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Language in Humans and in Other Animals. Fabrici d'Acquapendente at the Crossroads between Medicine and Philosophy

Abstract. In this paper we give a comprehensive account of the three treatises that Girolamo Fabrici d'Acquapendente (1533–1619), an anatomist from that stronghold of naturalistic-experimental Aristotelianism known as the *School of Padua*, devoted to language topics. In *De larynge* (1600), the author described the structure and the functions of the breathing/phonatory apparatus from a comparative point of view, in order to identify both the analogies and the differences existing between humans and other animals. In *De locutione* (1601) Fabrici put forward a 'philosophical' analysis of speech, taking into account both its physical-articulatory features and its specific role in human life. In the third treatise, *De brutorum loquela* (1603), Fabrici, while re-discussing the Aristotelian distinction between *phoné* and *diálektos*, ascribed non human animals a peculiar kind of articulation going hand-in-hand with their states of mind. In so doing, Fabrici paved in advance the way for an alternative to Descartes' distrust of the animal mind and its possibile linguistic counterparts.

Keywords: Girolamo Fabrici d'Acquapendente; history of linguistic ideas; phonetics; animal communication; Aristotelianism.

1. Introduction¹

Girolamo Fabrici d'Acquapendente (1533–1619) was an anatomist and surgeon from that stronghold of naturalistic-experimental Aristotelianism known as the *School of Padua*. He stands as an exemplary case study on account of the synthesis between medical-philosophical research and linguistic interests which he accomplished through much of his work.²

By explicitly drawing upon the teachings of Hippocrates of Cos (~460-after 377 b. C.), Aristotle of Stageira (384/83–322 b. C.) and Galen of Pergamon (129–201 A.D.), Fabrici endeavoured to create a genuine encyclopaedia of the anatomy and physiology of living beings, that he would call a *Theatrum totius animalis fabricae*.³ His ultimate end was to further develop the Aristotelian legacy according to its original meaning of an anatomical research project that has *the animal* as its object (Cunningham 2004: 173).⁴ Fabrici distinguished himself from his predecessors on the Paduan Chair, Gabriele Falloppio (~1523–1562) and Andrea Vesalio (1515–1564), insofar as he assigned the formation and functioning of language an unprecedented place within the medical tradition.

For Fabrici, the ultimate aim of anatomical dissection is to reveal the *functions* of organs and their parts. The body is thus conceived, in Aristotelian terms, as *soul in act*, but the ultimate aim of Fabrici's research is to study its various functions and attain exact cognition of the soul in its various articulations. In this perspective, anatomy acquires – as it had for Galen (Rocca 2008) – a fundamental importance for the philosophical understanding of living creatures; and language, with all of its distinguishing features, is integrated within the anatomical structure and the range of functions which it is destined to exercise by its very nature.

¹ This work is a combined effort. However, Michela Tardella is responsible for the final version of §§ 2-3, and Stefano Gensini for § 4, while §§ 1 and 5 were jointly drafted.

² On the *School of Padua*, see Schmitt (1983 a and b; 1985). On the Anatomy in Renaissance see Carlino (1994 and 2013).

³ The choice of the word *Theatrum* reflects two conceptual metaphors that were ingrained in the scientific culture of the 16th century: the idea of nature as a stage designed by God so that man may contemplate it, and that of the book as a theatre which faithfully illustrates nature for the reader's benefit (see Siraisi 2004 and Cunningham 2004). The original plan for the work was never fulfilled, however, due to the author's death. Only in 1687, in Leipzig, did Johannes Bohn publish the first complete edition of Fabrici's fourteen treatises.

⁴ In the *DA* Aristotle had already developed a 'non-anthropocentric' reflection on living natural bodies, assigning psychology "a higher place compared to the special biological sciences" (Movia 2001: 8).

