

Voice as Difference in Aristotelian Zoology

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The Aristotelian treatment of animal voice reveals a significant wealth of philosophical issues and methodological approaches. The capability to emit voice, in fact, concerns different aspects of animal life, which Aristotle studies both from the point of view of the different aspects of the soul's activity involved in phonation, and from the point of view of the bodily parts in control of voice emission and articulation. This paper attempts to provide a general survey of these issues.

The poet Alcman claimed he was able to recognize and distinguish the wide range of bird singing and attributed the origin of his art to this knowledge:

«aye, and Alcman did put together the tongued utterance of the *caccabis*, to make his twine of words and music» (fr. 39P, tr. Edmonds)

Centuries later, Aristotle listened to partridges with a different intent but with the same attention to differences in their singing¹.

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¹ See HA 536b 8 ff.

1. *The activity of the soul*

Aristotle argues that voice [φωνή] is peculiar to animals only and therefore he distinguishes it from what is more generally called 'sound' [ψόφος]. In *DA* 420b 5 he says that

«voice is a particular sound made by something with a soul [φωνὴ ψόφος τις ἔστιν ἐμψύχου]; for nothing which does not have a soul has a voice, although such things may be said, by way of likeness, to have a voice, e.g. the pipe, lyre and any other things which lack a soul but have variation in pitch, melody and articulation [διάλεκτος]; there is a likeness here because voice too has these properties» (tr. Hamlyn).

First it must be said that the definition of voice in this passage is evidently incomplete, because the plants are in the number of animate natural beings as well, but they don't have the capability to emit voice. In the following passage indeed Aristotle's account is more precise:

«so, the striking of the inbreathed air upon what is called the windpipe due to the soul in these parts constitutes voice. For, as we have said, not every sound made by an animal is voice (for it is possible to make a sound also with the tongue or as in coughing); but that which does the striking must have a soul and there must be a certain imagination [μετὰ φαντασίας τινός]; for voice is a particular sound which has meaning [σημαντικός].» (tr. Hamlyn)

From these issues it is possible to sum up a very elaborated definition of voice. This definition is firstly enunciated in a synthetic form - «voice is a particular sound made by something with a soul» - and then developed both from the point of view of the emission process and of the bodily parts controlling this function, and from the point of view of the soul's activity that is necessarily related to the voice.

What distinguishes voice emission from the production of a different kind of sound by the same animal, is that voice is always linked to an image and has the capability to signify something. The theoretical basis of this issue can be found in the first chapter of *De interpretatione*, where Aristotle says:

«now spoken sound are symbols [σύμβολα] of affections in the soul, and written marks symbols of spoken sounds. And just as written marks are not the same for all men, neither are spoken sounds. But what these are in the first place signs of – affections of the soul – are the same for all; and what these affections are likenesses [ὁμοιώματα] of – actual things – are also the same» (tr. Ackrill)².

The semantic character of voice is brought about by the symbolic connection which links it to the affections of the soul. In these terms, voice is the symbol [σύμβολον] of the soul's

² *De int.* 16a 3 ff. See R. Polansky - M. Kuczewski, 'Speech and Thought, Symbol and Likeness: Aristotle's *De Interpretatione* 16a 3-9', *Apeiron* 23 (1990), pp. 51-63, DOI: 10.1515/APEIRON.1990.23.1.51.

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[συνετωτέραν ἔχει ψυχὴν]. Man's imagination is strictly connected with thought [θεωρεῖν]⁶, and it is a necessary condition for it. On the other hand, all animals devoid of intellect [νοῦς], yet endowed with imagination, act in accordance with images⁷.

The relation between voice and imagination should be clear on the basis of these issues. Sounds are symbols of the soul's affections and bear resemblance to objects, so that they are ὁμοιώματα of objects. However this resemblance is peculiar to image: in *DA* 428b 14 ff. indeed, Aristotle holds that the 'movement' of imagination must be resemblant [ὁμοίαν] to the sensation of the object. This resemblance regards exclusively the soul's affection and the sensation of the relative object, not the word that designates the object, because this word is due to convention⁸.

The voice and the imagination of animals are distinguished by relevant differences, so that the questions at issue are firstly the nature of the connection between these differences and secondly the relation between the excellence of phonation and the soul qualities of animals.

2. The causal explication of differences

Aristotle already presents voice as a notable distinguishing mark in the first book of *Historia Animalium*, where he outlines the differences in animals as a whole:

«Further, some animals emit sound [ψοφητικὰ] while others are mute [ἄφωνα], and some are endowed with voice [φωνήεντα]: of these latter some have articulate speech [διάλεκτον ἔχει], while others are inarticulate [ἄγράμματα]; some are given to continual chirping and twittering some are prone to silence; some are musical, and some unmusical; but all animals without exception exercise their power of singing or chattering chiefly in connection with the intercourse of the sexes» (tr. D'Arcy W. Thompson).

The divisions set out in this passage have a rather simple basic structure with a dichotomous course, still they are enriched with distinctions concerning frequency and typology of voice emission and with an ethological observation about courtship.

⁶ See *DA*. 431a 14 ff., 432a 8 ff.

⁷ See *DA* 429a 4 ff.

