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Patterns of Thought in 16th Century Public Education

Anja-Silvia Göing

1. Introduction: Sensory Perception, Learning and Experience in 16th Century Philosophy

Within the context of the increasing interest in sensory perception during the period from 1450 to 1650, we find an unexpected phenomenon: an astonishing tendency to render dependent on linguistic usage the common understanding of things, beings and facts of nature, or the environment.¹ Evidence of this can be found in a wide variety of reference works relating either to dialectics or to the methodology of learning, the *ratio studiorum*,² or again in conceptually structured encyclopedias of universal knowledge.³ Through an analysis of Aristotelian texts used in schools, the present study provides evidence of the reciprocal relationship between the dynamic, highly individual process of “learning through experience”⁴ and the constraints of the existing terminology. By concentrating specifically on the learning

process, it becomes possible to recognise the normative or quasi-normative principles on which teaching methods were based. The precise manner in which these affected perception comes to light, reflexively, as it were, through an examination of the measures that were employed for training the senses. By this means, it will be possible to describe more clearly the contribution of the senses to the learning process that was formulated conceptually and employed in the teaching of philosophy in 16th century universities and academies, with the express goal of understanding the universe.

Notwithstanding Marie-Luce Demonet's pioneering research on linguistics⁵ and efforts such as those of Katherine Park to draw attention to conceptually relevant theories of the soul,⁶ the precise nature of contribution of sensory perception to the articulation of knowledge and to the process of its acquisition has not yet been fully investigated. The example here treated is significant above all for what it reveals about the patterns of thought that, having arisen in the teaching of philosophy, came to underlie the entire business of education. These represented the outer limits of the scope available for defining oneself, for experiencing the world and for all forms of communication.

2. The single steps of this article

The issue at hand is, thus, the conceptual terminology of learning that formed of the basis for the teaching of philosophy in this period. The fourteenth century distinction between the philosophical schools of the *via moderna* and the *via antiqua* at European universities forms the background to the present study. These were the two modes in use for the interpretation of Aristotle, in keeping with either nominalist or realist conceptualizations.⁷ Against this backdrop, Konrad Gesner's Zurich lecture notes provide us with an exceptionally useful standard of comparison: In what terms does he write about the senses? Consideration will first be given to the internal senses, with particular emphasis on the concept of the *sensus communis*. According to the mechanistic image of mind current at that time, each of the internal senses was located in a specific section of the brain, and was assigned functions that served to link the brain with the external senses. The *sensus communis* has been ennobled as a concept through its inclusion in the Cartesian theory of the dichotomy of mind and body.⁸ As Michaela Boenke has shown, Descartes himself saw this question as being directly connected to that of the correlative differentiation of intellectual and sensory experience. Later Cartesian tradition failed to transmit this connective element in Descartes' theories of mind and body.⁹ Before Descartes, however, the Aristotelian *sensus communis*, that is, the

faculty common to all the senses, was variously considered as being primarily responsible for the processing of sense perceptions, or again for the evaluation of active behaviour. Depending on the interpretation, the *sensus communis* could be defined as a generalised, common faculty, or again as one of the specifiable internal senses, with its place more or less localised beside from one up to four others, such as *cogitatio* and *memoria*. The internal senses served to process the impressions of the world gathered by the five external senses: touch, taste, smell, hearing and sight. The entire mechanism of perception, comprising the internal and the external senses was connected to the intellect. However, the precise nature of this connection, which is of particular interest to us here, was barely discussed. The closest approximation to an attempt to comprehend it can be found in discussions of the concept of *phantasia*, which is only vaguely distinguishable from the *sensus communis*.

The concept of *phantasia* was introduced in the High Middle Ages by Avicenna, in his commentary to Aristotle's *De Anima*. Avicenna interprets it as a generic term comprising what he sees as four internal senses, to which he then adds a fifth, the *memoria*. In the centuries that followed, the term was developed into a major concept. In the 15th century, *phantasia* was the subject of treatises by Marsilio Ficino, in his *Theologia Platonica*, and by Giovanni Francesco Pico della Mirandola. Although they arrived at opposite conclusions, both authors were principally concerned with precisely this relationship between mind and

body. The ideas of both authors were widely diffused and debated in the 16th century.¹⁰

Following a discussion of the *sensus communis*, we will turn to the consideration of a single sense and its relationship to conceptions of learning. Discussion of the senses is related to Aristotle's *physica*, where it is dealt with as a part of his treatment of the soul. This is found in *De Anima*, which was widely disseminated in the Middle Ages and the Renaissance, generally accompanied by commentaries and supplements. In keeping with the curriculum of the *artes liberales*, it was taught at academies and universities as belonging to the study of physics or philosophy. Like other aspects of the *physica*, *De Anima* was considered necessary preparation for the study of medicine at the universities.¹¹ All teaching of the physical sciences was based on the eight books of Aristotle's *Physics*. In it, he deals with aspects of the universe ranging from the appearance of the sky to the nature of lifeless substances.¹² Included in the *physica* are questions appertaining to meteorology, geography, anthropology, mineralogy and biology. Not included, on the other hand, is chemistry or the manufacture of scientific instruments. The manner in which Gesner, in his widely disseminated *Thesaurus Evonymi Philiatræ*, takes for granted a certain familiarity with the techniques and instruments of chemical distillation suggests, however, that doctors were also expected to acquire, at some point in their training, proficiency in the preparation of medicines.¹³

A full discussion of the subject at hand requires first a review of the principles that were considered fundamental to the question, and their gradual evolution in philosophical commentaries. Certain modifications took place already through the ordering and condensation of earlier texts. Others, however, were also the result of a new conceptual orientation. The first section will therefore be devoted to the presentation of factual knowledge, and the recommendations to students that accompanied this presentation. The second section is devoted to conceptions of learning, which had their basis in, or were an integral part of, the overall conceptual orientation. The choice of senses taken as examples is not entirely random: teaching material on this subject provides us with a welcome opportunity to observe the interface between conceptions concerning the assimilation of sensory impressions and the terms used for articulating them. The mental process of converting received sensory impressions into judgments and memories is, at least according to some theories, supposed to potentially to exert an influence even on the *ratio*, that is, on thought itself. Finally, it will be argued that these epistemological aspects of learning through sensory experience, in the period before they had been relegated by Descartes to the *sensus communis*, were presented primarily in the terms of quantitative and qualitative description: they are not embedded in any structure that assigns to them an origin or context in logical thought. Through a

discussion “smelling,” the question will therefore be posed as to whether, contrary to Roger Bacon’s widely accepted dictum, one cannot in fact observe in the senses a certain capacity for intensification, a learning potential that is subject to active influence.¹⁴

3. Lectures and Textbooks on Aristotle's *De Anima* at Zurich's Lectorium

3.1 Limiting the Philosophical Question on the Academic Sphere

The use of language as a conceptual basis for illustration, argumentation and derivation played a particularly important role in the processing of knowledge in all university and non-university disciplines during the Early Modern period.¹⁵ The circulation of copies, prints and lists of individual commonplace books and compilations by scholars and students came to constitute a generalised basis for the discussion of the transmission of knowledge.¹⁶ The accumulation of knowledge was pursued, on the one hand, through the compilation of encyclopedias, the advantage of which was often seen to lie in the multilingual terminology they applied to things and facts.¹⁷ On the other hand, as Anthony Grafton has shown in a number of his studies, the choice of sources considered relevant for reasoning about worldly things and affairs

differed widely, in keeping with the personal tastes and argumentative patterns of the individual compilers.¹⁸ Given the variety of approaches, it is justified to ask whether any generally recognised principles for comprehending the world had developed the validity of which extended beyond individual philosophical or theological interpretation, and which served as a foundation for man's reflections on himself and his role in the world. Directly related to the development of such hermeneutic thought patterns is the thus far unanswered question as to what is meant by learning to understand, and how it is to be accomplished. The central issue for us is to arrive at a conception of learning by understanding, or of learning to understand, within the context of Early Modern approaches to thought and institutional consolidation. From the point of view of pedagogical theory, limiting the treatment of these questions to the academic sphere leads, in the final consequence, not only to the question of classroom experience, in which conceptual, normative ideas and preconceptions, on the one side, meet the discovery of nature and social space on the other. Rather, it leads us also to the question of the practical relevance of acquired cultural techniques as their field of application becomes increasingly professionalised.