The works we will be discussing are *De larynge, vocis instrumento* (the title under which *De voce et eius instrumentis*, published in 1600, started circulating at some stage), *De locutione et eius instrumentis liber* (1601) and *De brutorum loquela* (1603).⁵ These writings illustrate the work which Fabrici conducted on the rational soul (Cunningham 1997), based on the Aristotelian distinction between *voice* (*phōnē*) and *articulated voice* (*diálektos* or *lógos*) – the two modes of expression which may be identified in the animal kingdom. In §§ 2 and 3, devoted to *De larynge* and *De locutione* respectively, we will attempt to clarify the place of human language in Fabrici's system, starting from its physical-articulatory basis; while in § 4 we will examine the innovative elements introduced by the *De brutorum loquela* vis-à-vis the tradition of research on communication between non-human animals.

2. Fabrici's anatomy: *De larynge vocis instumento*

Fabrici describes the anatomy of respiration/phonation in *De larynge*. This work, therefore, sets the stage for the broader research which the anatomist wishes to carry out on the rational soul. In Aristotelian terms, in order to understand the soul it is necessary to investigate the functions and activities of each faculty: the nutritive (*threptikón*), the desiderative (*orektikón*), the sensitive (*aisthētikón*), the intellectual (*dianoētikón*) and the locomotive one (*kinētikón*). This aim can only be achieved by studying the functioning of the organs that make these operations possible. In order to reach this goal, Fabrici distinguishes (1) the observation and description of anatomical parts (*historia*) from (2) the *actio*, which is to say the specific role played by the parts investigated in relation to the functioning of the animal (e.g. breathing), and (3) its *usus* (also *utilitas* or *causa*), which consists in identifying the general reason for the existence of the anatomical parts under consideration.

The larynx is a complex organ including several elements (the glottis, cartilages, the epiglottis, muscles, membranes and nerves) of which glottis is the most important one. It is known by the Greek word *glōttis* (Lat. *lingula*) because according to the Ancients both in its use and shape it resembles the component of the bagpipe which produces sound: “[Q]uod vox uti a fistulae, ita a laryngis lingula fit” (*De lar.* 1687: 268). The use of the term *tongue* to also describe that part of the larynx which generates voice, however, reflects a misunderstanding of the function of the tongue

⁵ For the *De locutione* and *De brutorum loquela*, the original editions have been used; for the *De larynge*, the 1687 edition.

in humans: while the Ancients believed that this was not only the instrument of speech but also of voice, it actually only comes into play in the subsequent stage, that of articulation.

The *actio* of the larynx is the utterance of voice and the glottis, most important part of it, essential for voice-formation, is the glottis. All other parts fulfil secondary functions, cooperating in such a way as to enable air to stream through the glottis during exhalation. The source which Fabrici constantly refers to is Galen, who, despite his failure to grasp the muscular activity underlying the whole process, had realised the centrality of the glottis.

Like Galen, Fabrici offers proof of this hypothesis through an experiment on birds:

Quod si etiam oculata fide id experiri placet, gallinaceus pullus, aut pennatum sumatur animal et aperto ore vociferari cogatur, manifesto apparebit rem ita se habere. Nam quando vocem emittunt, rimulam angustant, ubi vero abstinunt, ipsam latore reddunt. (*ibid.*)

Birds are therefore the animals that show the greatest resemblance to humans when it comes to voice: although their larynx is not as complex, particularly because it is furnished with a far more external *rimula*, birds indeed provide a useful term of comparison – as already Aristotle had argued.⁶

Chapter 5 of Part 2 further defines the nature of the process of exhalation (*efflatio*), which Fabrici considers to be the second cause necessary for the utterance of voice: the outgoing air (*spiritus*) must be energetically released and condensed, so as to acquire the “constitution of a solid body”, before it turns into sound as it makes its way through the *rimula*. If any of these passages are missing, the result will be a *libera exspiratio* which does not engender any vocal sounds. With respect to the actual functioning of the glottis (Albano Leoni and Maturi 1995: 32 ff.), Fabrici’s limit lies merely in the fact that he failed to identify the rapid cycles of opening and closing of the vocal folds (known as *vibration*).