⁸ Elsewhere I have argued that «se la semanticità del linguaggio è definita da un sistema di rapporti simbolici, essa si fonda allora sulle affezioni dell'anima e non già sulle cose, che vengono così escluse dalla relazione del significato», *cit.* p. 43. Therefore, the name is sign [σημείον] of an object in that it is a symbol [σύμβολον] that refers to this object. This reference is conventional, because the relation of similarity [ὁμοιώτης] connects exclusively the object and the relative affection (cfr. T. Waitz in Aristoteles, *Organon*, Aallen 1965, Neudruck der Ausgabe Leipzig 1844, p. 325). The conventionality of the σύμβολον is treated in *Rhet.* 1417b 2 ff., where the symbolic connection refers to the common sense. On the other hand, in *Pol.* 1340a 33 ff. the relation of similarity is characterized by its immediacy, thus it is well distinct from the semantic relation.

The double point of view of Aristotle's causal explication is sketched out clearly in the first passages of *De audibilibus*⁹:

«we all breathe the same air, but we emit different breath [πνεῦμα] and sounds owing to the difference of the organs involved, through which the breath passes to the region outside. These are the windpipe, the lung and the mouth.. But the greatest difference in sound is produced by the blows of the air and the shapes assumed by the mouth [οἱ τοῦ στομάτου σχηματισμοί]» (800a 17 ff., tr. Hett with additions)

Therefore differences in voice are brought about by the shape of the bodily parts in control of phonation, because the different constitution of these parts causes different functionality and capability. The breathing essential to voice emission originates in the lung, so that the features of this part bring about the quality of the sound emitted:

«when the lung is small, or thick, or hard, it can neither admit much air nor breathe much out again, nor can it make the air's blows either strong or powerful. For because it is hard, thick and tight it cannot admit of greater expansion, nor by contracting itself after a great expansion can it forcibly collect the breath, just as we cannot with bellows, when they are hard and can neither be expanded nor contracted easily. For this contributes to making the blow of the breath strong, when the lung contracting after a considerable expansion drives out the air violently. [...] But if the lung is large and pliable it can admit much air, and expel it again husbanding it as it wishes, because of its softness and because it can easily contract» (800a 33 ff., tr. Hett).

So, the softer and more elastic the lung, the longer and more powerful the vocal emission. The air pushed by the lung goes through the windpipe before reaching the mouth, where its movement undergoes a first transformation:

«but when the windpipe is long and narrow, it expels the voice to the outside with difficulty and needs considerable force because of the length that the breath travels. This is evident; for all creatures with long necks make violent sounds [φθέγγονται βιαίως], such as geese, cranes and cocks. [...] But in the case of those that have a large space in the windpipe their breath passes very easily to the outside, and when travelling within passes through the wide space, and the voice becomes hollow and toneless, and moreover such animals cannot differentiate with the breath [διαρεῖσθαι τῷ πνεύματι] because the windpipe has no support [διὰ τὸ μὴ συνερείδεσθαι]. [...] For as the windpipe is short it must expel the breath again quickly, and the blow of the air must be stronger, and all such give a sharper sound [ὀξύτερον φωνεῖν] because of the speed with which the breath travels» (800b 20 ff., tr. Hett).

The greater length and tightness of the passage make the vocal emission less easy, while an excessive width weakens the sound emitted: on the other hand, if the windpipe is short enough, the air maintains its speed, so that the voice is very loud. In *De aud.* 801b 12 ff. Aristotle argues that

«but voices appear clear in proportion to the accuracy of the articulation [σαφεῖ δὲ μάλιστα αἱ φωναὶ γίνονται παρὰ τὴν ἀκρίβειαν τὴν τῶν φθόγγων]. For unless there is perfect articulation the voices cannot be clear [μὴ τελέων τούτων διηρθρωμένων]» (tr. Hett).

⁹ In spite of its doubtful authenticity, this work offers a good sketch of the Aristotelian theories.

Therefore the most important distinguishing marks of voice are brought about by its final elaboration, that is the articulation made by the mouth.

On the basis of these issues the distinction between ‘sound’ [ψόφος], ‘voice’ [φωνή] and ‘language’ [διάλεκτος] outlined in *HA IV*, 9¹⁰ is borne out by an accurate analysis of the different bodily parts controlling these functions. From this point of view the distinction at issue is the starting point for the later divisions. It would be advisable now to make reference to the passage of *DA II*, 8 quoted above, where voice is distinguished from sound. In order to specify that voice is peculiar to animals, in so far as it is linked to a certain activity of the soul, in that passage Aristotle makes a comparison between the voices of animals and the sound of musical instruments such as flute or lyre. These instruments have voice only metaphorically because they are devoid of soul: their sound seems a voice because they have melody [μέλος] and modulation [διάλεκτος]¹¹, therefore having the capability to emit articulated sounds.

In addition to the analysis of the soul’s faculties related to voice emission, in *DA* there can be found a treatment of the bodily parts in control of the production and articulation of vocal sounds intended to explain the material conditions of voice emission:

«but voice is sound made by an animal and not with any chance part of its body. But since everything which makes a sound does so because something strikes something else in something else again, and the last is air, it is reasonable that the only creatures to have voice should be those which take in air» (*DA* 420b 14 ff., tr. Hamlyn).

