MEDIEVAL LATIN SERIES · VOLUME 79

On the Various Arts

Theophilus

Schedula Diversarum Artium

On the Various Arts

Painting, Glass, and Metalwork

---

with a word-for-word interlinear English translation

preserving the original word order



CANES NOBILES · MMXXVI

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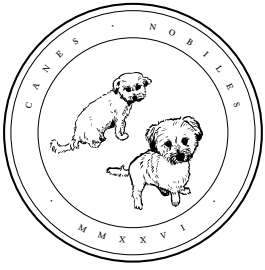

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Liber Primus. Præfatio

PREFACE TO BOOK ONE

Seven verses set out the order of the art: colors first, then their mixtures. Theophilus, humble priest and monk, writes for any who would shun idleness. Man, made in God's image, keeps by inheritance the capacity for every art; what God has given must be neither scorned nor hidden. He offers freely what he learned, and bids the reader, his dearest son, take this schedule of the arts, holding all that Greece, Tuscany, Arabia, Italy, France, and Germany know of colors, enamel, metalwork, gems, glass, and carving, and asks only his prayers in return.

(Sensim per partes discuntur quælibet artes.
(Gradually through parts are-learned any arts.
Artis pictorum prior est factura colorum.
Of-the-art of-painters first is the-making of-colors.
Post ad mixturas committat mens tua curas.
After to the-mixtures let-commit mind your cares.
Hoc opus exerce, sed ad unguem cuncta coherce,
This work exercise, but to the-nail all-things constrain,
Ut sit adornatum quod pinxeris et quasi natum.
That it-may-be adorned what you-shall-have-painted and as-if born.
Postea multorum documentis ingeniorum
Afterward of-many by-the-teachings of-wits
Ars opus augebit, sicut liber iste docebit.)
The-art the-work will-increase, as book this will-teach.)

Theophilus, humilis presbyter, servus servorum Dei, indignus
Theophilus humble priest servant of-the-servants of-God unworthy
nomine et professione monachi, omnibus mentis desidiam
of-the-name and profession of-monk to-all of-mind sloth
animique vagationem utili manuum occupatione, et
and-of-spirit wandering by-useful of-hands occupation and

delectabili novitatum meditatione declinare et calcare
by-delightful of-novelties meditation to-avoid and to-tread-down
volentibus, retributionem cœlestis præmii! Legimus in
wishing the-reward of-heavenly prize we-read in
exordio mundanæ creationis hominem ad imaginem
the-beginning of-the-worldly creation man to the-image
et similitudinem Dei conditum et inspiratione divini
and likeness of-God founded and by-the-inspiration of-divine
spiraculi animatum, tantæque dignitatis excellentia cæteris
breath animated and-of-so-great dignity by-the-excellence to-the-other
animantibus prærogatum, ut rationis capax divinæ prudentiæ,
living-things preferred that of-reason capable of-divine prudence
consilii ingeniique mereretur participium, arbitriique libertate
of-counsel and-of-wit should-deserve participation and-of-will by-the-freedom
donatus solius conditoris sui suspiceret voluntatem et
endowed of-the-sole founder his should-look-up-to the-will and
revereretur imperium. Qui astu diabolico misere
should-revere the-command who by-the-cunning devilish wretchedly
deceptus, licet propter inobedientiæ culpam privilegium
deceived although on-account-of of-disobedience the-fault the-privilege
immortalitatis amiserit, tamen scientiæ et intelligentiæ
of-immortality be-lost nevertheless of-knowledge and of-understanding
dignitatem adeo in posteritatis propaginem transtulit, ut
the-dignity so into of-posterity the-propagation he-transferred that
quicunque curam sollicitudinemque addiderit, totius artis
whoever care and-solicitude shall-have-added of-the-whole of-art
ingeniique capacitatem quasi hæreditario jure adipisci possit.
and-of-wit the-capacity as-if by-hereditary right to-obtain may-be-able
Hujusmodi intentionem humana suscipiens sollertia, et in
of-this-kind the-intention human taking-up skill and in
diversis actibus suis insistens lucris et voluptatibus, per
various acts its pressing-on to-gains and pleasures through

temporum incrementa, tandem ad prædestinata christianæ
of-times the-increases at-last to the-predestined of-the-Christian
religionis perduxit tempora, actumque est, ut quod ad laudem
religion brought times and-done it-was that what for the-praise
et gloriam nominis sui condidit dispositio divina, in ejus
and glory of-name his he-founded the-arrangement divine into his
obsequium converteret plebs Deo devota. Quapropter quod
service should-turn the-people to-God devoted wherefore what
ad nostram usque ætatem sollers prædecessorum transtulit
to our up-to age the-skillful of-predecessors transferred
provisio, pia fidelium non negligat devotio; quodque
provision the-pious of-the-faithful not let-it-neglect devotion and-what
hæreditarium Deus contulit homini, hoc homo omni aviditate
as-hereditary God conferred on-man this man with-all eagerness
amplectatur et laboret adipisci. Quo adepto nemo apud se,
let-him-embrace and let-him-labor to-obtain which obtained no-one with himself
quasi ex se et non aliunde accepto glorietur; sed et in
as-if from himself and not from-elsewhere received let-him-glory but even in
Domino, a quo et per quem omnia, et sine quo nihil,
the-Lord from whom and through whom all-things and without whom nothing
humiliter gratuletur, nec concessa invidiæ sacculo recondat,
humbly let-him-rejoice nor the-granted-things of-envy in-the-bag let-him-hide
aut tenacis armariolo cordis occultet, sed omni jactantia
or of-tenacious in-the-little-cupboard of-heart let-him-conceal but with-all boasting
repulsa, hilari mente simpliciter quærentibus eroget,
rejected with-cheerful mind simply to-the-seekers let-him-pay-out
metuatque evangelicam illius negotiatoris sententiam, qui
and-let-him-fear the-evangelical of-that trader the-sentence who
domino suo reconsignare dissimulans mnam fœneratam, omni
to-lord his to-reconsign dissembling the-mina put-to-interest of-all
beneficio privatus, oris sui judicio nequam servi
benefit deprived of-mouth his by-the-judgment of-a-worthless servant

promeruit notam. Quam sententiam incurrere formidans ego
earned the-mark which sentence to-incur dreading I
indignus et pene nullius nominis homuncio, quod mihi gratis
unworthy and almost of-no name a-little-man what to-me freely
concessit, quæ dat omnibus affluenter et non improperat,
granted which gives to-all abundantly and not reproaches
divina dignatio, cunctis humiliter discere desiderantibus
divine condescension to-all humbly to-learn desiring
gratis offero, et ut in me benignitatem Dei recognoscant
freely I-offer and that in me the-kindness of-God they-may-recognize
largitatemque mirantur, admoneo, et ut idem, si opera
and-the-generosity may-wonder-at I-admonish and that the-same if works
addiderint, sibi præsto esse, procul dubio credant,
they-shall-have-added to-themselves at-hand to-be far-from doubt they-may-believe
insinuo. Sicut enim homini quodcunque vetitum aut indebitum
I-suggest as for for-man whatever forbidden or undue
cujuscunque modi ambitione attemptare, sive rapina usurpare,
of-whatever manner by-ambition to-attempt or by-robbery to-usurp
iniquum est et detestabile: sic jure debitum et ex patre
unjust is and detestable so by-right owed and from the-father
Deo hæreditarium intemptatum negligere aut contemptui
God hereditary untried to-neglect or to-contempt
ducere, ignaviæ adscribitur ac stultitiæ. Tu ergo quicunque
to-reckon to-sloth is-ascribed and to-folly you therefore whoever
es, fili carissime, cui Deus misit in cor campum
you-are son dearest to-whom God sent into heart the-field
latissimum diversarum artium perscrutari, et ut exinde,
very-wide of-various arts to-search-through and that thence
quod libuerit, colligas, intellectum curamque apponere,
what shall-please you-may-gather understanding and-care to-apply
non vilipendas pretiosa et utilia quæque, quasi ea tibi
do-not despise precious and useful-things all as-if they for-you

sponte aut insperato domestica terra produxerit; quia
of-its-own-accord or unhoped-for the-domestic land had-produced because
stultus negotiator est, qui thesaurum subito fossa humo
foolish trader he-is who a-treasure suddenly with-dug earth
repererit, si illum colligere et servare neglexerit. Quod si
should-find if it to-gather and to-keep he-should-neglect but if
tibi arbusta vilia myrrham, thus et balsama producerent, seu
for-you shrubs cheap myrrh incense and balsams should-produce or
fontes domestici oleum, lac et mella profunderent, sive pro
springs domestic oil milk and honeys should-pour-forth or instead-of
urtica et carduo cæterisque horti graminibus nardus et
nettle and thistle and-the-other of-the-garden grasses nard and
fistula diversorumque generum aromata crescerent, numquid
cassia and-of-various kinds spices should-grow surely-not
his contemptis tanquam vilibus et domesticis ad extranea,
with-these despised as-if cheap and domestic to foreign-things
nec meliora, sed fortassis viliora comparanda circuires
nor better but perhaps cheaper to-be-procured you-would-go-around
terras et maria? et hoc te judice grandis foret
lands and seas and this with-you as-judge great would-be
stultitia. Quamvis enim soleant homines quæque pretiosa
folly although for are-wont men all precious-things
multa sudore quæsita, sumptuumque numerositate comparata,
many sweat sought and-of-expenses by-the-numerousness procured
primo loco reponere, summaque tueri cautela: tamen
in-first place to-store-away and-with-highest to-guard caution nevertheless
si forte interdum gratis occurrerint aut inveniantur paria
if perhaps sometimes freely they-should-occur or be-found equal
seu meliora, non dissimili, imo majori servantur custodia.
or better not with-unlike nay with-greater they-are-kept custody
Quapropter, fili dulcissime, quem Deus omnino beatum fecit
wherefore son sweetest whom God wholly blessed made

in hac parte, qua tibi gratis offeruntur, quæ multi
in this part in-which to-you freely are-offered what-things many
marinos secantes fluctus cum summo periculo vitæ, famis
marine cutting waves with highest danger of-life of-hunger
ac frigoris artati necessitate, aut diuturna doctorum fessi
and of-cold constrained by-the-necessity or by-long of-teachers wearied
servitute, omnimodoque fatigati discendi desiderio, intolerabili
by-servitude and-in-every-way exhausted of-learning by-the-desire unbearable
tamen acquirunt labore; hanc Diversarum artium schedulam
nevertheless acquire by-labor this of-the-Various arts little-schedule
avidis obtutibus concupisce, tenaci memoria perlege,
with-eager gazes desire with-tenacious memory read-through
ardenti amore complectere. Quam si diligentius perscruteris,
with-burning love embrace which if more-diligently you-search
illic invenies quicquid in diversorum colorum generibus et
there you-will-find whatever in of-various colors the-kinds and
mixturis habet Græcia; quicquid in electrorum operositate,
mixtures has Greece whatever in of-enamels the-workmanship
seu nigelli varietate novit Tuscia, quicquid ductili vel
or of-niello the-variety knows Tuscany whatever with-repoussé or
fusili, seu interrasili opere distinguit Arabia; quicquid in
cast or pierced work distinguishes Arabia whatever in
vasorum diversitate, seu gemmarum ossiumve sculptura auro
of-vessels the-diversity or of-gems or-of-bones carving with-gold
[et argento inclyta] decorat Italia; quicquid in fenestrarum
and silver famous adorns Italy whatever in of-windows
pretiosa varietate diligit Francia; quicquid in auri, argenti,
the-precious variety loves France whatever in of-gold of-silver
cupri et ferri, lignorum lapidumque subtilitate sollers
of-copper and of-iron of-woods and-of-stones subtlety skillful
laudat Germania. Quæ cum sæpe relegeris et tenaci
praises Germany which when often you-shall-have-reread and to-tenacious

memoriæ commendaveris, hac vicissitudine instructionis me
memory shall-have-entrusted with-this return of-instruction me
recompensabis, ut, quoties labore meo bene usus fueris,
you-will-repay that as-often-as of-labor my well used you-shall-have
ores pro me apud misericordiam Dei omnipotentis,
you-may-pray for me with the-mercy of-God almighty
qui scit, me nec humanæ laudis amore, nec temporalis
who knows me neither of-human praise by-love nor of-temporal
præmii cupiditate, quæ digesta sunt, conscripsisse, aut
reward by-desire the-things-which set-out are to-have-written or
invidiæ livore pretiosum quid aut rarum subtraxisse, seu
of-envy by-the-spite precious anything or rare to-have-withheld or
mihi peculiariter reservatum conticuisse, sed in augmentum
to-myself peculiarly reserved to-have-kept-silent but for the-increase
honoris et gloriæ nominis ejus multorum necessitatibus
of-honor and glory of-name his of-many to-the-necessities
succurrisse et profectibus consuluisse.
to-have-come-to-help and to-the-advances to-have-consulted

The flesh-tint is white lead burned yellow, ground, and mixed with unburned white lead and vermilion. Theophilus then builds a face and body in order: green earth, the first posch for the brows, eyes, and joints, the first rose for the cheeks, the first highlight, veneda in the eyes, a second posch and rose for the shadows and lips, a second highlight, and the hair and beards of boys, youths, and young men.

Caput I. De temperamento colorum in nudis corporibus.
Chapter I about the-tempering of-colors in nude bodies
Color qui dicitur membrana, quo pinguntur facies et
the-color which is-called flesh-tint with-which are-painted faces and
nuda corpora, sic componitur. Tolle cerosam, id est album,
nude bodies thus is-composed take white-lead that is the-white
quod fit ex plumbo, et mitte eam non tritam, sed
which is-made from lead and put it not ground but
ita ut est siccam, in vas cupreum vel ferreum, et pone
thus as it-is dry into a-vessel copper or iron and place-it
super prunas ardentes, et combure donec convertatur in
over coals burning and burn-it until it-be-turned into
flavum colorem [vel glaucum]. Deinde tere eum, et admisce
yellow color or gray then grind it and mix
albam ei cerosam et cenobrium [vel sinopidem], donec
white with-it white-lead and vermilion or sinoper until
carni similis fiat. Quorum colorum mixtura in tuo sit
to-flesh like it-become of-which colors the-mixture in your let-be
arbitrio; ut si, verbi gratia, rubeas facies habere vis,
judgment that if for example ruddy faces to-have you-wish
plus adde cenobrii: si vero candidas, plus appone albi; si
more add of-vermilion if however white more put of-white if
autem pallidas, appone pro cenobrio modicum prasini.
however pale put instead-of vermilion a-little of-green-earth

Caput II. De colore prasino.

Chapter II about the-color green-earth

Qui prasinus, est quasi confectio quædam habens similitudinem

which green-earth is as-if a-confection a-certain having a-likeness

viridis coloris et nigri, cujus natura talis est, quod non

of-green color and of-black whose nature such is that not

teritur super lapidem, sed missus in aquam resolvitur et

it-is-ground on a-stone but put into water is-dissolved and

per pannum diligenter colatur, cujus usus in recenti muro

through a-cloth diligently is-strained whose use on a-fresh wall

pro viridi colore satis utilis habetur.

for green color quite useful is-held

Caput III. De posch primo.

Chapter III about posch first

Cum vero membranam miscueris et inde facies et

when however the-flesh-tint you-shall-have-mixed and thence the-faces and

nuda corpora impleveris, admisce prasinum et rubeum,

nude bodies you-shall-have-filled mix green-earth and red

qui comburitur ex ogra, et modicum cenobrii, et confice

which is-burned from ochre and a-little of-vermilion and make

posch, ex quo designabis supercilia et oculos, nares

posch from which you-will-draw the-eyebrows and eyes the-nostrils

et os, mentum et fossulas circa nares, et tempora,

and mouth the-chin and little-hollows around the-nostrils and the-temples

rugas in fronte et collo, et rotunditatem faciei,

the-wrinkles on the-forehead and neck and the-roundness of-the-face

barbas juvenum et articulos manuum et pedum, et omnia

the-beards of-young-men and the-joints of-the-hands and of-the-feet and all

membra, quæ distinguuntur in nudo corpore.

limbs which are-distinguished in a-nude body

Caput IV. De rosa prima.

Chapter IV about rose first

Deinde misce cum simplici membrana modicum cenobrii et

then mix with simple flesh-tint a-little of-vermilion and

minii, et confice colorem, qui dicitur rosa, unde rubricabis

of-red-lead and make the-color which is-called rose with-which you-will-redden

utramque maxillam, os et mentum inferius, collum et

each cheek the-mouth and chin lower the-neck and

rugas frontis modice, ipsam frontem super tempora

the-wrinkles of-the-forehead moderately itself the-forehead above the-temples

ex utraque parte, nasum in longitudine et supernares ex

on each side the-nose in length and above-the-nostrils on

utraque parte, articulos et cætera membra in nudo corpore.

each side the-joints and the-other limbs in a-nude body

Caput V. De lumina prima.

Chapter V about highlight first

Post hæc misce cum simplici membrana cerosam tritam,

after these-things mix with simple flesh-tint white-lead ground

et compone colorem, qui dicitur lumina, unde illuminabis

and compose the-color which is-called highlight with-which you-will-light

supercilia, nasum in longitudine et super foramina narium

the-eyebrows the-nose in length and above the-openings of-the-nostrils

ex utraque parte, subtiles tractus circa oculos et tempora

on each side fine strokes around the-eyes and the-temples

inferius, et mentum superius, et juxta nares et os

below and the-chin above and beside the-nostrils and mouth

ex utraque parte, frontem superius, inter rugas frontis

on each side the-forehead above between the-wrinkles of-the-forehead

modice, et collum in medio, et circa aures, ac articulos

moderately and the-neck in the-middle and around the-ears and the-joints

manuum et pedum exterius et omnem rotunditatem
of-the-hands and of-the-feet on-the-outside and all the-roundness
manuum et pedum et brachiorum in medio.
of-the-hands and of-the-feet and of-the-arms in the-middle
Caput VI. De veneda in oculis ponenda.
Chapter VI about veneda in the-eyes to-be-put
Deinde commisce nigrum cum modico albo, qui color
then mix black with a-little white which color
vocatur veneda, et inde imple pupillas oculorum. Adde ei
is-called veneda and with-it fill the-pupils of-the-eyes add to-it
etiam de albo amplius, et imple oculos ex utraque parte
also of white more and fill the-eyes on each side
[pupillæ], et album simplex linies inter pupillam et
of-the-pupil and white simple you-will-smear between the-pupil and
ipsum colorem, et cum aqua lavabis.
itself the-color and with water you-will-wash
Caput VII. De posch secundo.
Chapter VII about posch second
Postea accipe posch, de quo supra dictum est, et admisce
afterward take the-posch about which above said it-is and mix
ei amplius de prasino et rubeo, ita ut umbra sit anterioris
with-it more of green-earth and red so that the-shadow be of-the-earlier
coloris, et imple medium spatium inter supercilia et oculos,
color and fill the-middle space between the-eyebrows and eyes
et sub oculis medium, et juxta nasum, et inter os et
and under the-eyes the-middle and beside the-nose and between the-mouth and
mentum, et granos seu barbulas adolescentum, et palmas
chin and the-whiskers or little-beards of-youths and the-palms
dimidias versus pollicem, et pedes supra minores articulos, et
half toward the-thumb and the-feet above the-smaller joints and
facies puerorum et mulierum a mento usque ad tempora.
the-faces of-boys and of-women from the-chin up-to to the-temples

Caput VIII. De rosa secunda.

Chapter VIII about rose second

Deinde misce cum rosa cenobrium, et linies inde in

then mix with the-rose vermilion and you-will-smear with-it in

medio oris, ita ut anterior superius inferiusque pareat,

the-middle of-the-mouth so that the-earlier above and-below may-appear

et fac subtiles tractus super rosam in facie, in collo et

and make fine strokes over the-rose in the-face in the-neck and

fronte, et designabis inde articulos in palmis, et juncturas

forehead and you-will-draw with-it the-joints in the-palms and the-junctures

omnium membrorum et ungulas.

of-all limbs and the-nails

Caput IX. De lumina secunda.

Chapter IX about highlight second

Et si facies tenebrosa fuerit ut ei non sufficiat

and if the-face dark shall-have-been so-that for-it not suffices

una lumina, adde ei amplius de albo et super priorem

one highlight add to-it more of white and over the-earlier

linies subtiles tractus per omnia.

you-will-smear fine strokes through all

Caput X. De capillis puerorum, adolescentum et juvenum.

Chapter X about the-hair of-boys of-youths and of-young-men

Post hæc misce modicum nigri cum ogra et imple

after these-things mix a-little of-black with ochre and fill

capillos puerorum, et discerne eos cum nigro. Adde amplius

the-hair of-boys and distinguish them with black add more

nigri cum ogra et imple capillos juvenum, et illumina

of-black with ochre and fill the-hair of-young-men and light-it

cum secunda [lumina suprascripta].

with the-second highlight above-written

Caput XI. De barbis adolescentum.

