Patterns of Thought in 16th Century Public Education

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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. 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, or again in conceptually structured encyclopedias of

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universal knowledge. 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” and the constraints of existing terminology. By concentrating specifically on the learning process, it becomes possible to recognize 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 linguistics and efforts such as those of Katherine Park to draw attention

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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 Universalis und Bibliotheca Selecta. Das Problem der Ordnung des gelehrtten Wissens in der frühen Neuzeit, Cologne/Weimar/Vienna: Böhlau, 1992.
to conceptually relevant the theories of the soul, 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. Against this backdrop, Konrad Gesner’s Zurich lecture notes provide us with an exceptionally useful standard of

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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 behavior. Depending on the interpretation, the *sensus communis* could be defined as a generalized, common faculty, or again as one of the specifiable internal senses, with its place more or less localized beside from one to four others, such as *cogitatio* and *memoria*.


\(^9\) Ibid., pp. 858-859.
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

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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 the *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*, the *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

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included, on the other hand, is chemistry or the manufacture of scientific instruments. The manner in which Gesner, in his widely disseminated *Thesaurus Evonymi Philiatri*, 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.\textsuperscript{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

\textsuperscript{13} [Konrad Gesner:] *Thesaurus Evonymi Philiatri, 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 idee 146), pp. 15-16, who provides list of 15\textsuperscript{th} century humanist tractates on technical constructions, such as defense installations, that suggest a coalescence of the *artes liberales* and the *artes mechanicae*. 
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.\textsuperscript{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. The circulation of copies, prints and lists of individual commonplace books and compiled by scholars and students came to constitute a generalized basis for the discussion of the transmission of knowledge. 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. 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

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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.
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 recognized principles for comprehending the world had developed, of which the validity 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 professionalized.

3.2 Sixteenth century teaching of philosophy: Konrad Gesner at Zurich

Konrad Gesner’s (1516-1565)\(^{19}\) writings 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 was 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. 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. 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

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how students went about learning in an academic context. With a few exceptions like Anton Schindling and Gabriel Codina Mir,\textsuperscript{22} traditional histories of teaching during this period have concentrated exclusively on pedagogical theories and handbooks.\textsuperscript{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.\textsuperscript{24} A selection has been made based on their


\textsuperscript{24} A sampling from the printed works includes such variegated works as:

\bf{Natural History}


Konrad Gesner, \textit{De stirpium collectione tabulae tum generailes, tum per duodecim menses ... olim per Conradox Gesnerum conscriptae ac aeditae, nunc authoris 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 Gesnerio authore}, (1587), [Microfiche] Leiden, 1981.


Konrad Gesner, \textit{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 authore} (Pseud. for Konrad Gesner), (1561), [Microfiche] Leiden, 1981.

David Kyber and Konrad Gesner, \textit{Lexicon rei herbariae trilingue, ex variis et optimis qui de stirpium historia scripserunt, authroibus concinnatum per Davudem Kyberum ... item tabulae collectionum in genere et particulatim per XII menses ... per Conradox Gesnerum ...} (1553), [Microfiche] Leiden 1981.


Konrad Gesner, \textit{Nomenclator aquatilium animantium: icones animalium aquatilium in mari et dulcibus aquas degentium ... et nominum confirmandorum causa descriptiones quorundam et alia quaedam adduntur ... per Conradox Gesnerum Tigurinum} (1560), [Microfiche] Leiden, 1981.


**Medicine**


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


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 Conradi Gesnerum in omnes libros (1549), [Microfiche] Leiden, 1989.

Konrad Gesner, *Ein kostlicher theürer schatz Evonymi Philiatri darinn behalten sind vil heymlicher gutter stuck der artzny, fürnemlich aber die art und eygenschafft der gbranntnen wasseren und ölen... erstlich in Latin beschriben durch Euonymum Philiatrum... verteütscht durch Joannera Rudolphum Landenberger, Zurich: Gesner, 1555.


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

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


Konrad Gesner, *De stirpium collectione tabulae tum generales, tum per duodecim menses ... olim per Conradum Gesnerum conscriptae ac aeditae, nunc authoris 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 authore (1587), [Microfiche] Leiden, 1981.

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


**General Knowledge**


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). The use of these books in his own teaching is traceable (Scholia, ed. Caspar Wolf).

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

**Languages and Aristotelian Principles**

Konrad Gesner, Mithridates: De differentiis linguarum tum veterum tum quae hodie apud diversas nationes in toto orbe terrarum in usu sunt. ... Observationes, Zurich: Froshoverus, 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 obsconenitate ... expurgata et ... emendata per Conradi Gesneri ... 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 aristonelis libros aliquot, nempe, de iuventute, senectute, vita et morte et graeco nunc primum conversa Conrado Gesnero ... interprete (1541), [Microfiche] Leiden, 1981.

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


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26 Konrad Gesner and Caspar Wolf, Conradi Gesneri Tigurini ... physicarum meditationum, annotationum et scholiorum lib. V. nunc recens ex variis Gesnerianae
His encyclopedic works on the animal, plant and mineral kingdoms demonstrate particularly clearly the connection between images, including symbols, organized 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, even concerning 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 also included 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 Philiatri*, Gesner states explicitly that a practicing physician ought to be well acquainted both with both medical terms and applications, on the one hand, and with each patient’s own individual circumstances, on the

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.” Nanci 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).
other. Still, in his *Meditationes*, he rates physics as one of the fundamental disciplines, above all for providing the philosophical concepts about nature. 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. 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.