The definition of sound quoted here is reminiscent of the one enunciated in *DA II*, 8¹² and outlines the relational structure in which Aristotle sets the activity of the bodily parts under discussion. The analysis of voice and language in *HA IV*, 9 proceeds indeed in this way¹³:

«voice and sound are different from one another; and language differs from voice and sound. The fact is that no animal can give utterance to voice except by the action of the pharynx, and consequently such animals as are devoid of lung have no voice; and language is the articulation of vocal sounds by the instrumentality of the tongue [διάλεκτος δ’ ἢ τῆς φωνῆς ἐστι τῆ γλώττι διάρθρωσις]. Thus, the voice and larynx can emit vocal or vowel sounds; non-vocal or consonantal sounds are made by the tongue and the lips; and out of these vocal [φωνήεντα] and non-vocal [ἄφωνα] sounds language is composed. Consequently, animals that

¹⁰ See W. Ax, ψόφος, φωνή und διάλεκτος als Grundbegriffe aristotelischer Sprachreflexion', *Glotta* LVI, pp. 245-271.

¹¹ The same term means both the modulation of sound peculiar to musical instruments and the articulation of voice peculiar to the mouth.

¹² See also *DA* 419b 17 ff., 420a 11 ff. where Aristotle admits the possibility to emit and hear sound in water.

¹³ See R. Zirin R., 'Aristotle's biology of language', *Transactions of the American Philological Association*, CX (1979), pp. 325-347, DOI: 10.2307/284226.

have no tongue at all or that have a tongue not freely detached, have neither voice nor language; although, by the way, they may be enabled to make noises or sounds by other organs than the tongue» (HA 535a 28 ff., tr. D'Arcy W. Tompson).

Language is composed of a vocal element, that is the vowels, and of a non-vocal element, that is the consonants¹⁴. A similar treatment can be found in PA 660a 2 ff.:

«now vocal speech consists of the combination of the various letters [γράμματα] or sounds, some of which are produced by an impact of the tongue, others by closing the lips; and if the lips were not supple, or if the tongue were other than it is, the greatest part of these could not possibly be pronounced» (tr. Peck).

Voice is that kind of sound produced by animals with the larynx, while language is an articulation of this sound made by tongue and lips. The relations between the functions of the parts in question are very complex.

In DA 420b 17 ff. Aristotle says that

«for nature then uses the air breathed in for two functions [καταχρήται ἡ φύσις ἐπὶ δύο ἔργα]; just as it uses the tongue for both tasting and articulation [διάλεκτον], and of these tasting is essential (and so is found in a greater number of creatures), while expression [ἐριμνεία] is for the sake of well-being. So also nature uses breath both to maintain the inner warmth, as something essential [...], and also to produce voice so that may be well-being. The organ of breathing is the throat, and that for which this part exists is the lung; for it is through this part that land animals have more warmth than other creatures. It is also primarily the region round the heart which needs breath. Hence the air must pass in when it is breathed in» (tr. Hamlyn).

The larynx controls breathing and therefore its activity is relative to the lung. Breathing is an essential activity for any animal because it is necessary to cool the heat of heart and lung¹⁵. So nature uses this necessary function for a further purpose, not giving this part another necessary task but employing it *for the sake of good*, that is the emission of the voice. In the passage at issue, Aristotle also notices an analogy between this double function of the larynx and the manifold use of the tongue, that have a necessary task, such as taste, and a further task for the sake of good, such as the articulation of voice.

On the basis of these issues Aristotle makes an analysis of the differences in the animal series related to phonation. The first group singled out regards insects emitting non-vocal sounds:

«insects, for instance, have no voice and no language, but they can emit sound by internal air or wind, though not by the emission of air or wind; for no insects are capable of respiration. But some of them make a humming noise, like the bee and the other winged insects; and others are said to sing, as the cicada. And all

¹⁴ See P. Laschia, *L'articolazione linguistica. Origini biologiche di una metafora*, Roma 1997, pp. 60 ff.

¹⁵ In PA 653a 29 ff. Aristotle argues that heart and lung are the hottest parts of the body, and that in the man these parts are hotter than in other animals. See also PA 669a 14 ff. and *De respir.* 21 about the relation between these parts in breathing.

these latter insects make their special noises by means of the membrane that is underneath the 'hypozoma'- those insects, that is to say, whose body is thus divided; as for instance, one species of cicada, which makes the sound by means of the friction of the air. Flies and bees, and the like, produce their special noise by opening and shutting their wings in the act of flying; for the noise made is by the friction of air between the wings when in motion. The noise made by grasshoppers is produced by rubbing or reverberating with their long hind-legs.» (*Hist. an.* IV, 9, 535b 3 ff., tr. D'Arcy W. Thompson).

These animals, devoid of lung, don't breathe, so they emit sounds with parts different from those controlling voice emission by moving the external air.