Chapter XI about the-beards of-youths

Misce prasinum et rubeum et si vis rosæ modicum, et

mix green-earth and red and if you-wish of-rose a-little and

imple barbas adolescentum. Misce ogram et nigrum et rubeum,

fill the-beards of-youths mix ochre and black and red

et imple capillos [juvenum] et illumina ogra modico nigro

and fill the-hair of-young-men and light-it with-ochre with-a-little black

mixta, et ex eadem mixtura fac nigros tractus in barba.

mixed and from the-same mixture make black strokes in the-beard

XII–XIV · OLD MEN, SHADOWS, AND GARMENTS

Gray and white hair and beards for the old and decrepit; the dark strokes of exedra around the pupils and mouth, then red and black for brows, nostrils, and the outlines of a face turned left or right; then, for book painting on parchment, the mixtures of each garment color, from azure and vermilion to green, orpiment, folium, and ochre, each filled, shadowed, and lit in three stages.

Caput XII. De capillis et barba adolescentum et senum.

Chapter XII about the-hair and beard of-youths and of-old-men

Misce modicum nigri cum cerosa, et imple capillos et

mix a-little of-black with white-lead and fill the-hair and

barbas decrepitorum. Adde eidem colori amplius nigri et

beards of-the-decrepit add to-the-same color more of-black and

modicum rubei, et fac inde tractus, et illuminabis simplici

a-little of-red and make with-it strokes and you-will-light with-simple

cerosa. Commisce rursum cerosæ amplius nigri, et imple

white-lead mix again with-white-lead more of-black and fill

capillos et barbas senum, et fac tractus ex eodem colore,

the-hair and beards of-old-men and make strokes from the-same color

admixto ei nigro amplius et modico rubeo, et illumina
mixed with-it black more and a-little red and light
eo unde decrepitos impleveras. Eo ordine, si vis,
with-that with-which the-decrepit you-had-filled in-that order if you-wish
adhuc nigriores capillos et barbas compone [addendo nigrum].
still blacker hair and beards compose by-adding black
Caput XIII. De exedra et cæteris coloribus vultuum [et
Chapter XIII about exedra and the-other colors of-faces and
nudorum corporum].
of-nude bodies
Deinde admisce rubeo modicum nigri, qui color vocatur
then mix with-red a-little of-black which color is-called
exedra, et fac inde tractus circa pupillas oculorum, et in
exedra and make with-it strokes around the-pupils of-the-eyes and in
medio oris, et subtiles tractus inter os et mentum.
the-middle of-the-mouth and fine strokes between the-mouth and chin
Post hæc cum simplici rubeo fac supercilia, et subtiles
after these-things with simple red make the-eyebrows and fine
tractus inter oculos et supercilia et oculos inferius, et in
strokes between the-eyes and eyebrows and the-eyes below and in
plena facie nasum in dextera parte [si ad dexteram partem
a-full face the-nose on the-right side if to the-right side
respiciens peracta vel figurata sit facies; aut in sinistra, si
looking done or figured be the-face or on the-left if
ad sinistram vertatur], et supernares ex utraque parte, et
to the-left it-be-turned and above-the-nostrils on each side and
os inferius, et circa frontem et maxillas senum interius,
the-mouth below and around the-forehead and the-cheeks of-old-men on-the-inside
et circa digitos manuum et articulos pedum interius,
and around the-fingers of-the-hands and the-joints of-the-feet on-the-inside
et in conversa facie circa nares in anteriori parte [et
and in a-turned face around the-nostrils on the-front side and

foramina narium]. Supercilia vero senum sive decrepitorum
the-openings of-the-nostrils the-eyebrows however of-old-men or of-the-decrepit
facies cum veneda, unde pupillas implesti. Deinde cum
you-will-make with veneda with-which the-pupils you-filled then with
simplici nigro juvenum supercilia facies, ita ut superius
simple black of-young-men the-eyebrows you-will-make so that above
aliquantulum rubei appareat, et oculos superius [in palpebris]
a-little of-red may-appear and the-eyes above on the-eyelids
et foramina narium, et os ex utraque parte, et circa
and the-openings of-the-nostrils and the-mouth on each side and around
auriculas, manus et digitos exterius, et articulos et cæteros
the-little-ears the-hands and fingers on-the-outside and the-joints and the-other
corporis tractus. Omnes vero tractus circa nuda corpora
of-the-body strokes all however strokes around nude bodies
fac cum rubeo, et ungues designabis cum exteriore rosa.
make with red and the-nails you-will-draw with the-outer rose
Caput XIV. De mixtura diversorum colorum in vestimentis
Chapter XIV about the-mixture of-various colors in the-garments
imaginum quæ fiunt in pergameno.
of-images which are-made on parchment
Misce menesch cum folio sive cum nigro, et modico rubeo,
mix menesch with folium or with black and a-little red
et imple vestimentum. Admisce etiam modicum nigri et
and fill the-garment mix also a-little of-black and
fac tractus [rugarum et plicationum vestimenti]. Deinde
make the-strokes of-the-wrinkles and of-the-folds of-the-garment then
misce lazur cum modico menesch, sive cum folio, sive
mix azure with a-little menesch or with folium or
cum eodem colore unde implesti, et illumina primum,
with the-same color with-which you-filled and light first
et cum puro lazur illumina superius. Post hæc misce
and with pure azure light above after these-things mix

parum albi cum lazur et fac subtiles et raros tractus.
a-little of-white with azure and make fine and sparse strokes
Imple vestimentum cum rubeo, et si rubeum pallidum
fill the-garment with red and if the-red pale
sit, adde modicum nigri. Inde misce amplius nigri cum
be add a-little of-black then mix more of-black with
eodem, et fac tractus. Deinde misce modicum rubei cum
the-same and make strokes then mix a-little of-red with
cenobrio et illumina superius primum. Post hæc adde
vermilion and light above first after these-things add
modicum minii cum cenobrio, et illumina superius. Imple
a-little of-red-lead with vermilion and light above fill
vestimentum cum cenobrio, et misce cum eodem modicum
the-garment with vermilion and mix with the-same a-little
rubei, et fac tractus. Deinde misce primum modicum minii
of-red and make strokes then mix first a-little of-red-lead
cum cenobrio, et illumina primum. Post hæc illumina
with vermilion and light first after these-things light
cum simplici minio. Ad extremum misce modicum nigri
with simple red-lead at-the last mix a-little of-black
cum rubeo, et fac exteriorem umbram. Misce purum viride
with red and make the-outer shadow mix pure green
cum ogra, ita ut de ogra plus sit, et imple vestimentum.
with ochre so that of ochre more be and fill the-garment
Adde eidem colori modicum de succo et parum rubei, et
add to-the-same color a-little of juice and a-little of-red and
fac tractus. Misce eidem colori unde implesti album,
make strokes mix with-the-same color with-which you-filled white
et illumina primum. Adde plus albi, et illumina exterius.
and light first add more of-white and light on-the-outside
Misce etiam cum superiori umbra [de qua fecisti tractus]
mix also with the-previous shadow from which you-made strokes

plus succi et rubei et parum viridis, et fac umbram
more of-juice and of-red and a-little of-green and make the-shadow
exteriorem. Misce succum folii cum cerosa, et imple
outer mix the-juice of-folium with white-lead and fill
vestimentum. Adde folii plus, et fac tractus. Adde plus
the-garment add of-folium more and make strokes add more
cerosæ, et illumina. Post hæc cum simplici cerosa. Ad
of-white-lead and light after these-things with simple white-lead at-the
extremum modicum folii triti et modicum cenobrii misce
last a-little of-folium ground and a-little of-vermilion mix
cum priore umbra, et fac exteriorem. Et eodem colore
with the-earlier shadow and make the-outer and with-the-same color
imple aliud vestimentum. Adde ei plus folii et cenobrii,
fill another garment add to-it more of-folium and of-vermilion
et fac tractus. Adde eidem unde implesti, cerosam et
and make strokes add to-the-same with-which you-filled white-lead and
modicum cenobrii, et illumina primum. Adde plus cerosæ,
a-little of-vermilion and light first add more of-white-lead
et illumina superius. Ad extremum misce modicum rubei
and light above at-the last mix a-little of-red
cum priori umbra, et fac exteriorem. Ex hac mixtura
with the-earlier shadow and make the-outer from this mixture
facies tria genera vestimentorum, unum purpureum, aliud
you-will-make three kinds of-garments one purple another
violaticum, tertium candidum. Misce viride cum succo, et
violet the-third white mix green with juice and
adde modicum ogræ, et imple vestimentum. Adde plus de
add a-little of-ochre and fill the-garment add more of
succo, et fac tractus. Adde etiam modicum nigri, et fac
juice and make strokes add also a-little of-black and make
exteriorem umbram. Adde cum impletione plus viridis et
the-outer shadow add with the-filling more of-green and

illumina primum. Cum puro viridi illumina exterius, et si
light first with pure green light on-the-outside and if
opus sit, adde ei modicum albi. Misce modicum cenobrii
need be add to-it a-little of-white mix a-little of-vermilion
cum auripigmento, et imple vestimentum. Adde parum rubei,
with orpiment and fill the-garment add a-little of-red
et fac tractus. Cum simplici rubeo umbram exteriorem.
and make strokes with simple red the-shadow outer
Adde cum impletione plus auripigmenti, et illumina primum.
add with the-filling more of-orpiment and light first
Cum simplici auripigmento illumina exterius. Usus hujus
with simple orpiment light on-the-outside the-use of-this
vestimenti non est in muro. Misce auripigmentum cum
garment not is on a-wall mix orpiment with
indico, sive cum menesch, sive cum succo sambuci, et
indigo or with menesch or with the-juice of-elder and
imple vestimentum. Adde amplius de succo, sive menesch,
fill the-garment add more of juice or menesch
sive de indico et fac tractus. Adde modicum nigri, et fac
or of indigo and make strokes add a-little of-black and make
umbram exteriorem. Deinde plus auripigmenti cum impletione,
the-shadow outer then more of-orpiment with the-filling
et illumina primum. Cum simplici auripigmento illumina
and light first with simple orpiment light
superius. Auripigmentum et quicquid ex eo temperatur,
above orpiment and whatever from it is-tempered
nullam vim habet in muro. Misce menesch cum folio, et
no strength has on a-wall mix menesch with folium and
imple vestimentum. Adde folii plus, et fac tractus. Adde
fill the-garment add of-folium more and make strokes add
etiam parum nigri, et fac exteriorem umbram. Cum simplici
also a-little of-black and make the-outer shadow with simple

menesch illumina primum. Adde parum albi, et illumina
menesch light first add a-little of-white and light
superius. Misce ogram cum nigro, et imple vestimentum.
above mix ochre with black and fill the-garment
Adde nigri plus, et fac tractus. Adde etiam plus, et fac
add of-black more and make strokes add also more and make
umbram exteriorem. Adde ogræ plus cum impletione, et
the-shadow outer add of-ochre more with the-filling and
illumina primum. Adde etiam plus, et illumina superius.
light first add also more and light above
Cum ogra et rubeo fac similiter. Misce album et viride,
with ochre and red make likewise mix white and green
et imple vestimentum. Cum simplici viridi fac tractus.
and fill the-garment with simple green make strokes
Adde parum succi, et fac umbram exteriorem. Adde plus
add a-little of-juice and make the-shadow outer add more
albi cum impletione, et illumina primum. Cum simplici
of-white with the-filling and light first with simple
albo illumina superius. Misce modicum nigri et parum
white light above mix a-little of-black and a-little
rubei cum albo, et imple vestimentum. Adde plus rubei
of-red with white and fill the-garment add more of-red
et parum nigri, et fac tractus. Adde etiam amplius nigri
and a-little of-black and make strokes add also more of-black
et rubei, et fac umbram exteriorem. Adde cum impletione
and of-red and make the-shadow outer add with the-filling
plus albi, et illumina primum. Cum simplici albo, illumina
more of-white and light first with simple white light
superius. Misce menesch cum albo ordine quo supra.
above mix menesch with white in-the-order in-which above

Misce similiter nigrum cum albo. Eodem modo misce
mix likewise black with white in-the-same way mix
ogram cum albo, et in umbra ejus adde modicum rubei.
ochre with white and in the-shadow its add a-little of-red

XV–XVI · PAINTING ON WALLS AND THE RAINBOW

On a wall the colors are laid wet with lime, veneda under azure and green; then the rainbow stroke, bands of color graded from white to the pure color and on to black, used for thrones, columns, towers, arches, trunks, and mountains.

Caput XV. De mixtura vestimentorum in muro.
Chapter XV about the-mixture of-garments on a-wall
In muro vero imple vestimentum cum ogra, addito ei modico
on a-wall however fill the-garment with ochre added to-it a-little
calcis, propter fulgorem, et fac umbras ejus sive cum simplici
of-lime on-account-of the-brightness and make the-shadows of-it either with simple
rubro, sive cum prasino, vel ex posch, qui fiat ex ipsa ogra
red or with green-earth or from posch which be-made from the-very ochre
et viridi. Membrana in muro miscetur ex ogra et cenobrio
and green the-flesh-tint on a-wall is-mixed from ochre and vermilion
et calce, et posch ejus et rosa et lumina fiant ut
and lime and the-posch of-it and the-rose and highlight let-them-be-made as
supra. Cum imagines vel aliarum rerum effigies pertrahuntur in
above when images or of-other things likenesses are-drawn on
muro sicco, statim aspergatur aqua, tam diu donec omnino
a-wall dry at-once let-it-be-sprinkled with-water so long until wholly
madidus sit. Et in eodem humore liniantur omnes colores,
wet it-be and in the-same moisture let-them-be-smeared all colors
qui supponendi sunt, qui omnes calce misceantur, et
which to-be-placed-under are which all with-lime let-them-be-mixed and

cum ipso muro siccentur ut hæreant. In campo sub lazur
with itself the-wall let-them-dry so-that they-may-stick in the-field under azure
et viridi, ponatur color, qui dicitur veneda, mixtus ex
and green let-it-be-placed the-color which is-called veneda mixed from
nigro et calce super quem, cum siccus fuerit, ponatur
black and lime over which when dry it-shall-have-been let-it-be-placed
in suo loco lazur tenuis cum ovi mediolo abundanter aqua
in its place azure thin with of-egg the-yolk abundantly with-water
mixto temperatus, et super hunc iterum spissior propter
mixed tempered and over this again thicker on-account-of
decorem. Viride quoque misceatur cum succo et nigro.
beauty green also let-it-be-mixed with juice and black

Caput XVI. De tractu qui imitatur speciem pluvialis arcus.

Chapter XVI about the-stroke which imitates the-appearance of-the-rainy bow

Tractus qui imitatur speciem pluvialis arcus conjungitur
the-stroke which imitates the-appearance of-the-rainy bow is-joined
diversis coloribus, videlicet cenobrio et viridi, item cenobrio
with-various colors namely vermilion and green likewise vermilion
et menesch; item viridi et ogra; item viridi et folio;
and menesch likewise green and ochre likewise green and folium
item folio et ogra; item menesch et ogra; item cenobrio
likewise folium and ochre likewise menesch and ochre likewise vermilion
et folio; qui hoc modo componuntur. Fiunt duo tractus
and folium which in-this way are-composed are-made two strokes
æqua latitudine; unus ex rubeo, calce mixto, in muro,
of-equal width one from red with-lime mixed on a-wall
sub cenobrio, ita ut vix quarta pars sit rubei; in laqueari
under vermilion so that scarcely the-fourth part be of-red on a-ceiling
vero ipsum cenobrium similiter cum creta mixtum. Alter
however itself the-vermilion likewise with chalk mixed the-other

vero viridis pari modo mixtus absque succo, et inter
however of-green in-like manner mixed without juice and between
eos fiat albus tractus. Deinde misce ex cenobrio et
them let-it-be-made a-white stroke then mix from vermilion and
albo quot colores volueris, ita ut primus sit modicum
white as-many-as colors you-shall-wish so that the-first be a-little
cenobrii, secundus plus, tertius amplius, quartus adhuc plus,
of-vermilion the-second more the-third more-still the-fourth still more
donec pervenias ad simplex cenobrium. Deinde admisce
until you-arrive at simple vermilion then mix
eidem modicum rubeum. Deinde simplex rubeum. Post
to-the-same a-little red then simple red after
hæc rubeum nigro misce. Ad ultimum nigrum. Simili
these-things red with-black mix at-the last black in-like
modo commisce colores ex viridi et albo, donec pervenias
manner mix colors from green and white until you-arrive
ad simplex viride. Deinde admisce ei modicum succum.
at simple green then mix with-it a-little juice
Commisce iterum, et adde plus succi. Post hæc misce
mix again and add more of-juice after these-things mix
modicum nigri; deinde plus; ad ultimum simplex nigrum.
a-little of-black then more at-the last simple black
Umbras vero in ogra facies cum rubeo; ad ultimum
the-shadows however on ochre you-will-make with red at-the last
addito nigro. Umbras menesch cum folio; ad ultimum
added black the-shadows of-menesch with folium at-the last
addito nigro. Umbras folii cum rubeo, addito ad ultimum
added black the-shadows of-folium with red added at-the last
nigro. Qui colores ita ponendi sunt, ut ex medio pallidiores
black which colors so to-be-placed are that from the-middle paler
tractus procedant, et ita ascendant usque ad exterius nigrum.
strokes proceed and thus ascend up-to to the-outer black

Horum tractuum nunquam plus quam duodecim esse possunt
of-these strokes never more than twelve be can
in utroque colore. Et si tot volueris, sic tempera mixturas,
in each color and if so-many you-shall-wish thus temper the-mixtures
ut simplex in octavo loco ponas. Si volueris novem, in
that the-simple in the-eighth place you-place if you-shall-wish nine in
sexto loco simplex pone. Si volueris octo vel septem, in
the-sixth place the-simple place if you-shall-wish eight or seven in
quinto loco simplex pone. Si volueris sex, in quarto. Si
the-fifth place the-simple place if you-shall-wish six in the-fourth if
quinque, in tertio. Si quatuor vel tres, non interponas eis
five in the-third if four or three not put-between to-them
simplex, sed eum, qui ante simplicem poni deberet,
the-simple but that which before the-simple to-be-placed ought
habeas pro simplici, et eidem admisce umbram usque
have instead-of the-simple and to-the-same mix the-shadow up-to
ad alterius nigrum. Hoc opere fiunt throni rotundi et
to of-the-other black by-this work are-made thrones round and
quadranguli, et tractus circa limbos, et arborum stipites cum
quadrangular and strokes around borders and of-trees trunks with
ramis, et columnæ, et turres rotundæ, et sedilia et quicquid
branches and columns and towers round and seats and whatever
rotundum apparere velis. Fiunt etiam arcus super columnas
round to-appear you-wish are-made also arches over columns
in domibus eodem opere; sed uno colore, ita ut interius
in houses by-the-same work but with-one color so that on-the-inside
album sit et exterius nigrum. Turres rotundæ fiunt cum
white it-be and on-the-outside black towers round are-made with
ogra, ita ut in medio sit albus tractus, et ex utraque parte
ochre so that in the-middle be a-white stroke and from each side
procedat ogra omnino pallida et paulatim trahens croceum
proceed ochre wholly pale and little-by-little drawing a-saffron-yellow

colorem usque antepenultimum tractum, cum quo misceatur
color up-to the-third-from-last stroke with which let-it-be-mixed
modicum rubeum; deinde modice amplius, sic tamen ut
a-little red then moderately more thus nevertheless that
nec simplex ogra nec simplex rubeum appareat. Eodem
neither simple ochre nor simple red appear in-the-same
modo et eadem mixtura fiunt turres et columnæ ex
way and with-the-same mixture are-made towers and columns from
nigro et albo. Stipites arborum commiscentur ex viridi
black and white the-trunks of-trees are-mixed from green
et ogra, addito modico nigro et succo. Quo colore
and ochre added a-little black and juice with-which color
pinguntur etiam terra et montes. Fiunt etiam terra et
are-painted also the-earth and mountains are-made also the-earth and
montes ex viridi et albo sine succo, ita ut interius sit
mountains from green and white without juice so that on-the-inside it-be
pallidum, et exterius trahat umbras mixtas cum modico
pale and on-the-outside draw shadows mixed with a-little
nigro. Omnes colores, qui aliis supponuntur in muro,
black all colors which to-others are-placed-under on a-wall
calce misceantur propter firmitatem. Sub lazur et sub
with-lime let-them-be-mixed on-account-of firmness under azure and under
menesch et sub viridi ponatur veneda; sub cenobrio
menesch and under green let-it-be-placed veneda under vermilion
rubeum; sub ogra et folio iidem colores calce mixti.
red under ochre and folium the-same colors with-lime mixed

Altar panels and doors are joined with cheese glue, covered with hide, and coated with gesso of glue made from hide and stag's horn, smoothed with shave-grass. Linseed oil is pressed for reddening doors, and the varnish called vernition is boiled from oil and gum, with a warning against its flame.