### 3.3 The actual choice: teaching material on "De Anima" written by Konrad Gesner

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 pronunciatio, 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, pronunciatio respondit. quid secun- <18> dam, quid tertium, idem. [...] Similiter in re medica maximum recte praeparandi ars et commode administrandi solertia momentum habent...”
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*. Both works provide us both 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 encyclopedic works, the *Bibliotheca Universalis* and the *Pandecta*, which were intended to provide an overview of the collected knowledge of Gesner’s day. 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,

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32 Cf. notes 25 and 26.
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 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.\[^{35}\]


\[^{35}\] Gesner, *Physicarum Meditationum*, 1586, p. 220:
"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 common sense, which only takes in images of the senses;

d. the imagination, which distinguishes the images;

e. the common sense, which only takes in images of the senses.

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**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 rete mirabili et cerebri arterijs. Est autem Galeno triplex. Aristoteles duo 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 elicet, ut equus ex applausu blanditias. Definitur a quibusdam, Vis apprehendens de sensato quod non est sensatum: Cuius objectum intentione bonitatis et malevolentiae, conuenientiae et disconuenientiae, vtilitatis vel nocuenti, ut elici potest a forma per imaginationem apprehensia. Sic ouis cognoscit inimicitias lupi naturaliter. versatur circa corporis necessaria vel commoda.

d. Phantasia, seu cogitatio, 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 sensitiuae, ut Phantasiae priuatum hic dictae, phantasiae rationalis aut veluti rationalis, opus: vt si canis in triuio constitutus, de ferae cursu, qua abierit, colligat: non hac nec istac, ergo illac. Alii sic sensus interiores partuntur, nimirum vt externis pares numero eos faciant, aut quia totidem esse putant, quo actions requiruntur, quasi non duae pluresve eiusdem siue potentiae siue substantiae actiones esse possint. Nos Galeni divisionem tanquam medium sequemur, quae tot facit interiores sensus quot sunt ventriculi cerebri.

Conciliatio. Memoriam distincte omnes ponunt, in caeteris quatuor differunt. Recentiores a. b. c. d. cceu quatuor diversos 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 ratione proxime accedit. Igitur

Sensus interior Galeno triplex statuitur.
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 deduced 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.

Whether, of these five, imagination is 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 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 precedes his discussion, or meditation, on the internal sense of living beings with 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 base themselves on the writings of the unnamed medieval philosopher Avicenna and distinguish five faculties,

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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.
is rejected. Gesner prefers Galen’s 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 favor of Galen is, in addition, his conceptualization based on clearly distinguished functions: the *sensus communis*, or *phantasia*, receives and sorts out the images; the *cognitio* 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 conceptualization that makes sense. Its

Avicenna, where *phantasia* has the function of a general conceptual category. This is criticized nevertheless by Giovanni Francesco Pico della Mirandola, by way of contrast to Marsilio Ficino’s neoplatonist interpretation; cf. ibid., pp. 533-535.
origin lies not in a logical necessity, such as one finds in the scholastic
search for conceptual categories. Rather, it can more adequately be
characterized 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 to actions already described by earlier philosophers.
Rather, he merely presents what these authors have said about them.
His primary interest is in first determining 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)
organized reception, (2) processing and (3) storage of sensory
perceptions. Is there any difference between Gesner’s reference to Galen
for this conceptualization 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 summarized 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 organize
available knowledge for handy reference.

37 Gesner, Physicarum Meditationum, 1586, p. 32: “Ad hunc modum ceperat Gesnerus
Fabri Stapulensis phisica prolixa et copiosa, in breue compendium redigere ...”
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 are in fact made up entirely of compilations and summaries of other authors; nor again 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 Claudius Galenus, one of the
very few authors whom he mentions by name. Latin and Greek conceptualizations 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 conceptualization that is intended to correlate with 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. 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 organization of the material had the advantage that students were immediately aware of the most important contemporary schools of thought on the reading of the *De Anima*. In this way, they became capable of providing a well-founded

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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).
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 the 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 organized, 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? As 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 the *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 the *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, the *De Anima*, was one of the important works in Aristotle’s *physica*. The textbook devoted to it by Konrad Gesner
appeared in 1563.\textsuperscript{39} It was printed in a volume that also included commentaries by the authors Juan Luis Vives, Philipp Melanchthon and Veit Amerbach.\textsuperscript{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: “\textit{sed commune hoc solum discrimen, quo <odores> nobis vel grati vel ingrate sunt}.”\textsuperscript{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.”\textsuperscript{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

\textsuperscript{39} Gesner, \textit{De Anima}, 1563.
\textsuperscript{40} Gesner, \textit{De Anima}, 1563; cf. note 25.
\textsuperscript{41} Gesner, \textit{De Anima}, 1563, p. 845.
\textsuperscript{42} Gesner, \textit{De Anima}, p. 880: “\textit{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}.”
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 author of 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, a conceptual and an experimental basis

We began by noting that Gesner’s teaching material on the subject of the senses was organized along lines suited for a discussion of Aristotle’s *De Anima*. This construct was not taken over from the *De Anima* directly, however. It resulted rather out of a dialogue with other works on the same subject. With regard to the important conceptual description 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 organizationally through the assignation of concepts and functions physical givens. 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, of which he often makes mention. Gesner also encourages the

\(^{43}\) 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.
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 generalized 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 monicausality 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.