3.2 The 16th Century Teaching of Philosophy: Konrad Gesner at Zurich

The writings of Konrad Gesner (1516-1565)¹⁹ on the natural sciences and medicine were composed to serve as reference works and textbooks while he was on the faculty of the Zurich Schola Tigurina, the Lectorium. The school served mainly for the training of future preachers, but also provided the preparation needed for university studies, including that of medicine. Gesner belonged to the second generation of professors under the leadership of the church head Heinrich Bullinger, the generation whose training and appointment had still been guided by the late Huldrych Zwingli. Gesner had been one of the first students at the school to have been provided with a scholarship and sent by Zwingli himself to study at a foreign university. Following a number of detours, he completed his education in medicine and, upon receiving his doctorate in Basel in 1541, was appointed to a lecturership in natural philosophy and ethics at the Zurich Lectorium. At this time, he was also appointed the official physician of the city. It was not until late in his life, in 1558, that he was made a canon, at his own request, and was thus entitled to receive the same remuneration as the other professors. Gesner came to occupy an important place in the development of Early Modern science; his works were read and disseminated through Europe.²⁰ His encyclopedic works and other compendia had already been translated

into vernacular German and English in his own lifetime. After his death, they were even more widely disseminated. Illustrated collections of his scientific and zoological works continued to be re-issued in revised editions as late as the 18th century.

The Zurich Lectorium of the 16th century provides us with a unique collection of primary sources that make it possible to follow the course of teaching theory and regulation as they developed in classroom practice and along their various paths of dissemination by teachers and students alike.²¹ Gesner's works were written within close proximity of where he actually taught. The source material includes students' lecture transcripts and notes. This characteristic of the sources makes it possible to situate the present study in a social and institutional environment that has until now remained entirely inaccessible to us: the early modern classroom. Scholarship on the history of education has thus far provided rarely investigation into the subject; we do not know how students went about learning in an academic context. With a few exceptions like Anton Schindling and Gabriel Codina Mir,²² traditional histories of teaching during this period have concentrated exclusively on pedagogical theories and handbooks.²³

Konrad Gesner's teaching material and manuscripts are available for the most part in the Manuscript and Old Prints collections of the Zurich *Zentralbibliothek*.²⁴ A selection has been made based on their significance for the interplay between the senses, things, and lexical

knowledge. As a scholar and polymath, he authored works on language theory and lexica, in which he compiled mainly the names and terms for things, as well as textbooks on the significance and function of the senses for experiencing the world on one's own (*De Anima*).²⁵ The use of these books in his own teaching is traceable (Scholia, ed. Caspar Wolf).²⁶ His encyclopedic works on the animal, plant and mineral kingdoms demonstrate particularly clearly the connection between images, including symbols, organised knowledge contents, and observations of nature, be they his own or those of his contemporaries. His works on the preparation of milk and cheese, his cookbook, and his description of mountain hikes leave the academic world behind for that of active experience. In his treatises on medicine and pharmaceuticals there are observations on sensory perceptions and the conclusions to be drawn from them, concerning even the nose and the sense of touch. The story of his experiments on himself with American tobacco is perhaps the best known about him, but his diagnostic methods included also more traditional practices, such as the testing of urine by sight, smell and taste.²⁷ In his manual on the distillation of water, the *Thesaurus Evonymi Philiatræ*, Gesner states explicitly that a practicing physician ought to be well acquainted with both medical terms and applications, on the one hand, and with each patient's own individual circumstances, on the other.²⁸ Still, in his *Meditationes*, he rates physics as one of the fundamental disciplines, above all for providing the philosophical

concepts about nature.²⁹ The particular circumstances of individual patients are not dealt with in this book, even though they would theoretically have a bearing on the diagnosis. The ability to put together mechanical devices and to employ them properly in the production of medicines, that is, the traditional *artes mechanicae*, Gesner states expressly in his foreword, is among the skills that a trained doctor should possess, and is something on which his patients can judge him.³⁰ Gesner contributes further to the nobility of the *artes mechanicae* by comparing the manufacture and use of medical instruments to rhetoric, one of the main concerns of which is correct pronunciation, that is, the technical use of language in speech.³¹

3.3 The Actual Choice: Teaching Material on *De Anima* Written by Konrad Gesner

We have in our possession copies of Konrad Gesner's preparatory teaching material, *Meditationes*, as well as a textbook of his on the Aristotelian theory of the soul, *De Anima*.³² Both works provide us with a precise guide to his conception of the function of the senses. Moreover, because they were composed expressly for teaching purposes, they also provide us with a proximity to the classroom that is of particular usefulness for the subject at hand. Further theoretical remarks

concerning sensory experience can also be found in the encyclopaedic works, *Bibliotheca Universalis* and *Pandecta*,³³ which were intended to provide an overview of the collected knowledge of Gesner's days. Gesner provides a precise account of the way in which the senses fit together and function, taking Aristotle and, above all Galen, as his starting point. He discusses their views in the context of what other authors have to say on the same subjects. The context and the backdrop for Gesner's thinking is provided by the textbooks on physics composed and used in the universities, such as those of Wittenberg, Basel, Paris, Montpellier or Padua. Many of the authors he cites are mentioned by name, so that the lines of his thinking can easily be traced to their origins.³⁴

4. Building an Argument: The Use of Aristotle and Galen

4.1 Transcription of a Lecture Part on the Internal Senses

The evidence examined above shows us the path to follow in trying to clarify the way Gesner dealt with the conceptions of the senses as found in books. To begin, there is the question of the logical argument employed by Gesner in order to describe the internal senses. What does he do with the Aristotelian *physica*? This then leads to the question as to

the extent to which it is possible to assimilate a conception of learning into the description.

Gesner's classroom notes on the senses open with an explication of names and concepts taken from the classical writings of Aristotle and Galen, and from certain unnamed, contemporary authors.³⁵

"CATALOGUE OF THE INTERNAL SENSES

The internal sense is the organic potential within the cranium that is destined for cognition, distinguishing itself in its actions from the external sense. Its substance is in the animal spirit that has been elaborated into the arteries of the *rete mirabile* and the brain. According to Galen, it is threefold, while Aristotle sees only two internal senses: memory and the common sense. Certain modern authors posit five, as follows:

- a. the common sense, which only takes in images of the senses;
- b. the imagination, which distinguishes the images;
- c. the estimation, which elicits one thing from another, as a horse elicits compliments from applause; it is defined by some as the power of apprehending from what has been sensed that which has not been sensed. Its object is intent, determining whether it is benevolent or malevolent, suitable or unsuitable, useful or harmful, as can be educed on the basis of the form that has been apprehended by the imagination. Thus a sheep is naturally capable of recognizing the enmity of a wolf. The appraisal is aimed at what is necessary or convenient for the body;
- d. phantasia, or cogitation, which goes a step further by making combinations;
- e. memory.

Out of these five, is imagination not in fact the same as *phantasia*? But the latter is Greek, the former, Latin. Estimation, however, is the activity of the sensitive *phantasia*, like the product of the *phantasia* that has been named here specially, the rational, or quasi-rational *phantasia*: as when a dog standing at a three-pronged intersection, figures out from which path in the wild it has come: not from this one and not from that, so from the other.

Others divide the internal senses in such a way, of course, that they are equal in number to the external, rather because they think there as many of them as there are actions required, as if two or more actions could not appertain to either the same faculty or substance. We follow Galens' division, the middle one, as it were, which counts as many internal senses as there are chambers of the brain.