Caput XVII. De tabulis altarium et ostiorum, et de
Chapter XVII about the-panels of-altars and of-doors and about
glutine casei.
the-glue of-cheese
Tabulæ altarium sive ostiorum [sic componuntur]: primum
the-panels of-altars or of-doors thus are-composed first
particulatim diligenter conjungantur [asseres] junctorio
piece-by-piece diligently let-them-be-joined the-boards with-the-jointing
instrumento, quo utuntur doliarii sive tonnarii. Deinde
instrument which use coopers or cask-makers then
componantur glutine casei, quod hoc modo fit. Caseus
let-them-be-composed with-the-glue of-cheese which in-this way is-made cheese
mollis [de vacca] minutatim incidatur et aqua calida in
soft from a-cow little-by-little let-it-be-cut and with-water hot in
mortario cum pila tamdiu lavetur, donec aqua multotiens
a-mortar with a-pestle so-long let-it-be-washed until the-water many-times
infusa pura inde exeat. Deinde idem caseus attenuatus manu
poured-in pure thence come-out then the-same cheese made-thin by-hand
mittatur in frigidam aquam donec indurescat. Post hæc
let-it-be-put into cold water until it-harden after these-things
teratur minutissime super ligneam tabulam æqualem
let-it-be-ground very-fine on a-wooden board level
cum altero ligno, sicque rursum mittatur in mortarium
with another wood and-thus again let-it-be-put into the-mortar

et cum pila diligenter tundatur addita aqua cum viva
and with the-pestle diligently let-it-be-pounded added water with quick
calce mixta, donec sic spissum fiat, ut sunt feces. Hoc
lime mixed until so thick it-become as are dregs with-this
glutine tabulæ compaginatæ, postquam siccantur, ita sibi
glue the-panels joined after they-dry so to-each-other
inhæreant, ut nec humore nec calore disjungi possint.
cling that neither by-moisture nor by-heat to-be-separated they-can
Postmodum æquari debent planatorio ferro, quod curvum
afterward to-be-leveled they-ought with-the-planing iron which curved
et interius acutum habet duo manubria, ut ex utraque
and on-the-inside sharp has two handles so-that with each
manu trahatur, unde raduntur tabulæ, ostia, et scuta,
hand it-be-drawn with-which are-scraped panels doors and shields
donec omnino fiant plana. Inde cooperiantur corio crudo
until wholly they-become flat then let-them-be-covered with-hide raw
equi, sive asini, sive bovis, quod aqua madefactum, mox
of-a-horse or of-an-ass or of-an-ox which with-water soaked as-soon
ut pili erasi fuerint, aqua aliquantum extorqueatur,
as the-hairs scraped-off shall-have-been the-water somewhat let-it-be-wrung-out
et ita humidum cum glutine casei superponatur.
and thus moist with the-glue of-cheese let-it-be-laid-on

Caput XVIII. De glutine corii et cornuum cervi.

Chapter XVIII about the-glue of-hide and of-the-horns of-the-stag

Quo diligenter exsiccato [fiat aliud gluten isto modo]:
which diligently dried let-it-be-made another glue in-this way
tolle incisuras ejusdem corii similiter exsiccatas et particulatim
take the-cuttings of-the-same hide likewise dried and piece-by-piece
incide [et sunt etiam bonæ incisuræ aliorum pergamenorum],
cut and there-are also good cuttings of-other parchments
et accipiens cornua cervi minutatim confracta malleo
and taking the-horns of-the-stag little-by-little broken with-the-hammer

ferrarii [vel rasuram aut limaturam ipsorum] super incudem,
of-the-smith or the-scraping or filing of-them on the-anvil
compone in ollam novam, donec sit dimidia, et imple eam
put into a-pot new until it-be half and fill it
aqua, sicque adhibe ignem donec excoquatur tertia pars
with-water and-thus apply fire until be-boiled-away the-third part
ejusdem aquæ, sic tamen ut combulliat; et ita probabis:
of-the-same water thus nevertheless that it-boil and thus you-will-test-it
fac digitos tuos humidos eadem aqua, et cum refrigerati
make fingers your wet with-the-same water and when cooled
fuerint, si sibi adhærent, bonum est gluten; sin
they-shall-have-been if to-each-other they-stick good is the-glue if-not
autem, tamdiu coque donec sibi adhæreant. Deinde
however so-long boil until to-each-other they-stick then
effunde ipsum gluten in vas mundum, et rursum imple
pour-out itself the-glue into a-vessel clean and again fill
ollam aqua, et coque sicut prius, sicque facias usque quater.
the-pot with-water and boil as before and-thus do up-to four-times
Caput XIX. De albatura gypsi super corium et lignum.
Chapter XIX about the-whitening of-gypsum over hide and wood
Posthæc tolle gypsum more calcis combustum, sive cretam,
after-this take gypsum in-the-manner of-lime burned or chalk
qua pelles dealbantur, et tere diligenter super lapidem cum
with-which skins are-whitened and grind diligently on a-stone with
aqua: deinde mitte in vas testeum, et infundens gluten corii,
water then put into a-vessel earthen and pouring-in the-glue of-hide
pone super carbones, ut gluten liquefiat, sicque linies
place-it over coals so-that the-glue melt and-thus you-will-smear
cum pincello super ipsum corium tenuissime; ac deinde,
with a-brush over itself the-hide very-thinly and then
cum siccum fuerit, linies aliquantulum spissius; et
when dry it-shall-have-been you-will-smear somewhat more-thickly and

si opus fuerit, linies tertio. Cumque omnino siccum
if need shall-be you-will-smear a-third-time and-when wholly dry
fuerit, [deinde radendo cum ferro adæqua, postea] tolle
it-shall-have-been then by-scraping with iron level-it afterward take
herbam, quæ appellatur asperella, quæ crescit in similitudinem
the-plant which is-called shave-grass which grows in the-likeness
junci et est nodosa; quam cum in æstate collegeris,
of-rush and is knotty which when in summer you-shall-have-gathered
siccabis in sole, et ex ea fricabis ipsam dealbaturam, donec
you-will-dry in the-sun and with it you-will-rub itself the-whitening until
omnino plana et lucida fiat. Si vero defuerit corium
wholly smooth and shining it-become if however shall-have-been-lacking hide
ad cooperiendum tabulas, eodem modo et eodem glutine
for covering the-panels in-the-same way and with-the-same glue
cooperiantur cum panno mediocri novo lini vel canabi.
let-them-be-covered with cloth middling new of-linen or of-hemp
Caput XX. De rubricandis ostiis et de oleo lini.
Chapter XX about reddening doors and about the-oil of-linseed
Si autem volueris ostia rubricare [aut alio colore
if however you-shall-wish doors to-redden or with-another color
colorare], tolle oleum lini, quod hoc modo compones.
to-color take oil of-linseed which in-this way you-will-compose
Accipe semen lini, et exsicca illud in sartagine super ignem
take the-seed of-flax and dry it in a-frying-pan over the-fire
sine aqua. Deinde mitte in mortarium, et contunde illud
without water then put into a-mortar and pound it
pila donec tenuissimus pulvis fiat, rursumque mittens
with-a-pestle until a-very-fine powder it-become and-again putting
illud in sartaginem, et infundens modicum aquæ, sic
it into the-pan and pouring-in a-little of-water thus
calefacies fortiter. Postea involve illud in pannum novum,
you-will-heat-it strongly afterward wrap it in a-cloth new

et pone in pressatorium, in quo solet oleum olivæ, vel
and place-it in the-press in which is-wont oil of-olive or
nucum, vel papaveris exprimi, ut eodem modo etiam istud
of-nuts or of-poppy to-be-pressed so-that in-the-same way also this
exprimatur. Cum hoc oleo tere minium sive cinobrium [aut
be-pressed with this oil grind red-lead or vermilion or
quem alium colorum vis] super lapidem sine aqua, et cum
which other of-colors you-wish on a-stone without water and with
pincello linies super ostia, vel tabulas, quas rubricare
a-brush you-will-smear over the-doors or panels which to-redden
volueris, et ad solem siccabis. Deinde iterum linies,
you-shall-wish and in the-sun you-will-dry then again you-will-smear
et rursum siccabis. Ad ultimum vero superlinies ei
and again you-will-dry at-the last however you-will-smear-over on-it
gluten quod vernition dicitur, quodque hoc modo conficitur.
the-glue which vernition is-called and-which in-this way is-made

Caput XXI. De glutine vernition.

Chapter XXI about the-glue vernition

Pone oleum lini in ollam novam parvulam, et adde gummi
put oil of-linseed into a-pot new very-small and add of-gum
[Arabici] quod vocatur fornis, minutissime tritum, quod habet
Arabic which is-called fornis very-finely ground which has
speciem lucidissimi thuris, sed cum frangitur fulgorem
the-appearance of-most-shining frankincense but when it-is-broken a-brightness
clariorem reddit. Quod cum super carbones posueris, coque
clearer gives-back which when over coals you-shall-have-placed boil
diligenter sic ut non bulliat, donec tertia pars consumatur,
diligently thus that not it-boil until the-third part be-consumed
et cave a flamma, quia periculosum est nimis et difficile
and beware of flame because dangerous it-is very and with-difficulty
exstinguitur si accendatur. Hoc glutine omnis pictura
is-quenched if it-be-kindled with-this glue every painting

superlinita lucida fit et decora, ac omnino durabilis. Si vero
smeared-over shining becomes and comely and wholly durable if however
defuerit corium ad cooperiendas tabulas, eodem modo
shall-have-been-lacking hide for covering the-panels in-the-same way
et eodem glutine cooperiantur cum panno mediocriter novo.
and with-the-same glue let-them-be-covered with cloth moderately new
Item alio modo. Compone quatuor [vel tres] lapides, qui
likewise in-another way set four or three stones which
possint ignem sustinere, ita ut non resiliant [et boni
can fire to-endure so that not they-spring-apart and good
sunt lateres], et super ipsos pone ollam rudem, et in eam
are bricks and over them place a-pot rough and into it
mitte supra dictum gummi fornis, quod Romane glassa
put the-above said gum fornis which in-Romance glassa
dicitur, [aliter Arabicum] et super os hujus ollæ pone
is-called otherwise Arabic and over the-mouth of-this pot place
ollulam minorem, quæ habeat in fundo modicum foramen,
a-little-pot smaller which have in the-bottom a-small hole
et circumlinies ei pastam, ita ut nihil spiraminis inter
and you-will-smear-around on-it paste so that nothing of-breath between
ipsas ollas exeat. Deinde, suppone ignem diligenter, donec
themselves the-pots come-out then put-under fire diligently until
ipsum gummi liquefiat. Habebis etiam ferrum gracile et
itself the-gum melt you-will-have also an-iron slender and
manubrio impositum, unde commovebis ipsum gummi, et
in-a-handle set with-which you-will-stir itself the-gum and
cum quo sentire possis ut omnino liquidum sit. Habeas
with which to-feel you-may-be-able that wholly liquid it-be have
quoque ollam tertiam juxta super carbones positam, in qua
also a-pot third beside over the-coals placed in which
sit oleum lini calidum; et cum gummi penitus liquidum
be oil of-linseed hot and when the-gum thoroughly liquid

fuerit, ita ut extracto ferro quasi filum trahatur, infunde
shall-have-been so that drawn-out the-iron as-if a-thread be-drawn pour-in
ei oleum calidum et ferro commove, et sic insimul coque
to-it the-oil hot and with-the-iron stir and thus together boil
ut non bulliat, et interdum extrahe ferrum, et lini modice
so-that not it-boil-over and sometimes draw-out the-iron and smear moderately
super lignum sive super lapidem, ut probes densitatem
on wood or on stone so-that you-may-test the-thickness
ejus. Et hoc caveas in pondere, ut sint duæ partes olei,
of-it and this take-care in the-weight that there-be two parts of-oil
et tertia gummi. Cumque ad libitum tuum coxeris
and the-third of-gum and-when to pleasure your you-shall-have-boiled
diligenter, ab igne removens et discooperiens refrigerari sine.
diligently from the-fire removing and uncovering to-cool allow

XXII–XXVI · GOLD AND TIN LEAF

Saddles and carved stools are gessoed and laid out. Gold leaf is beaten between reddened Greek parchment and laid with glair; tin leaf serves where there is no gold, and, varnished with vernition, is steeped in a dye of the inner bark of rotten wood and saffron in wine or beer until it passes for gilding; colors for such work are ground in oil.

Caput XXII. De sellis equestribus et octoforis.
Chapter XXII about saddles equestrian and litters

Sellas autem equestres et octoforos, item sellas plicatorias,
saddles however equestrian and litters likewise saddles folding
ac scabella et cætera, quæ sculpuntur, et non possunt
and stools and the-other-things which are-carved and not can
corio vel panno cooperiri, mox ut [ea feceris
with-hide or cloth to-be-covered as-soon as them you-shall-have-made

et] raseris ferro, fricabis asperella, sicque bis
and you-shall-have-scraped with-iron you-will-rub with-shave-grass and-thus twice
dealbabis, et cum sicca fuerint, [adhuc ea cum
you-will-whiten and when dry they-shall-have-been still them with
ferro radendo adæquabis et] rursum asperella [fricabis et]
the-iron by-scraping you-will-level and again with-shave-grass you-will-rub and
planabis. Posthæc in [stylo] circino ut regula metire, et
you-will-smooth after-this with stylus compass and rule measure and
dispone opus tuum, videlicet imagines aut bestias, vel aves
dispose work your namely images or beasts or birds
et folia, sive quodcunque pertrahere volueris. Quo facto
and leaves or whatever to-draw you-shall-wish which done
si decorare volueris opus tuum, auri petulam impones,
if to-adorn you-shall-wish work your of-gold leaf you-will-put-on
quam tali modo facies.
which in-such way you-will-make

Caput XXIII. De petula auri.

Chapter XXIII about leaf of-gold

Tolle pergamenam Græcam, quæ fit ex lana ligni et
take parchment Greek which is-made from wool of-wood and
fricabis eam ex utraque parte cum rubeo colore, qui
you-will-rub it on each side with red color which
comburitur ex ogra, minutissime trita et sicca, et polies
is-burned from ochre very-finely ground and dry and you-will-polish
eam dente castoris sive ursi, vel apri, diligentissime,
it with-the-tooth of-a-beaver or of-a-bear or of-a-boar most-diligently
donec lucida fiat, et idem color ipsa fricatione [et
until shining it-become and the-same color by-the-very rubbing and
politione] adhæreat. Deinde incide forcipe ipsam pergamenam
polishing adhere then cut with-shears itself the-parchment
per partes quadras ad latitudinem quatuor digitorum, æqualiter
into parts square to the-width of-four fingers equally

latas et longas. Postmodum facies eadem mensura ex
broad and long afterward you-will-make by-the-same measure from
pergameno vituli quasi marsupium, et fortiter consues,
parchment of-calf as-if a-purse and strongly you-will-sew-it
ita amplum, ut multas partes rubricatæ pergamenæ possis
so large that many parts of-the-reddened parchment you-can
imponere. Quo facto, tolle aurum [vel argentum] purum
to-put-in which done take gold or silver pure
et fac illud attenuari malleo super incudem æqualem
and make it be-thinned with-a-hammer on an-anvil level
diligentissime ita, ut nulla sit in eo fractura, et incide
most-diligently so that no be in it crack and cut
illud per quadras partes ad mensuram duorum digitorum.
it into square parts to the-measure of-two fingers
Deinde mittes in illud marsupium unam partem rubricatæ
then you-will-put into that purse one part of-reddened
pergamenæ, et supra eam unam partem auri [vel argenti] in
parchment and over it one part of-gold or of-silver in
medio, sicque pergamenam et rursus aurum [seu argentum];
the-middle and-thus parchment and again gold or silver
atque ita facies donec impleatur marsupium, et aurum [seu
and so you-will-do until be-filled the-purse and the-gold or
argentum] semper sit in medio commixtum. Dehinc habeas
silver always be in the-middle mingled then have
malleum fusilem ex auricalco, juxta manubrium gracilem et
a-hammer cast from brass by the-handle slender and
in plana latum, unde percuties ipsum marsupium super
in the-flat broad with-which you-will-strike itself the-purse on
lapidem magnum et æqualem, non graviter, sed moderate; et
a-stone large and level not heavily but moderately and
cum sæpius respexeris, considerabis, utrum velis ipsum
when more-often you-shall-have-looked you-will-consider whether you-wish itself

aurum [vel argentum] omnino tenue facere, vel mediocriter
the-gold or silver wholly thin to-make or moderately
spissum. Si autem supercreverit aurum [vel argentum]
thick if however shall-have-outgrown the-gold or silver
in attenuando et marsupium excesserit, præcides illud
in thinning and the-purse shall-have-exceeded you-will-cut-off it
forcipe parvulo et levi, tantummodo ad hoc opus facto. Hæc
with-shears very-small and light only for this work made this
est ratio aureæ petulæ. Quam cum secundum libitum tuum
is the-method of-golden leaf which when according-to pleasure your
attenuaveris, ex ea incides forcipe particulas quantas
you-shall-have-thinned from it you-will-cut with-shears pieces as-large-as
volueris, et inde ordinabis coronas circa capita imaginum,
you-shall-wish and thence you-will-set-out crowns around the-heads of-images
et stolas et oras vestimentorum, et cætera ut libuerit.
and stoles and the-borders of-garments and the-other-things as shall-please

Caput XXIV. De modo ponendi aurum et argentum.
Chapter XXIV about the-manner of-placing gold and silver

Imponendo autem aurum [seu argentum] tolle clarum, quod
in-putting-on however gold or silver take glair which
percutitur ex albugine ovi sine aqua, et inde cum
is-beaten from the-white of-egg without water and with-it with
pincello leniter linies locum in quo ponendum est
a-brush gently you-will-smear the-place in which to-be-placed is
aurum [vel argentum], et cauda ejusdem pincelli in ore
gold or silver and with-the-tail of-the-same brush in mouth
tuo madefacta, continges unum cornu incisæ petulæ, et ita
your moistened you-will-touch one corner of-the-cut leaf and thus
elevans cum summa velocitate impones [loco linito], et
lifting-it with highest speed you-will-put-it on-the-place smeared and
cum pincello [non madefacto sed sicco] æquabis. Ea hora
with a-brush not moistened but dry you-will-level-it at-that hour

oportet te a vento cavere, et ab halitu continere, quia si
it-behooves you from wind to-beware and from breath to-hold-back because if
flaveris, petulam perdes et difficile reperies. Quæ
you-shall-have-blown the-leaf you-will-lose and with-difficulty you-will-find-it which
cum posita fuerit et siccata, ei, si volueris, eodem
when placed it-shall-have-been and dried on-it if you-shall-wish in-the-same
modo alteram superpone, et tertiam similiter, si opus fuerit,
way another lay-over and a-third likewise if need shall-be
ut eo lucidius cum dente sive cum lapide polire possis.
so-that the more-brightly with a-tooth or with a-stone to-polish you-can
Hanc etiam petulam, si volueris, in muro et laqueari
this also leaf if you-shall-wish on a-wall and ceiling
[super stagni petulam vernitiatam] eodem modo imponere
over of-tin leaf varnished in-the-same way to-put-on
poteris. Quod si aurum non habueris [nec argentum],
you-will-be-able but if gold not you-shall-have nor silver
petulam stagni accipies, quam hoc modo facies.
leaf of-tin you-will-take which in-this way you-will-make

Caput XXV. De petula stagni.

Chapter XXV about leaf of-tin

Stagnum purissimum attenuabis diligenter super incudem
tin very-pure you-will-thin diligently on an-anvil
malleo, quantas et quam tenues partes volueris. Et
with-a-hammer as-large and as thin parts you-shall-wish and
cum aliquantulum attenuari cœperint, purgabis eas
when somewhat to-be-thinned they-shall-have-begun you-will-clean them
in una parte panno et carbonibus siccis minutissime
on one side with-a-cloth and with-coals dry very-finely
tritis, ac iterum percuties malleo, rursumque fricabis
ground and again you-will-strike with-the-hammer and-again you-will-rub
panno et carbonibus, sicque singulis vicibus facies, donec
with-cloth and coals and-thus at-each times you-will-do until

omnino attenuaveris. Post hæc fricabis eas leniter
wholly you-shall-have-thinned-them after these-things you-will-rub them gently
dente apri super ligneam tabulam æqualem, usque quo
with-the-tooth of-a-boar on a-wooden board level up-to which
lucidæ fiant [et deinde ipsis loco argenti utaris].
shining they-become and then them in-place of-silver use
Caput XXVI. De modo colorandi tabulas stagneas tenuatas
Chapter XXVI about the-manner of-coloring plates tin thinned
ut tanquam deauratæ videantur, et ipsis possit uti loco
that as-if gilded they-may-seem and them one-may use in-place
auri quando aurum non habetur.
of-gold when gold not is-had
Deinde conjunges easdem partes unam ad alteram super
then you-will-join the-same parts one to the-other on
ipsam tabulam, et adhærebis eas singulas ad lignum cum
the-very board and you-will-fasten them singly to the-wood with
cera, ne possint moveri, et superlinies eas manu
wax lest they-can to-be-moved and you-will-smear-over them with-hand
tua ex supradicto glutine vernition atque siccabis ad
your from the-above-said glue vernition and you-will-dry-them in
solem. Postmodum accipe virgas ligni putridi, quas cum
the-sun afterward take rods of-wood rotten which when
in Aprili incideris, findes per medium et siccabis
in April you-shall-have-cut you-will-split through the-middle and you-will-dry
super fumum. Deinde auferes exteriorem corticem, et
over smoke then you-will-take-off the-outer bark and
interiorem, qui est croceus, rades in patella munda,
the-inner which is saffron-yellow you-will-scrape into a-dish clean
addens ei crocum ad quintam partem; et perfunde hæc
adding to-it saffron to the-fifth part and pour-over these-things
vino veteri sive cervisia abundanter, et cum ita per
with-wine old or beer abundantly and when thus through

noctem steterit, in crastinum calefacies super ignem
the-night it-shall-have-stood on the-morrow you-will-heat-it over the-fire
donec tepefiat; sicque impones tabulas stagneas singulatim,
until it-grow-warm and-thus you-will-put-in the-plates tin one-by-one
et frequenter elevabis, donec consideres, quod aureolum
and frequently you-will-lift-them until you-consider that a-golden
colorem sufficienter trahant. Postque rursum adhærebis eas
color sufficiently they-draw and-after again you-will-fasten them
ligneæ tabulæ superliniens gluten sicut prius, et cum
to-the-wooden board smearing-over the-glue as before and when
siccatæ fuerint, jam habes stagneas petulas, quas
dried they-shall-have-been already you-have tin leaves which
impones operi tuo secundum libitum tuum glutine corii.
you-will-put-on to-work your according-to pleasure your with-the-glue of-hide
Ac deinceps accipe colores quos imponere volueris, terens eos
and thereafter take the-colors which to-put-on you-shall-wish grinding them
diligenter oleo lini sine aqua, et fac mixturas vultuum
diligently with-oil of-linseed without water and make the-mixtures of-faces
ac vestimentorum sicut superius aqua feceras, et bestias
and of-garments as above with-water you-had-made and beasts
sive aves aut folia variabis suis coloribus, prout libuerit.
or birds or leaves you-will-vary with-their colors as shall-please

Colors ground in oil dry slowly, so gum from the cherry or plum tree serves for haste; every color goes on three times and is varnished. Translucent painting is laid over polished tin. Then the bronze mill for grinding gold for books is cast and used, the gold washed and the fine kept.

