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LOGIC, LINGUISTICS, AND SIMON STEVIN
IN THE CONTEXT OF THE 16TH AND 17TH CENTURIES

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0. Introduction

In the Port-Royal Logic (La Logique ou L’art de penser) of 1662 the authors, Antoine Arnauld and Pierre Nicole, when dealing with the difference between the definition of words and the definition of things, refer in great detail to the Dutchman Simon Stevin, who is mentioned as the famous mathematician of Maurice, Prince of Orange. Stevin (1548–1620) was born at Bruges, an important merchant-town of Flanders. He had lived for almost thirty years in the southern part of the Low Countries before he travelled in Poland, Prussia, and Norway and finally settled in Holland, at the town of Leyden, 1581 (cf. Diiksterhuis 1970). He was a many-sided and inventive scientist and engineer, who published on mathematics, geometrics, mechanics, hydrostatics and the building of fortresses. Arnauld and Nicole were familiar with Stevin’s Arithmétique of 1585, the only book he wrote in French. They do not show any knowledge of either Stevin’s Dutch textbook on logic, the Dialectike ofte Bewysconst (‘Dialectics or the Art of Demonstration’), published in the same year, or his extensive Wisconstige Gedachtenissen (‘Mathematical Memoirs’) of 1608, which was available in a French and a Latin translation.1 Apart from his various scientific achievements, Stevin had interesting and influential ideas on language, language usage and the importance of the vernaculars. I intend to go into his ideas on linguistic matters after examining Stevin’s part in the issue raised in the Port-Royal Logic. Special attention will be paid to Stevin’s ideal word structure, its background and its further development.

1. The Port-Royal Issue

The authors of the Port-Royal Logic point out that often a dispute may be reduced to a confusion of words, as the same words refer to different ideas. This happens, for instance, when a pagan philosopher and a theologian both use the

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1 The translations were both published by Jan Jacobszoon Paets at Leyden in 1608 under the titles Mémoires Mathématiques and Hypomnemata Mathematica.
word *virtue*. Their ideas of what virtue is are totally different. According to the Port-Royal authors, such confusion may be avoided by defining words. They do not suggest defining every word — which would not even be possible — but only such words as may cause confusion. *It would not* be necessary to define, for instance, a word such as *time*, since everyone has a clear idea of what time is. The definitions proposed are definitions of names (*definitiones nominis*) and have to be distinguished from the definitions of things (*definitiones rei*). The definitions of names are arbitrary, whereas the definitions of things are not. The difference may be illustrated by two examples. (1) *Man is an animal with reason*, the English translation of one of the Port-Royal examples. Here we have to do with the definition of a thing, in this case ‘man’, which is defined as ‘an animal with reason’. (2) *I call reason that which is the thinking principle in us*, my own adaptation of one of the Port-Royal examples. This is a definition of a name, which is clearly indicated by ‘I call’. It says that ‘reason’ will be used with the meaning of ‘that which is the thinking principle in us’. The latter definition is arbitrary: one may give some other significance to the name *reason*. Consequently, one cannot argue against a definition of a name, but one can do so against the definition of a thing, which is to be seen as a kind of proposition.

Definitions of names obviously have great advantages for scientific publications in particular: the defined name may again and again function as a substitute for an amount of words. In geometry, for instance, definitions of names are very common. In the Port-Royal Logic the geometrians are repeatedly highly praised, especially for their method of beginning with the most general and most simple things in order to arrive at the less general and more complicated ones (cf. Arnauld & Nicole [1662:306]. Nevertheless, they are also criticized for having not always understood the difference between the definitions of words and the definitions of things (cf. Arnauld & Nicole [1662:312-315]). It is in this context that Stevin appears on the scene. His definition of number (*Nombre est cela par lequel s'explique la quantité de chacune chose*; “Number is that through which the quantity of each thing is expressed”), to be found in his *Arithmétique*, includes one (or unity). Stevin strongly opposed those who did not consider one to be a number, but according to Arnauld and Nicole he had no right to do so. It is only a dispute about a word. A definition of a name, not a definition of a thing, is at stake. Depending on the definition of number, one is included or not: according to Stevin’s definition, it is, but according to Euclides’s definition (*Nombre est une multitude d’unités assemblées*; “Number is a multitude of collected units”), it is not.