Further divisions concern different aquatic animals, such as molluscs (*malakia*), crustaceans (*malakostraka*), fishes and dolphins:

«no mollusk or crustacean can produce any natural voice or sound. Fishes can produce no voice, for they have no lungs, nor windpipe and pharynx; but they emit certain inarticulate sounds and squeaks, which is what is called their 'voice', as the lyra or gurnard, and the sciaena (for these fishes make a grunting kind of noise) and the caprus or boar-fish in the river Achelous, and the chalcis and the cuckoo-fish; for the chalcis makes a sort piping sound, and the cuckoo-fish makes a sound greatly like the cry of the cuckoo, and is nicknamed from the circumstance. The apparent voice in all these fishes is a sound caused in some cases by a rubbing motion of their gills, which by the way are prickly, or in other cases by internal parts about their bellies; for they all have air or wind inside them, by rubbing and moving which they produce the sounds. Some cartilaginous fish seem to squeak. But in these cases the term 'voice' is inappropriate; the more correct expression would be 'sound'. For the scallop, when it goes along supporting itself on the water, which is technically called 'flying', makes a whizzing sound; and so does the sea-swallow or flying-fish: for this fish flies in the air, clean out of the water, being furnished with fins broad and long. Just then as in the flight of birds the sound made by their wings is obviously not voice, so is it in the case of all these other creatures. The dolphin, when taken out of the water, gives a squeak and moans in the air, but these noises do not resemble those above mentioned. For this creature has a voice (and can therefore utter vocal or vowel sounds), for it is furnished with a lung and a windpipe; but its tongue is not loose, nor has it lips, so as to give utterance to an articulate sound (or a sound of vowel and consonant in combination.)» (tr. D'Arcy W. Thompson).

Mollusks and crustaceans are in fact excluded from this treatment because they don't emit sound. Fishes are also devoid of lung, wind pipe and larynx, i.e. the parts in control to voice emission. These remarks show that the *criterium* of differentiation is the analysis of the bodily parts, as in *DA* 420b 9 ff.:

«but many animals do not have a voice, e.g. those which are bloodless as well as fish among those which do have blood. And this is reasonable enough, since sound is a particular movement of air. But those fishes which are said to have a voice, e.g. <those> in the Achelous, make a sound with their gills or some such part; but voice is sound made by an animal and not with any chance part of its body» (tr. Hamlyn).

Every aquatic animal cannot emit voice because this is a certain movement of air. The case of the fishes that seem to emit voice is peculiar because the movement of air that generates sounds is produced by parts not controlling voice emission. From the same point of view, the case of dolphins is indeed different because this animal is endowed with lung and windpipe - parts in

control to voice emission - but it is devoid of a nimble tongue and of lips and thus it cannot articulate voice.

An overall view of the parallel passages of *HA* and *DA* reveals the various perspectives of differentiation operating in these first steps of the Aristotelian analysis. The distinctions concerning sound emission are grounded on the assumption of kinds singled out in accordance with different lines of differentiation. The first division is effected by the opposition ‘endowed with lung’ / ‘devoid of lung’: in *PA* 669b 13 ff. Aristotle singles out animals endowed with lung as a certain kind and argues that this mark belongs to their essence. On the other hand, the fishes kind, firstly singled out in *HA* IV, 9 is described in *HA* I, 6 as one of the μέγιστα γένη that divide the ‘animal’ kind. Further observations are grounded on the assumption of the kind of aquatic animals, related to the distinction of the term ‘aquatic’ sketched in *HA* 487a 16 ff.:

«some animals live in water and others on land. And of those that live in water some do so in one way, and some in another: that is to say, some live and feed in the water, take in and emit water, and cannot live if deprived of water, as is the case with the great majority of fishes; others get their food and spend their days in the water, but do not take in water but air, nor do they bring forth in the water. Many of these creatures are furnished with feet, as the otter, the beaver, and the crocodile; some are furnished with wings, as the diver and the grebe; some are destitute of feet, as the water-snake. Some creatures get their living in the water and cannot exist outside it: but for all that do not take in either air or water, as, for instance, the sea-nettle and the oyster. And of creatures that live in the water some live in the sea, some in rivers, some in lakes, and some in marshes, as the frog and the newt» (tr. D’Arcy W. Thompson)¹⁶.

The nature of the dolphin is at issue in *PA* 669a 7 ff.¹⁷:

«all land animals breathe; so do some of the water-animals (*e.g.* the whale, the dolphin, and all the spouting cetacean). This is not surprising, for many animals are intermediate between the two [ἐπαμφοτερίζουσι]: some that are land-animals and breathe spend most of their time in the water owing to the blend in their bodies; and some of the water-animals partake of the nature of land-animals to such an extent that the limiting condition of life for them lies in the breath» (tr. Peck).

The division made in accordance with the mark ‘endowed with lung’ doesn’t correspond to the distinction by the opposition ‘terrestrial’ / ‘aquatic’. A comparison between these two lines of division shows that in the kind of the ‘endowed with lung’ animals can be numbered (i) terrestrial animals, (ii) aquatic animals that share the constitution of terrestrial animals, (iii) terrestrial animals that share the habits of aquatic animals. On the other hand, a comparison between this passage and

¹⁶ Some of the arguments in *PA* I, 3 are intended to show that with respect to distinguishing marks of this kind, animals cannot be divided by only one difference at a time because these differences must be further differentiated from many points of view.