Caput XXVII. De coloribus oleo et gummi terendis.
Chapter XXVII about colors with-oil and gum to-be-ground
Omnia genera colorum eodem genere olei teri et
all kinds of-colors with-the-same kind of-oil to-be-ground and
poni possunt in opere ligneo, in his tantum rebus quæ
to-be-placed can on work wooden in these only things which
sole siccari possunt, quia quotiescunque unum colorem
in-the-sun to-be-dried can because as-often-as one color
imposueris, alterum ei superponere non potes, nisi
you-shall-have-put-on another on-it to-put-over not you-can unless
prior exsiccetur, quod in imaginibus [et aliis picturis]
the-earlier be-dried which in images and other paintings
diuturnum et tædiosum nimis est. Si autem volueris opus
long and tedious too is if however you-shall-wish work
tuum festinare, sume gummi, quod exit de arbore ceraso
your to-hasten take the-gum which comes-out of the-tree cherry
sive pruno, et concidens illud [minutissime vel] minutatim
or plum and cutting it very-finely or in-small-bits
pone in vas fictile, et aquam abundanter infunde, et pone
place-it into a-vessel earthen and water abundantly pour-in and place-it
ad solem, sive super carbones [lenti ignis in hieme], donec
in the-sun or over coals of-slow fire in winter until
gummi liquefiat, et ligno rotundo diligenter commisce.
the-gum melt and with-a-wood round diligently mix-it

Deinde cola per pannum, et inde tere colores et impone.
then strain-it through a-cloth and thence grind the-colors and put-them-on
Omnes colores et mixturæ eorum hoc gummi teri et
all colors and mixtures of-them with-this gum to-be-ground and
poni possunt, præter minium et cerosam et carmin, qui
to-be-placed can except red-lead and white-lead and carmine which
cum claro ovi terendi et ponendi sunt. Viride Hispanicum
with glair of-egg to-be-ground and to-be-placed are green Spanish
non misceatur succo sub glutine, sed per se cum gummi
not let-it-be-mixed with-juice under the-glue but by itself with gum
ponatur. Aliud vero miscere potes, si volueris.
let-it-be-placed another however to-mix you-can if you-shall-wish

Caput XXVIII. Quotiens iidem colores ponendi sunt.

Chapter XXVIII how-many-times the-same colors to-be-placed are

Omnes colores sive oleo sive gummi tritos in ligno ter
all colors either with-oil or with-gum ground on wood three-times
debes ponere, et pictura perfecta et siccata, delato opere
you-ought to-place and the-painting finished and dried carried the-work
ad solem, diligenter linies glutine illud vernition, et cum
to the-sun diligently you-will-smear with-glue it vernition and when
defluere cœperit a calore, leniter manu fricabis,
to-run-down it-shall-have-begun from the-heat gently with-the-hand you-will-rub
atque tertio sic facies, et tunc sine donec penitus exsiccetur.
and a-third-time thus you-will-do and then allow until thoroughly it-be-dried

Caput XXIX. De pictura translucida.

Chapter XXIX about painting translucent

Fit etiam pictura in ligno, quæ dicitur translucida, et apud
is-made also a-painting on wood which is-called translucent and among
quosdam vocatur aureola, quam hoc modo compones. Tolle
some is-called golden which in-this way you-will-compose take
petulam stagni non linitam glutine nec coloratam croco,
a-leaf of-tin not smeared with-glue nor colored with-saffron

sed ita simplicem et diligenter politam, et inde cooperies
but thus simple and diligently polished and with-it you-will-cover
locum, quem ita pingere volueris. Deinde [vernitiata
the-place which thus to-paint you-shall-wish then with-the-varnished
petula] tere colores imponendos diligentissime oleo lini, ac
leaf grind the-colors to-be-put-on most-diligently with-oil of-linseed and
valde tenues trahe eos cum pincello, sicque permitte siccari.
very thin draw them with a-brush and-thus allow to-be-dried

Caput XXX. De molendo auro in libris et de fundendo molendino.

Chapter XXX about grinding gold for books and about casting the-mill

Cum pertraxeris imagines vel litteras in libris, tolle aurum
when you-shall-have-drawn images or letters in books take gold
purum et lima illud minutissime in mundissima pelvi, sive
pure and file it very-finely into a-very-clean basin or
baccina, sicque lavabis illud cum pincello in concha testudinis
bowl and-thus you-will-wash it with a-brush in a-shell of-tortoise
vel conchilii, quæ de aqua tollitur. Deinde habeas molendinum
or of-shellfish which from the-water is-taken then have a-mill
cum pistillo suo, utraque fusilia ex metallo cupri et stagni
with pestle its both cast from metal of-copper and of-tin
ita commixto, ut tres partes sint cupri puri et quarta stagni
so mixed that three parts be of-copper pure and the-fourth of-tin
mundi a plumbo. His ita compositis fundatur molendinum
clean of lead these-things thus composed let-it-be-cast the-mill
ad similitudinem mortarioli, et pistillum ejus circa ferrum
to the-likeness of-a-little-mortar and the-pestle its around an-iron
quasi nodus, ita ut ferrum inde procedat grossitudine unius
as-if a-knot so that the-iron thence proceed in-thickness of-one
digiti, et longitudine modice amplius pedis dimidii; cujus ferri
finger and in-length a-little more of-a-foot half of-which iron

tertia pars infigatur ligno diligenter tornato ad longitudinem
the-third part let-it-be-fixed in-a-wood diligently turned to the-length
quasi unius ulnæ, et rectissime forato, in cujus inferiori
as-if of-one ell and very-straight bored in whose lower
parte tamen a fine longitudine quatuor digitorum, sit
part however from the-end in-length of-four fingers let-there-be
rotula sive lignea sive plumbea tornatilis, et in media
a-little-wheel either wooden or lead turned and in the-middle
parte superiori figatur corrigia qua trahi et volvendo
part upper let-it-be-fixed a-strap by-which to-be-drawn and by-turning
retrahi possit. Posthæc mittatur ipsum molendinum in
to-be-drawn-back it-can after-this let-it-be-put itself the-mill into
foramen super scamnum ad hoc aptatum inter duas columnellas
a-hole on a-bench to this fitted between two little-columns
ligneas in ipso scamno firmiter fixas super quas sit aliud
wooden in the-very bench firmly fixed over which let-there-be another
lignum eis insertum, quod possit ejici et reponi,
wood into-them inserted which can to-be-taken-out and to-be-put-back
in cujus medio inferius sit foramen in quo volvatur
in whose middle below let-there-be a-hole in which may-turn
pistillum molendini. His ita depositis mittatur aurum
the-pestle of-the-mill these-things thus set-down let-it-be-put the-gold
diligenter purgatum in molendinum, addita modica aqua,
diligently cleaned into the-mill added a-little water
et imposito pistillo atque superiori ligno coaptato trahatur
and put-on the-pestle and the-upper wood fitted let-it-be-drawn
corrigia et revolvi permittatur, rursumque trahatur et
the-strap and to-be-turned-back let-it-be-allowed and-again let-it-be-drawn and
iterum revolvatur, sicque fiat per duas vel tres horas.
again let-it-turn-back and-thus let-it-be-done through two or three hours
Tunc superius lignum ejiciatur, et pistillum in eadem
then the-upper wood let-it-be-taken-out and the-pestle in the-same

aqua cum pincello lavetur. Deinde molendinum elevetur,
water with a-brush let-it-be-washed then the-mill let-it-be-lifted
aurum cum aqua usque ad fundum cum pincello moveatur
the-gold with the-water up-to to the-bottom with a-brush let-it-be-moved
et modice teneatur, donec quod grossius est resideat; moxque
and a-little let-it-be-held until what coarser is settle and-soon
aqua in baccinam mundissimam effundatur, et quicquid
the-water into a-bowl very-clean let-it-be-poured-out and whatever
auri cum aqua exierit, molitum est. Rursumque
of-gold with the-water shall-have-gone-out ground is and-again
imposita aqua, repositisque pistillo et superiori ligno, iterum
put-in water and-put-back the-pestle and the-upper wood again
molatur eo ordine, quo prius, donec omnino exeat
let-it-be-ground in-that order in-which before until wholly it-go-out
cum aqua. Tali modo molendum est argentum, auricalcum,
with the-water in-such way to-be-ground is silver brass
et cuprum. Sed aurum diligentius molendum est, et leniter
and copper but gold more-diligently to-be-ground is and gently
trahendum, sæpiusque respiciendum quia mollius ceteris
to-be-drawn and-more-often to-be-looked-at because softer than-the-other
metallis est, ne forte adhæreat molendino vel pistillo et
metals it-is lest perhaps it-stick to-the-mill or pestle and
conglomeretur. Quod si per negligentiam contigerit,
be-clumped but if through negligence it-shall-have-happened
quod conglomeratum est eradatur et ejiciatur, et
what clumped is let-it-be-scraped-off and let-it-be-thrown-out and
quod reliquum est usque ad effectum molatur. Quo facto
what remaining is up-to to completion let-it-be-ground which done
superiorem aquam cum sordibus de baccina effunde, inde
the-upper water with the-dirt from the-bowl pour-off then
aurum diligenter in concham mundam lava. Dehinc infundens
the-gold diligently in a-shell clean wash then pouring-in

ei aquam cum pincello move, et cum per unam horam
to-it water with a-brush stir and when through one hour
in manu tenueris ipsam aquam in alteram concham
in hand you-shall-have-held-it itself the-water into another shell
funde, et illud minutissimum quod cum aqua exierit
pour and that very-fine-part which with the-water shall-have-gone-out
serva. Rursumque imposita aqua super carbones calefac et
keep and-again put-in water over coals heat and
move, ac sicut prius minutum cum aqua ejice, sicque
stir and as before the-fine with the-water throw-out and-thus
facias donec omnino purgaveris. Posthæc ipsum minutum
do until wholly you-shall-have-cleaned after-this itself the-fine
relava ordine eodem bis et tertio, et quicquid auri
rewash in-order the-same twice and a-third-time and whatever of-gold
susceperis priori admisce. Eodem ordine lavabis
you-shall-have-received with-the-earlier mix in-the-same order you-will-wash
argentum, auricalcum et cuprum. Deinceps tolle vesicam
silver brass and copper next take the-bladder
piscis, qui vocatur huso, et lavans aqua tepida tertio,
of-the-fish which is-called sturgeon and washing-it with-water lukewarm a-third-time
incide particulatim, ac mittens in ollam purissimam cum
cut-it piece-by-piece and putting-it into a-pot very-clean with
aqua, sine mollificari per noctem, et in crastinum coque
water allow to-be-softened through the-night and on the-morrow boil-it
super carbones ita ut non bulliat donec probes digitis tuis,
over coals so that not it-boil until you-test with-fingers your
si adhæreat, et cum fortiter adhæserit, bonum est gluten.
if it-stick and when strongly it-shall-have-stuck good is the-glue

Gold and silver are laid on a ground of red lead and glair and burnished; tin and saffron stand in for gold. A Flemish method grinds gold with quicksilver, and a further recipe tempers gold for writing with gum, vinegar, and ammoniac.

Caput XXXI. Quomodo aurum et argentum ponatur in
Chapter XXXI how gold and silver be-placed in
libris.
books

Postea tolle minium purum, et adde ei tertiam partem
afterward take red-lead pure and add to-it a-third part
cenobrii, terens super lapidem. Quo diligenter trito, percute
of-vermilion grinding on a-stone which diligently ground beat
clarum ex albugine ovi, in æstate cum aqua, in hieme sine
glair from the-white of-egg in summer with water in winter without
aqua, et cum purum fuerit, mitte minium in cornu et
water and when pure it-shall-have-been put the-red-lead into a-horn and
infunde clarum, impositoque ligno move modicum, et inde cum
pour-in the-glair and-placed-in a-stick stir a-little and then with
pincello imple omnia loca, in quibus aurum velis imponere.
a-brush fill all the-places in which gold you-wish to-put-on
Dehinc pone ollulam cum glutine super carbones, et cum
then place the-little-pot with the-glue over coals and when
liquefactum fuerit, funde in concham auri et lava illud
melted it-shall-have-been pour into the-shell of-gold and wash it
inde. Quod cum effuderis in alteram concham, in
thence which when you-shall-have-poured-out into another shell in
qua purgamentum servatur, rursus infunde gluten calidum, et
which the-sweepings are-kept again pour-in glue hot and
tenens in palma manus sinistræ, move diligenter cum pincello,
holding-it in the-palm of-hand left stir diligently with a-brush

et pone utrum volueris spissum vel tenue, sic tamen ut
and place-it whichever you-shall-wish thick or thin thus nevertheless that
glutinis modicum sit, quia si superabundaverit, nigrescit
of-glue a-little there-be because if it-shall-have-been-in-excess grows-black
aurum et non recipit fulgorem. Postquam autem siccatum
the-gold and not receives brightness after however dried
fuerit, polies illud dente vel lapide sanguinario
it-shall-have-been you-will-polish it with-a-tooth or with-a-stone bloodstone
diligenter limato et polito super tabulam corneam æqualem ac
diligently filed and polished on a-board of-horn level and
lucidam. Quod si contigerit per negligentiam glutinis
shining but if it-shall-have-happened through the-negligence of-glue
non bene cocti, ut aurum in fricando se pulveret, vel præ
not well boiled that the-gold in rubbing itself turn-to-powder or from
nimia spissitudine se elevet, habeas penes te clarum vetus
too-great thickness itself raise have with you glair old
sine aqua percussum, et mox cum pincello de eo modicum
without water beaten and soon with a-brush of it a-little
ac leniter super aurum liniens, cum siccum fuerit denuo
and gently over the-gold smearing when dry it-shall-have-been anew
dente vel lapide fricabis. Hoc modo aurum, argentum,
with-the-tooth or stone you-will-rub in-this way gold silver
auricalcum et cuprum in suis locis pones et fricabis.
brass and copper in their places you-will-place and you-will-rub

Caput XXXII. Quomodo decoretur pictura librorum stagno et croco.

Chapter XXXII how be-adorned the-painting of-books with-tin and saffron

Si vero neutrum habueris, et tamen opus tuum
if however neither you-shall-have and nevertheless work your
quoquomodo decorare volueris, tolle stagnum purum, et
in-some-way to-adorn you-shall-wish take tin pure and

raso minutissime, mole et lava sicut aurum, et pone
scraped very-finely grind and wash as gold and place-it
eodem glutine in litteris vel aliis locis, quæ volueris
with-the-same glue on letters or other places which you-shall-wish
auro vel argento ornare, et cum polieris dente,
with-gold or silver to-adorn and when you-shall-have-polished-it with-a-tooth
tolle crocum quo sericum coloratur perfundens illum claro
take saffron with-which silk is-colored pouring-over it glair
sine aqua, et cum per noctem steterit, sequenti
without water and when through the-night it-shall-have-stood on-the-following
die cum pincello cooperies ea loca, quæ volueris deaurare,
day with a-brush you-will-cover those places which you-shall-wish to-gild
cætera habeto loco argenti. Deinde facies subtiles tractus
the-rest have in-place of-silver then you-will-make fine strokes
circa libros, literas et folia et nodos ex minio cum
around the-books letters and leaves and knots from red-lead with
penna, et paraturas vestimentorum ac cætera ornamenta.
a-pen and the-trimmings of-garments and the-other ornaments

Caput XXXIII. De molendo auro secundum Flandrenses.

Chapter XXXIII about grinding gold according-to the-Flemings

Si ipsum aurum molere nescimus, eundum est ad aurifices, ut
if itself the-gold to-grind we-know-not to-be-gone is to the-goldsmiths that
illud molant sicut suam deauraturam molere consueverunt,
it they-may-grind as their gilding to-grind they-are-accustomed
sed tamen satis subtilius ad vestrum quam ad suum usum,
but nevertheless rather more-finely for your than for their-own use
et penitus cum vivo argento miscendum. Tunc deauratura
and thoroughly with quick silver to-be-mixed then gilding
illa cruda, vel aurum cum vivo argento, per corium
that raw or gold with quick silver through the-hide
cervi extorquenda est. Vivum argentum exibit; aurum
of-a-stag to-be-wrung-out is quick silver will-go-out gold

remanebit, tamen vivo argento infectum adhuc omnino.
will-remain nevertheless with-quick silver tainted still wholly
Hoc ergo aurum cum vivo argento super testam ponendum
this therefore gold with quick silver on a-tile to-be-placed
est, testa sive levigata vel planissima, sine asperitate, sine
is a-tile either smoothed or very-flat without roughness without
cavernulis. Quæ super carbones leves et lentissimos ponenda
little-hollows which over coals light and very-slow to-be-placed
est. Sed hic opus est summa diligentia: nam si parum
is but here need is of-highest diligence for if a-little
acriori calore aurum torreatur, mox calescit, ita igne
with-sharper heat the-gold be-roasted soon it-grows-hot so by-fire
vivum argentum torrendo non effundatur. Sal ergo tritum
the-quick silver by-roasting not be-poured-out salt therefore ground
et ustum subtilissimum auro miscendum est, ut
and burned very-fine with-the-gold to-be-mixed is so-that
pariter sine intermissione conteratur et spargatur. Et hoc
equally without interruption it-be-rubbed and be-scattered and this
fiat spargendo et conterendo, terendo et spargendo,
let-it-be-done by-scattering and by-rubbing by-grinding and by-scattering
donec vivum argentum evanescat super fumum. Quod tamen
until the-quick silver vanish over the-smoke which nevertheless
totum suscipitur suspensa scutella desuper adipe inuncta.
all is-caught by-a-hung dish above with-fat smeared
Tunc postea pulvis auri in bacinis lavatur diligenter, sicut
then afterward the-powder of-gold in bowls is-washed diligently as
minium lavari solet, excepto quod aurum sua dignitate
red-lead to-be-washed is-wont except that gold with-its dignity
tractandum est. Tunc pulvis lavatus et siccatus est et in
to-be-handled is then the-powder washed and dried is and in
glutine ponitur. Gluten autem de vitulina charta erit. Quod
glue is-placed the-glue however from calf parchment will-be which

in testudine tenui positum, semper super aquam calidam erit,
in a-shell thin placed always over water hot will-be
ut gluten sit solutum. Tunc penna intincta scribetur.
so-that the-glue be dissolved then with-a-pen dipped it-will-be-written

Caput XXXIV. Quomodo scribitur de auro.
Chapter XXXIV how one-writes with gold

Accipe massam auri et delicatissime cum lima ferrea limabis
take a-lump of-gold and most-delicately with a-file iron you-will-file-it
et pones in vase vitreo cum aqua; deinde tolles et
and you-will-place-it in a-vessel glass with water then you-will-take-it and
super marmorem porphiriticum tere. Accipiesque duas partes
on marble porphyry grind and-you-will-take two parts
sal gemmae et modicum sulphuris crocei; et misces cum
of-salt of-gem and a-little of-sulfur saffron-yellow and you-mix with
auro; tamdiuque teres, quousque totum sit dissolutum.
the-gold and-so-long you-will-grind until all be dissolved
Tollesque et mittens in vase uno, abluesque in
and-you-will-take-it and putting-it into vessel one and-you-will-wash-it into
quarto vel quinto vasis diligenter de uno in alterum.
the-fourth or fifth of-vessel diligently from one into another
Quando vero optime lotum fuerit, mittes in cornu
when however excellently washed it-shall-have-been you-will-put into horn
ejus. Distemperaturam quæ eum distemperabit, cum de eo
its the-tempering which it will-temper when with it
scribere volueris, sic facies. Gummam Arabicam cum aqua
to-write you-shall-wish thus you-will-make gum Arabic with water
in vase vitreo distemperabis, ponesque ad solem ut
in a-vessel glass you-will-temper and-you-will-place in-the sun so-that
liquefiat. Liquefactam misces cum ea acetum tantum quantum
it-melt melted you-mix with it vinegar as-much as
sit aqua. Si non habes acetum, de optimo vino misces;
be the-water if not you-have vinegar from best wine you-mix

et iterum pones ad solem siccare, bulliesque aqua ad
and again you-will-place in-the sun to-dry and-you-will-boil water at
ignem in patellam; accipiesque moniaculum et pones in
the-fire in a-dish and-you-will-take ammoniac and you-will-put-it in
aqua et statim liquefiet, natabitque desuper suscipiesque
the-water and at-once it-will-melt and-it-will-float above and-you-will-catch
illud et misces cum Arabica; movebisque eas insimiliter,
it and you-mix with the-Arabic and-you-will-stir them together
reponesque in vase optimo ad servandum, quanto tempore
and-you-will-put-back in a-vessel best for keeping how-long time
volueris. Et hæc erit distemperatura ad scribendum de
you-shall-wish and this will-be the-tempering for writing with
auro. Igitur quando de auro scribere volueris, pone aurum
gold therefore when with gold to-write you-shall-wish place the-gold
molitum in parvissima patella, ad hoc opus de aurichalco
ground in a-very-small dish for this work of brass
facta, et mitte super carbones, ut fulgorem modice
made and put-it over coals so-that brightness moderately
recipiat. Tunc pones in cornu ut dictum est, accipiesque
it-receive then you-will-place-it in the-horn as said it-is and-you-will-take
de cotho parumper et misces cum auro; in cornuque
of the-cotho a-little and you-mix with the-gold in and-the-horn
miscebis quotiens de eo scribere volueris. Cum autem
you-will-mix as-often-as with it to-write you-shall-wish when however
scripseris de eo, dimitte siccare et de emate polies.
you-shall-have-written with it let-it to-dry and with hematite you-will-polish
Hoc solummodo de auro et aurichalco poteris facere.
this only with gold and brass you-will-be-able to-do

Short recipes follow: metals ground on a whetstone or with bull's gall, gold tempered with parchment glue, with quicksilver and saffron, with dragon's blood, with sulfur, with vinegar, salt, or lead; all, it says, come to one understanding.