The Port-Royal authors made their justified point, and we may wonder whether Stevin made some naive mistake in opposing an arbitrary definition of a name. At this moment I shall not go into this matter any further, but focus on Stevin’s linguistic ideas. In passing, some light will be shed on Stevin’s position
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in the definition issue.

2. Stevin’s Linguistic Ideas: The Role Language Has to Play

Stevin’s linguistic ideas are to be found in his books on logic, mechanics and mathematics, published in a time when the interest in the vernaculars had become clearly manifest in all of Western Europe (cf. Van den Branden 1967). In the Low Countries this increasing attention to the vernacular is indicated by a number of important publications such as the first complete Dutch grammar, the well-known Twe-spraak vande Nederduitsche letterkunst (‘Dialogue of Dutch grammar’) of 1584, and the detailed Dutch–Latin dictionaries compiled by Cornelis Kiliaen, i.e., the Dictionarium Teutonico–latinum of 1574 and its following enlarged editions. At the same time various statements in which the value attached to the vernacular is emphasized were made in all sorts of publications.

Stevin’s contribution to the Dutch language, both in theory and in practice, should not be underestimated. He was fully convinced of the important role his mother tongue could play. In his opinion, the Dutch language in particular had all the characteristics which were needed to express the thoughts of the native speakers. In his “Uytspraek van de Weerdicheyt der Duytsche Tael” (‘Discourse on the Worth of the Dutch Language’) of 1586 he explicitly states:

The object of language is, among other things, to expound the tenor of our thought, and just as the latter is short, the exposition also calls for shortness; this can best be achieved by denoting single things by single sounds.

What precisely does Stevin mean by his remark about shortness? Shortness can best be achieved by denoting single things by single sounds. Different from the sense in phonetics, single sound means here what is pronounced in a single effort of speech. Single, non-complex things have to be indicated by single sounds, i.e., monosyllables. Those monosyllables have to allow for composition. The ease of compounding is Stevin’s second characteristic. On top of these two structural qualities Stevin mentions two functional ones, viz., the fitness for scholarly work, especially for teaching the arts and sciences on the one hand, and the ability to express emotions and to convince people on the other. Of all languages, the Dutch language, according to Stevin, fits most excellently with

2 Stevin’s “Uytspraek van de Weerdigheyt der Duytsche Tael” was first published in his De Beg­

hinselen der Weeghconst (‘The Principles of the Art of Weighing’). Stevin (1955–1966, vol. I) offers a facsimile ed. with an English translation. I give translated quotations in the body of the text, whereas the Dutch originals are to be found in notes. The Dutch quotation under discussion here is: “T’einde der spraken is, onder anderen, te verclaren t’inhoudt des ghedachts, ende geheijck dat cort is, also begeheert die verclaring oock cortheyt, de selve can bequamelicx gheschien, duer ynckel saken met ynckel gheluuyden te beteeekenken” (Stevin [1955–1966, 1:64]).
these ideals and in these respects even surpasses Greek, Latin, and Hebrew, the three honoured and divine languages.

3. Shortness and Composition: Meaning and Background


From the numerous monosyllables compounds may be created very easily. Newly created Dutch compounds are not difficult to understand, since there is a systematic rule implying that the first element is the modifier and the second the head. With examples such as putwater ‘well-water’, on the one hand and waterput ‘well’, on the other and jachthondt ‘hunting-hound’, against hondjacht ‘hound-hunting’, Stevin illustrates this rule (Stevin [1955–1966, I:84]).

According to Stevin, the two structural language characteristics under discussion meet our needs in representing reality very well:

Since by means of the tongue, lips, teeth, palate, and throat we can utter an almost infinite variety of monosyllabic sounds, it is fit that we should assign to every single thing a monosyllabic sound (for less is impossible, and more is useless), and of such a nature that they are fit for composition, so that we may pleasingly and intelligibly represent by them not only ordinary things, but also the strange things which Nature daily creates.

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3 Damsteegt 1983 convincingly demonstrated that Stevin selected his Dutch material from Christopher Plantin’s Thesaurus Theutonicae Linguae, Schat der Neder-duytscher spraken (Antwerp 1573) and not, as previously assumed, from Jan van den Werve’s Den Schat der Duytscher Talen.