¹⁷ On cetaceans see *De respir.* 476b 12 ff. and *PA* 697a 16 ff.

DA 420b 9 ff. shows that Aristotle makes reference to the difference ‘endowed with blood’ / ‘devoid of blood’ and to the relation between this line of differentiation and the others.

In HA IV, 9 further analysis concerns the animals grouped in PA 660b3 ff. in a kind singled out in accordance with the three differences ‘terrestrial’, ‘oviparous’ and ‘blooded’:

«the tongue is useless for the purpose of speech [πρὸς μὲν τὴν τῆς φωνῆς ἐργασίαν ἀχρηστον] in most of the oviparous and blooded land-animals because it is fastened down and is hard; but it is very useful for the purpose of taste, e.g. in the serpents and lizards, which have long, forked tongues» (tr. Peck).

Tongues like these lack the capability to articulate voice, so that

«of animals which are furnished with tongue and lung, the oviparous quadrupeds produce a voice, but a feeble one; in some cases, a shrill piping sound, like the serpent; in others, a thin faint cry; in others, a low hiss, like the tortoise. The formation of the tongue in the frog is exceptional. The front part of the tongue, which in other animals is detached, is tightly fixed in the frog as it is in all fishes; but the part towards the pharynx is freely detached, and may, so to speak, be spat outwards, and it is with this that it makes its peculiar croak» (HA 536a 4 ff.; tr. D’Arcy W. Thompson).

The kind ‘oviparous’ and the species ‘quadrupeds’ and ‘snakes’ are singled out and collocated in the range of a superordinate kind characterized by the differences ‘endowed with tongues’ and ‘endowed with lung’. Therefore, these differences are the criteria both for the differentiation of animals from the point of view of phonation and for the causal explication of the emission and articulation of voice.

In the following passage the courtship of some animals and its relation to their cries is at issue:

«the croaking that goes on in the marsh is the call of the males to the females at rutting time; and, by the way, all animals have a special cry for the like end at the like season, as is observed in the case of goats, swine, and sheep. (The bull-frog makes its croaking noise by putting its under jaw on a level with the surface of the water and extending its upper jaw to its utmost capacity. The tension is so great that the upper jaw becomes transparent, and the animal’s eyes shine through the jaw like lamps; for, by the way, the commerce of the sexes takes place usually in the night time.)» (tr. D’Arcy W. Thompson).

Except for the frog, which has a particular constitution, these animals belong to the kind ‘blooded viviparous quadrupeds’ referred to briefly in HA 536a 33:

«viviparous quadrupeds utter vocal sounds of different kinds, but they have no power of converse. In fact, this power, or language, is peculiar to man» (tr. D’Arcy W. Thompson).

And also quoted in PA 660a 31 ff.:

«the blooded viviparous quadrupeds have a limited vocal articulation; it is because their tongues are hard and thick and not sufficiently loose» (tr. Peck).

Animals of this kind have a limited capability to articulate voice because of the shape of the tongue, so that even if their articulated voices are not a language, still they are differentiated for example during courtship. The elephant is peculiar, because it

«the elephant makes a vocal sound of a wind like sort by the mouth alone, unaided by the trunk, just like the sound of a man panting or sighing; but, if it employ the trunk as well, the sound produced is like that of a hoarse trumpet» (tr. D'Arcy W. Thompson):

the differentiation of voice is not brought about by the mouth, that is by tongue and lips, but by the different way of pushing air out.

A distinguishing mark of the Aristotelian treatment of the voice is that the explication of the differences concerning the kind of the birds and that of man are parallel and related both in *HA* and in *PA*. In *PA* 659b 20 ff. the description of the beak reveals Aristotle's views on this matter:

«in all blooded animals that have teeth, the lips have their place below the nostrils. (As stated already, birds have a bony beak for getting food and for defense; and this is as it were teeth and lips run into one. The nature of the beak can be illustrated thus. Supposing, in a human being, that the lips were removed, and all the upper teeth were welded together, and similarly all the bottom teeth, and then each set were extended in a forward direction and made to taper: this would result in a beak such as birds have.) In all animals except man the lips are intended to preserve and to protect the teeth; hence we find that the distinctness of formation in the lips is directly proportionate to the nicety and exactitude of formation in the teeth» (tr. Peck).

The function of the beak is analogous to the function of teeth and lips both from the point of view of the necessary task of these parts and from the point of view of their use for the sake of the good, that is voice articulation. In *PA* 659b 31 ff. Aristotle shows that this double function of the parts at issue is most evident in man:

«in man the lips are soft and fleshy and can be separated. Their purpose is (as in other animals) to protect the teeth; but – still more important – to subserve a *good* purpose [διὰ τὸ εὖ], inasmuch as they are among the parts that make speech possible [πρὸς γὰρ τὸ χρῆσαι τῷ λόγῳ]. This double function of the human lips [...] may be compared with that of the human tongue, which is unlike that of any other animal, and is used by Nature for two functions [πρὸς ἐργασίας δύο καταχρησασμένη] (a device of hers which we have often noted), (a) to perceive the various tastes, and (b) to be the means of speech» (tr. Peck).