Caput XXXV. Item de eodem.
Chapter XXXV likewise about the-same
Aurum, vel argentum, vel cuprum aut aurichalcum cum
gold or silver or copper or brass with
cote teritur, et scipho excipitur vel bacino. Quæ tante
a-whetstone is-ground and in-a-cup is-caught or in-a-bowl which so-much
lavatur quod melius cum aqua interdum projicitur, etc. Ipsa
is-washed that better with water sometimes is-thrown-out etc itself
aqua frequentius in diversis vasis recipitur. Postea procurato
the-water more-often in various vessels is-received afterward procured
lucidissimo ex pergamenis glutine in hypogaeis, aut in occultis
very-clear from parchments glue in crypts or in hidden
locis convenit scribere. Deinde limpidissima petra vel onychino
places it-is-fitting to-write then with-a-very-clear stone or onyx
aut emate vel simili re convenit scripturam detergere, quod
or hematite or like thing it-is-fitting the-writing to-wipe which
sic et soliditatem accipit et fulgorem vel colorem.
thus both solidity receives and brightness or color
Caput XXXVI. De eadem arte sicut supra.
Chapter XXXVI about the-same art as above
Argentum aut cuprum vel aurichalcum tere super marmorem
silver or copper or brass grind on marble
cum felle taurino et modico sale spisso. Quando scribere
with gall of-bull and a-little salt thick when to-write

volueris, cum supradicta distemperatura scribe et burni
you-shall-wish with the-above-said tempering write and burnish
vel dente vel petra.
either with-a-tooth or with-a-stone
Iterum. Si vis scribere de auro, accipe pulverem auri et
again if you-wish to-write with gold take the-powder of-gold and
distempera cum glutine ipsius pergameni, in quo debes
temper-it with the-glue of-the-very parchment on which you-ought
scribere, et ad ignem de ipso auro cum glutine scribe;
to-write and at the-fire with the-very gold with glue write
et quando littera sicca fuerit, burni de planissima petra
and when the-letter dry shall-have-been burnish with a-very-smooth stone
aut de dente apri.
or with the-tooth of-a-boar
Item ad idem. Tolle vivum argentum et misce cum auro
likewise to the-same take quick silver and mix with gold
et terens bene mitte in caliculum, et pone ad ignem
and grinding well put into a-little-cup and place-it at the-fire
donec vivum argentum siccetur et remaneat aurum, quod
until the-quick silver be-dried and remain the-gold which
mittens in mortariolo marmoreo, cum pistello æreo teres
putting in a-little-mortar marble with a-pestle bronze you-will-grind
donec pulvis fiat. Deinde tolles crocum et teres
until powder it-become then you-will-take saffron and you-will-grind
in unum. Si enim una fuerit auri, croci solidi sint
into one if for one shall-have-been of-gold of-saffron shillings let-there-be
duo. Mittes in aquam; decoquant similiter. Similiter
two you-will-put-them into water let-them-boil-down likewise likewise
mittes in compositione ejus aquam de gummi, teres
you-will-put into the-composition of-it water of gum you-will-grind
diligenter, postea mitte in ampullam et suspende ad solem,
diligently afterward put into a-flask and hang-it in the-sun

et tollens de sole quæ volueris scribe. Similiter
and taking-it from the-sun what-things you-shall-wish write likewise
argentum et æramentum compones.
silver and bronze you-will-compose

Caput XXXVII. De eadem arte.
Chapter XXXVII about the-same art

Sume stagnum et confla cum argento vivo et mitte ut
take tin and melt-it with silver quick and put-it so-that
refrigeret, et tere in mortariolo cum alumine scissili et
it-cool and grind in a-little-mortar with alum scissile and
locio pueri. Fiet inde liquidum, et cum fecerit
with-the-urine of-a-boy will-become thence liquid and when it-shall-have-made
atramenti scriptoris pinguedinem, scribe ex eo. Cumque
of-ink of-the-writer the-thickness write from it and-when
siccatum fuerit, separatim teres crocum cum
dried it-shall-have-been separately you-will-grind saffron with
glutino puro. Scribe ex eo quæ jam scripseras et
glue pure write with it what-things already you-had-written and
siccatum dente frica.
dried with-a-tooth rub

Sicut dixi. Sanguine draconis intinge aurum et pone in
as I-said with-the-blood of-dragon steep gold and place-it in
æreo vase; et circumda foris carbonibus, et statim solvitur;
a-bronze vessel and surround-it outside with-coals and at-once it-is-dissolved
et in tantum erit liquidum ut ex eo possis scribere.
and to so-much it-will-be liquid that with it you-can to-write

Adhuc audi. Tolle aurum et fac tenue, postea incide
further hear take gold and make-it thin afterward cut-it
minutatim, et tolle duodecim partes argenti vivi et misce
in-small-bits and take twelve parts of-silver quick and mix
cum eo in vasculo ligneo, et tamdiu misce cum digito, donec
with it in a-little-vessel wooden and so-long mix with the-finger until

fiat totum argentei coloris. Postea mitte in conchula, et in
become all of-silver color afterward put into a-little-shell and on
prunas leniter calefac cum fabricio folle. Tunc habeas ferrum
the-coals gently heat with a-smithing bellows then have an-iron
bene politum et misce cum eo usque dum summitas illius
well polished and mix with it up-to while the-top of-that
ferri habeat aureum colorem. Hoc autem facto projice illud in
iron have a-golden color this however done throw it into
aquam frigidam: tunc tractum de aqua pone super lapidem
water cold then drawn from the-water place-it on a-stone
porphirii et commisce sulphur, et tamdiu tere cum lapide
of-porphyry and mix sulfur and so-long grind with a-stone
porphirii donec aurum et sulphur veniant ad nigrum colorem;
of-porphyry until the-gold and sulfur come to a-black color
et iterum pone in conchula super calidum cinerem, et tum
and again place-it in a-little-shell over hot ash and then
dimitte donec aurei coloris efficiatur, et sic pone in aliud vas
let-it until of-golden color it-be-made and thus place-it into another vessel
et diligenter lava, donec omnis immunditia recedat, et utere.
and diligently wash until all impurity withdraw and use-it
Item. Aurum obrizum et bene coctum lima lima tenui et
likewise gold refined and well fired file with-a-file thin and
in mortare marmoreo mittes et adjicies acetum acerrimum
into a-mortar marble you-will-put-it and you-will-add vinegar very-sharp
et teres pariter et lavabis tamdiu quamdiu nigrum
and you-will-grind together and you-will-wash so-long as-long-as black
fuerit et effundes. Tum demum mittes aut
it-shall-have-been and you-will-pour-it-off then at-last you-will-put-in either
salis granum, aut affronitum; et sic solvetur, et scribes.
of-salt a-grain or aphronitrum and thus it-will-be-dissolved and you-will-write
Postea litteras polito. Similiter omnia metalla solvuntur.
afterward the-letters polish likewise all metals are-dissolved

Item. Plumbum confla et frequenter tinge in aqua, et
likewise lead melt and frequently dip into water and
tunc confla aurum et restingue in prædicta aqua, et fit
then melt gold and quench-it in the-aforesaid water and it-becomes
fragile. Limatum teres diligenter aurum cum argento vivo
brittle filed you-will-grind diligently the-gold with silver quick
et purgabis diligenter, et misces gummam liquidam cum
and you-will-clean diligently and you-mix gum liquid with
eo et scribes. Antea autem in alumine liquido tinges
it and you-will-write before however in alum liquid you-will-dip
calamum. Quod alumen cum sale et aceto optimo purgabis.
the-reed which alum with salt and vinegar best you-will-clean
Item. Sumes laminas argenteas vel aureas et teres
likewise you-will-take plates silver or gold and you-will-grind-them
in mortariolo aureo cum sale græco, vel nitro, donec
in a-little-mortar golden with salt Greek or with-natron until
non compareat, deinde mittes in aquam et ablues.
not it-appear then you-will-put-it into water and you-will-wash
Et iterum mitte sal et ablue similiter, et ut purum
and again put salt and wash likewise and when pure
remanserit, adjicies æris florem modicum et fel
it-shall-have-remained you-will-add of-bronze flower a-little and gall
taurinum et conteres pariter et scribes. Postea poli
of-bull and you-will-grind together and you-will-write afterward polish
litteras. Si vero vis ut diffusum sit et abundantius
the-letters if however you-wish that spread it-be and more-abundantly
litteras scribere, separatim auripigmenti quatuor partes
letters to-write separately of-orpiment four parts
scindes et electri partem unam mittes, et tribulas et
you-will-cut and of-electrum part one you-will-put and you-will-pound and
misces in tantum quantum sit æquale auro, et teres
you-mix in so-much as be equal to-the-gold and you-will-grind

pariter et scribes, et cum siccaverit poli. Ex hoc
together and you-will-write and when it-shall-have-dried polish from this
autem et in muro et in marmore potes pulchre pingere.
however both on a-wall and on marble you-can beautifully to-paint
Huc usque de solutione auri et argenti et aliorum
hither up-to about the-dissolving of-gold and of-silver and of-other
metallorum, quamvis multa sint alia documenta vel dicta,
metals although many be other teachings or sayings
sed ad unum intellectum redeunt.
but to one understanding they-return

XXXVIII–XLII · GLUES, FOLIUM, VERMILION, AND GREEN

Glues for gold from parchment, eel skin, and pike bones; colors tempered for books; the three kinds of folium steeped in lye and urine; vermilion made by heating sulfur and quicksilver in a sealed flask; and salt green grown on copper plates smeared with honey and salt, sealed in a hollowed oak with vinegar or urine and buried in dung for four weeks.

Caput XXXVIII. De omni genere glutinis in pictura auri.
Chapter XXXVIII about every kind of-glue in the-painting of-gold
Si vesicam non habueris, pergamenum vituli spissum eodem
if the-bladder not you-shall-have parchment of-calf thick in-the-same
modo incide, lava, et coque. Follem quoque anguillæ
way cut wash and boil the-skin also of-an-eel
diligentissime rasum, incisum et lotum eodem modo
most-diligently scraped cut and washed in-the-same way
coque. Ossa quoque capitis lupi piscis sicci, diligenter
boil the-bones also of-the-head of-the-pike fish dried diligently
lota in calida aqua ter, ita coque. Qualecunque horum
washed in hot water three-times so boil whichever of-these

coxeris, adde ei tertiam partem gummi lucidissimi,
you-shall-have-boiled add to-it a-third part of-gum most-clear
et modice coque, poterisque servare quamdiu volueris.
and moderately boil and-you-will-be-able to-keep-it as-long-as you-shall-wish
Caput XXXIX. Quomodo colores in libris temperentur.
Chapter XXXIX how colors in books be-tempered
His ita peractis fac temperamentum ex gummi
these-things thus completed make a-tempering from gum
lucidissimo et aqua sicut supra, et tempera omnes colores,
most-clear and water as above and temper all colors
excepto viridi, et cerosa, et minio, et carmin. Viride
except green and white-lead and red-lead and carmine green
salsum non valet in libro. Viride Hispanicum temperabis
salt not avails in a-book green Spanish you-will-temper
vino puro, et si volueris umbras facere, adde modicum
with-wine pure and if you-shall-wish shadows to-make add a-little
sucum gladioli, vel caulæ, vel porri. Minium et cerosam
juice of-sword-lily or of-cabbage or of-leek red-lead and white-lead
et carmin temperabis claro. Omnes mixturas colorum,
and carmine you-will-temper with-glair all mixtures of-colors
si indigueris ad pingendas imagines, compone in libro ut
if you-shall-need for painting images compose in a-book as
supra. Omnes colores bis ponendi sunt in libro, in primis
above all colors twice to-be-placed are in a-book at first
tenuissime, deinde spissius; in literis vero semel.
very-thinly then more-thickly on letters however once
Caput XL. De generibus et temperamentis folii.
Chapter XL about the-kinds and temperings of-folium
Folii tria sunt genera, unum rubeum, aliud purpureum,
of-folium three are kinds one red another purple
tertium saphireum, quæ sic temperabis. Tolle cineres et cribra
the-third sapphire which thus you-will-temper take ashes and sift

eos per pannum, et perfundens eos aqua frigida, fac inde
them through a-cloth and pouring-over them water cold make thence
tortulas in similitudinem panis, mittensque eas in ignem, sine
little-cakes in the-likeness of-bread and-putting them into the-fire let-them
donec omnino candescant. Postquam diutissime canduerint,
until wholly they-glow after very-long they-shall-have-glowed
et postea friguerint, mitte inde partem in vas fictile,
and afterward shall-have-grown-cold put thence a-part into a-vessel earthen
perfundens urina, et move ligno. Cumque resederit
pouring-over-it with-urine and stir with-a-stick and-when it-shall-have-settled
lucide, perfunde inde rubeum folium, et terens illud modice
clear pour-over thence the-red folium and grinding it moderately
super lapidem, adde ei quartam partem vivæ calcis, et cum
on a-stone add to-it the-fourth part of-quick lime and when
tritum fuerit ac sufficienter perfusum, cola illud per
ground it-shall-have-been and sufficiently soaked strain it through
pannum, et trahe cum pincello ubi volueris tenue, deinde
a-cloth and draw-it with a-brush where you-shall-wish thin then
spissius. Et si placet similitudinem pallii in pagina facere
thicker and if it-pleases the-likeness of-a-cloth on the-page to-make
purpureo folio, eodem temperamento sine calce perfuso,
with-purple folium with-the-same tempering without lime soaked
pinge penna prius in ipsa pagina nodos vel circulos, et
paint with-a-pen first on the-very page knots or circles and
interius aves sive bestias aut folia; et cum siccum fuerit,
on-the-inside birds or beasts or leaves and when dry it-shall-have-been
linies per omnia rubeum folium tenue, deinde spissius, et
you-will-smear over all-things the-red folium thin then thicker and
tertio si sit opus; ac postmodum linies desuper tenue
a-third-time if there-be need and afterward you-will-smear above thin
vetus clarum, sine aqua percussum. Purpureum folium et
old glair without water beaten the-purple folium and

saphireum non teres, sed perfunde eodem temperamento
the-sapphire not you-will-grind but pour-over with-the-same tempering
in concha sine calce, et move ligno, et cum per noctem
in a-shell without lime and stir with-a-stick and when through the-night
steterit, in crastinum pone quomodocumque volueris,
it-shall-have-stood on the-morrow place-it howsoever you-shall-wish
liniens claro superius. Vestimenta quoque et omnia quæ
smearing with-glair above the-garments also and all-things which
folio et carmin pinxeris, claro superlinies. Cineres
with-folium and carmine you-shall-have-painted with-glair you-will-smear-over the-ashes
autem coctos, qui remanserint, servare diu poteris siccos.
however baked which shall-have-remained to-keep long you-will-be-able dry

Caput XLI. De cenobrio.

Chapter XLI about vermilion

Si desideras cenobrium componere, tolle sulphur, cujus sunt
if you-desire vermilion to-compose take sulfur of-which there-are
tria genera, album, nigrum et croceum, quod frangens
three kinds white black and saffron-yellow which breaking
super lapidem siccum, adde ei duas partes vivi argenti,
on a-stone dry add to-it two parts of-quick silver
æquo pondere stateræ; et cum diligenter miscueris,
by-equal weight of-the-balance and when diligently you-shall-have-mixed
mitte in vitream ampullam, cooperiens eam ex omni parte
put-it into a-glass flask covering it on every side
argilla, et os obstrue, ne fumus exeat, et pone eam
with-clay and the-mouth block lest the-fume go-out and place it
ad ignem ut exsiccetur. Deinde pone eam inter carbones
at the-fire so-that it-be-dried then place it among coals
ardentes, et mox cum cœperit calefieri, audies
burning and soon when it-shall-have-begun to-grow-hot you-will-hear
fragorem interius, quomodo se vivum argentum commiscet
a-crashing within how itself the-quick silver mingles

ardenti sulphuri; et cum sonus cessaverit, statim
with-the-burning sulfur and when the-sound shall-have-ceased at-once
ejice ampullam et aperiens tolle colorem.
take-out the-flask and opening-it take the-color

Caput XLII. De viridi salso.

Chapter XLII about green salt

Si autem viridem colorem velis conficere, sume lignum
if however a-green color you-wish to-make take a-wood
quercinum, quantæ longitudinis et latitudinis volueris, et
of-oak of-what of-length and of-width you-shall-wish and
cava illud in modum scrinii. Deinde tolle cuprum, et fac
hollow it in the-manner of-a-chest then take copper and make
illud attenuari in laminas, quantæ latitudinis volueris, ut
it be-thinned into plates of-what of-width you-shall-wish so-that
tamen longitudo ejus cooperiat latitudinem cavi ligni.
nevertheless the-length of-it cover the-width of-the-hollow wood
Post hæc accipe scutellam plenam salis, et comprimens
after these-things take a-dish full of-salt and pressing
eum fortiter, mitte in ignem et cooperi carbonibus per
it strongly put-it into the-fire and cover-it with-coals through
noctem, et in crastinum tere eum diligentissime super
the-night and on the-morrow grind it most-diligently on
lapidem siccum. Cumque acceperis surculos graciles,
a-stone dry and-when you-shall-have-taken twigs slender
colloca eos in prædictum cavum lignum, ita ut duæ partes
place them in the-aforesaid hollow wood so that two parts
cavi sint inferius, et tertia superius, sicque linies
of-the-hollow be below and the-third above and-thus you-will-smear
laminas cupreas ex utraque parte melle puro, aspergens
the-plates copper on each side with-honey pure sprinkling
desuper sal tritum, et collocabis super surculos illos
above salt ground and you-will-place-them over twigs those

conjunctim, cooperiens diligenter altero ligno ad hoc aptato,
joined covering-them diligently with-another wood for this fitted
ita ut nihil spiraminis exire possit. Post fac foramen
so that nothing of-breath to-go-out can afterward make a-hole
terebrari in angulo ipsius ligni per quod possis infundere
to-be-bored in the-corner of-the-very wood through which you-can to-pour-in
acetum calefactum aut urinam calidam, ita ut tertia pars
vinegar heated or urine hot so that the-third part
ejus impleatur, et mox obstrue foramen. Hoc lignum in
of-it be-filled and soon block the-hole this wood in
tali loco debes ponere, ubi possis illud sterquilinio ex
such a-place you-ought to-place where you-can it with-dung on
omni parte cooperire. Post quatuor vero septimanas solve
every side cover after four however weeks loosen
operculum, et quicquid super cuprum inveneris, erade
the-lid and whatever on the-copper you-shall-have-found scrape-off
et serva, et iterum reponens cooperi ordine quo supra.
and keep and again putting-it-back cover-it in-the-order in-which above

XLIII–XLV · SPANISH GREEN, WHITE LEAD, AND INK

Spanish green is grown on copper with vinegar alone; white lead grows on lead plates and is roasted into red lead. Ink is boiled down from thorn bark cut in spring, boiled again with wine, dried in bags in the sun, and tempered with wine and a little vitriol for use.

Caput XLIII. De viridi Hispanico.