4 Cf. Stevin (1955–1966, I:88): “Anghesien wy duer t’behulp van tong, lippen, tanden, verhemelt, keel, bycans oneindelighe verscheyden eensilbighe gheluyden connen uyt enyder ynckel saeck een eensilbich gheluyt toeeyghenen (want min is onmueghelick, meer is onnut) ende van sulker aert, dat sy de Tsaemvoughing bequamelick lijden, op dat wy daer duer niet alleen de ghemeene dinghen, maer ook de wonderlicke die de Natuer dagheligx baert, bevallick ende verstaenlick uytbeeldhen mueghen”. Stevin ascribes the quoted argument to the ancient Dutch, who are said to have developed an excellent view on the purpose of language.
Single, non-complex things correspond with monosyllables and complex things are represented by compounds. In the background a Platonic idea shows up. The idea that linguistic simplicity and complexity reflect simplicity ('ordinary things') and complexity ('the strange things which Nature daily creates') in reality. In other words, there is a relationship between the word and the thing it indicates. Elsewhere Stevin asserts the value of compounding, "since the names of things are thus short definitions thereof". It is obvious that in Stevin's view a name is not just a name. He does not assume an arbitrary relationship between a word or a name and the thing it indicates. In passing, I note that this may shed some light on his former strong opposition against a specific definition of a name, the definition of number I have just discussed earlier.

4. The Origin of the Brevity Concept

Monosyllabic wealth and compounding power are not just some peculiar ideas invented by Stevin and forgotten ever since. Previously, Stevin's compatriot Goropius Becanus discussed both characteristics of 'Duyts', in his Latin publications, and so did the authors of the first Dutch grammar, the Twe-spraack, who heavily drew on Becanus in this respect. In order to avoid any misunderstanding, I note that Stevin, Becanus, and the Twe-spraack all use the common name of the Dutch language, 'Duyts', which could at the time indicate both Dutch and German (cf. Dibbets 1992). In the Twe-spraack monosyllabicity is considered a discriminating feature for genuine Dutch vocabulary. In cases such as faam – fana ‘fame’, lyn – linea ‘line’, kroon – corona ‘crown’, forma – forma ‘form’, wyn – vinum ‘wine’, wal – vallum ‘wall’, the Dutch monosyllabic nouns are assumed to be the original ones against the corresponding Latin words. Stevin obviously agrees with this incorrect view on what are undisputed Latin loans today. The Romans were supposed to have lengthened words such as caes ‘cheese’, beest ‘beast’, put ‘pit’, muer ‘wall’, recht ‘right’, cael ‘bald’, graen ‘grain’, heer ‘lord’, etc., for which they said caseus, bestia, puteus, murus, rectus, calvus, granum, herus (cf. Stevin [1955–1966, I:81]). It is worth noticing that Stevin not only adopted the monosyllabic claim for Dutch, but, unlike his predecessors, also provided new statistic material (his detailed lists of monosyllables) to prove it.

The question may be asked why the concept of brevity exercised such an ap-

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6 Cf. Joannes Goropius Becanus, Origines Antwerpianae (Antwerp: Christopher Plantin, 1569) and his Opera (Antwerp: Christopher Plantin, 1580). In works by Germans published in Latin short remarks on monosyllables are found as early as the beginning of the 16th century (cf. Jellinek [1898:60]).
peal on Stevin. This was not because it was an adaptation of the brevitas concept in rhetoric, as has been suggested (cf. Gützlaff 1988). Economy plays some role, as the quotation in section 4 shows: “It is fit that we should assign to every single thing a monosyllabic sound (for less is impossible, and more is useless)”.

