazziotta. 2015b. Syntactic polygraphs. A formalism extending both constituency and dependency. In *Proceedings of the 14th Meeting on the Mathematics of Language (MoL 2015)*, pages 152–164. Association for Computational Linguistics.

Sylvain Kahane and Timothy Osborne. 2015. Translators' introduction. In *Elements of structural syntax* (Tesnière, 2015), pages xxix–lxxiv. Translation of (Tesnière, 1959).

Françoise Madray-Lesigne and Jeannine Richard-Zappella, editors. 1995. *Lucien Tesnière aujourd'hui. Actes du colloque international du CNRS URA 1164 – Université de Rouen 16 - 17 - 18 Novembre 1992*. Peeters, Louvain and Paris.

Nicolas Mazziotta and Sylvain Kahane. Forthcoming. L'émergence de la syntaxe structurale de Lucien Tesnière. In Cécile Mathieu and Valentina Bisconti, editors, *Entre vie et théorie: La biographie des linguistes dans l'histoire des sciences du langage*. Lambert Lucas, Limoges.

Nicolas Mazziotta. 2014. Nature et structure des relations syntaxiques dans le modèle de Lucien Tesnière. *Modèles linguistiques*, 69:123–152.

Nicolas Mazziotta. 2016a. Drawing syntax before syntactic trees. Stephen Watkins Clark's sentence diagrams (1847). *Historiographia Linguistica*, 43(3):301–342.

Nicolas Mazziotta. 2016b. *Représenter la connaissance en linguistique. Observations sur l'édition de matériaux et sur l'analyse syntaxique. Mémoire de synthèse en vue de l'obtention de l'Habilitation à diriger des recherches.* Université Paris Ouest, Nanterre – La Défense. `http://hdl.handle.net/2268/204408`.

Igor Mel'čuk and Lidija Iordanskaja. 2015. Ordering of simple clauses in an English complex sentence. *Rhema*, 4:17–59.

Igor Mel'čuk. 1988. *Dependency syntax: theory and practice*. State University of New York, Albany.

Timothy Osborne and Kim Gerdes. 2019. The status of function words in dependency grammar: A critique of Universal Dependencies (UD). *Glossa*, 4(1)(17). `http://doi.org/10.5334/gjgl.537`.

Timothy Osborne. 2013. A look at Tesnière's *Éléments* through the lens of modern syntactic theory. In *Proceedings of the Second International Conference on Dependency Linguistics (DepLing 2013)*, pages 262–271. Charles University in Prague, Matfyzpress, Prague, Czech Republic, Prague, Czech Republic, August.

Jean Petitot. 1995. Approche morphodynamique de l'iconicité des stemmas. des connexions tesnièriennes aux images-schèmes des grammaires cognitives. In Madray-Lesigne and Richard-Zappella (Madray-Lesigne and Richard-Zappella, 1995), pages 105–112.

Didier Samain. 1995. Le graphe et l'icône. Remarques sur la logique du schématisme chez lucien tesnière. In Madray-Lesigne and Richard-Zappella (Madray-Lesigne and Richard-Zappella, 1995), pages 129–135.

Frederik Stjernfelt. 2007. *Diagrammatology: An investigation on the borderlines of phenomenology, ontology, and semiotics*. Springer, Dordrecht.

Pierre Swiggers. 1994. Aux débuts de la syntaxe structurale: Tesnière et la construction d'une syntaxe. In *Actes du colloque international: Lucien Tesnière. Linguiste européen et slovène (1893-1993). Ljubljana, 18-20 novembre 1993*, pages 209–219. Faculté des Lettres et Philosohie de l'Université de Ljubljana, Ljubljana.

Lucien Tesnière. 1959. *Éléments de syntaxe structurale*. Klincksieck, Paris.

Lucien Tesnière. 1934a. Comment construire une syntaxe. *Bulletin de la Faculté des Lettres de Strasbourg*, 7:219–229.

Lucien Tesnière. 1934b. *Petite grammaire russe*. Didier, Paris.

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

Lucien Tesnière. 2015. *Elements of structural syntax,* translated by Timothy Osborne and Sylvain Kahane. Benjamins, Amsterdam/Philadelphia. Translation of (Tesnière, 1959).