Having completed the descriptive section of his treatise, Fabrici turns to discuss the central topic, the *usus* of the larynx:

Etenim ab Aristotele, primo *Politicorum* cap. 2, dictum est Naturam eo usque in animalibus processisse, ut sensum quidem jucundi

⁶ As we read in *Probl.* 595a 9, birds have the capacity to articulate two or three consonants and, among non-human animals, they are capable of articulating voice more than any other animals (*HA*, 504b 1). On this topic see Fusco (2014).

ac molesti habeant. Animalibus autem, quae societatem inter se ineunt, opportunissimum fuit ut hujusmodi jucundi et molesti sensum inter se significarent, quod nil aliud est quam animi affectus cogitationesque invicem manifestari communicarique, quae cum sua natura latentes et insensibiles sint [...] Neque solum in homine, sed etiam in brutis longe maxima ejus est utilitas. (*De lar.* 1687: 286).

As is plain to see, one of the most significant aspects of this passage is the analogy that is drawn between humans and other animals, most notably those that live together in groups. The capacity to vocally express what is perceived by the soul as ‘pleasant’ or ‘unpleasant’ is crucial for the survival of both individuals and groups. And soul’s affections are, in this sense, a decisive element. The Latin term *affectus* (gr. *páthos*, *páthema*) describes an emotion, or passion that is generated through a pleasant or unpleasant sensory perception, and which leads one to pursue or avoid what has been perceived. Fabrici believes that each passion is strictly connected with an image, a representation (lat. *phántasma*) of its object, and stems from an operation of comprehension or cognition (cf. *De brut.* 1603: 19) which is performed by the sensitive soul in synergy with the bodily structure. This is an activity which animal species share with humans, at any rate as regards survival – the search for food, reproduction, and the avoidance of dangers.

3. Human language as *problema philosophicum*: *De locutione et eius instrumentis liber*

The reflection on human language presented in *De locutione* constitutes a coherent development of *De larynge*. Most notably, Fabrici states that his study has not been conducted from the viewpoint of grammarians, as one might expect in relation to such a topic, but rather according to the principles of natural philosophy.

Once again, Fabrici’s approach draws mainly on Aristotle and Galen. Particular attention is paid to their works in which human speech, described as *loquela* or *locutio* in *De loc.*, is presented as the ultimate and most significant outcome of the process of expulsion of air. As it flows out of the lungs, the air carries away the hazardous residues accumulated in the heart (*De loc.* 1601: 2), while at the same time performing the five actions defined by Galen in the *De lociis affectis*: expiration, the soundless emission of air, the emission of air accompanied by sound, the production of voice and the production

of *loquela*. These operations are interconnected, in the sense that if one (e.g. the production of voice) is impeded, the subsequent one (*loquela*) will also be interrupted.

Fabrici sets out from *HA* IV 9⁷ to first of all define *locutio* in the following terms: “Speech is the articulation of voice by means of the tongue” (“Locutio vocis per linguam dearticulatio est”, *De loc.* 1601: 5). The flow of voice accompanied by sound, which is continuous in itself, is broken up into separate units (Lat. *litterae*, Gr. *grámmata*) just at the moment in which the voice turns into *loquela*. Voice here, as was already the case in the *DGA*, stands to *loquela* as matter stands to form. Clearly, expressions such as *littera* and *grámma* were ambiguous ones, insofar as the written and the spoken articulation of human language were commonly conflated.⁸ Fabrici avoids this ambiguity by adopting the term *articulus* (another expression deeply rooted in the Greek medical tradition)⁹ to describe any actually articulated unit, including those proffered by animals. Whereas *littera* maintains the double meaning of ‘grapheme’ (*character*) and ‘phonic unit’, *articulus* exclusively describes a *natural* element, independent of writing. *Articuli* correspond not only to the *characteres* by which they are transcribed and fixed on parchment but, most importantly, to specific configurations of the organs of phonation. So, whereas the term *littera* is exclusively associated with human *loquela*, the term *articulus* is also used by Fabrici to describe the articulations of non-human animals (Fusco and Tardella 2012). With this broadening of the notion of *loquela* to encompass animal communication as well, the fact that *litterae* may be written becomes a secondary matter, for the focus is on spoken language. In *De brut.* “the impossibility of transcribing animal *articuli* is, conversely, reduced to a technical matter, which is to say a delicate problem, but one which is not unsolvable in principle” (Gensini 2012: 175).