If we want to consider any relationship with another discipline, it is neither rhetoric nor logic, but geometry that has to be taken into consideration. Stevin himself gives a hint in this direction by comparing language with geometry. In geometry everything is built up from the smallest elements to the more complex entities, and it would be absurd to consider the point, the element of magnitude, greater than magnitude itself. In the same way it is said to be improper in grammar for letters, the smallest elements in grammar, to consist of more syllables than the word made of these letters. The superiority of Dutch in this respect is illustrated in spelling the word Dal, which is in Greek Delta, Alpha, Lambda and in Hebrew Daleth, Aleph, Lamed. In both cases each element improperly consists of more syllables (namely two) than the monosyllabic word Dal. In Dutch Dal is spelled with three single sounds or monosyllables, pronounced as De, A, El (cf. Stevin [1955–1966, I:80]). The idea is clear, although Stevin’s argument may seem peculiar for us nowadays. In evaluating the compounding power of Greek and Dutch, Stevin draws an arithmetic parallel:

Just as no sensible person will deem three to be a bigger number than one thousand, but much smaller, likewise Greek composition is not superior to Dutch, but far inferior, for in the former there are occasionally a few words admitting of it, but in the latter it is always possible, and such with special brevity, suitability, and proper denotation of their fundamental meaning.

However interesting it may be to investigate the origins of the concept of shortness, another important question is why Becanus, the Twe-spraack, and Stevin could use this concept so well. To obtain an answer, I shall have to examine contemporary language data.

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7 A similar remark is to be found in the section of the Twe-spraack in which Becanus’s ideas are discussed (cf. Peeters [1990:26]).
8 Brink (1989) also noticed some geometrical similarity, but did not pay any attention to the parallels drawn by Stevin himself in the “Uytspraak van de Weerdigheyt der Duytscbe Tael”.
9 Cf. Stevin (1955–1966, I:83): “want ghelijck gheen menschen die wel by haer sinnen sijn drie groeter ghetal en achten dan Duyst, maer veel cleender; also oock de Griecschc Tsaamvoughing niet boven de Duystsche, maer verre daer onder, want in die sijn hier en daer sommighe woorden dese lijden, maer in dese overal, ende dat met een ander besonder cortheyt, gheschictheyt, ende eyghentlicker beteckening haers grondts [...]”.
5. Shortness and Language Reality: The Relationship between the Ideal Word Structure and the Language Data

Stevin’s lists of monosyllables reveal a consistent choice from the available language data. In the Middle Ages most nouns and first person singular verb forms ended in -e (cf. here ‘lord’, vrouwe ‘lady’, cruce ‘cross’, crone ‘crown’; ic vraege ‘I ask’, ic hebbe ‘I have’, ic woene ‘I live’, etc.). By the process of e-deletion, already started in the Middle Ages, variation begins to occur, and variants with and without -e are to be found. Occasionally, this variation and the dialectical differences are noted. In his grammar of 1625 the grammarian Van Heule asserts that in Holland words are clipped in their pronunciation. Almost every word is enunciated without an e at the end, for instance, vraeg ‘question’, antwoort ‘answer’, ik zeg ‘I say’, ik heb ‘I have’, instead of vraege, antwoorde, zegge, hebbe. The southern dialects (Brabantian and Flemish) did not show e-deletion at that time. Without any further explanation Stevin selected the variants of the province of Holland, viz., the variants without -e, which correspond with his monosyllabic ideal. Stevin, born and raised in the south, prefers these above the variants of his native southern dialect. A small group of monosyllables got Stevin’s special attention which are the nouns vara ‘father’, moer ‘mother’, broer ‘brother’, zus ‘sister’. According to Stevin, they only occur in the dialect of the province of North-Holland. They correspond with nouns of two syllables in the other Dutch dialects (vader, moeder, broeder, suster). Historicallinguistics teaches us that vara, moer, broer, zus regularly developed from vader, moeder, broeder, suster. For Stevin, however, the monosyllabic variants are the oldest forms which survived in the North-Holland dialect. This dialect, therefore, is considered to be the best contemporary Dutch. The longer variants have come into being by ignorance of the native speakers (cf. Stevin 1608: “I. Bouck des Eertclootschrifts”, p.24).