Summary. All authors make a distinction of memory; they differ on the other four. More recent authors explain a., b., c., and d. as four diverse senses. Aristotle binds them together under the name of the *sensus communis*. Galenus calls a. and b. the *sensus communis*, or *phantasia*; and c. and d. he calls cogitation...Thus the distinctions between the things are clear, even if the names seem to be confused, when some use the word *phantasia* to refer to the *sensus communis* and others to refer to that faculty of cogitation among the feeble-minded that most closely approximates human reason. Thus it is established by Galens that the inner sense is threefold."

4.2 Descriptive Analysis of the Lecture Part

Gesner's discussion, or meditation, on the internal sense of living beings is preceded by this brief overview. It begins with a definition of terms, including a consideration of the available literature and a decision on the opinion to be adopted. As guarantors for the division of the internal senses into different faculties, he names the ancient authors Aristotle and Galen. Later authors, on the other hand, whom Gesner groups together as being "more recent," are left nameless. The opinion of these more recent authors, who based themselves on the writings of the unnamed medieval philosopher Avicenna³⁶ and distinguished five faculties, is rejected. Gesner prefers Galens' distinction of three parts. The first is the *sensus communis*, or the *phantasia*, which receives and sorts the images perceived by the external senses. This is followed by cognition, which rearranges the received images in associative connected chains, up to and including their subsumption under abstract categorical terms. Lastly, there is memory.

The distinction drawn by Aristotle, who differentiates only between the *sensus communis* and memory, is not sufficiently detailed for Gesner. At the same time, the distinctions of the "more recent" authors lack clarity, since they make use of both Latin and Greek terms (*imaginatio* and *phantasia*) without sufficiently distinguishing between them; neither is there a coherent explanation of the difference between estimation and

rational *phantasia*. That Galen's threefold partitioning of the senses is related physically to the partitioning of the brain into three organizational compartments is as obvious to Gesner as it was to Galen. His main argument in favour of Galen is, in addition, his conceptualisation based on clearly distinguished functions: the *sensus communis*, or *phantasia*, receives and sorts out the images; the *cogitatio* recombines them, and the *memoria* stores them. This line of reasoning demonstrates the unambiguous connection between the concept, the position of the organ, and the function. It is a conceptualisation that makes sense. Its origin lies not in a logical necessity, as one finds in the scholastic search for conceptual categories. Rather, it can more adequately be characterised as a kind of systematic description of an object.

This brings us to the realm of grammar: in his description of the internal senses, Gesner does not immediately make any obvious substantive changes in actions already described by earlier philosophers. Rather, he merely presents what these authors said about them. His primary interest is in determining first as precisely as possible the terms and concepts involved, based on content, position and function. The main distinguishing criteria here are the three functions of (1) organised reception, (2) processing and (3) storage of sensory perceptions. Is there any difference between Gesner's reference to Galen for this conceptualisation and that found in the treatises and tractates already

known to him? At the end of the section dealing with the internal sense there is a note under the text, which could possibly have been added by the editor, Caspar Wolf: "In this manner Gesner undertook the edition of a brief compendium of Faber Stapulensis' extensive and copious *Physica*."³⁷ Gesner is said here to have summarised the conclusions of Faber Stapulensis, a time-consuming task for which he is praised. The mention of this express non-originality is a very clear indication that the intended purpose of the *scholia* was to organise available knowledge for handy reference.

It is not the object of the present study to provide a detailed analysis of Gesner's *scholia* and the various innovations in his meditative approach, where the conclusions reached are not always clearly compatible; nor is the intent to establish whether these notes or the meticulous discussions of Galen were in fact made up entirely of compilations and summaries of other authors; nor again is it to determine the precise extent to which Gesner allowed himself to be guided by Aristotle, Galen and such contemporary authors as Faber Stapulensis or Giovanni Francesco Pico della Mirandola. The question that interests us here is whether the fact that these theoretical treatises were intended as textbooks, or as a basis for classroom discussion, played a significant role in the choice of their form or content. The material contained in the short paragraph cited above is presented in a manner that makes familiarity with the Aristotelian original unnecessary:

there is no explicit reference to specific passages in the original text. The sentences follow in a logical descriptive order. The use of a numbered list provides optical satisfaction. It is clear that we are not dealing here with a textual commentary, such as those of Faber Stapulensis, who uses *lemmata* in order to refer to the Aristotelian passages on which he comments.

The introductory numbered list is followed by a more detailed discussion, in which each item in the list is explained individually. The differences of opinion mentioned in the list are further elaborated. Gesner's most important authority remains Galen, one of the very few authors whom he mentions by name. Latin and Greek conceptualisations are taken for granted in some cases. In others, however, they are compared and explained. The logic of the arguments is descriptive; there is no syllogistic deduction from major premises. They are based on a conceptualisation that is intended to correlate with the physical reality, as seen in the choice of a partitioning of the senses in parallel to that of the chambers of the brain.

Gesner's short overview of the *physica* for classroom discussion offers a useful alternative to a close reading of the Aristotelian text or of condensed, schoolbook versions of authors such as Avicenna. Its usefulness is increased by the fact that its argument includes direct references to the original texts of Galen, which will later be part of the required reading for prospective medical students, particularly in the

universities of Northern Europe.³⁸ At the same time, the immense amount of material to be covered in the lessons was reduced to the main points needed for its reasoned explanation. This organisation of the material had the advantage that students became immediately aware of the most important contemporary schools of thought on the reading of *De Anima*. In this way, they became capable of providing a well-founded response to the most important questions as needed for intellectual 'consumption' at the universities.

5. On 'Smelling': From the lecture notes to the textbook 'De Anima'

Having considered the formal characteristics of the teaching material and their implications for the underlying conception of learning, we now turn to a material consideration of learning, as evidenced in the teaching material on *De Anima*. Concerning the content of the book, which in itself has reflexive recourse to sensory perception, a question arises not only with respect to the differentiation between the internal senses and the intellect. There is also the issue of whether the knowledge to be conveyed was simply collected and organised, or whether it is, in fact, possible to teach and train the external sense itself to serve as an instrument of reception, processing and storage. Are quantitative or qualitative increases in perception something to be desired or promoted?

Since it was in the last of these questions that Gesner differed most widely from his predecessors, it is there that we will focus our attention. As we have seen above, in his analysis of the internal senses, Gesner tends to orient himself materially along the lines of his predecessors, relying mainly on Galen and the commentary of Faber Stapulensis. The situation changes, however, when it comes to the external senses. For the following analytic description, I have chosen to focus on the sense of smell. This is linked to its structure, which Gesner sees as comprising a simple dichotomy. As one of the lower senses, the sense of smell, along with those of touch and taste, was already ranked by Aristotle below the intellectually superior senses of sight and hearing. In a passage from his textbook on *De Anima* itself, Gesner makes a remark of particular importance in our context: It is possible, he argues, to discriminate in the perception of smells, even though, human beings generally tend to judge smells in an entirely indiscriminate manner: The smell is only judged to be good or bad. An analysis of this statement leads to the conclusion, at least with regard to the sense of smell, that Gesner was attempting to exert some influence on the way his students used their senses. In his search for the copious contents of different smells (turning the modern reader thus to the Erasmian idea of *copia*), Gesner is suggesting to his students that they themselves make the attempt to train their noses. The expression of conceptual differentiations leads by suggestion to a refinement of the perceived sensory capacity. It is worth

noting that with respect to the sense of smell, Gesner's textbook on *De Anima* offers much fuller documentation than the scholia, which provide only a brief schematic overview of the main characteristics of the sense.