Chapter XLIII about green Spanish

Si vero viride Hispanicum componere velis, tolle cupri tabulas
if however green Spanish to-compose you-wish take of-copper plates
attenuatas et radens eas diligenter ex utraque parte, perfunde
thinned and scraping them diligently on each side pour-over-them

aceto puro et calido absque melle et sale, componesque eas
with-vinegar pure and hot without honey and salt and-you-will-set them
in ligno minori cavo, ordine quo supra. Post duas septimanas
in a-wood smaller hollow in-the-order in-which above after two weeks
respice ac rade, sicque facies donec tibi color sufficiat.
look and scrape and-thus you-will-do until for-you the-color suffice

Caput XLIV. De cerosa et minio.
Chapter XLIV about white-lead and red-lead

Cerosam autem compositurus fac tibi plumbeas tabulas
white-lead however about-to-compose make for-yourself lead plates
attenuari, et componens eas siccas in cavo ligno sicut
be-thinned and setting them dry in a-hollow wood as
cuprum supra, infuso aceto calido sive urina cooperi.
the-copper above poured-in vinegar hot or urine cover-it
Deinde post mensem solve cooperculum, et quicquid album
then after a-month loosen the-lid and whatever white
fuerit auferens, rursum repone sicut prius. Cumque
shall-have-been taking-away again put-back as before and-when
tibi suffecerit, et minium inde facere placuerit,
for-you it-shall-have-sufficed and red-lead thence to-make it-shall-have-pleased
eamdem cerosam tere super lapidem absque aqua, et deinde
the-same white-lead grind on a-stone without water and then
mittens in ollas novas duas vel tres, pone super carbones
putting-it into pots new two or three place-them over coals
ardentes; habeas autem ferrum gracile curvum ex una parte
burning have however an-iron slender curved on one side
ligno aptatum et in summitate latum, cum quo movere
to-a-wood fitted and at the-top broad with which to-stir
ac miscere ipsam cerosam interdum possis; atque hoc
and to-mix itself the-white-lead from-time-to-time you-can and this
tam diu facies donec minium omnino rubeum fiat.
so long you-will-do until the-red-lead wholly red become

Caput XLV. De incausto.

Chapter XLV about ink

Incaustum etiam facturus incide tibi ligna spinarum

ink also about-to-make cut for-yourself branches of-thorns

in Aprili, in Maio, priusquam producant flores aut folia, et

in April in May before they-put-forth flowers or leaves and

congregans inde fasciculos, sine jacere in umbra duabus

gathering thence little-bundles let-them lie in the-shade for-two

hebdomadibus vel tribus aut quatuor, donec aliquantulum

weeks or three or four until somewhat

exsiccentur. Deinde habeas malleolos ligneos cum quibus

they-be-dried then have little-mallets wooden with which

super aliud lignum durum contundas ipsas spinas, donec

on another wood hard you-may-pound themselves the-thorns until

corticem omnino evellas, quem statim mittes in dolium

the-bark wholly you-tear-off which at-once you-will-put into a-cask

aqua plenum; cumque duo dolia vel tria seu quatuor aut

with-water full and-when two casks or three or four or

quinque cortice et aqua repleveris, sine sic stare per octo

five with-bark and water you-shall-have-filled let thus stand for eight

dies, donec aqua omnem corticis succum in se emordeat.

days until the-water all of-the-bark juice into itself draw-out

Post hæc mitte ipsam aquam in cacabum mundissimum,

after these-things put the-very water into a-cauldron very-clean

vel in lebetem, et supposito igne coque; interdum etiam

or into a-kettle and placed-under fire boil-it from-time-to-time also

immitte de ipso cortice in cacabum, ut si quid succi

put-in of the-very bark into the-cauldron so-that if any of-juice

in eo remanserit excoquatur. Quam cum coxeris,

in it shall-have-remained be-boiled-out which when you-shall-have-boiled

ejice, aliumque rursus immitte. Quo facto coque residuam

take-out and-other again put-in which done boil the-remaining

aquam usque ad tertiam partem, sicque ejiciens de ipso
water up-to to the-third part and-thus taking-it-out of the-very
cacabo mitte in minorem, et tamdiu coque donec nigrescat
cauldron put-it into a-smaller and so-long boil until it-grow-black
ac incipiat densescere, hoc omnino cavens ne aliquod addas
and begin to-thicken this wholly taking-care lest any you-add
aquæ, excepta illa quæ succo mixta est. Cumque videris
of-water except that which with-juice mixed is and-when you-shall-have-seen
eam densescere, adde vini puri tertiam partem, et mittens
it to-thicken add of-wine pure a-third part and putting-it
in ollas novas duas vel tres, tamdiu coque donec videas quod
into pots new two or three so-long boil until you-see that
in supremo quasi cutem trahat. Deinde tollens ipsas ollas
on the-top as-if a-skin it-draw then taking themselves the-pots
ab igne pone ad solem donec se nigrum incaustum
from the-fire place-them in-the sun until itself the-black ink
a rubea fæce purificet. Postea tolle folliculos ex pergameno
from the-red dregs purify afterward take little-bags of parchment
diligenter consutos et vesicas, et infundens purum incaustum
diligently sewn and bladders and pouring-in the-pure ink
suspende ad solem donec omnino siccetur. Cumque siccum
hang-them in-the sun until wholly it-be-dried and-when dry
fuerit, tolle inde quotiens volueris et tempera vino
it-shall-have-been take thence as-often-as you-shall-wish and temper-it with-wine
super carbones, et addens modicum atramenti scribe. Quod
over coals and adding a-little of-vitriol write but
si contigerit per negligentiam ut non satis nigrum sit
if it-shall-have-happened through negligence that not enough black be
incaustum, accipe frustum grossitudine unius digiti, et ponens
the-ink take a-piece in-thickness of-one finger and putting-it
in ignem, sine candescere, mox et in incaustum projice.
into the-fire let-it glow soon and into the-ink throw-it

Liber Secundus. Prologus

PROLOGUE TO BOOK TWO

The first book urged his brother to flee idleness, since to learn something is praise and to refuse is fault. Theophilus came, he says, to the court of Holy Wisdom and filled the cupboard of his heart with the knowledge of colors; but painting cannot let the daylight through, so he studied glass, and he writes down what he learned by sight and hearing.

In præcedenti libello, frater carissime, sinceræ dilectionis
in the-preceding little-book brother dearest of-sincere love
affectu non me piguit tuæ indoli insinuare, quanti
with-the-affection not me it-irked to-your nature to-insinuate of-how-much
honoris quantumque perfectionis sit, otium declinare, et
honor and-of-how-much perfection it-is idleness to-avoid and
inertiam desidiamque calcare; quamque dulce ac delectabile,
sluggishness and-sloth to-tread-down and-how sweet and delightful
diversarum utilitatum exercitiis operam dare, juxta vocem
of-various usefulnesses in-the-exercises attention to-give according-to the-voice
oratoris cujusdam dicentis:
of-an-orator a-certain saying

> Scire aliquid laus est; culpa est, nil discere velle.
> *To-know something praise is; a-fault is, nothing to-learn to-wish.*

Nec pigritetur quispiam, eum, de quo Salomon ait,
nor let-him-be-slothful anyone him about whom Solomon says
qui addit scientiam, addit laborem, apprehendere; quia,
who adds knowledge adds labor to-grasp because
quantus ex eo procedat animæ et corporis profectus,
how-great from it proceeds of-soul and of-body advancement

diligens meditator poterit advertere. Nam luce clarius
a-diligent meditator will-be-able to-notice for than-light more-clearly
constat, quia, quisquis otio studet ac levitati, fabulis quoque
it-is-plain that whoever idleness pursues and levity to-tales also
supervacuis operam dat, et scurrilitati, curiositati, potationi,
superfluous attention gives and to-buffoonery to-curiosity to-drinking
ebrietati, rixæ, pugnæ, homicidio, luxuriæ, furtis,
to-drunkenness to-quarreling to-fighting to-homicide to-lust to-thefts
sacrilegiis, perjuriis et cæteris hujusmodi, quæ contraria
to-sacrileges to-perjuries and to-the-other of-this-kind which contrary
sunt oculis Dei respicientis super humilem et quietum et
are to-the-eyes of-God looking upon the-humble and quiet and
operantem cum silentio in nomine Domini, et obedientem
working with silence in the-name of-the-Lord and obeying
præcepto B. Pauli apostoli: Magis autem laboret
the-precept of-blessed Paul the-apostle rather however let-him-labor
operando manibus suis, quod bonum est, ut habeat
by-working with-hands his what good is so-that he-may-have
unde tribuat necessitatem patienti. Hujus ergo imitator
whence he-may-give the-need to-one-suffering of-this-one therefore an-imitator
desiderans fore, apprehendi atrium agiæ Sophiæ conspicorque
desiring to-be I-approached the-court of-holy Sophia and-I-behold
cellulam diversorum colorum omnimodo varietate refertam et
a-little-cell of-various colors with-every variety filled and
monstrantem singulorum utilitatem ac naturam. Quo mox
showing of-each the-usefulness and nature which soon
inobservato pede ingressus, replevi armariolum cordis mei
unobserved with-foot entering I-filled the-little-cupboard of-heart my
sufficienter ex omnibus, quæ diligenti experientia sigillatim
sufficiently from all-things which by-diligent experience one-by-one
perscrutatus, cuncta visu manibusque probata satis lucide
having-searched-through all by-sight and-by-hands tested quite clearly

tuo studio commendavi absque invidia. Verum quoniam
to-your zeal I-commended without envy but since
hujusmodi picturæ usus perspicax non valet esse, quasi
of-this-kind painting the-use transparent not can be as-if
curiosus explorator omnibus modis elaboravi cognoscere, quo
a-curious explorer in-all ways I-labored to-learn by-what
artis ingenio et colorum varietas opus decoraret, et lucem
of-art ingenuity both of-colors the-variety the-work might-adorn and the-light
diei solisque radios non repelleret. Huic exercitio dans
of-day and-of-the-sun the-rays not might-repel to-this exercise giving
operam vitri naturam comprehendo, ejusque solius usu
attention of-glass the-nature I-grasp and-of-it alone by-the-use
et varietate id effici posse considero, quod artificium,
and variety this to-be-done to-be-able I-consider which artifice
sicut visum et auditum didici, studio tuo indagare curavi.
as by-sight and hearing I-learned for-zeal your to-track-down I-took-care

I–VI · THE GLASS FURNACES

The working furnace, fifteen feet by ten, with its hearth, pot holes, and windows; the cooling furnace; the spreading furnace and the tools. Beech ash and washed sand are fritted a night and a day, white clay pots are fired, and the glass is blown into a long bladder, opened at both ends, and carried to the cooling furnace.

Caput I. De constructione furni ad operandum vitrum.
Chapter I about the-construction of-a-furnace for working glass
Si sederit animo tuo ut vitrum componas, primum
if it-shall-have-settled in-mind your that glass you-compose first
incide ligna faginea multa et exsicca ea. Deinde combure ea
cut logs beech many and dry them then burn them
pariter in loco mundo, et cineres diligenter colligens, cave ne
together in a-place clean and the-ashes diligently gathering beware lest

quicquam terræ vel lapidis commisceas. Postmodum compone
anything of-earth or of-stone you-mix-in afterward build
furnum ex lapidibus et argilla, longitudine pedum XV et
a-furnace from stones and clay in-length of-feet XV and
latitudine X, in hunc modum. Primum pone fundamenta in
in-width X in this manner first lay the-foundations on
utroque longitudinis latere spissitudine pedis unius, faciens
each of-the-length side in-thickness of-foot one making
larem in medio firmum et æqualem lapidibus et argilla,
a-hearth in the-middle firm and level with-stones and clay
dividens eum inter tres partes æquales, ita ut duæ partes
dividing it into three parts equal so that two parts
sint per se et tertia per se, divisa muro in latitudine
be by themselves and the-third by itself divided by-a-wall in width
posito. Deinde fac foramen in utraque fronte latitudinis,
placed then make an-opening in each front of-the-width
per quod possint ligna et ignis imponi, et ædificans
through which can wood and fire to-be-put-in and building
murum in circuitu usque ad altitudinem pene quatuor pedum,
a-wall in circuit up-to to a-height almost four of-feet
fac iterum larem firmum et æqualem per omnia, et sine
make again a-hearth firm and level through all and let
murum divisionis aliquantulum ascendere. Post quæ fac in
the-wall of-the-division somewhat rise after which make in
majori spatio quatuor foramina in uno latere longitudinis, et
the-greater space four openings in one side of-the-length and
quatuor in altero per medium laris, in quibus ponantur
four in the-other through the-middle of-the-hearth in which may-be-placed
vasa operis, duoque foramina in medio per quæ flamma
the-vessels of-the-work and-two openings in the-middle through which the-flame
possit ascendere, et ædificans murum in circuitu, fac duas
can to-rise and building a-wall in circuit make two

fenestras quadras longitudine et latitudine unius palmi, in
windows square in-length and in-width of-one palm on
utroque latere contra foramina unam, per quas vasa
each side opposite the-openings one through which the-vessels
imponantur et ejiciantur cum his, quæ in illis mittuntur.
may-be-put-in and be-taken-out with those-things which into them are-put
Fac etiam in minori spatio foramen per medium laris
make also in the-smaller space an-opening through the-middle of-the-hearth
juxta parietem medium, et fenestram ad mensuram palmi
beside the-wall middle and a-window to the-measure of-a-palm
juxta parietem frontis exteriorem, per quam possit imponi
beside the-wall of-the-front outer through which can to-be-put-in
et assumi quod necessarium est operi. Postquam hæc
and to-be-taken what necessary is for-the-work after these-things
ita ordinaveris, fac partem interiorem cum muro exteriori
thus you-shall-have-arranged make the-part inner with the-wall outer
in similitudinem fornacis arcuarii, interius altitudine modice
in the-likeness of-an-oven arched on-the-inside in-height a-little
amplius pedis dimidii, ita ut superius larem facias æqualem
more of-a-foot half so that above a-hearth you-make level
per omnia, cum labro altitudine trium digitorum in circuitu
through all with a-lip in-height of-three fingers in circuit
posito, ut quicquid operis vel utensiliorum superponitur
placed so-that whatever of-work or of-utensils is-placed-on
non possit cadere. Iste furnus dicitur clibanus operis.
not can to-fall this furnace is-called the-oven of-the-work

Caput II. De furno refrigerii.

Chapter II about the-furnace of-cooling

Fac et alium furnum, longitudine pedum X et latitudine
make also another furnace in-length of-feet X and in-width
VIII, altitudine vero IV. Hinc facies in una fronte
VIII in-height however IV hence you-will-make in one front

foramen ad inponenda ligna et ignem, et in latere
an-opening for putting-in wood and fire and in side
uno fenestram pedis unius ad inponendum et ejiciendum
one a-window of-foot one for putting-in and taking-out
quod necessarium fuerit, et larem interius firmum et
what necessary shall-have-been and a-hearth on-the-inside firm and
æqualem. Iste furnus dicitur clibanus refrigerii.
level this furnace is-called the-oven of-cooling

Caput III. De furno dilatandi et utensiliis operis.
Chapter III about the-furnace of-spreading and the-utensils of-the-work

Facies etiam furnum tertium longitudine pedum sex,
you-will-make also a-furnace third in-length of-feet six
latitudine quatuor, altitudine trium, et foramen fenestramque
in-width four in-height three and an-opening and-a-window
et larem sicut superius. Hic furnus dicitur clibanus dilatandi
and a-hearth as above this furnace is-called the-oven of-spreading
et æquandi; utensilia vero ad hoc opus necessaria sunt
and of-leveling the-utensils however for this work necessary are
fistula ferrea duarum ulnarum, grossitudine pollicis unius,
a-pipe iron of-two ells in-thickness of-thumb one
forcipes duo in una parte ferri percussi, trullæ ferreæ
tongs two in one piece of-the-iron struck ladles iron
duæ atque alia lignea et ferrea, quæ volueris.
two and other wooden and iron which you-shall-wish

Caput IV. De commixtione cinerum et sabuli.
Chapter IV about the-mixing of-the-ashes and of-the-sand

His ita compositis accipe ligna faginea omnino in fumo
these-things thus composed take logs beech wholly in smoke
exsiccata, et accende ignem copiosum in majori furno
dried and kindle a-fire copious in the-greater furnace
ex utraque parte. Deinde tollens duas partes cinerum de
on each side then taking two parts of-the-ashes about

quibus supra diximus, et tertiam sabuli diligenter de
which above we-spoke and the-third of-sand diligently from
terra et lapidibus purgati, quod de aqua tuleris,
earth and stones cleaned which from water you-shall-have-taken
commisce in loco mundo. Cumque diu et bene commixta
mix in a-place clean and-when long and well mixed
fuerint, levans cum trulla ferrea pone in minori
they-shall-have-been lifting-them with a-ladle iron place-them in the-smaller
parte furni super larem superiorem ut coquantur,
part of-the-furnace on the-hearth upper so-that they-be-baked
et cum cœperint calefieri, statim eadem move ne
and when they-shall-have-begun to-grow-hot at-once the-same stir lest
forte liquefiant a calore ignis et conglomerentur, sicque
perhaps they-melt from the-heat of-the-fire and be-clumped and-thus
facies per spatium unius noctis et diei.
you-will-do through the-space of-one night and day

Caput V. De vasis operis et de coquendo vitro albo.

Chapter V about the-vessels of-the-work and about cooking glass white

In quo spatio accipe lutum album, ex quo componuntur ollæ,
in which space take clay white from which are-made pots
et exsiccans tere diligenter, et infusa aqua macera cum ligno
and drying-it grind diligently and poured-in water knead-it with a-stick
fortiter, et compone vasa tua, quæ sint superius lata, inferius
strongly and make vessels your which be above broad below
vero stricta, habentia circa ora labium parvum interius
however narrow having around the-mouths a-lip small inward
recurvum. Quæ cum sicca fuerint, accipe cum forcipe
curved which when dry they-shall-have-been take with tongs
ponens ea in foramina furni candentis ad hoc aptata, et
placing them into the-openings of-the-furnace glowing for this fitted and
levans cum trulla cineres coctos cum sabulo mixtos, imple omnia
lifting with a-ladle the-ashes baked with sand mixed fill all

vasa vespere, et per totam noctem adde ligna sicca, ut
the-vessels at-evening and through the-whole night add logs dry so-that
vitrum ex cineribus et sabulo liquefactum pleniter coquatur.
the-glass from ashes and sand melted fully be-cooked

Caput VI. Quomodo operentur vitreæ tabulæ.
Chapter VI how be-worked glass panels

Mane hora prima accipe fistulam ferream, et si tabulas
in-the-morning at-hour first take the-pipe iron and if panels
vitreas facere volueris, pone summitatem ejus in vas unum
glass to-make you-shall-wish place the-top of-it into vessel one
vitro plenum; cui cum adhæserit, volve ipsam fistulam in
with-glass full to-which when it-shall-have-stuck turn itself the-pipe in
manu tua donec conglomeretur circa eam, quantum volueris;
hand your until it-be-clumped around it as-much-as you-shall-wish
moxque ejiciens appone ori tuo et suffla modicum,
and-soon taking-it-out put-it to-mouth your and blow a-little
statimque removens ab ore tene juxta maxillam, ne forte,
and-at-once removing-it from the-mouth hold-it beside the-cheek lest perhaps
si retraxeris anhelitum, trahas flammam in os
if you-shall-have-drawn-back breath you-draw the-flame into mouth
tuum. Habeas quoque lapidem æqualem ante fenestram super
your have also a-stone level before the-window on
quem modice percuties ipsum candens vitrum, ut æqualiter
which moderately you-will-strike the-very glowing glass so-that equally
ex omni parte pendeat, et statim cum festinatione crebro
from every side it-hang and at-once with haste often
sufflans, totiens ab ore remove. Cumque videris
blowing so-often from the-mouth remove-it and-when you-shall-have-seen
illud dependere quasi vesicam longam, adhibe summitatem
it hang-down as-if a-bladder long apply the-top
ejus ad flammam, et statim liquefacto apparebit foramen,
of-it to the-flame and at-once it-melted will-appear an-opening

acceptoque ligno ad hoc opus facto, fac foramen amplum
and-taken a-stick for this work made make the-opening wide
sicut est in medio. Deinde conjunge oram ipsius, superiorem
as it-is in the-middle then join the-edge of-it upper
videlicet partem ad inferiorem, ita ut ex utraque parte
namely the-part to the-lower so that from each side
conjunctionis foramen appareat. Statimque cum humido ligno
of-the-joining an-opening appear and-at-once with a-moist stick
continge ipsum vitrum juxta fistulam, et excute modicum
touch the-very glass beside the-pipe and shake a-little
et separabitur. Mox etiam calefac ipsam fistulam in flamma
and it-will-be-separated soon also heat itself the-pipe in the-flame
fornacis, donec liquefiat vitrum quod ei jungitur, et cum
of-the-furnace until melt the-glass which to-it is-joined and with
festinatione pone super oras et vas vitri conjunctas et
haste place-it on the-edges and the-vessel of-glass joined and
adhærebit. Quod continuo elevans mitte in flamma fornacis
it-will-stick which immediately lifting put into the-flame of-the-furnace
donec liquefiat foramen unde prius fistulam separasti, et
until melt the-opening whence before the-pipe you-separated and
accepto ligno rotundo dilata sicut alterum et complicans oram
taken a-stick round spread-it as the-other and folding-together the-edge
ejus in medio separansque a fistula cum ligno humido,
of-it in the-middle and-separating-it from the-pipe with a-stick moist
da puero, qui inducto ligno per foramen ejus portabit in
give-it to-a-boy who brought-in a-stick through the-opening of-it will-carry-it into
furnum refrigerii, qui mediocriter calefactus sit. Hoc genus
the-furnace of-cooling which moderately heated be this kind
vitri purum est et album. Eodem modo atque eodem
of-glass pure is and white in-the-same way and in-the-same
ordine operare similes partes vitri, donec vasa exhaurias.
order work like parts of-glass until the-vessels you-empty

Glass left longer in the pot turns saffron or purple, and a tawny glass serves for flesh-tint; sheets are flattened in the spreading furnace; vessels, handles, and long-necked flasks are blown and drawn. Ancient pagan buildings hold opaque mosaic glass of many colors, used for enamels, and small vessels of the same colors, which the Franks gather and remelt into sapphire panes; the Greeks gild their sapphire cups under a fused glaze.