In his description of the articulations pertaining to human languages, Fabrici first of all distinguishes between vowels and consonants (as *DPA* and *HA* do), noting that the latter are soundless and hence require a vocalic element to *consonare*, i.e. become perceivable. In order for a transition from the level of grammar to the theoretical-philosophical one to occur, Fabrici believes it is necessary to explore the reasons behind the phenomena he is investigating:

⁷ “Speech (*diálekto*s) is the articulation of voice by means of the tongue” (*HA* IV, 535 a30).

⁸ Fabrici repeatedly refers to Priscian’s (fl. around A.D. 500) *Institutiones* (I, 2-3).

⁹ See the second section of Laspia (1997).

Cur litterae primo in vocales et consonantes distinguantur? Curque vocales sonent, consonantes sine sono sint? Curque praeterea consonantes, ut sonent, vocalem habeant adiunctam, eamque aut praecedentem, aut subsequentem? (*De loc.* 1601: 15)

The answers which Fabrici offers to such questions provide the general framework for an anatomically and philosophically grounded view of human speech: the sound of voice constitutes the material support for vowels (which already constitute form), whose *continuum* is then made discrete through the insertion of consonants. The latter have a strategic function with respect to the semantic power of language, because if *loquela* were made of vowels only, it would not be able to communicate the multifaceted states of the mind. Also consonants are needed to express the complexity of both affections and concepts, an *utilitas* which vowels can only partially fulfil.

Fabrici goes on to identify the specific parts involved in the articulation process. Since language is produced at a subsequent stage compared to voice, the organs responsible for it must necessarily be positioned *after* the larynx. The organs of articulation are therefore located in the oral cavity, consisting of the *fauces*, tongue, palate, teeth and lips. Based on Hippocratic and Aristotelian works, Fabrici emphasises the role played by the tongue: “Caput enim resonat, lingua vero articulatur occurrunt in faucibus appellensque et occurrunt ad palatum et ad dentes, facit clarescere” (*Ivi*: 28). Articulation, therefore, occurs in the moment in which the tongue positions itself at different sections of the oral cavity, interrupting the flow of vowels. By positioning the tongue on the palate and teeth, the consonants *c, d, g, l, n, r, s* and *t* are produced. The other consonants – *b, p, m, f* – are instead produced by the movement of the lips, with a more limited involvement of the tongue.

More complex is the question of where exactly vowel-formation occurs in the body: as the formal antecedents of *loquela*, vowels provide the material basis for the formation of consonants. Hence, the anatomical area in which vowels are formed is bound to be more internal than the palatal region, responsible for consonant-formation. The transition from simpler forms (vowels) to more complex ones (consonants) must necessarily have an anatomical counterpart, which the researcher is required to investigate. Once again, turning to Aristotle’s biological treatises, Fabrici carries out a philosophical analysis of the relevant chapters in the *Historia animalium*. Much emphasis is placed on the ambiguous way the Latin interpreters have translated terms such *larynx* and *pharynx* that play a decisive role in Aristotle’s discussion of the articulation process. Most notably, *larynx* and *pharynx* have been translated with the same term (*guttur*), even though two separate

words are available in Latin, *guttur* for *larynx* and *fauces* for *pharynx*.¹⁰ This has led to the erroneous conclusion that Aristotle regarded larynx as the organ responsible not just for voice but also for vowels, thus resulting in an unacceptable contradiction: vowels cannot be generated at the same time as voice, i.e. the material substratum necessary for their formation. But in fact, if voice is the substratum of vowels – and this is certainly the case – it must be formed at an earlier stage than vowels, just as vowels, which are the matter of consonants, must be generated at an earlier stage than the latter.