The treatise on the soul, *De Anima*, was one of the important works in Aristotle's *physica*. The textbook devoted to it by Konrad Gesner appeared in 1563.³⁹ It was printed in a volume that also included commentaries by the authors Juan Luis Vives, Philipp Melanchthon and Veit Amerbach.⁴⁰ Gesner's section includes a very precise description of the five senses with which living beings perceive their environment. The most important remark concerning the possibility of training the senses we find, however, not in Gesner's description of their location and function. It appears rather in the description of the specific reality that the senses are called upon to perceive. Speaking of the smells to be described, Gesner claims that the average person only makes a distinction between what smells good and what smells foul: "*sed commune hoc solum discrimen, quo <odores> nobis vel grati vel ingrate sunt.*"⁴¹ Through his detailed description of what smells precisely how, he stimulates his students' ability to differentiate between smells. The details go so far as to include the effect of various ingredients on the smell of urine: "Urine has a bad smell in and of itself; it is worse, however, when people have eaten garlic or asparagus, which themselves do not have a foul smell. [The smell] is more pleasant when people have swallowed resin, of the larch in particular, as we have noted."⁴² For the

student who follows Gesner's teachings, there is no choice but to check the content of the descriptions of individual smells and to supplement them with others, as required. This is the only method of training the senses that Gesner offers the reader. It is based on the assumption that the sense of smell functions, in principle, the same way in all people, and that it is connected to human reason and memory. Through the interplay of concepts and categorizations, it is able to arrive at a conscious, conceptually descriptive classification of what has been sensorily perceived. At no point does Gesner claim by this means to bring about an improvement or sharpening of the senses. Rather, it is the capacity for conceptualization that remains in the foreground of his endeavors. This is noteworthy, given the fact that in the Middle Ages it was still assumed that the senses could not, in principle, be trained. The reference here would be Roger Bacon (1214-1294). Gesner does not contradict Bacon. He does, however, raise the possibility of circumventing empirically Bacon's philosophically derived statement. Here again, Gesner offers his students the possibility of confirming for themselves what the medical books of antiquity and the Middle Ages claim and to imitate them in prepared discussions. Gesner here offers not only a theoretical discussion of the most important authors' main arguments. He also provides a repertoire of guided, individual olfactory experience, capable of being expanded discursively, and of being highly useful in practical medical diagnosis.

6. Conclusion: Learning as Expanded Function of 'Imitation' Relying on Both, Conceptual and Experimental Basis

We began by noting that Gesner's teaching material on the subject of the senses was organised along lines suited for a discussion of Aristotle's *De Anima*. This construct was not taken over from *De Anima* directly, however. It resulted rather out of a dialogue with other works on the same subject. With regard to the important conceptual descriptions of the internal senses, Gesner follows the lead of Galen. At the same time, he avoids creating material-functional contradictions between Galen and the other authors cited with respect to the inner senses and the sense of smell. The conceptual description is not derived syllogistically from major premises. These are employed, instead, as standards for a topical-empirical overview. The connection to reality is established organisationally through the assignation of concepts and functions physically given. Learning here is an expanded function of imitation,⁴³ in both the theoretical and the empirical domains. The intent is to have students repeat guided discussions and experiences. With respect to the specification of smells, Gesner works with examples of individual smells and their ingredients in order to promote the precise use of terms, not only in Latin and, in many cases, Greek, but also in the vernacular languages which he often mentions. Gesner also encourages the imitative

formation of judgment, which will later be of use for them at the university in rhetorical discussions (though not in strict scholastic disputations), and still later in professional practice for the diagnosis of diseases. This practical orientation does not cause Gesner to lose sight of his goal of universality. Again and again he returns to the fundamental principles applicable to all human beings in all walks of life, referring back to the generalised faculties of all living beings, as in our example of the sense of smell. This combining of functional and universalist objectives gives rise to a scientific methodology that goes beyond the activity that Brian Olgilvie has elucidated with emphatic monocausality and catchingly termed “the science of describing.”⁴⁴ The use of learning models serves, both in concept and in practice, a concrete purpose in the real world.

References

¹ The two distinct traditions for the linguistic relationship between *verba et res* during the period here considered – the rhetorical and the dialectical – have been elucidated by Brian Vickers, “‘Words and Things’ – or ‘Words, Concepts, and Things’? Rhetorical and Linguistic Categories in the Renaissance,” in Eckhard Kessler and Ian Maclean (eds.), *Res et Verba in der Renaissance*, Wiesbaden:Harrassowitz, 2002 (Wolfenbütteler Abhandlungen zur Renaissanceforschung, 21), pp. 287-336.

² Vickers 2002, pp. 311-320.

³ A highly refined example of this tendency can be seen in the encyclopedias compiled by the Zurich scholar Konrad Gesner; cf. Helmut Zedelmaier, *Bibliotheca Univesalis und Bibliotheca Selecta. Das Problem der Ordnung des gelebrten Wissens in der frühen Neuzeit*, Cologne/Weimar/Vienna: Böhlau, 1992.

⁴ “Experience” is to be understood here as being viewed with a thoroughly critical eye; cf. Joan W. Scott, “The Evidence of Experience,” *Critical Inquiry* 17 (1991), pp. 773-797. It is possible that the art historian Hubertus Günther’s 1981 inquiry into the revival of ancient symbolic uses of form in the Renaissance can be seen as a

first step toward an understanding of assimilated experience as a process of abstraction, and as an attempt to find order in the random assemblage of what has been “self-observed and self-measured.” See Hubertus Günther, “Porticus Pompeji. Zur archäologischen Erforschung eines antiken Baus in der Renaissance,” *Zeitschrift für Kunstgeschichte* 44 (1981), pp. 358-398.

⁵ Marie-Luce Demonet, *Les voix du signe: nature et origine du langage à la Renaissance (1480-1580)*, Paris/Geneva, 1992.

⁶ Katherine Park, “The Organic Soul,” in Charles B. Schmitt, Quentin Skinner, Eckhard Kessler and Jill Kraye (eds.), *The Cambridge History of Renaissance Philosophy*, Cambridge/New York/Oakleigh: Cambridge University Press, 1988, pp. 464-484.

⁷ Cf. Heiko Oberman, “*Via Antiqua* and *Via Moderna*: Late Medieval Prolegomena to Early Reformation Thought,” *Journal of the History of Ideas* 48 (1987), pp. 23-40.

⁸ Cf. Descartes’ response to a question from Elisabeth von der Pfalz as to how the mind could control voluntary acts, that is, extend its influence to the realm of the physical, and the discussion of it in Michaela Boenke, “Der Quellmeister eines Wasserspiels. Descartes’ Theorie der Selbstkonditionierung von Körper und Geist,” in Barbara Mahlmann-Bauer (ed.), *Scientiae et artes. Die Vermittlung alten und neuen Wissens in Literatur, Kunst und Musik*, vol. 2, Wiesbaden, 2004 (Wolfenbütteler Arbeiten zur Barockforschung 38), pp. 843-860, here p. 848.

⁹ *Ibid.*, pp. 858-859.

¹⁰ See the overview by M. R. Pagnoni-Sturlese, “Phantasia,” in Joachim Ritter and Karlfried Gründer (ed.), *Historisches Wörterbuch der Philosophie*, vol. 7, Darmstadt: Wissenschaftliche Buchgesellschaft, 1989, pp. 526-535; further references can be found there.

¹¹ On the teaching of the physical sciences at the universities, see my article, “*Physica* im Lehrplan der Schola Tigurina, 1541-1597,” in Hans-Ulrich Musolff and Anja-silvia Göing (eds.), *Anfänge und Grundlegungen moderner Pädagogik im 16. Jahrhundert*, Cologne: Böhlau, 2003, pp. 73-91.