The necessary use of lips is the protection of the teeth, while their function for the sake of good concerns voice articulation. In *PA* 661b 7 ff. Aristotle argues that teeth participate to some extent in this articulation:

«human teeth too are admirably adapted for the common purpose [πρὸς τε τὴν κοινὴν χρῆσιν] that all teeth subserve: the front ones are sharp, to bite up the food; the molars are broad and flat, to grind it small; and on the border between the two are the dog-teeth whose nature is intermediate between the two: and just as a mean shares the nature of both its extremes, so the dog-teeth are broad in one part and sharp in another. Thus the provision is similar to that of the other animals, except those whose teeth are all sharp; but in man even

those sharp teeth, in respect of character and number, are adapted chiefly for the purpose of speech, since the front teeth contribute a great deal to the formation of the sound» (tr. Peck).

The tongue of man and the tongue of birds have shape in common, because

«the human tongue is the freest, the broadest, and the softest of all: this is to enable it to fulfill both its functions. On the one hand it has to perceive all the various tastes, for man has the most delicate senses of all animals, and a soft tongue is the most responsive to touch, and taste is a sort of touch. It has, also, to articulate the various sounds and to produce speech, and for this a tongue which is soft and broad is admirably suited, because it can roll back and dart forward in all directions» (PA 660a 17 ff., tr. Peck),

and similar capabilities belong to the tongue of many birds:

«a tongue which is broad can also become narrow, on the principle that the great includes the small, but not *vice versa*. That is why the clearest talkers, even among birds, are those which have the broadest tongues»¹⁸ (PA 660a 28 ff., tr. Peck).

This remark shows the material cause that brings about the capability of the tongue to articulate voice, both in the birds and in man.

This treatment developed in the passages quoted, is based on the distinction between the necessary function of the parts at issue - that is their 'common use' - and their further use, which is a certain excellence, peculiar to some animals only. This manifold use is the distinguishing mark of the parts controlling voice articulation¹⁹, and shows that phonation, being a superior rank activity, exceeds the range of the necessary-for-life functions. The distinction between what belongs to animals for the sake of living and what belongs to them for the sake of good is at issue in PA 656a 4 ff.:

«but with creatures that not only live but also have the power of sensation, the formations are more varied, and there is more diversity in some than in others. The greatest variety being found in those creatures which in addition to living have the capability of living the good life, as man has. Man is the only of the animals known to us who has something of the divine in him, or, if there are others, he has most» (tr. Peck).

Therefore, animal life has - so to say - different levels of complexity. In the passage quoted above Aristotle outlines this gradualness, which concerns both the activities peculiar to the different beings and the parts in control of the relative functions, so that to the excellence of certain functions

¹⁸ The birds at issue are songbirds. See also HA 597b 27 ff. where Aristotle deals with the parrot, «that is said to be human-tongued» (tr. Balme) [ἀνθρωπόγλωττον ὄρνειον]. In *De aud.* 800a 23 ff. Aristotle argues that many birds share with man the capability to imitate the voices of other animals.

¹⁹ The verbs καταχρῆσθαι and παρακαταχρῆσθαι usually express this manifold function: the same mean is for the sake of different goals. This treatment is a good example of the complexity of the Aristotelian theory of causality. See A. Preus, *Science and philosophy in Aristotle's biological works*, pp. 226 ff.

corresponds a greater complexity of the bodily parts and a wider diversification of the body as a whole. An example of analysis from this point of view can be found in *PA* 687a 6 ff.:

«Anaxagoras indeed asserts that it is his possession of hands that makes man the most intelligent of the animals; but surely the reasonable point of view is that it is because he is the most intelligent animal that he has got hands. Hands are an instrument; and Nature, like a sensible human being, always assigns an organ to the animal that can use it» (tr. Peck).

Aristotle's criticism of Anaxagoras concerns the right definition of the terms of causal explanation in the case of a part in control of a manifold use such as the hand: the matter is whether the complexity of the part at issue is cause or effect of the superior capabilities of the soul. What Aristotle says in *PA* 645b 15 ff. shows that his view on this question is clear:

«since every instrument is for the sake of something, and each bodily part is for the sake of something, and what they are for the sake of is an activity, it is plain that the body too as a whole is composed for the sake of a full activity» (tr. Balme).

Therefore, with regard to voice articulation there is an evident relation between the better and more definite shape of the parts and the higher complexity of their function, and it is clear that this connection corresponds to the relation between goal and mean.

From the point of view of this relation some limits must be set regarding the parallel treatment of the phonation of men and birds, because this is the basis for the definition of the distinguishing marks of human language. The limit at issue, however, must be marked accurately. Aristotle argues frequently that animal is to man as a child is to an adult or as a disabled person is to a healthy one²⁰. In a famous passage of *Pol.* I, 2 Aristotle clearly marks the difference between man and animal²¹:

«nature, as we often say, makes nothing in vain, and man is the only animal who has the gift of speech [λόγος]. And whereas mere voice [φωνή] is but an indication of pleasure or pain, and is therefore found in other animals (for their nature attains to the perception of pleasure and pain and the intimation of them to one another, and no further), the power of speech is intended to set forth the expedient and inexpedient, and therefore likewise the just and the unjust» (*Pol.* 1253a 9 ff., tr. Everson).