The misunderstanding in question stems from what Fabrici regards as an inverted use of the two terms on Aristotle's part: for the philosopher employed the term *larynx* to indicate the supralaryngeal tract, which is to say the pharynx, while in the passages discussing voice-formation the term *pharynx* was used. According to Fabrici, Aristotle was well aware of the distinct role played by the two anatomical organs: (i) voice-production (in the case of what, by inverting the two terms, he identifies as the *pharynx*) and (ii) the articulation of vowels (in the case of the anatomical part located above it, which he calls the *larynx*). Aristotle's incorrect labelling of these anatomical parts, then, would not ultimately contradict the key assumption of his psychological theory, which is to say the notion that matter-potency always precedes the act that informs it. On the other hand, when it comes to his own specialist vocabulary, Fabrici obviously maintains the distinction between *larynx* and *pharynx*, resorting to their Latin counterparts *guttur* and *fauces*.

Finally, as regards vowels, what makes their articulation possible are the various positions which the tongue can take within the area of the pharynx, although the movements of the muscles attached to the pharyngeal walls also contribute to this process (*De loc.* Chs. VIII–XI). Fabrici identifies the areas and organs responsible for the production of vocalic *articuli*, while explicitly stating that their modes of configuration are completely obscure to him and that therefore he will only be presenting his own personal hypotheses, formulated on the basis of mere observation: *a*, for example, would appear to be generated by an elongated, oval configuration of the pharynx; with *i* the cavity grows narrower; with *u* the pharynx itself stretches in length (*ibid.*). Fabrici's observations on vowels are definitely more in line with modern findings than his analysis of consonants. Today we know that when the supralaryngeal cavities change their conformation in relation to the phoneme that is being articulated, this process also alters

¹⁰ “Ambas autem has partes ‘guttur’ Interpres vertit, quamvis pro pharynge ‘fauces’, pro larynge ‘guttur’, Latinas voces haberet” (*De loc.* 1601: 33).

the basic sound produced by the vocal folds, the so-called *laryngeal tone*. In the light of these considerations, it is reasonable to argue that Fabrici reached some remarkable insights, since he not only distinguished the stage of voice-production from that of the articulation of vocalic phonemes, but also recognised the involvement of the pharynx in their production.

4. *De brutorum loquela*

Divided into six chapters, *De brutorum* completes Fabrici's functional-anatomical study of language, focussing on the similarities and differences between human and animal communication (the main comparison is drawn with dogs and hens, two "domestic" species that are ideally suited to a systematic empirical observation). This third treatise is the one in which the author most departs from the Aristotelian tradition: for here he contends that a genuine form of *loquela* – which is to say, in technical terms, of articulated voice – is also to be attributed to animals (or, at any rate, to the animal species under consideration). The question is a relevant one on two levels: the physical-articulatory level and the semantic-cognitive one. From both points of view Fabrici developed an original approach that ought to be examined within its specific historical and doctrinal context.

As is widely known, a leading Classical and late-antique tradition, which finds in Titus Lucretius Carus (?–55 b. C.), Plutarch of Cheronea (50–after 120 A.D.), Sextus Empiricus (end 2nd – beginnings 3rd century A.D.) and Porphyry of Tire (234–beginnings 4th century A.D.) its most notable representatives, had credited animals with the capacity to communicate and reason, and even with 'moral' behaviour. Clearly, these capacities were held to be far less developed in animals than in man, but they were still seen to reflect the same underlying qualities. The distinction, in other words, was regarded as a matter of degree, not of nature. Our difficulty in understanding animal communication was thought to be due not to the animals themselves, but rather to the human incapacity to tune in to such communication. Besides, as Sextus Empiricus writes in a famous passage [§ 74] of his *Outlines of Pyrrhonism*, even when we hear "barbarians" speak, we do not understand them and perceive their language as uniform sound. The idea of a substantial 'continuity' between human and non-human language stands in contrast to the Aristotelian notion, expressed in the *Politics*, that the boundaries between the various species are clear-cut (see § 1 above). Even more so, it stands in contrast with the Stoic notion that animals lack any form of inner rationality/discursiveness (*lógos endiáthetos*) – a view which