¹² Editions of Aristotle’s *Physica* in use at the period included those of Gualterus Burlaeus (1275-1345), *Expositio in Aristotelis Physica*, with the Aristotelian text in the edition of Nicoletus Vernia, Venice:Herbort, 1482; Jacob Schegh the Elder, *Philosophiae naturalis (quae acroamata solitus fuit appellare Aristoteles) omnes disputationes, ac universa tractatio, doctus libris comprehensa*, Tübingen, Monhardi, 1538. Gesner’s library also contained a heavily annotated exemplar of *Aristotelis Stagiritae, philosophorum omnium facile principis, opera ... omnia in tres tomos digesta; accesserunt in singulos libros argumenta, nunc primum ex optimis Graecorum commentariis in latinam linguam conversa item Supra censuram Io. Lodovici Vivis Valentini de libris Aristotelicis, & Philippi Melanchthonis commentationem doctissimam, adiecta nunc primum fuit de ordine librorum Aristotelis, denique illius scriptis legendis dissertatio...* Basel: [Johann Oporin], 1542; as well as a copy of the Greek text in an edition by Erasmus: *Aristotelous hapanta = Aristotelis summi semper viri, et in quem unum vim suam universam contulisse natura rerum videtur, opera quaecunque impressa hactenus extiterunt omnia, denuo iam collatione vetustissimorum exemplarium, partim integris aliquot libris, veluti peri phytton duobus, peri areton uno, nunc primum adiectis, partim locorum infinitis fere millibus emendatis, ita instaurata atque restituta, ut hic author plane nunc primum e*

tenebris erutus, in lucem prodiiſſe videri poſſit / per Des. Eras. Roterodamum. - Basileae : per Io. Beb. et Mich. Ising., anno 1539.

¹³ [Konrad Gesner:] *Thesaurus Evonymi Philiatrī, de remediis secretis, liber Physicus, Medicus, et partim etiam Chymicus, et oeconomicus in uinorum diuersi saporis apparatu, medicis et pharmacopolis omnibus praecipue necessarius...* Zurich: Andreas Gessner. F. and Rudolph Vuyssenbach, 1552, Forword, pp. 14-20: here Gesner states explicitly that an acquaintance with chemical apparatus and methods are a necessary element of a physician's training. It is not clear, however, whether this kind of experimental research into nature and its interactions, that is alchemy, was taught at the academies and universities; in principle it was an activity conducted by certain scholars as part of their private research. Cf. Paolo Rossi, *Il tempo dei maghi: Rinascimento e modernità*, Milan: R. Cortina (Scienza e idée 146), pp. 15-16, who provides list of 15th century humanist tractates on technical constructions, such as defense installations, that suggest a coalescence of the *artes liberales* and the *artes mechanicae*.

¹⁴ Cf. Rogerii Baconis...*Perspectiva in qua quae ab aliis fuisse traduntur, succincte, nervose ita pertractantur ut omnium intellectui facile pateant.../ opera, studio Iohannis Combachii...* Francoforti: Richteri..., 1614; David C. Lindberg, *Roger Bacon and the origins of "Perspectiva" in the Middle Ages...*, Oxford 1996; Brian Clegg, *The first scientist: a life of Roger Bacon*, London: Constable, 2003. On the question of the senses, in general: *Corps et âme: sur le "De Anima" d'Aristotle. Sous la direction de Gilbert Romeyer-Dherbey; études réunies par Cristina Viano*, Paris 1996 (Bibliothèque d'histoire de la philosophie); Sascha Salatowsky, *De Anima: die Rezeption der aristotelischen Psychologie im 16. und 17. Jahrhundert*, Amsterdam, 2006 (Bochumer Schriften zur Philosophie 43).

¹⁵ See: Wilhelm Schmidt-Biggemann, *Topica universalis. Eine Modellgeschichte humanistischer und barocker Wissenschaft*, Hamburg, 1983; idem, "Die Modelle der Human- und Sozialwissenschaften in ihrer Entwicklung," In: Walter Rüegg (ed.), *Geschichte der Universität in Europa*, vol 2: *Von der Reformation zur französischen Revolution: 1500 - 1800*. Munich: Beck 1996, pp. 391-424. For a consideration from the perspective of the development of language, see Peter Stotz, *Handbuch zur lateinischen Sprache des Mittelalters*, Munich: Beck, 2002 (vol. 1) and 2000 (vol. 1) (Handbuch der Altertumswissenschaft, Abt. 2. 1/5).

¹⁶ Ann Blair, "Reading Strategies for Coping with Information Overload ca. 1550-1700," *Journal of the History of Ideas* 64 (2003), pp. 11-28; Ann Moss, *Printed Commonplace-Books and the Structuring of Renaissance Thought*, Oxford/New York: Clarendon Press, 1996, pp. 134-185.

¹⁷ A description of Konrad Gesner's encyclopedia entries can be found in Stefano Perfetti, *Aristotle's Zoology and its Renaissance Commentators (1521-1601)*, Leuven University Press, 2000 (Ancient and Medieval Philosophy I, XXVII), p. 192, n. 9. The listing of names in several languages was part of all entries.

¹⁸ Lisa Jardine and Anthony T. Grafton: "'Studied for Action': How Gabriel Harvey read his Livy," *Past and Present* 1990, pp. 30-78; Anthony T. Grafton, "Joseph Scaliger and Historical Chronology: The Rise and Fall of a Discipline," *History and Theory*, 14(1975), pp. 156-185; Ibid., *Joseph Scaliger: A Study in the History of Classical Scholarship*, Oxford - Warburg Studies. Vol. 1: *Textual Criticism and Exegesis*, Oxford/New York: Oxford University Press, 1983. Vol. 2: *Historical Chronology*, Oxford: Clarendon Press, 1993.

¹⁹ Annotated bibliography: Hans Wellisch, *A Bio-Bibliography*, 2nd expanded ed., Zug: IDC, 1984.

²⁰ Cf. Hans Fischer, ed., *Conrad Gessner: 1516-1565; Universalgelehrter, Naturforscher, Arzt*, Zurich: Orell Füssli, 1967 (=Jubiläums-Publikationen zur 450-jährigen Geschichte der Art. Institut Orell Füssli 2).

²¹ A good overview of the Zurich Lectorium can be found in: Ulrich Ernst, *Geschichte des zürcherischen Schulwesens bis gegen das Ende des sechzehnten Jahrhunderts*. Diss. phil. Zürich, Winterthur, 1879.; Hans Nabholz, "Zürichs Höhere Schulen von der Reformation bis zur Gründung der Universität, 1525 – 1833," in: Ernst Gagliardi, Hans Nabholz, and Jean Strohl (eds.), *Die Universität Zürich 1833 – 1933 und ihre Vorläufer. Festschrift zur Jahrhundertfeier*, Zürich:Verlag der Erziehungsdirektion, 1938 (Die Zürcherischen Schulen seit der Regeneration der 1830er Jahre. 3), pp. 3-164; Hans-Ulrich Bächtold, ed., *Schola Tigurina: Die Zürcher Hobe Schule und ihre Gelehrten um 1550; Katalog zur Ausstellung vom 25. Mai bis 10. Juli 1999 in der Zentralbibliothek Zürich*, Zürich/Freiburg i.Br., 1999.

²² Anton Schindling, *Humanistische Hochschule und freie Reichsstadt: Gymnasium und Akademie in Strassburg 1538-1621*, Wiesbaden: Steiner, 1977 (Veröffentlichungen des Instituts für Europäische Geschichte Mainz. 77); Mir, Gabriel Codina, *Aux sources de la pédagogie des Jésuites, le "modus parisiensis"*, Rome: Institutum Historicum S. I. 1968.

²³ A recent example of this approach can be found in Winfried Böhm, *Geschichte der Pädagogik: Von Platon bis zur Gegenwart*, Munich: Beck, 2004. The entire concept of the *Historisches Wörterbuch der Pädagogik* is also founded on this approach: Dietrich Benner and Jürgen Oelkers (eds), *Historisches Wörterbuch der Pädagogik*, Weinheim/Basel: Beltz, and Darmstadt: Wissenschaftliche Buchgesellschaft, 2004.

²⁴ A sampling from the printed works includes such variegated works as:

Natural History

Konrad Gesner, *Historia Animalium*, 5 vols., Zurich, 1551-1587.