²⁰ See *HA* 536b 2 ff.: «for while the capability of talking implies the capability of uttering vocal sounds, the converse does not hold good. Men that are born deaf are in all cases also dumb; that is, they can make vocal sounds, but they cannot speak. Children, just as they have no control over other parts, so have no control, at first, over the tongue; but it is so far imperfect, and only frees and detaches itself by degrees, so that in the interval children for the most part lisp and stutter» (tr. D'Arcy W. Thompson). See also *PA* 686b 2 ff.

²¹ See R. Sorabji, 'Esprits d'animaux', in *AA.VV.*, *L'animal dans l'antiquité*, édité par B. Cassin et J.-L. Labarrière sous la direction de G. Romeyer Dherbey, Paris 1997, p. 369 and T. Gontier, *L'homme et l'animal. La philosophie antique*, Paris 1999.

The distinguishing mark of man is the excellence of the phonation, while a limited capability is peculiar to the other animals in general. The question is at issue also in *Probl. X*, 38-39:

«why does man show great variety of voice, but other animals have only one, unless they are of different species [τὰ δὲ ἄλλα μίαν, ἀδιάφορα ὄντα τῷ εἶδει] ? Or has man only one voice, though many varieties of speech? Why does this speech take different forms, when it does not with other animals? Is it because man can utter a number of letters, but of the other animals some utter none and some only two or three consonants? These consonants combined with vowels make articulate speech. Now speech consists of conveying a meaning not by the voice, but by certain affections of it, and not only pain and pleasure. Now letters are affections of the voice. Children and beasts show their meaning in the same way, for children cannot yet pronounce the letters» (tr. Hett).

The solution to these *aporia* should be the consequence of a complete analysis of the differences in voice. The hypothesis ventured in the first *aporia* outlines a division of the whole animal series into two kinds singled out according to the differences ‘able to emit many voices’ / ‘able to emit only one voice’. Therefore, one kind would include only man, while the other would include the other animals: from this point of view, every animal different from man would lack a difference with respect to the species, because it would be marked simply as able to emit only one voice, although the voice it is able to emit is its distinguishing mark. On the other hand, the second *aporia* expresses the Aristotelian point of view, stated in *HA* 536b 19-20.

The *aporia* of *Probl. X*, 39 explain the limited phonation of animals, showing that they are able to articulate two or three consonants only. Probably, the animals considered in this passage are those quoted in *PA* 660a 34 ff.:

«some birds – the smaller sorts – have a large variety of notes. The crook-taloned birds have fairly broad tongues. If birds use their tongues as a means of communication with other birds [πρὸς ἑρμηνείαν ἀλλήλων], and some to a very considerable extent, so much that it is probable that in some cases information is actually conveyed from one bird to another [μάθησιν παρ’ ἀλλήλων]. I have spoken of these in the *Researches upon animals*» (tr. Peck).

The «communication» and the «information conveying» of birds seem to be limited to the expression of joy and pain, but it must be said that these capabilities have a certain gradualness, so that the «information conveying» is an excellence of the «communication». This passage contains a reference to *HA* 536a 20 ff.:

«birds can utter vocal sounds; and such of them can articulate best as have the tongue moderately flat, and also such as have thin delicate tongues. In some cases, the male and the female utter the same note; in other cases, different notes. The smaller birds are more vocal and given to chirping than the larger ones; but in the pairing season every species of bird becomes particularly vocal. Some of them call when fighting, as the quail, others cry or crow when challenging to combat, as the partridge, or when victorious, as the barn-door cock. In some cases cock-birds and hens sing alike, as is observed in the nightingale, only that the hen stops

singing when brooding or rearing her young; in other birds, the cocks sing more than the hens; in fact, with barn-door fowls and quails, the cock sings and the hen does not» (tr. D'Arcy W. Thompson).

The gradualness at issue is outlined here more clearly. Firstly, the kind of birds is singled out as a whole in accordance to the capability to emit voice as a distinguishing mark. Therefore, the differences in this kind concern the different capability to emit voice, which is caused by the different shape of the tongue: this capability is peculiar to birds endowed with a large tongue, but particularly to birds endowed with a large and thin tongue. The following marks are as many as the criteria of differentiation. Voice can be distinguished (1) with respect to the difference 'male' / 'female': this difference concerns some species only, while other species don't have differences from this point of view; (2) with respect to the capability to emit many voices: the explication of this difference, the distinction concerning the size of birds and an ethological analysis overlap, because the capability at issue is peculiar to little birds and increases during courtship; (3) with respect to habits and activities, because different birds emit voice (a) fighting, (b) as a gesture of defiance or (c) to crow over their victory; finally (4) with respect to the difference 'male' / 'female' according to (a) 'possession and privation', (b) 'more and less' and (c) habits concerning reproduction²². It must be noticed that the ethological differences outlined in this passage give the articulated voices of the birds a semantic capability vaster and more complex than the simple expression of joy and pain.