Caput VII. De croceo vitro.

Chapter VII about saffron-yellow glass

Quod si videris vas aliquod in croceum colorem mutari,

but if you-shall-have-seen vessel any into a-saffron-yellow color be-changed

sine illud coqui usque horam tertiam, et habebis croceum

let it be-cooked up-to the-hour third and you-will-have saffron-yellow

leve, et operare inde quantum volueris ordine quo supra.

light and work thence as-much-as you-shall-wish in-the-order in-which above

Si vis permitte coqui usque horam sextam et habebis

if you-wish allow-it to-be-cooked up-to the-hour sixth and you-will-have

croceum rubicundum; fac etiam inde quod libuerit.

saffron-yellow reddish make also thence what shall-have-pleased

Caput VIII. De purpureo vitro.

Chapter VIII about purple glass

Si vero perspexeris quod se forte vas aliquod in

if however you-shall-have-perceived that itself perhaps vessel any into

fulvum colorem convertat, qui carni similis est, hoc vitrum

a-tawny color turn which to-flesh like is this glass

pro membrana habeto, et auferens inde quantum volueris,

for flesh-tint have and taking-away thence as-much-as you-shall-wish

reliquum coque per duas horas, videlicet a prima usque

the-rest cook through two hours namely from the-first up-to

ad tertiam, et habebis purpuream levem, et rursum coque
to the-third and you-will-have purple light and again cook
a tertia usque ad sextam, erit purpurea rufa et perfecta.
from the-third up-to to the-sixth it-will-be purple reddish and perfect

Caput IX. De dilatandis vitreis tabulis.

Chapter IX about spreading glass panels

Cum autem ex his coloribus operatus fueris quantum
when however from these colors worked you-shall-have as-much-as
potueris, et vitrum in furno refrigeratum fuerit,
you-shall-have-been-able and the-glass in the-furnace cooled shall-have-been
expone opus tuum universum, et fac ignem copiosum
set-out work your all and make a-fire copious
accendi in furno in quo debet dilatari et æquari. Quo
be-kindled in the-furnace in which it-ought to-be-spread and to-be-leveled which
videlicet candente accipe ferrum calidum, et findens unam
namely glowing take an-iron hot and splitting one
partem vitri, pone super larem candentis furni, et cum
part of-glass place-it on the-hearth of-the-glowing furnace and when
cœperit molliri, tolle forcipem ferreum et lignum
it-shall-have-begun to-be-softened take tongs iron and a-stick
æquale, aperiensque in ea parte qua fissum est, dilatabis
level and-opening-it in that part where split it-is you-will-spread-it
et cum forcipe secundum libitum æquabis. Cumque
and with the-tongs according-to pleasure you-will-level-it and-when
omnino æquatum fuerit, mox ejiciens inde mitte in
wholly leveled it-shall-have-been soon taking-it-out thence put-it into
furnum refrigerii modice calefactum, sic ut non jaceat, sed
the-furnace of-cooling moderately heated so that not it-lie but
stet ad parietem ejus tabula, juxta quam statues et
stand against the-wall of-it a-panel beside which you-will-stand also
aliam pari modo æquatam, ac tertiam et reliquas omnes.
another in-like manner leveled and a-third and the-rest all

Quæ cum frigidæ fuerint, utere eis in componendis
which when cold they-shall-have-been use them in composing
fenestris findendo particulatim qualiter volueris.
windows by-splitting piece-by-piece as you-shall-wish

Caput X. Quomodo fiant vasa vitrea.

Chapter X how be-made vessels glass

Vasa vero facturus compone vitrum ordine quo supra,
vessels however about-to-make compose the-glass in-the-order in-which above
et cum sufflaveris secundum quantitatem quam volueris,
and when you-shall-have-blown according-to the-size which you-shall-wish
non facies foramen in fundo sicut superius, sed ita
not you-will-make an-opening in the-bottom as above but thus
integrum separabis a fistula cum ligno aquæ intincto,
whole you-will-separate-it from the-pipe with a-stick in-water dipped
quam fistulam mox calefactam adhærere facies in ipso
which pipe soon heated to-stick you-will-make on the-very
fundo. Elevans vero vas calefacies in flamma, et cum
bottom lifting however the-vessel you-will-heat-it in the-flame and with
ligno rotundo dilatabis foramen illud unde fistulam separasti,
a-stick round you-will-spread the-opening that whence the-pipe you-separated
formans oram ejus ac dilatans secundum libitus tuos,
forming the-edge of-it and spreading according-to pleasures your
amplificabisque circa fistulam fundum ut inferius cavum sit.
and-you-will-enlarge around the-pipe the-bottom so-that below hollow it-be
Quod si volueris ansas in eo facere, quibus possit pendere,
but if you-shall-wish handles on it to-make by-which it-can to-hang
accipe gracile ferrum, mittens illud summotenus in vas vitri,
take a-slender iron putting it to-the-tip into the-vessel of-glass
et cum ei modicum adhæserit, auferens pone super vas,
and when to-it a-little it-shall-have-stuck taking-it-away place-it on the-vessel
in quo loco placuerit, et cum adhæserit, calefacies
in what place it-shall-have-pleased and when it-shall-have-stuck you-will-heat-it

ut firmiter hæreat. Fac ex his ansis quod velis, interim
so-that firmly it-cling make from these handles what you-wish meanwhile
tenens vas juxta flammam ut calidum sit nec tamen
holding the-vessel beside the-flame so-that hot it-be nor however
liquescat. Aufer etiam modicum vitri a furno ita ut filum
melt take also a-little of-glass from the-furnace so that a-thread
post se trahat, et apponens vasi in quo loco volueris,
after itself it-draw and applying-it to-the-vessel in what place you-shall-wish
circumvolve juxta flammam ut hæreat. Quo facto secundum
wind-it-around beside the-flame so-that it-cling which done according-to
consuetudinem amovebis fistulam, mittens vas in furnum
custom you-will-remove the-pipe putting the-vessel into the-furnace
refrigerii; atque hoc modo operaberis, quantum velis.
of-cooling and in-this way you-will-work as-much-as you-wish

Caput XI. De ampullis cum longo collo.

Chapter XI about flasks with long neck

Quod si volueris ampullas cum longo collo facere, sic age.
but if you-shall-wish flasks with long neck to-make thus do
Cum sufflaveris calidum vitrum quasi vesicam magnam,
when you-shall-have-blown the-hot glass as-if a-bladder large
obstrue foramen fistulæ pollice tuo, ne forte ventus exeat,
block the-opening of-the-pipe with-thumb your lest perhaps the-wind go-out
vibrans ipsam fistulam cum vitro, quod ei appendet, ultra
swinging itself the-pipe with the-glass which to-it hangs beyond
caput tuum, eo modo quasi velis eam projicere, et
head your in-that way as-if you-wished it to-throw-forward and
mox extenso collo ejus in longum, elevata manu tua in
soon stretched-out the-neck of-it in length lifted with-hand your on
altum, sine ipsam fistulam cum vase inferius dependere,
high let itself the-pipe with the-vessel below hang-down

ut collum non curvetur, et sic separans cum humido
so-that the-neck not be-bent and thus separating-it with a-moist
ligno mitte in furnum refrigerii.
stick put-it into the-furnace of-cooling

Caput XII. De diversis vitri coloribus.
Chapter XII about the-various of-glass colors

Inveniuntur in antiquis ædificiis paganorum in musivo opere
are-found in ancient buildings of-the-pagans in mosaic work
diversa genera vitri; videlicet album, nigrum, viride, croceum,
various kinds of-glass namely white black green saffron-yellow
saphireum, rubicundum, purpureum, et non est perspicax,
sapphire reddish purple and not it-is transparent
sed densum in modum marmoris, et sunt quasi lapilli
but dense in the-manner of-marble and they-are as-if little-stones
quadri, ex quibus fiunt electra in auro, argento et cupro,
square from which are-made enamels on gold silver and copper
de quibus in suo loco sufficienter dicemus. Inveniuntur
about which in its place sufficiently we-will-speak are-found
etiam vascula diversa eorundem colorum, quæ colligunt
also little-vessels various of-the-same colors which gather
Franci in hoc opere peritissimi, et saphireum quidem
the-Franks in this work most-skilled and the-sapphire indeed
fundunt in furnis suis, addentes ei modicum vitri clari
they-melt in furnaces their adding to-it a-little of-glass clear
et albi, et faciunt tabulas saphiri pretiosas ac satis utiles
and white and they-make panels of-sapphire precious and quite useful
in fenestris. Faciunt etiam ex purpura et viridi similiter.
in windows they-make also from purple and green likewise

Caput XIII. De vitreis scyphis, quos græci auro et
Chapter XIII about glass cups which the-Greeks with-gold and
argento decorant.
silver adorn
Græci vero faciunt ex eisdem saphireis lapidibus pretiosos
the-Greeks however make from the-same sapphire stones precious
scyphos ad potandum, decorantes eos auro hoc modo.
cups for drinking adorning them with-gold in-this way
Accipientes auri petulam, de qua superius diximus, formant
taking of-gold leaf about which above we-spoke they-form
ex ea effigies hominum, aut avium, sive bestiarum, vel
from it likenesses of-men or of-birds or of-beasts or
foliorum, et ponunt eas cum aqua super scyphum in
of-leaves and they-place them with water on the-cup in
quocumque loco voluerint; et hæc petula debet aliquantulum
whatever place they-shall-wish and this leaf ought somewhat
spissior esse. Deinde accipiunt vitrum clarissimum, velut
thicker to-be then they-take glass very-clear like
crystallum, quod ipsi componunt, quodque mox, ut
crystal which they-themselves compose and-which as-soon as
senserit calorem ignis, solvitur, et terunt diligenter
it-shall-have-felt the-heat of-fire is-dissolved and they-grind-it diligently
super lapidem porphiriticum cum aqua, ponentes cum pincello
on a-stone porphyry with water placing-it with a-brush
tenuissime super petulam per omnia, et cum siccatum
very-thinly over the-leaf through all and when dried
fuerit, mittunt in furnum, in quo fenestræ vitrum
it-shall-have-been they-put-it into the-furnace in which of-the-window the-glass
pictum coquitur, de quo postea dicemus, supponentes ignem
painted is-fired about which afterward we-will-speak putting-under fire
et ligna faginea in fumo omnino siccata. Cumque viderint
and logs beech in smoke wholly dried and-when they-shall-have-seen

flammam scyphum tandiu pertransire donec modicum ruborem
the-flame the-cup so-long pass-through until a-little redness
trahat, statim ejicientes ligna, obstruunt furnum, donec per
it-draw at-once taking-out the-logs they-block the-furnace until by
se frigescat; et aurum nunquam separabitur.
itself it-grow-cold and the-gold never will-be-separated

XIV–XVII · GREEK WORK AND DESIGNING WINDOWS

The Greeks paint cups with gold, silver, and colored glass; they gild glass cubes for mosaic and paint pottery with powdered glass. A window is designed full size on a chalked board, its colors marked by letters, and each piece of glass traced over the drawing.

Caput XIV. Item alio modo.
Chapter XIV likewise in-another way
Faciunt et alio modo, accipientes aurum in molendino
they-make also in-another way taking gold in the-mill
molitum, cujus usus est in libris, temperant aqua,
ground whose use is in books they-temper-it with-water
et argentum similiter, facientes inde circulos et in eis
and silver likewise making thence circles and in them
imagines, sive bestias, aut aves, opere variato, et liniunt
images or beasts or birds with-work varied and they-smear
hæc vitro lucidissimo, de quo supra diximus. Deinde
these-things with-glass most-clear about which above we-spoke then
accipientes vitrum album et rubicundum ac viride, quorum
taking glass white and reddish and green whose
usus est in electris, terunt super lapidem porphiriticum
use is in enamels they-grind-it on a-stone porphyry
unumquodque per se diligenter cum aqua, et inde pingunt
each by itself diligently with water and thence they-paint

flosculos et nodos, aliaque minuta, quæ voluerint, opere
little-flowers and knots and-other small-things which they-shall-wish with-work
vario inter circulos et nodos, et limbum circa oram; et
varied between the-circles and knots and a-border around the-edge and
hoc mediocriter spissum, coquentes in furno ordine quo
this moderately thick firing in the-furnace in-the-order in-which
supra. Faciunt quoque scyphos ex purpura sive levi saphiro,
above they-make also cups from purple or light sapphire
et fialas mediocriter extento collo circumdantes filis
and phials moderately with-stretched neck surrounding-them with-threads
ex albo vitro factis, ex eodem ansas imponentes. Ex aliis
from white glass made from the-same handles putting-on from other
etiam coloribus variant diversa opera sua pro libitu suo.
also colors they-vary various works their according-to pleasure their
Caput XV. De vitro græco, quod musivum opus decorat.
Chapter XV about glass Greek which mosaic work adorns
Vitreas etiam tabulas faciunt opere fenestrario ex albo vitro
glass also panels they-make by-work window-making from white glass
lucido, spissas ad mensuram unius digiti, findentes eas calido
clear thick to the-measure of-one finger splitting them with-a-hot
ferro per quadras particulas minutas, et cooperientes eas
iron into square pieces small and covering them
in uno latere auri petula, superliniunt vitrum lucidissimum
on one side of-gold with-leaf they-smear-over-it glass most-clear
tritum ut supra, et componunt eas conjunctim super ferream
ground as above and they-set them joined on an-iron
tabulam, de quo paulo inferius dicemus, coopertam calce
plate about which a-little below we-will-speak covered with-lime
sive cineribus coquentes in furno fenestrarum, ut supra.
or ashes firing-them in the-furnace of-the-windows as above
Hujusmodi vitrum interpositum musivum opus omnino decorat.
of-this-kind glass put-between mosaic work wholly adorns

Caput XVI. De vasis fictilibus diverso colore vitri pictis.
Chapter XVI about vessels earthen with-various color of-glass painted
Scutellas quoque fictiles et naviculas faciunt, aliaque
dishes also earthen and little-boats they-make and-other
vasa fictilia, pingentes ea hoc modo. Accipiunt omnium
vessels earthen painting them in-this way they-take of-all
genera colorum, terentes ea singillatim cum aqua, et ad
kinds of-colors grinding them one-by-one with water and to
unumquemque colorem miscentes ejusdem coloris vitrum per
each color mixing of-the-same color glass by
se minutissime tritum cum aqua, quintam partem, inde
itself very-finely ground with water a-fifth part thence
pingunt circulos sive arcus vel quadrangulos, et in eis bestias,
they-paint circles or arches or quadrangles and in them beasts
aut aves, sive folia vel aliud quodcumque voluerint. Postquam
or birds or leaves or other whatever they-shall-wish after
vero ipsa vasa tali modo depicta fuerint, mittunt
however themselves the-vessels in-such way painted they-shall-have-been they-put
ea in furnum fenestrarum, adhibentes inferius ignem atque
them into the-furnace of-the-windows applying below fire and
ligna faginea sicca, donec a flammis circumdata candescant,
logs beech dry until by the-flames surrounded they-glow
sicque extractis lignis furnum obstruunt. Possunt etiam
and-thus drawn-out the-logs the-furnace they-block they-can also
eadem vasa per loca decorare auri petula, sive molito
the-same vessels in places to-adorn of-gold with-leaf or with-ground
auro et argento, modo quo supra, si voluerint.
gold and silver in-the-way in-which above if they-shall-wish

Caput XVII. De componendis fenestris.

Chapter XVII about composing windows

Cum volueris fenestras componere vitreas, primum fac

when you-shall-wish windows to-compose glass first make

tibi tabulam ligneam æqualem tantæ latitudinis et

for-yourself a-board wooden level of-such width and

longitudinis, ut possis uniuscujusque fenestræ duas partes in

length that you-can of-each window two parts on

ea operari, et accipiens cretam atque radens cum cultello per

it to-work and taking chalk and scraping-it with a-little-knife over

totam tabulam, asperge desuper aquam per omnia, et frica

the-whole board sprinkle above water through all and rub

cum panno per totum. Cumque siccata fuerit, accipe

with a-cloth through the-whole and-when dried it-shall-have-been take

mensuram unius partis in fenestra longitudinem et latitudinem,

the-measure of-one part in the-window the-length and width

pingens eam in tabula regula et circino cum plumbo vel

drawing it on the-board with-rule and compass with lead or

stagno, et si vis limbum in ea habere, pertrahe cum

tin and if you-wish a-border on it to-have draw-it with

latitudine qua tibi placuerit, et opere quo volueris. Quo

the-width which to-you shall-have-pleased and with-work which you-shall-wish which

facto pertrahe imagines quot volueris in primis plumbo vel

done draw images as-many-as you-shall-wish at first with-lead or

stagno, sicque rubeo colore sive nigro, faciens omnes tractus

tin and-thus with-red color or black making all strokes

studiose, quia necessarium erit cum vitrum pinxeris,

carefully because necessary it-will-be when the-glass you-shall-have-painted

ut secundum tabulam conjungas umbras et lumina. Deinde

that according-to the-board you-join shadows and highlights then

disponens varietates vestimentorum, nota uniuscujusque colorem

disposing the-varieties of-garments mark of-each the-color

in suo loco, et aliud quodcumque pingere volueris, littera
in its place and other whatever to-paint you-shall-wish with-a-letter
colorem signabis. Post hæc accipe vasculum plumbeum,
the-color you-will-mark after these-things take a-little-vessel lead
et mittens in eo cretam cum aqua tritam, fac tibi
and putting into it chalk with water ground make for-yourself
pincellos duos vel tres ex pilo, videlicet de cauda mardi,
brushes two or three from hair namely from the-tail of-a-marten
sive grisii, vel spirioli, aut catti, sive de coma asini;
or of-a-gray-squirrel or of-a-squirrel or of-a-cat or from the-mane of-an-ass
et accipe unam partem vitri cujuscumque generis volueris,
and take one part of-glass of-whatever kind you-shall-wish
quæ ex omni parte major sit loco in quo ponenda est,
which on every side larger be than-the-place in which to-be-placed it-is
adhibens eam campo ipsius loci, et sicut consideraveris
applying it to-the-field of-that place and as you-shall-have-perceived
tractus in tabula per medium vitrum, ita pertrahe cum
the-strokes on the-board through the-middle glass so draw with
creta super vitrum exteriores tractus tantum, et si vitrum
the-chalk on the-glass the-outer strokes only and if the-glass
illud densum fuerit sic ut non possis perspicere tractus
that dense shall-have-been so that not you-can to-see-through the-strokes
qui sunt in tabula, accipiens album vitrum pertrahe super
which are on the-board taking white glass draw on
eum, utique cum siccum fuerit pone densum vitrum
it certainly when dry it-shall-have-been place the-dense glass
super album elevans contra lucem, et sicut perspexeris,
on the-white lifting-it against the-light and as you-shall-have-seen-through
ita pertrahe. Eodem modo designabis omnia genera vitri
so draw in-the-same way you-will-mark all kinds of-glass

sive in facie, sive in vestimentis, in manibus, in pedibus,
whether in face or in garments in hands in feet
in limbo, vel in quocumque loco colores ponere volueris.
in the-border or in whatever place colors to-place you-shall-wish

XVIII–XXII · CUTTING AND PAINTING GLASS

Glass is split with a hot iron and trimmed with the grozing iron. The paint is copper burned with green and sapphire glass, laid in three tones for shadow and light, with ornament of branches, flowers, and beasts on fields of color, and fired in a small kiln of wattle and clay.

Caput XVIII. De dividendo vitro.
Chapter XVIII about dividing glass
Postea calefacies in foco ferrum divisorium, quod sit per
afterward you-will-heat in the-hearth the-iron dividing which be through
omnia gracile, sed in fine grossius. Quod cum canduerit
all slender but at the-end thicker which when it-shall-have-glowed
in grossiori parte, appone vitro, quod dividere volueris,
in the-thicker part apply to-the-glass which to-divide you-shall-wish
et mox apparebit initium fracturæ. Si vero vitrum durum
and soon will-appear the-beginning of-a-break if however the-glass hard
fuerit, madefac illud digito tuo ex saliva in loco,
shall-have-been moisten it with-finger your from saliva in the-place
ubi ferrum posueras; quo statim fisso, secundum quod
where the-iron you-had-placed which at-once split according-to what
dividere volueris, trahe ferrum et fissura sequetur. Omnibus
to-divide you-shall-wish draw the-iron and the-split will-follow all
vero partibus ita divisis, accipe grosarium ferrum, quod
however parts thus divided take the-grozing iron which
sit longitudine unius palmi, utroque capite recurvum, cum
be in-length of-one palm at-each end bent-back with

quo æquabis et conjunges omnes partes, unamquamque in
which you-will-level and you-will-join all parts each in
suo loco. His ita compositis accipe colorem cum quo
its place these-things thus composed take the-color with which
vitrum pingere debes, quem tali modo compones.
the-glass to-paint you-ought which in-such way you-will-compose

Caput XIX. De colore cum quo vitrum pingitur.