Konrad Gesner, *De stirpium collectione tabulae tum generales, tum per duodecim menses ... olim per Conradum Gesnerum conscriptae ac aeditae, nunc auctoris opera locupletatae et de novo in usum pharmacopolarum luci datae per Casparum Wolphium... accesserunt de stirpibus et earum partibus tabulae ex Theophrasti precipue libris confectae, eodem Gesnero auctore*, (1587), [Microfiche] Leiden, 1981.

Konrad Gesner, *De omni rerum fossilium genere, gemmis, lapidibus metallis et huiusmodi, libri aliquot, plerique nunc primum editi opera Conradi Gesneri, quorum catalogum sequens folium continent* (1565), [Microfiche] Leiden 1981.

Konrad Gesner, *Historia et interpretatio prodigii, quo coelum ardere visum est per plurimae Germaniae regiones, ineunte anno Domini MDLXI die tertio a natali Dominico, qui pueris innocentibus dedicatus est... Conrado Boloveso Fridemontano auctore* (Pseud. for Konrad Gesner), (1561), [Microfiche] Leiden, 1981.

David Kyber and Konrad Gesner, *Lexicon rei herbariae trilingue, ex variis et optimis qui de stirpium historia scripserunt, auctroibus concinnatum per Davidem Kyberum ... item tabulae collectionum in genere et particulatim per XII menses ... per Conradum Gesnerum ...* (1553), [Microfiche] Leiden 1981.

Konrad Gesner, *De Balneis omnia quae extant apud Graecos, Latinos et Arabas*, (1553), [Microfiche] Leiden, 1982.

Konrad Gesner, *Nomenclator aquatilium animantium: icones animalium aquatilium in mari et dulcibus aquis degentium ... et nominum confirmandorum causa descriptiones quorundam et alia quaedam adduntur ... per Conradum Gesnerum Tigurinum* (1560), [Microfiche] Leiden, 1981.

Konrad Gesner, *Icones avium omnium, quae in Historia avium Conradi Gesneri describuntur, cum nomenclaturis singulorum latinis, italicis, gallicis et germanicis plerunque, per certos ordines digestae...* (1560), [Microfiche] Leiden, 1981.

Konrad Gesner, *Icones animalium quadrupedum viviparorum et oviparorum, quae in Historia animalium C. Gesneri describuntur, cum nomenclaturis singulorum latinis, italicis, gallicis et germanicis plerunque per certos ordines digestae* (1560), [Microfiche] Leiden, 1981.

Gesner, Konrad, *Catalogus plantarum latine, graece, germanice et gallice* (1542), [Microfiche] Leiden, 1981.

Konrad Gesner, *Historia plantarum et vires ex Dioscoride, Paulo Aegineta, Theophrasto, Plinio et recentioribus Graecis, iuxta elementorum ordinem per Conradum Gesnerum Tigurinum. Una cum rerum et verborum locupletissimo indice* (1541), [Microfiche] Leiden, 1981.

Konrad Gesner, *Vollkommenes Vogel-Buch: darstellend eine ... Abb. aller ... sich enthaltender zahmer und wilder Vögel und Feder-Viehes ... sammt einer umständlichen Beschreibung vormahls durch Conradum Gesnerum beschrieben. anjetzo aber von neuem übersehen ..., verbessert ... durch Georgium Horstium* (Reprint of the ed. Frankfurt a.M.: Serlin, 1669), Hannover 1981.

Konrad Gesner, Georg Horst and Conrad Forer, *Allgemeines Thier-Buch: das ist: eigentlich und lebendige Abb. aller vierfüßigen Thieren..., sampt einer ausführlichen Beschreibung... vormahls udrcb conradum gesnerum in lat. Sprache beschrieben und ancmahls durch Conradum Forerum ins Teutsche übers.; in die betige teutsche Sprache gebracht und erw. durch georgium Horstium* (Reprint of the ed. Frankfurt a.M.: Serlin 1669), Hannover, 1983.

Konrad Gesner and Georg Horst, *Vollkommenes Fisch-Buch: darst. eine ... Abbildung aller so wol in dem grossen Mittelländischen Meer, als andern kleinen Meeren... sich enthaltender ... Fische und seltsamer Meerwunder... durch Conradum Gesnerum beschrieben, an itzo aber von neuem übersehen, verbessert und vermehret durch Georgium Horstium* (Reprint of the ed. Frankfurt a.M.: Serlin, 1670), Hannover 1981.

Medicine

Actuarius Johannes Zacharias, *Actuarius de medicamentorum copositione*, ed. Konrad Gesner, Basel: Robert Winter 1540. [Microfiche] Zug, 1984.

Actuarius Johannes Zacharias, *Compendium ex Actuarii Zachariae libris de differentiis urinarum, indiciiis et praevidentijs: Universalis doctrina Claudij Galeni ... de compositione pharmacorum secundum locos affectos à capita ad calcum ...: Opus medicum ... Sylvula Galeni experimentorum et aliorum aliquot/ Omnia per Conradum Gesnerum ... congesta*, Zurich, Froschauer, s.a. [1541?].

Actuarius, Johannes Zacharias, *Compendium ex Actuarii Zachariae libris de differentiis urinarum, iudiciis et praevidentiis omnia per Conradum Gesnerum ... congesta, nunc primum nata et audita*, [Microfiche] Leiden, 1989.

Paulus Aegineta, *Apparatus et delectus simplicium medicamentorum omnia nunc primum aedita, cum medicis, tum pharmacopolis omnibus apprime necessaria, auctore Conrado Gesnero Tigurino* (1542), [Microfiche] Leiden, 1981.

Konrad Gesner, *Conradi Gesneri enumeratio medicamentorum purgantium, vomitoriorum et aliorum bonam facientium, iuxta ordinem alphabeti* (1543), [Microfiche] Leiden, 1982.

Galenus, *Cl. Galeni opera quae ad nos extant omnia in latinam linguam conversa et nunc multis recentissimis translationibus per Ianum Cornarium ... exornata ... accesserunt etiam nunc primum, capitum numeri et argumenta per Conradum Gesnerum in omnes libros* (1549), [Microfiche] Leiden, 1989.

Konrad Gesner, *Thesaurus Euonymi Philatri de remediis secretis, liber physicus, medicus et partim etiam chymicus et oeconomicus in vinorum diversi saporis apparatu, medicis et pharmacopolis omnibus praecipue necessarius, nunc primum in lucem editus ...* [by Konrad Gesner, under the pseudonym Euonymus Philatrus] (1552), [Microfiche] Leiden: 1981.

Konrad Gesner, *Ein kostlicher theurer schatz Evonymi Philatri darinn behalten sind vil heymlicher gutter stucke der artzney, fürnemlich aber die art und eygenschaft der gbranntnen wasseren und ölen... erstlich in Latin beschriben durch Euonymum Philatrum... verteiücht durch Joannera Rudolphum Landenberger*, Zurich: Gesner, 1555.

Konrad Gesner, *Euonymus: Conradi gesneri medici et philosophi ... de remediis secretis liber...*, [part 2] *nunc primum opera et studio Caspari Wolphii ... in lucem editus* (1569), [Microfiche] Leiden, 1981.

Konrad Gesner, *Chirurgia: de chirurgia scriptores optimi quique veteres et recentiores, plerique in Germania antebac non editi, nunc primum in unum coniuncti volumen*, Zurich: Gesner, 1555.

Konrad Gesner, *Enchiridion rei medicae triplicis: illius primum quae signa ex pulsibus et urinis diiudicat, deinde therapeuticae de omni morborum genere curando singillatim, tertio diaeteticae vel de ratione victus... auctores sequens pagella indicabit...* (1555), [Microfiche] Leiden, 1981.

Konrad Gesner, *Conradi Gesneri medici De raris et admirandis herbis. quae sive quod noctu luceant, sive alias ob causas, lunariae nominantur* (1555), [Microfiche] Leiden 1981.