The treatment of the differences in the voice ends in *HA* 536b 8 ff.:

«vocal sounds and modes of language differ according to locality [κατὰ τοὺς τόπους]. Vocal sounds are characterized chiefly by their pitch, whether high or low [ὀξύτητι καὶ βαρύτητι], and the kinds of sound capable of being produced are identical within the limits of one and the same species [τὸ δ' εἶδος οὐδὲν διαφέρει τῶν αὐτῶν γενῶν]; but articulate sound [ἐν τοῖς ἄρθροις], that one might reasonably designate 'language' [ἦν ἄν τις ὥσπερ διάλεκτον εἴπειεν], differs both in various animals, and also in the same species according to diversity of locality; as for instance, some partridges cackle, and some make a shrill twittering noise. Of little birds, some sing a different note from the parent birds, if they have been removed from the nest and have heard other birds singing; and a mother-nightingale has been observed to give lessons in singing to a young bird, from which spectacle we might obviously infer that the song of the bird was not equally congenial with mere voice, but was something capable of modification and of improvement [ὡς οὐχ ὁμοίως φύσει τῆς διαλέκτου οὔσης καὶ τῆς φωνῆς, ἀλλ' ἐνδεχόμενον πλάττεσθαι]. Men have the same voice or vocal sounds, but they differ from one another in speech or language» (tr. D'Arcy W. Thompson).

This passage adds two new differences, with respect to (5) habitat and (6) to the loudness of voice.

In *DA* 420a 26 ff. Aristotle argues that loudness is the essential difference in sound and that from this point of view voices can be distinguished as a certain kind of sound. With respect to this

²² The method of division used here is treated in *HA* 491a 15 ff. and in *PA* 644a 17 ff.

criterion of differentiation, animals can be divided into different kinds because the different loudness of their voice is brought about by the different shape of the parts in control of phonation. On the other hand, the greater or lower loudness of the voice of animals belonging to the same kind doesn't bring about a difference with respect to the species in this kind because the different loudness is not caused by the different shape of the bodily parts²³.

The difference concerning habitat regards the articulated voice. Aristotle argues that birds are able to communicate with a certain kind of language and thinks that this animal language has characteristics very similar to those of human language. The differences concerning habitat - the different cry of the partridge is significant - are analogous to the distinguishing marks of human languages, although animal language is less complex, at least because of the smaller number of letters articulated. Moreover, this kind of language is not a natural endowment but it is acquired with proper teaching. This way it could happen that a bird learns the singing peculiar to a different species.

A comparison between these issues and what Aristotle says in the *De interpretatione* about human language is now essential. The thesis of the conventionality of language, to which the last passage quoted contains an explicit reference, is outlined in *De int.* 16a 26 ff. on the basis of the opposition between man and animal:

«I say 'by convention' because no name is a name naturally but only when it has become a symbol. Even inarticulate noises (of beasts, for instance) do indeed reveal something, yet none of them is a name» (tr. Ackrill).

Here human language is compared to the voice of animals devoid of parts controlling voice articulation, and not actually to a voice such as that of the birds, similar to the «articulate sound that one might reasonably designate 'language'».

In man the better shape of the bodily parts brings about the higher complexity of voice articulation and the perfect semantic capability of voice. However, what Aristotle says about the voices of birds leads one to believe that he recognized in these animals a certain minor capability to emit semantic voices. Moreover, this capability should derive from teaching, although the Aristotelian treatment of the animal imagination shows that the semantic character of animal language cannot be brought about by conventionality, because the conventional semantic character

²³ See *De aud.* 801a 11 ff.

of human language is based on psychological structures more complex than those of animals, so that the *logos*²⁴ is a distinguishing character of man.

3. Overall conclusions

From the point of view of the arguments, the treatment of the voice of animals is based on the parallel assumption of many lines of differentiation²⁵ that Aristotle studies by dwelling on their intersection. From the point of view of the method of inquiry, this analysis embraces a wide range because Aristotle starts treating every kind of sound emitted by animals, and then specifies which sound can correctly be defined as a ‘voice’.

The remarks concerning the causal explanation show that phonation is a significant distinguishing mark for the differentiation of animals. Bodily parts such as lung, larynx, tongue, teeth and lips have a necessary function peculiar to the entire kind of animals endowed with them, but they have all a further use which concerns phonation: this function *for the sake of good* is a distinguishing mark that permits the differentiation of animals with respect to the different shape of the parts controlling this function, that is in accordance with the different capability to emit and articulate voice.

A long tradition bases the treatment of human language on the flat opposition between man and animal, referring to Aristotle as the ancestor²⁶. Nonetheless, a close examination of the Aristotelian treatment of this matter shows that this common view should be revised, because - from many points of view - Aristotle anticipates issues about animal communication reached only recently²⁷. On the other hand, these analyses cast new light on the Aristotelian theory of language as such, in particular with respect to the relation between the activity of the soul and voice articulation.

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²⁴ See *De int.* 4

²⁵ See Aristotele, *De partibus animalium*, introduzione, traduzione e commento a cura di A. L. Carbone, Milano, Rizzoli 2004, pp. 54 ff.

²⁶ See A. Arbo, 'Gli uccelli cantano davvero?', *Rivista di estetica*, n.s., 8, XXXVIII (1998), pp.113-126.

²⁷ See AA.VV. *Animal communication*, ed. by T. A. Sebeok, Indianapolis 1968.

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