reduces the mode of expression of birds, for example, to a purely mechanical phenomenon (*SVF* II, 135 [2]), encapsulated by the expression “uttered speech” (*lógos prophorikós*).¹¹

Fabrici’s ties to this tradition are evident, if for no other reason but his repeated mention of strategic passages from Porphyry’s *De abstinence ab esu carniū*, a classic example of the defence of animal rationality in Antiquity.¹² In Porphyry and Plutarch (not to mention Michel de Montaigne [1533–1592], who had recently drawn upon the same themes in his 1580 *Essais*, II 12), the vindication of animal language is chiefly a dialectical argument that serves a sceptic concept of the human nature. Fabrici, by contrast, explores the topic from a strictly scientific standpoint. To describe the kind of utterances expressed by non-human animals, Fabrici does not use the term *vox* (corresponding to Aristotle’s *phōnē*), but *articulus*: in his view, in those animals equipped with a suitable respiratory apparatus (lungs, larynx, etc.), voice undergoes a genuine form of articulation, albeit one less complex than the articulation of human voice. As is the case with vowels in human languages, this kind of articulation occurs in the anatomical area located just after the larynx, which is to say the pharynx, which through its muscular movements is capable of significantly altering its structure and hence the flow of air. In human beings, this process of articulation continues in the oral cavity, where consonants are formed through the combined action of tongue, teeth and lips. In animals, the same process instead ends at the first stage. It is reasonable, therefore, to speak of a kind of *loquela* (amounting to *vox explanata*), but not of language in the human, species-specific sense of the term. The *articuli* of brute animals are not “letters” (*litterae*) and hence cannot be transcribed according to the graphic conventions of modern alphabets. However, they still share in common with human language a capacity to reinforce the semantic effect of voice, enabling a more sophisticated expression of the affections of the soul (clearly, unlike human beings, animals do not have access to any psychological content of the rational sort). Fabrici sums up his perspective as follows:

¹¹ On this Classical distinction, see Gensini and Fusco (2010: 27-40). For a more in-depth discussion, see Mühl (1962) and Manetti (2012).

¹² Possibly as a matter of prudence, Fabrici does not quote *De rerum natura* by the materialist Lucretius, whose portrayal of the expressiveness of animal language showed many affinities with his own doctrine. Instead, Fabrici mentions (Ch. I) the Christian author Firmianus Lactantius (~250 - ~325), who in his *Divinae Institutiones* had argued: “Nam caetera, [etiam] quae putantur esse homini propria, in caeteris quoque animalibus reperiuntur. Cum enim suas voces propriis inter se notis discernunt atque dignoscunt, colloqui videntur” (III, Ch. X).

Si enim articulus in eo vocem afficit, ut fusam efficiat interceptam, continuatam, distinctam, productam et uniformem, divisam et variam: profecto nullus est qui inficiabitur aves, quadrupedia et bruta omnia vocem habere articulatam et consequenter loquelam. Quid namque sunt Lusciniae moduli tam varii, quam eius loquela et articulata vox? Ecquid referunt canum latratus aut eiulatus tam concisi et diversi, quam diversos articulationis modos? (*De brut.* 1603: 5)