Konrad Gesner, *Sanitatis tuendae praecepta cum aliis, tum literarum studiosis hominibus et iis qui minus exercentur, cognitum necessaria, contra luxum convivorum, contra notas astrologicas ephemeridum de secandis venis* (1556), [Microfiche] Leiden, 1981.

Konrad Gesner, *Dictionarium medicum vel, expositiones vocum medicinalium, ad verbum excerptae ... lexica duo in Hippocratem huic dictionario praefixa sunt, unum Erotiani ... alterum Galeni ...* [ed. Henri Estienne, with annotations by Henri Estienne and Konrad Gesner] (1564), [Microfiche] Leiden, 1989.

Konrad Gesner: *Epistolarum medicinalium, Conradi Gesneri ... libri III.: his accesserunt eiusdem Aconiti primi Dioscoridis Asseveratio, et de Oxytelitis Elleborati utriusque descriptione et usu Libellus omnia nunc primum per Casparum Wolphium in lucem data*, ed. Caspar Wolf, Zurich: Froschauer, 1577.

Konrad Gesner: *De stirpium collectione tabulae tum generales, tum per duodecim menses ... olim per Conradum Gesnerum conscriptae ac aeditae, nunc auctoris opera locupletatae et de novo in usum pharmacopolarum luci datae per Casparum Wolphium... accesserunt de stirpibus et earum partibus tabulae ex Theophrasti praecipue libris confectae, eodem Gesnero auctore* (1587), [Microfiche] Leiden, 1981.

The Art of Cooking, Milk and Cheese Preparation and Mountain Climbing

Jodocus Willich, *Ars magica, hoc est, coquinaria, de cibariis, ferculis, opsoniis, alimentis et potibus diversis parandis ... Iodoco Willichio Reselliano ... nunc primum editus; huic accedit, Iacobi Bifrontis Rhaeti De operibus lactariis epistola*, ed. Konrad Gesner, Zurich, 1563. [Microfiche] Leiden, 1989.

Konrad Gesner: *Libellus de lacte, et operibus lactariis, philologus pariter ac medicus, cum epistola ad Iacobum avienum de montium admiratione auctore Conrado Gesnero*, (1541), [Microfiche] Leiden, 1981.

General Knowledge

Konrad Gesner, *Bibliotheca Universalis*, Zurich, 1545. [Microfiche] Leiden, 1981.

Konrad Gesner: *Bibliotheca instituta et collecta primum a Conrado Gesnero, deinde in Epitomen redacta et novorum librorum accessione locupletata, iam vero postremo recognita et in duplum post priores editiones aucta per Josiam Simlerum Tigurinum. Habes hic ... catalogum locupletissimum omnium fere scriptorum .. publicatorum et passim in bibliothecis latitantium. Opus utilissimum. Zürich: Froschauer 1574.*

Konrad Gesner: *Pandectarum sive partitionum universalium Conradi Gesneri Tigurini, medici et philosophiae professoris, libri XXI...* Zürich: Froschauer 1548. [Microfiche] Leiden, 1981

Konrad Gesner, Josias Simmler, Johann Jakob Fries: *Bibliotheca instituta et collecta, primum a Conrado Gesnero, deinde in epitomen redacta ... per Iosiam Simlerum, iam vero postremo ... amplificata per Iohannem Iacobum Frisium Tigurinum.* (1583), [Microfiche] Leiden, 1990.

Languages and Aristotelian Principles

Konrad Gesner, *Mithridates: De differentiis linguarum tum veterum tum quae hodie apud diuersas nationes in toto orbe terrarum in usu sunt. ... Observationes*, Zurich: Froschoverus, 1555.

Konrad Gesner, *Onomasticon propriorum nominum, virorum, mulierum... secunda haec aeditio est Onomastici nostri, quod primum ex Ambrosii Calepini et aliorum doctorum dictionariis propriorum nominum concinnaveramus...* (1549), [Microfiche] Leiden, 1981.

Konrad Gesner, *Onomasticon propriorum nominum, virorum, mulierum... nunc primum cum ex Calepini, tum ex aliorum doctorum dictionariis partim a Conrado Gesnero Tigurino, partim ab eius amicis congestum* (1544), [Microfiche] Leiden, 1981.

Marcus Valerius Martialis, *M. V. Martialis poetae facetissimi epigrammata, ad linguae Latinae copiam ... recens ab omni verborum obscoenitate ... expurgata et ... emendata per Conradum Gesnerum ... Iacobi Micylli Argentoratensis* (1544), [Microfiche] Leiden, 1981.

Konrad Gesner, *Porphyrii institutiones quinque vocum ad Chrysaorium: Aristotelis categoriae ... una cum compendio de syllogismis, autoris incerti: omnia nuper et e graeco sermone in latinum translata et in lumen edita...* (trans. and ed. by Konrad Gesner) (1542), [Microfiche] Leiden, 1983.

Michael Ephesius, *Michaelis Ephesii scholia in aristotelis libros aliquot, nempe, de iuventute, senectute, vita et morte e graeco nunc primum conversa Conrado Gesnero ... interprete* (1541), [Microfiche] Leiden, 1981.

Josua Mahler, *Die teütsch Spraach: alle Wörter, Namen und Arten zu reden in hochteütscher Spraach ... dem ABC nach ... gestellt unnd mit gutem Latein ... vertolmetscht ... durch Josua Maaler...* Forword by Konrad Gesner (1561), [Microfiche] Leiden, 1983.

Konrad Gesner, *Lexicon Graecolatinum* (1537), [Microfiche] Leiden, 1983.

²⁵ Ioannis Lodovici Vitis Valentini de Anima et vita Libri tres. Eiusdem argumenti. Viti Amerbachii de Anima Libri IIII. Philippi Melanthonis Liber vnus. His accedit nunc primum Conradi Gesneri de Anima liber, sententiosa breuitate, velutique per tabulas et aphorismos magna ex parte conscriptus, philosophiae, rei mediae ac philologiae studiosis accommodatus: in quo de tactilibus quitatisbus, saporibus, odoribus, sonis, et coloribus, copiose accurateque tractatur. Cum Indice duplici. Tiguri, apud Iacobum Gesnerum, 1563. Only the part of Gesner on microfiche (Leiden, 1989).

²⁶ Konrad Gesner and Caspar Wolf, *Conradi Gesneri Tigurini ... physicarum meditationum, annotationum et scholiorum lib. V. nunc recens ex variis Gesnerianae diligentiae relictis schedis et libris, studiose collecti, methodici dispositi et conscripti per Casparum Wolphium Tigurinum...* Zurich: Froschauer, 1586. [Microfiche] Leiden, 1989.

²⁷ Cf. Gesner, *De Anima*, 1563, p. 840; at the end of the chapter on taste, he refers to other medical books for further examples of for the use of tasting: “Qui plura de saporibus requirit, medicorum libros consulat.” Nancy Siraisi discusses in her book *Avicenna in Renaissance Italy. The Canon and Medical Teaching in Italian Universities after 1500*, Princeton: Princeton University Press 1987, the way in which Avicenna’s canon was employed in medical studies. She refers to Avicenna’s canon as a textbook that was adapted for didactic purposes in the classroom. At the same time, she discovers, however, that often only a few sections of the entire canon were actually read in class. Cf. [Ibn Sina:] *Liber canonis Avicennae revisus et ab omni errore mendaque purgatus summaque, cum diligentia Impressum*, Venice, 1507, fol. 49r-52v on urine (Liber I, Fen II Doctr. III, Summa II: de vrina et egestinoe cuius sunt 13 capitula; 4. Kap: de signis odoris vrine).

²⁸ Gesner, *Thesaurus*, pp. 17-18.

²⁹ Gesner, *Physicarum Meditationum*, 1586, p. 7: [Partes philosophiae] Primarie, vt Ethica. Physica. Metaphysica. Secundariae, et illis subiecta, ... vt Physicae, Medicina. Oeconomicae, Polytica. Ethicae, Polytica, Oeconomica.

