

Preface

Boni enim interpretis est, non ipsa modo verba seorsum considerare, sed & cum antecedentibus simul & consequentibus conferre. (Steno, OPH I,66)

A good interpreter considers not only the words as such
but also confers them with what precedes and what follows.

Vilhelm Maar's scholarly edition from 1910, the *Nicolai Stenonis Opera Philosophica* (OPH), is after one hundred years still the foundation for the study of Niels Stensen's scientific works in their original languages. Most works were written in Latin, one is in French and two small works were published later in Italian. Gustav Scherz's *Niels Stensen, eine Biographie*, for 25 years the most exhaustive existing biography, provides the documentation that lies behind the author's contribution on Stensen in the *Dictionary of scientific biography*.^a

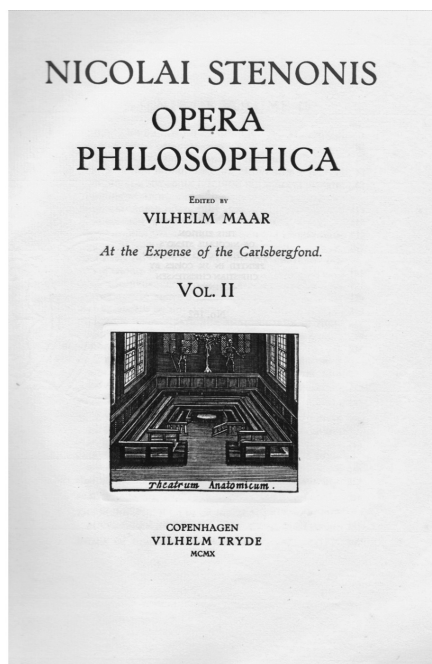
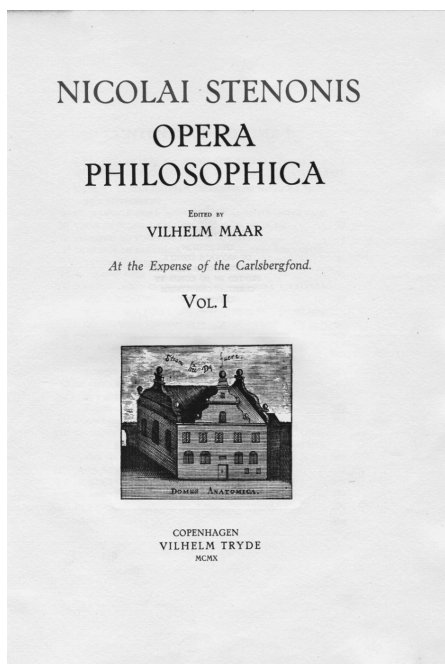
Both these editions came out in small numbers, the biography from a mainly religious publisher in the former GDR. It would be of little service just to make re-editions or to provide access on the web, since only few readers today master the Latin sufficiently enough to study Maar's edition of Stensen; or read German well enough to study Scherz with benefit; or read or even can get hold of the first and only complete translation of OPH in modern language, the richly illustrated Italian edition, *Niccolò Stenone – Opere Scientifiche*, edited by Luciana Casella and Enrico Coturri in 1986.

We present here what was missing, English translations of all Stensen's printed scientific works and of the first volume in Scherz's biography on Stensen that deals with genealogy, youth, education, and his life and achievements as a scientist. Scherz's volume 2 deals with Stensen as a Catholic bishop in Northern Germany between 1677–1686. That volume and Stensen's theological writings await a new team to take over.

33 published works in science and additional texts were collected and edited in the OPH by Vilhelm Maar in 1910.

Stensen's active life in research lasted altogether from 1660 to 1674. His science falls into two main categories, the anatomical works and the geological works. The *geological* works between 1667–1670 are OPH 23, 27, 29, 30. Stensen's first work in science from 1661, *On hot springs*, was still undiscovered at the time of Vilhelm Maar.

^a DSB 13, 30–35.



Vilhelm Maar (1871–1940) completed medical studies at Copenhagen University in 1896. After studies at learned centres in Europe, mainly in London, Maar became an assistant to his teacher of physiology, Professor Christian Bohr. Based on studies of the respiration Maar became Doctor of Medicine in 1902. Alongside the academic career Maar practiced medicine. Maar was Professor of the History of Medicine in Copenhagen between 1911–1933 and published a number of bibliophile editions, the first of which was the Danish translation of the *Prodromus on solids* in 1902 in cooperation with August Krogh, the zoo physiologist and later Nobel laureate

Thematically the *anatomical* works can be sub-grouped as follows, with the time and place of origin indicated.