Having established this point, Fabrici embarks on a kind of survey of the vast range of communication systems to be found among animal species. He does so with the zest of a real naturalist who delights in the discoveries he makes, but also with warm-hearted appreciation of the wealth of nature. This conjures up the memory of the famous *Elegy of Philomela* (*De brut.* 1603: 12), a work attributed to Ovid (Publius Ovidius Naso, 43 b.C. – 17 A.D.) at the time. Fabrici's experimental attitude is here reflected by verses that express the impossibility of conveying in a modern language the subtle differences between animal languages ("Tigrides indomita raucant, rugiuntque leones / Panther caurit amans, pardus hiando felit, / dum lince oreando fremunt, ursus ferus uncat, / ast lupus ipse ululat, frendet agrestus aper").¹³

With regard to the forms which signs can take, it is worth adding that Fabrici also pays the utmost attention to the various modes in which states of mind of non-human animals are expressed. *Loquela* is obviously the most perfect way in which certain animal species can display the affections of their soul. More primitive species can resort to means that are not as perfect but are nonetheless effective, such as (in order of increasing complexity) touch, sight, bodily movement, and sound. Even lowly creatures like worms and ants – Fabrici observes – are bound to communicate in their own fashion, probably by resorting to touch, sight and bodily movement, as is suggested by their drawing close to one another, making physical contact and rubbing faces (Dante comes to mind here: "E'en so the emmets, 'mid their dusky troops, / peer closely one at other, to spy out / their mutual road perchance, and how they thrive", *Purg.* XXVI, 34–6, transl. H. F. Gary).

The dog, a more complex creature, can run the whole gamut of modes of expression, with increasing levels of energy: from sight to phonic-acoustic threat signals, e.g., when it strives to take another dog's place (*De brut.*, 1603: 14). This multimodal dimension applies all the more to humans, since

¹³ *The Elegy of Philomela*, possibly dating from the 7th century, is no. 762 in Riese (hrsg.) (1870: 224-227).

a gaze, touch, gesture or tone of voice can express refined feelings and even turn into genuine art: references are made here to Cicero's (106–43 b.C.) *Tusculanae Disputationes* (IV), who had spoken of 'bodily eloquence', and Lucian of Samosata's (125–end 2nd century A.D.) *De Saltatione*, who had discussed the expressiveness of actors.

The second aspect of the problem has to do with the psychological content (the *affectus*) which the signs of *loquelaе brutorum* are meant to express. Fabrici borrows Aristotle's idea that animal languages are essentially meant to express likes and dislikes, i.e. *iucundum et molestum*. These general notions, however, can – and indeed must – be analysed (cf. Ch. V) in the form of a range of specific affections, thereby enriching our understanding of the psychological life of the species investigated (and hence of its language). The two primitive notions of what is pleasant and positive and what is unpleasant and negative may be broken down into four basic affections: *Voluptas*, *Cupiditas*, *Molestia*, and *Metus*. In turn, pleasure – to consider but one example – may be subdivided into at least six different kinds of affection: *Amor*, *Gaudium*, *Laetitia*, *Delectatio*, *Malevolentia et Iactatio*. On the basis of these distinctions – partly drawn from Cicero's moral works, partly from contemporary philosophical treatises¹⁴ – Fabrici carries out the "fieldwork" of observing animal behaviours, which prove to be far more complex and nuanced than one would expect. First-hand observation, moreover, makes it possible to establish what relation exists between a given psychological state and the sign expressing it, in such a way as to reconstruct what nowadays would be described as the "communication code" of a species. One example of the method followed by Fabrici is the following reconstruction of the face-off between a dog and a hen that is escorting and courageously protecting her chicks:

Canis cursu vehementi contra faetam gallinam ducentem pullos irruerat, quae facta prius in sensorio visus tum alteratione, tum dignotione obiecti, nimirum vehemens motus, mox concepit illum esse molestum et e vestigio duobus modis eum coercere et evitare se ipsam apparavit, pugna videlicet et fuga. Unde necessario duplex affectus excitatus in ea fuit, ira ac timor, quae duo, quoniam contraria sunt, ut simul in eodem subiecto eodem tempore consistere nequeant, iccirco diversa respiciunt