³⁰ Gesner, *Thesaurus*, p. 18: “Similiter in re medica maximum recte praeparandi ars et commode administrandi solertia momentum habent: neque plus refert quid exhibeas, quam quo modo.”

³¹ Gesner, *Thesaurus*, p. 17: “In oratione elocutio, actio et pronuntiatio, magis fere movent audientium animos quam ipsum quod tractatur argumentum. hinc est quod numeris et metris inclusa, tanto pere delectant: quae si oratione soluta efferas, frigida, supina et inertia habebuntur. Hinc est quod quidam in oratore quid primum esset interrogatus, pronuntiatio respondit. quid secundam, quid tertium, idem. [...] Similiter in re medica maximum recte praeparandi ars et commode administrandi solertia momentum habent...”

³² Cf. notes 25 and 26.

³³ Konrad Gesner, *Bibliotheca Universalis*, Zurich, 1545. [Microfiche] Leiden, 1981; Konrad Gesner, *Bibliotheca instituta et collecta primum a Conrado Gesnero, deinde in Epitomen redacta et novorum librorum accessione locupletata, iam vero postremo recognita et in duplum post priores editiones aucta per Josiam Simlerum Tigurinum. Habes hic ... catalogum locupletissimum omnium fere scriptorum .. publicatorum et passim in bibliothecis latitantium. Opus utilissimum*, Zurich: Froschauer, 1574; Konrad Gesner, Josias Simmler, and Johann Jakob Fries, *Bibliotheca instituta et collecta, primum a Conrado Gesnero, deinde in epitomen redacta ... per Iosiam Simlerum, iam vero postremo ... amplificata per Iohannem Iacobum Frisium Tigurinum*, Zurich, 1583. [Microfiche] Leiden, 1990; Konrad Gesner, *Pandectarum sive partitionum universalium Conradi Gesneri Tigurini, medici et philosophiae professoris, libri XXI...*Zurich: Froschauer, 1548. [Microfiche] Leiden, 1981.

³⁴ See also his list of recommended reading, contained in his handwritten study guide, now in the Zurich *Zentralbibliothek*: ZB C50a:9. Konrad Gesner, *De studiis philosophi futuri, medici praeserti, Conradi Gesneri Consideratio inchoata*, 1560; autogr., part draft, part clean copy, foll. 104-107. See also the catalogue of manuscripts... 1982, col. 360. Lit.: Anja-Silvia Göing, "Physica im Lehrplan der Schola Tigurina 1541 – 1597," in Hans-Ulrich Musolf and Anja-Silvia Göing (eds.), *Anfänge und Grundlegungen moderner Pädagogik im 16. und 17. Jahrhundert*, Cologne: Böhlau, 2003, pp. 73-91.

³⁵ Gesner, *Physicarum Meditationum*, 1586, p. 220:

TABVLA IN SENSVS INTERIORES.

Sensus interior est potentia organica intra craneum ad cognitionem destinata, excellens actionibus sensuum exteriorum. Substantia eius est in spiritu animali elaborato in reti mirabili et cerebri arterijs. Est autem Galeno triplex. Aristoteles duos tantum facit sensus interiores, memoram et sensum communem. A recentioribus quibusdam quinque ponuntur, hoc modo,

a. Sensus communis, qui nihil quam recipit imagines sensuum.

b. Imaginatio, quae discernit imagines.

c. Aestimatio, quae aliud ex alio elicit, ut equus ex applausu blanditias. Definitur a quibusdam, Vis apprehendens de sensato quod non est sensatum: Cuius obiectum intentio bonitatis et malevolentiae, conuenientiae et disconuenientiae, vtilitatis vel nocuenti, vt elici potest a forma per imaginationem apprehensa. Sic ouis cognoscit inimicitias lupi naturaliter. versatur circa corporis necessaria vel commoda.

d. Phantasia, seu cogitativa, quae longius progreditur componendo.

e. Memoria.

An ex his quinque, imaginatio quidem, idem quod phantasia est? Sed hoc Graecum illud Latinum. Aestimatio autem actio est Phantasiae sensitivae, ut Phantasiae priuatim hic dictae, phantasiae rationalis aut veluti rationalis, opus: vt si canis in truiuo constitutus, de ferae cursu, qua abierit, colligat: non hac nec istac, ergo illac. Alij sic sensus interiores partiuntur, nimirum vt externis pares numero eos faciant, aut quia totidem esse putant, quot actiones requiruntur, quasi non duae pluresve eiusdem siue potentiae siue substantiae actiones esse possint. Nos Galeni diuisionem tanquam mediam sequemur, quae tot facit interiores sensus quot sunt ventriculi cerebri.

Conciliatio. Memoriam distincte omnes ponunt, in caeteris quatuor differunt. Recentiores a. b. c. d. ceu quatuor diuersos explicant. Aristoteles communis sensus nomine eos omnes complectitur. Galenus a. b. sensum communem vocat, vel phantasiam. Et c. d. cogitationem vel ... Sic enim rerum discrimina apparent, etsi nomina confundi videantur, cum phantasiae vocabulum, alij ad sensum communem referant, alij ad cogitationem illam quae in brutis humana rationi proxime accedit. Igitur

Sensus interior Galeno triplex statuitur.

³⁶ Cf. [Ibn Sina] Avicenna Latinus, *Liber de anima seu sextus de naturalibus*, 2 vols., S. van Riet, ed., Louvain/Leiden 1972, vol. 1, pp. 85-90 (I,5) and vol. 2, pp. 1-11 (IV,1). For a brief overview of its diffusion see M. R. Pagnoni-Sturlese, "Phantasia," in: Joachim Ritter and Karlfried Gründer (ed.), *Historisches Wörterbuch der Philosophie*, vol. 7, Darmstadt: Wissenschaftliche Buchgesellschaft, 1989, pp. 526-535, here pp. 529-533, with further references to relevant literature. Gesner does not interpret the *phantasia* of the "more recent authors" as a general concept with specific subfunctions, as in Avicenna; this suggests that he is not referring to the original text of Avicenna, but rather to its derivatives, which deal exclusively with the subfunctions. This is why Gesner is able to find fault with the double naming of the same faculty as *phantasia* and *imaginatio*, a terminological usage not contained in this form in the original text of Avicenna, where *phantasia* has the function of a general conceptual category. This is criticised nevertheless by Giovanni Francesco Pico della Mirandola, by way of contrast to Marsilio Ficino's neoplatonist interpretation; cf. *ibid.*, pp. 533-535.

³⁷ Gesner, *Physicarum Meditationum*, 1586, p. 32: "Ad hunc modum ceperat Gesnerus Fabri Stapulensis phisica prolixa et copiosa, in breue compendium redigere ..."

³⁸ Siraisi, 1987, describes the divergence between German and Italian universities with regard to in the dissemination of Avicenna in the early 16th century. While Italy remained steadfastly attached to Avicenna (pp. 99-100), the Germans tended to prefer reading Galen in the original (p. 77). After 1550, no university continued to maintain the superiority of Avicenna's independent authority over that of Galen (p.105).

³⁹ Gesner, *De Anima*, 1563.

⁴⁰ Gesner, *De Anima*, 1563; cf. note 25.

⁴¹ Gesner, *De Anima*, 1563, p. 845.

⁴² Gesner, *De Anima*, p. 880: "Vrina per se male olet, deterius autem illorum, qui allia ederint, aut asparagos, qui tamen ipsi non foetent. suauiter autem illorum qui resinam, e larice praesertim, ut diximus, deglutierint."

⁴³ See on the rhetorical concept *imitare* the still authoritative article by G. W. Pigman III, “Versions of Imitation in the Renaissance,” *Renaissance Quarterly* 33 (1980), pp. 1-32, whose conceptualization has been adopted here. Further relevant literature is cited by Pigman.

⁴⁴ Brian Ogilvie, *The Science of Describing. Natural History in Renaissance Europe*, Chicago/London: University of Chicago Press, 2006.