1. *Works on the glands and lymphatics* comprise OPH 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13 from the Netherlands 1661–1663 and the second part of OPH 15 from Copenhagen 1664. Many pages were spent on a dispute with Gerard Blaes and his allies on priority for the discovery of the excretory duct of the parotid gland.
2. *Works on the heart and muscles*, OPH 9, 10 and 14 from the Netherlands 1662–1663, the first part of OPH 15 from Copenhagen 1664, the main work, *Specimen of elements of myology* OPH 22, from Florence 1667, and OPH 32 from Copenhagen 1673. The annotated English translation of OPH 22 was published by the Transactions of the American Philosophical Society in 1994. It is now accessible on the web, from which we have selected excerpts.
3. *Works on the brain*, the *Discourse of anatomy of the brain* from Paris 1665 and OPH 28 from Innsbruck 1669.

4. *Works on the circulation of the blood*, OPH 11 from Leiden 1662, and OPH 33 from Copenhagen 1673.
5. *Works on foetal malformations*. OPH 20 is from Paris 1665 and OPH 28 from Innsbruck in 1669.
6. *Comparative works on reproductive organs and foetal growth*. OPH 16 and 17 are from Copenhagen 1664, and OPH 19, 20, 21, 24, 25, and 26 from Florence in 1668.
7. *An essay on scientific endeavour* is the *Prooemium*, OPH 31 from Copenhagen 1673, which contains Steno's most famous words, *Beautiful is what we see, more beautiful what we know, but by far the most beautiful is what we do not know*.

There are thematic overlaps. Thus, the main geological work, the *Prodromus on solids*, OPH 27, contains an original description of the compartments of the water space in the body with a conclusion that the formation of stones, such as bladder and gallstones, takes place by accretion in the so-called external water space of the body. An interest in stone formation in living beings was revealed in the Chaos-manuscript as a medical student, a prompter for his later interests.

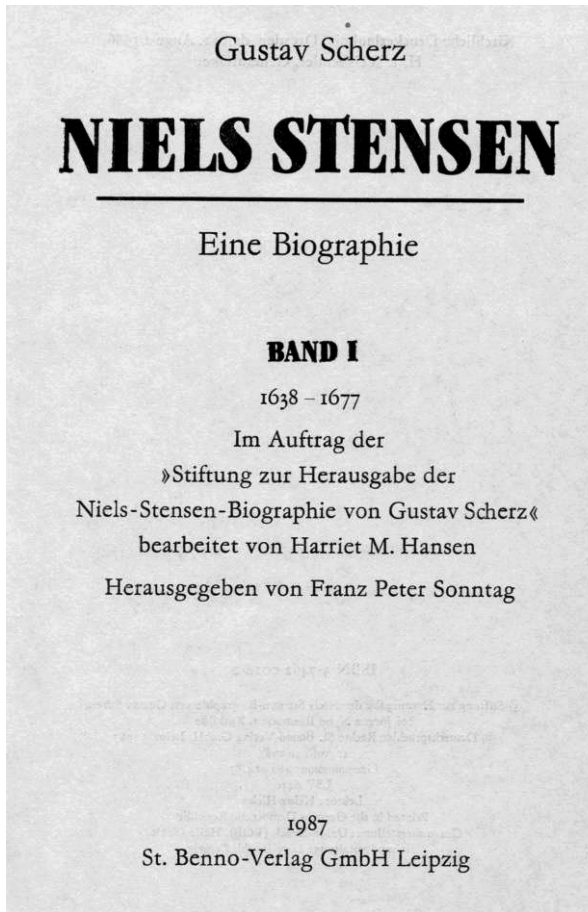
English translations of the scientific works remained few and scattered when Gustav Scherz edited *Steno – Geological Papers* (GP) in 1969 with new translations from Latin by Alex J. Pollock of 2 of the 33 works in OPH and of the dissertation *On hot springs*. The GP further contains two letters in Italian on Grottos, OPH 29 and 30, translated by Maureen Rohde. These five geological papers with an excerpt of the notes by Scherz are reprinted here with kind permission by the publisher, the University Press of Southern Denmark.