In the course of time the strong initial stress in the Germanic languages caused erosion of unstressed final syllables. This well-known language development allows a theory such as Stevin’s in which languages are valued on their amount of monosyllables. Dutch shares the monosyllabic quality with other Germanic languages, but this common feature need not involve an identical attitude. The abundance of monosyllables in English, especially in the genuine Anglo-Saxon part of it, was noticed by Stevin’s contemporaries, but opinions on this phenomenon differed. Richard Mulcaster (c.1530–1611), for instance, thought that monosyllables gave strength and force to the vernacular. Others were of the opinion that the use of monosyllables made the English bark like dogs and that “books written in them and no other, seem like shop keepers’ boxes, that contain nothing else save halfe-pence, three-farthings and twopence” (Jones [1953: 199]). They believed that monosyllables were incompatible with eloquence (cf. Jones [1953:238]).
Stevin’s linguistic ideas exercised a strong influence on Dutch authors, grammarians and the wider circle of literate people in the 17th century. In the following century his ideas had not fallen into oblivion: the 18th-century Dutch grammarian Willem Séwel (1654–1720), dealing with specific grammatical problems, still refers to Stevin as an authority. Stevin’s influence even went across the borders of the Low Countries. The most striking example is the famous German grammarian Schottelius, who fully adopted Stevin’s ideas in his magnum opus Ausführliche Arbeit von der Teutschen Hauptsprache of 1663.10

The system of compounding played an important role in Schottelius’ approach and moreover, he elaborated Stevin’s ideas on monosyllabicity in a very interesting way. The structure of a German word is assumed to be built up out of three elements, viz., the root (Stammwort), the inflectional ending and the derivational ending. Each of these three elements may be monosyllabic. In this way, more German words square with the monosyllabic ideal than would be the case if Stevin’s original monosyllabic concept was adopted. Nevertheless, Schottelius was confronted with similar problems as Stevin: Vater ‘father’, Mutter ‘mother’, Adler ‘eagle’, Himmel ‘heaven’, were obviously not monosyllabic roots. Schottelius could not refer to dialect variants to solve this problem. He assumed that the ancient Germans pronounced these words as monosyllables Vaer, Moer, Arndt, Himl.11 Nouns as Hirte and Ehre remain problematic. They cannot be seen as monosyllables and the -e’s neither belong to the derivational endings nor can they possibly be an inflectional ending since the nominative is involved. Through Schottelius Stevin’s ideas became part of the German grammatical tradition.

6. Further Considerations and Conclusions

Stevin aimed at proving the value of Dutch, a Germanic language, against the classical languages, Latin and Greek, and the Romance languages. Once the superiority of Dutch over Latin and Greek had been proven, no further discussion was needed. The Romance languages, being inferior descendants of Latin, could not possibly be of the same high rank as Dutch (cf. Stevin [1955–1966, I:81-83]). Dutch even surpassed the divine language Hebrew in some respects, as we have seen above. Although he rightly stressed two structural characteristics of the Dutch language, I must conclude that Stevin, not unlike many of his contemporaries, had no sound judgment of either language change or borrowing in the past. In his opinion monosyllables were original and polysyllables arose

11 Kurt R. Jankowsky kindly pointed out to me that Schottelius could also have referred to German Aar ‘eagle’, a monosyllabic word older than Adler (= adel-are ‘noble eagle’).
through the ignorance of native speakers. On top of that, loans from Latin were thought to be original Dutch words.

Finally, I should note that Stevin’s linguistic ideas and his scientific views were strongly intertwined. An excellent language, in his opinion, was the key to scientific achievements. Latin was still the language used in the scholarly field, but Stevin was convinced of the important roles the vernaculars had to play. The developing new sciences needed practitioners, and Latin should not be a barrier. Learning sciences in one’s mother tongue would be a great gain in time and efforts. Evaluating the vernaculars, the Dutch language was especially worth using as a medium for scientific expression. Its structural characteristics — shortness and ability of composition — made it an extremely useful tool for indicating concepts and things. When the unity of the scholarly language, Latin, started to be gradually replaced by the diversity of the vernaculars, Stevin made clear that the choice for Dutch was the best one to be made. He put his ideas into practice: after his French *Arithmétique* he wrote all his scholarly works in Dutch and not in Latin or in French, and others followed his example. He used, invented and coined the Dutch technical terminology instead of using loans. Through his efforts he made an important contribution to the Dutch language and furthered its elaboration of function. Moreover, his linguistic ideas had their impact and were part of the contemporary debate on the vernaculars in Western Europe.

**REFERENCES**