¹⁴ Francesco Piccolomini's (1520-1604) *Universa philosophia de moribus* (1583) surely was an important source of Fabrici's reflections on this point. The Sienese Piccolomini was an authoritative exponent of Paduan Aristotelianism at Fabrici's times.

et ad diversa referuntur. Timor enim et fuga ad pullos, ira vero et pugna ad ipsammet Gallinam refertur. Unde, facto tali quodam articulo KIK, pullos ad fugam excitavit, qui audito hoc articulo, statim omnes stipatim fugam arripuerunt; se ipsam autem interim opposuit cani ad pugnam. Porro cane confestim discedente, ipsa denuo alio articulo, ut puta GLO GLO, pullos ad se subito convocavit. Sicque universa finita fuere. (*De brut.* 1603: 24).

Several significant elements stand out here: the sharp portrayal of the almost simultaneous psychological states of the hen (*fear* for the chicks and *anger* towards the dog); the identification of signals (KIK KIK to prompt the chicks to flee, GLO GLO to call them back); the alternation of phonic-acoustic and bodily signals, also carrying a specific meaning; the symbolic compromise that brings the fight to an end (the dog, intimidated by the hen's readiness to fight, withdraws), and so on.

Finally, it is interesting to note that although Fabrici establishes "writability" (the possibility of being turned into characters) as a distinctive feature of human language, which also consists of complex consonantal articulations, he does not hesitate to employ ordinary graphemes to express the acoustic signals of a hen. The concept of writability (that Aristotle considered as a kind of counter-check of language articulation) seems to have lost all ontological meaning, becoming a purely technical problem. More generally, it is worth noting that the continuity paradigm followed by Fabrici falls short before the nature/culture opposition. No matter how rich and nuanced the psychological states of animals may be, or how varied their expressive signals, they are still confined to the realm of merely natural experience: they represent a heritage with which the various species have been endowed by nature, with no possibility of further variation. This is why animals belonging to the same species will always understand one another. In the case of human language, these natural foundations are instead enriched by an indefinite capacity for variations in space and time, which correspond to incomparably greater semantic possibilities. This is why, according to Fabrici, there exist as many languages as nations; and why human beings, in many circumstances, cannot understand one another.

5. Conclusions

This is not the venue to illustrate the naturalist linguistics of Fabrici d'Acquapendente in any greater detail.¹⁵ A few chronological considerations should suffice to sum up its historical value. Hardly twenty years after Fabrici's death, the unitary and experimental approach to language proposed by his works ran up against the dualistic paradigm of the René Descartes' (1596–1650) *Discours de la méthode* (1637). While this did not prevent scholars from investigating the *machine* of human phonation (Jean-Louis de Cordemoy's [1655–1714] *Discours physique de la parole*, 1668, is a good case in point), it removed its field of action from that of meaning and of the processing of thought. The theory of the *bête machine* brought the study of animal communication to a standstill: with the exception of the chapters devoted to it in Marin Cureau de La Chambre's (1594–1669) *Traité de la connoissance des Animaux* (1648) and in Pierre Gassendi's (1592–1655) *Syntagma* (1658), the topic was ignored until the mid–18th century. In Etienne Bonnot de Condillac's (1715–1780) writings (*Essai sur les origines de la connoissance humaine*, 1746, *Traité des animaux*, 1755) the topic of animal language crops up now and then, but mainly in merely epistemological terms. We have to wait until the end of the century for some now forgotten naturalists to pick up the idea of the systematic observation of language in animals; and until Charles Darwin for this kind of study to gain full scientific legitimacy. It is hardly surprising that with the contemporary rediscovery of the biological foundations of language brought about by the 'cognitive' turn of our day, scholars such as Fabrici d'Acquapendente, too, become a focus of interest.

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¹⁵ For further details, refer to Tardella (2011), Gensini (2011) and Gensini and Tardella (2016).

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