Of 29 anatomical works only a few were accessible in English when we published two works in *Steno on muscles* and one work, the *Prooemium*, in *Steno – Life, Science, Philosophy* in 1994. These translations were based on preliminary work by the late Sister M. Emmanuel Collins, OSF, in Rochester, Minnesota. We thank the editors of the *Transactions of the American Philosophical Society* and the *Acta Historica Scientiarum Naturalium et Medicinalium* for permission to republish these translations.

In continuation Paul Maquet, assisted by August Ziggelaar, S.J., D. Phil., translated all remaining scientific works into English with the exception of OPH 17, which was uniquely translated by Margaret Tallmadge May in 1950. The *Journal of History of Medicine and Allied Sciences* granted the permission to republish Dr. May's translation.

The scholarly annotations by Vilhelm Maar in OPH are to be found in the additional material to the present edition (part III) which can be downloaded from <http://extra.springer.com>, together with the anatomical works by Stensen in their original languages transcribed from OPH, except for the *Elementorum myologiae specimen*, which is, like the geological works, accessible in print and/or in net version.

Those translations completed, Paul Maquet took up the task of translating Gustav Scherz's biography of Stensen from the German.



Gustav Scherz, C.ss.R, D. phil. & theol. & h.c. (1895–1971) is the second great scholar on Stensen of the twentieth century. Among numerous books and papers Scherz co-edited Stensen's *Opera theologica* (OTH) and edited his correspondence, the *Epistolae* (EP), both works having been published in quarto two-volume sets like the *Opera philosophica*. See the Gustav Scherz biography by Ivar Hoel

Dr. August Ziggelaar, of Copenhagen, now Nijmegen in the Netherlands, assisted also in this translation and he revised Scherz's many quotations from Stensen's student journal, the Chaos-manuscript, based on his own English edition (Chaos, ed. Z).

Texts and illustrations were edited by Troels Kardel. Alan Cutler, Ph. D., Washington D.C., geologist and the author of a widely distributed scientific biography on Stensen,^a kindly undertook the revision of geological issues and helped with the language editing. Harriet M. Hansen, M.A., historian and the editor of the German

^a Recent English biographies: Hans Kermit, *Niels Stensen. The scientist who was beatified*; Alan Cutler, *The seashell on the mountaintop*

edition of the Stensen-biography, contributed with several notes. Health problems prevented her from taking part in the editing. We are most grateful for the assistance and inspiration we have received over the years of cooperation from August Ziggelaar, Alan Cutler and Harriet M. Hansen and for inputs from a number of other specialists. We also like to thank the Committee for Publication of Gustav Scherz's Biography on Niels Stensen for permission to make this English edition as granted on November 3, 2009 by Jørgen Nybo Rasmussen.

We are grateful to the Uffizi Gallery, Florence, Italy for providing a photo of Stensen's portrait for this edition. Scans and photos from books were kindly provided by the Royal Library, Copenhagen, Denmark, the Biblioteca Nazionale Centrale, and the Archivio di Stato, Florence, Italy, the Library Company, Philadelphia, Pennsylvania, USA, the Historische Bibliothek St. Anna, Schwerin, Germany and the University Library in Tromsø, Norway. Other illustrations are from books in the possession of the editors. The ornaments are reproduced from Vilhelm Maar's edition.

It has been our aim to keep the texts as complete as possible. Annexes were added within areas of new research, that is on the muscles – myology – and on geology. Texts were supplied with comments mainly as footnotes or added in earlier endnotes. In the words of Gustav Scherz, when he himself edited A.D. Jørgensen's classical biography of Stensen from 1884, notes and annexes were made "in order that old mistakes should not be given prolonged life, and not deny the certain knowledge that recent research has come to." It is our hope that the access to Niels Stensen's scientific works and biography in translation will enhance further studies on an important figure in European science and erudition in the seventeenth century.

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Troels Kardel, M.D.
Doct. Med. Copenhagen
Gammel Holte, Denmark

Paul Maquet M.D.
Doct. h.c. Univ. Paris XII
Doct. med. h.c. R.W.T.H. Aachen
Aywaille, Belgium

Nicolaus Steno

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