Chapter XIX about the-color with which glass is-painted

Tolle cuprum tenue percussum, comburens in parvula patella
take copper thin beaten burning-it in a-very-small dish
ferrea, donec pulvis omnino sit, et accipe particulas viridis
iron until powder wholly it-be and take pieces of-green
vitri, et saphiri græci, terens singulariter inter duos lapides
glass and of-sapphire Greek grinding-them separately between two stones
porfiriticos, et commiscens hæc tria simul, ita ut sit tertia
porphyry and mixing these three together so that be a-third
pars pulvis, et tertia viride, tertiaque saphirum, teres
part powder and a-third green and-a-third sapphire you-will-grind
pariter super ipsum lapidem cum vino vel urina diligentissime,
together on the-very stone with wine or urine most-diligently
et mittens in vas ferreum sive plumbeum, pinge vitrum
and putting-it into a-vessel iron or lead paint the-glass
cum omni cautela secundum tractus, qui sunt in tabula.
with all caution according-to the-strokes which are on the-board
Quod si litteras in vitro facere volueris, partes illas cooperies
but if letters on glass to-make you-shall-wish parts those you-will-cover
omnino ipso colore, scribens eas cauda pincelli.
wholly with-the-very color writing them with-the-tail of-the-brush

Caput XX. De coloribus tribus ad lumina in vitro.
Chapter XX about colors three for highlights on glass
Umbras et lumina vestimentorum, si studiosus fueris
the-shadows and highlights of-garments if studious you-shall-have-been
in hoc opere, poteris eodem modo facere, sicut in
in this work you-will-be-able in-the-same way to-make as in
pictura colorum, tali modo. Cum feceris tractus in
painting of-colors in-such way when you-shall-have-made strokes on
vestimentis ex colore prædicto, sparge eum cum pincello ita
garments from the-color aforesaid spread it with a-brush so
ut vitrum fiat perspicax in ea parte, qua luminam facere
that the-glass become transparent in that part in-which highlight to-make
consuevisti in pictura, et idem tractus in una parte
you-have-been-accustomed in painting and the-same stroke in one part
sit densus, in altera levis, atque levior cum tanta diligentia
be dense in another light and lighter with so-much diligence
discretus, quasi videantur tres colores appositi. Quem ordinem
distinguished as-if seem three colors placed-beside which order
etiam observare debes infra supercilia, et circa oculos
also to-observe you-ought below the-eyebrows and around the-eyes
atque nares et mentum, ac circa facies juvenum, circa
and nostrils and chin and around the-faces of-youths around
pedes nudos et manus et reliqua membra nudi corporis,
the-feet nude and hands and the-other limbs of-a-nude body
sitque species picturæ composita colorum varietate.
and-let-be the-appearance of-the-painting composed by-the-variety of-colors
Caput XXI. De ornatu picturæ in vitro.
Chapter XXI about the-ornament of-painting on glass
Sit etiam quidam ornatus in vitro, videlicet in vestibus,
let-there-be also a-certain ornament on glass namely on garments
in sedibus, et in campis, in saphiro, in viridi et albo,
on seats and on fields in sapphire in green and white

purpureoque colore claro. Cum feceris priores umbras
and-purple color clear when you-shall-have-made the-earlier shadows
in hujusmodi vestimentis, et siccæ fuerint, quicquid
on of-this-kind garments and dry they-shall-have-been whatever
reliquum est vitri, cooperi levi colore, qui non sit tam
remaining is of-glass cover with-light color which not be so
densus sicut secunda umbra, nec tam clarus sicut tertia, sed
dense as the-second shadow nor so clear as the-third but
inter has medius. Quo exsiccato fac cum cauda pincelli
between these middle which dried make with the-tail of-the-brush
juxta priores umbras, quas feceras, subtiles tractus ex
beside the-earlier shadows which you-had-made fine strokes on
utraque parte, ita ut inter hos tractus et priores umbras
each side so that between these strokes and the-earlier shadows
illius levis coloris subtiles tractus remaneant. In reliquo autem
of-that light color fine strokes remain in the-rest however
fac circulos et ramos, et in eis flores ac folia eodem
make circles and branches and in them flowers and leaves in-the-same
modo, quo fiunt in litteris pictis; sed campos qui
way in-which they-are-made in letters painted but the-fields which
coloribus implentur in litteris, debes in vitro subtilissimis
with-colors are-filled in letters you-ought on glass with-very-fine
ramusculis pingere. Potes etiam in ipsis circulis interdum
little-branches to-paint you-can also in the-very circles sometimes
bestiolas et avicolas et vermiculos ac nudas imagines
little-beasts and little-birds and little-worms and nude images
inserere. Eodem modo facies campos ex albo clarissimo,
to-insert in-the-same way you-will-make fields from white very-clear
cujus campi imagines vesties cum saphiro, viridi, purpura,
of-which field the-images you-will-clothe with sapphire green purple
et rubicundo. In campis vero saphiri et viridis coloris
and reddish in fields however of-sapphire and of-green color

eodem modo depictis, et rubicundi non picti, facies
in-the-same way painted and of-reddish not painted you-will-make
vestimenta ex albo clarissimo, quo vestimenti genere
the-garments from white very-clear than-which of-garment kind
nullum speciosius est. Ex supra dictis tribus coloribus
none more-beautiful is from the-above said three colors
pinges in limbis ramos et folia, flores et nodos, ordine
you-will-paint on the-borders branches and leaves flowers and knots in-the-order
quo supra; et uteris eisdem in vultibus imaginum et
in-which above and you-will-use the-same in the-faces of-images and
manibus ac pedibus et in nudis membris per omnia pro
hands and feet and in nude limbs through all instead-of
eo colore, qui in præcedenti libro dicitur posc. Croceo
that color which in the-preceding book is-called posch saffron-yellow
vitro non multum uteris in vestimentis nisi in coronis et
glass not much you-will-use in garments except in crowns and
in eis locis ubi aurum ponendum esset in pictura. His
in those places where gold to-be-placed would-be in painting these-things
omnibus compactis ac depictis coquendum est vitrum et
all fitted-together and painted to-be-fired is the-glass and
color confirmandus in furno quem compones hoc modo.
the-color to-be-fixed in a-furnace which you-will-compose in-this way
Caput XXII. De furno in quo vitrum coquitur.
Chapter XXII about the-furnace in which glass is-fired
Accipe virgas flexibiles infigens eas terræ in angulo domus,
take rods flexible fixing them in-the-earth in the-corner of-the-house
utroque capite æqualiter in similitudinem arcuum, qui arcus
at-each end equally in the-likeness of-arches which arches
habeant altitudinem pedis et dimidii, latitudinem quoque
have a-height of-a-foot and a-half a-width also
similem, longitudinem vero modice amplius duorum pedum.
like a-length however a-little more of-two feet

Deinde macerabis argillam fortiter cum aqua et fimo equi,
then you-will-knead clay strongly with water and dung of-horse
ita ut tres partes sint argilla, et quarta fimus. Qua optime
so that three parts be clay and the-fourth dung which excellently
macerata, miscebis ei fœnum siccum, faciens inde pastillos
kneaded you-will-mix with-it hay dry making thence little-cakes
longos et cooperies arcum virgarum interius et exterius ad
long and you-will-cover the-arch of-rods on-the-inside and on-the-outside to
spissitudinem unius pugni, et in medio superius relinques
the-thickness of-one fist and in the-middle above you-will-leave
foramen rotundum per quod possis manum tuam imponere;
a-hole round through which you-can hand your to-put-in
facies etiam tibi tres trabes ferreos grossitudine unius
you-will-make also for-yourself three bars iron of-the-thickness of-one
digiti, et longitudine tanta ut possint transire latitudinem
finger and of-length so-great that they-can to-cross the-width
furni, quibus facies ex utraque parte tria foramina,
of-the-furnace for-which you-will-make on each side three holes
ut cum volueris possis imponere et ejicere. Tunc
so-that when you-shall-wish you-can to-put-them-in and to-take-them-out then
pones in furnum ignem et ligna donec exsiccetur.
you-will-place into the-furnace fire and logs until it-be-dried

The painted glass is fired on an iron plate bedded in lime until the paint holds. Lead cames are cast in hinged iron molds or in a split wooden one, many at one heating.

Caput XXIII. Quomodo coquatur vitrum.

Chapter XXIII how be-fired the-glass

Interim fac tibi tabulam ferream ad mensuram furni

meanwhile make for-yourself a-plate iron to the-measure of-the-furnace

interius, exceptis duobus digitis in longitudine et duobus

on-the-inside except two fingers in length and two

in latitudine, super quam cribrabis calcem vivum siccum,

in width over which you-will-sift lime quick dry

sive cineres spissitudine unius festucæ, et cum æquali ligno

or ashes in-thickness of-one straw and with a-level wood

compones eos ut firmiter jaceant. Habebit eadem tabula

you-will-set them so-that firmly they-lie will-have the-same plate

caudam ferream, per quam possit portari et imponi

a-tail iron by which it-can to-be-carried and to-be-put-in

ac extrahi. Pones autem super eam vitrum pictum

and to-be-drawn-out you-will-place however on it the-glass painted

diligenter et conjunctum, ita ut in exteriore parte versus

diligently and joined so that on the-outer part toward

caudam ponas viride et saphirum, ac interius album et

the-tail you-place green and sapphire and inside white and

croceum et purpureum, quod durius est contra ignem, et

saffron-yellow and purple which harder is against fire and

sic immissis trabibus pones super eos tabulam. Deinde

thus put-in the-bars you-will-place on them the-plate then

accipies ligna faginea in fumo valde sicca, et accendes

you-will-take logs beech in smoke very dry and you-will-kindle

ignem modicum in furno, postea majorem cum omni cautela,
a-fire small in the-furnace afterward a-greater with all caution
donec videas flammam retro, et ex utraque parte inter
until you-see the-flame behind and on each side between
furnum et tabulam ascendere, et vitrum transiendo atque
the-furnace and the-plate rise and the-glass by-passing-over and
quasi lingendo cooperire, tamdiu donec modice candescat, et
as-if by-licking cover so-long until moderately it-glow and
statim ejiciens ligna obstrues os fornacis diligenter, ac
at-once throwing-out the-logs you-will-block the-mouth of-the-furnace diligently and
superius foramen per quod fumus exibat usque dum per se
above the-hole through which the-smoke went-out up-to while by itself
refrigeret. Ad hoc valet calx et cinis super tabulam, ut
it-cool for this avails the-lime and ash on the-plate so-that
servet vitrum, ne super nudum ferrum a calore confringatur.
it-keep the-glass lest on bare iron from the-heat it-be-shattered
Ejecto autem vitro proba, si possis cum ungue tuo colorem
taken-out however the-glass test if you-can with fingernail your the-color
eradere; si non, sufficit ei, si autem, iterum repone. Tali
to-scrape-off if not it-suffices for-it if however again put-it-back in-such
modo partibus omnibus coctis, repone super tabulam singulas
way the-parts all fired put-back on the-board each
in suo loco, deinde funde calamos ex puro plumbo hoc modo.
in its place then cast cames from pure lead in-this way

Caput XXIV. De ferreis infusoriis.

Chapter XXIV about iron casting-molds

Fac tibi duos ferros, qui habeant latitudinem digitorum
make for-yourself two irons which have a-width of-fingers
duorum et spissitudinem unius digiti, longitudinemque unius
two and a-thickness of-one finger and-a-length of-one
ulnæ. Hos copulabis in una summitate in modum cardinum
ell these you-will-couple at one top in the-manner of-hinges

ut sibi adhæreant, et uno clavo firmentur, ita ut
so-that to-each-other they-adhere and with-one nail be-fastened so that
possint claudi et aperiri, et in altero capite facies
they-can to-be-closed and to-be-opened and at-the other end you-will-make
eos aliquantulum latiores et tenuiores ita, ut cum clauduntur,
them somewhat broader and thinner so that when they-are-closed
sit quasi initium foraminis interius, et exteriores costæ
there-be as-if the-beginning of-an-opening within and the-outer ribs
æqualiter procedant; sicque conjunges eos cum runcina
equally proceed and-thus you-will-join them with plane
et lima, ut nihil luminis inter eos perspicere possis.
and file so-that nothing of-light between them to-see-through you-can
Post hæc separabis eos ab invicem, acceptaque regula
after these-things you-will-separate them from each-other and-taken a-rule
facies in medio unius partis duas lineas, et e contra
you-will-make in the-middle of-one part two lines and from opposite
in medio alterius duas, a summo usque deorsum parva
in the-middle of-the-other two from the-top down-to below with-small
latitudine, et fodies, ferro fossorio, quo candelabra
width and you-will-engrave with-the-iron graving with-which candlesticks
fodiuntur ac cetera fusilia, quam profunde volueris, et
are-engraved and the-other cast-things as deep you-shall-wish and
rade interius inter duas regulas modicum in utroque ferro,
scrape within between the-two rules a-little in each iron
ut cum plumbum in eis fuderis, una pars fiat.
so-that when lead in them you-shall-have-poured one part become
Os vero, in quod funditur, ita ordinabis, ut una pars
the-mouth however into which it-is-poured so you-will-arrange that one part
ferri jungatur in alteram, ne possit in fundendo vacillare.
of-the-iron be-joined into the-other lest it-can in pouring to-waver

Caput XXV. De fundendis calamis.

Chapter XXV about casting cames

Post hæc fac tibi larem ubi plumbum fundas, et in
after these-things make for-yourself a-hearth where lead you-may-cast and in
lare fossam in quo ponas testam ollæ magnam, quam
the-hearth a-pit in which you-may-place a-shard of-a-pot large which
linies interius et exterius argilla cum fimo macerato ut
you-will-smear within and without with-clay with dung kneaded so-that
firmior sit, et super eam accendes ignem copiosum. Cumque
firmer it-be and over it you-will-kindle a-fire copious and-when
siccata fuerit, pone plumbum super ignem intra testam,
dried it-shall-have-been place lead over the-fire within the-shard
ut cum liquefactum fuerit fluat in eam. Interim
so-that when melted it-shall-have-been it-flow into it meanwhile
aperiens ferrum calami pone super carbones, ut calidum
opening the-iron of-the-came place-it on coals so-that hot
fiat, et habeas lignum longitudinis unius ulnæ, quod sit in
it-become and have a-wood of-the-length of-one ell which be at
uno capite, quo manu tenebitur, rotundum, in altero
one end by-which with-the-hand it-will-be-held round at-the other
vero planum et latum ad mensuram quatuor digitorum,
however flat and broad to the-measure of-four fingers
ubi incidatur in transverso usque in medium secundum
where be-cut in across up-to into the-middle according-to
latitudinem ferri, in quam incisuram ipsum ferrum calidum
the-width of-the-iron into which cut itself the-iron hot
et in se clausum pones, et ita in superiori parte manu
and on itself closed you-will-place and thus in the-upper part with-the-hand
modicum reflexa tenebis, ut inferiori parte super terram
a-little bent-back you-will-hold-it so-that with-the-lower part on the-ground
stet, acceptaque parvula patella ferrea calefacta, hauri
it-stand and-taken a-very-small dish iron heated draw-up

liquefactum plumbum et funde in ferrum. Et statim depone
the-melted lead and pour into the-iron and at-once set-down
patellam super ignem ut semper calida sit, ejectumque
the-dish over the-fire so-that always hot it-be and-the-thrown-out
ferrum a ligno super terram aperi cum cultello, et
iron from the-wood on the-ground open with a-little-knife and
eiciens calamum rursum claude et repone in lignum.
throwing-out the-came again close and put-it-back into the-wood
Si autem non possit plumbum ferro funditus influere,
if however not can the-lead into-the-iron thoroughly to-flow-in
calefacto melius ferro iterum funde; sicque temperabis donec
heated better the-iron again pour and-thus you-will-regulate-it until
plenum fiat, quia, si æqualiter temperatum fuerit, in
full it-become because if equally regulated it-shall-have-been in
uno calore plus quam quadraginta calamos fundere poteris.
one heat more than forty cames to-cast you-will-be-able

Caput XXVI. De ligneo infusorio.

Chapter XXVI about the-wooden casting-mold

Quod si ferrum non habueris, perquire tibi lignum
but if the-iron not you-shall-have seek for-yourself a-wood
abietinum vel aliud, quod æqualiter findi possit, longitudinis,
of-fir or other which evenly to-be-split it-can of-length
latitudinis et spissitudinis ut supra, quod fissum incide
of-width and of-thickness as above which split cut
exterius rotundum. Deinde ordinabis duo signa parvula
on-the-outside round then you-will-arrange two marks very-small
exterius in utraque utriusque ligni fronte, secundum quod
on-the-outside on each of-each wood front according-to what
volueris calamum esse latum in medio, accipiensque filum
you-shall-wish the-came to-be broad in the-middle and-taking a-thread
lineum retortum et gracile, madefac illud in rubeo colore,
linen twisted and slender wet it in red color

disjunctisque lignis super unam partem interius appone ipsum
and-the-separated woods on one part within apply the-very
filum a signo, quod incidisti superius, usque ad signum
thread from the-mark which you-cut above up-to to the-mark
inferius, ita ut firmiter extendatur, et adjungens illi alterum
below so that firmly it-be-stretched and joining to-it the-other
lignum fortiter comprime, ita ut cum separaveris, color
wood strongly press so that when you-shall-have-separated the-color
in utrisque partibus appareat. Ejectumque filum et rursum
on both parts appear and-thrown-out the-thread and again
colore madidum affige in alterum signum, iterumque super
with-color wet fix-it at the-other mark and-again over
pone alterum lignum et comprime. Cumque in utrisque
place the-other wood and press and-when on both
partibus color apparuerit, incide cultello calamum, quam
parts the-color shall-have-appeared cut with-a-little-knife the-came as
latum et profundum volueris, sic tamen ut incisura finem
broad and deep you-shall-wish thus nevertheless that the-cut the-end
non pertranseat, sed superius, ubi infundi debet, foramen
not pass-through but above where to-be-poured-in it-ought an-opening
habeat. Quo facto ligna conjunge, ligans cum corriga
it-have which done the-woods join binding-them with a-strap
a summo usque deorsum, et tenens cum ligno infunde
from the-top down-to below and holding-them with a-wood pour-in
plumbum, solutaque corriga eice calamum. Rursumque
lead and-loosened the-strap throw-out the-came and-again
ligans et infundens, hoc tam diu facies, donec ustura usque
binding and pouring-in this so long you-will-do until the-burning up-to
in finem incisuræ perveniat; sicque postea leviter, quoties et
into the-end of-the-cut reach and-thus afterward lightly as-often and
quantum volueris, infundere poteris. Cumque tibi sufficere
as-much-as you-shall-wish to-pour-in you-will-be-able and-when to-you to-suffice

calamos videris, incide lignum duobus digitis latum et
the-cames you-shall-have-seen cut a-wood two fingers broad and
tam spissum sicut calamus latus est interius, dividens illud
as thick as the-came broad is within dividing it
in medio ita, ut in una fronte integrum sit et in altera
in the-middle so that on one front whole it-be and on the-other
incisum ubi calamus inferatur. Quem impositum incide cum
cut where the-came may-be-brought-in which put-in cut with
cultello ex utraque parte, et plana et rade sicut placuerit.
a-little-knife on each side and plane and scrape as it-shall-have-pleased

XXVII–XXXI · ASSEMBLING WINDOWS AND GLASS RINGS

The window is leaded piece by piece over the board, nailed, and soldered with tin on both sides; jewels of colored glass are fused onto painted glass without lead. Simple windows are knotwork; a broken glass vessel is mended with fused glass; and glass rings are spun on an iron spit down to a wooden disc.

Caput XXVII. De conjungendis et consolidandis fenestris.
Chapter XXVII about joining and soldering windows
His ita completis accipe stagnum purum et commisce ei
these-things thus completed take tin pure and mix with-it
quintam partem plumbi, et funde in supradicto ferro sive ligno
a-fifth part of-lead and cast in the-above-said iron or wood
quot calamos volueris, cum quibus opus tuum solidabis.
as-many-as rods you-shall-wish with which work your you-will-solder
Habeas quoque clavos quadraginta longitudine digiti unius,
have also nails forty in-length of-finger of-one
qui sint in uno capite graciles et rotundi, in altero quadri
which be at one end slender and round at-the other square
et recurvi penitus, ita ut foramen appareat in medio. Deinde
and bent-back thoroughly so that a-hole appear in the-middle then

accipe vitrum pictum et coctum et pone secundum ordinem
take the-glass painted and fired and place-it according-to the-order
in altera parte tabulæ ubi nulla pictura est. Post hæc tolle
on the-other side of-the-board where no painting is after these-things take
caput unius imaginis, et circumvolvens illud plumbo repone
the-head of-one image and wrapping-around it with-lead put-it-back
diligenter in suo loco, et circumfige ei tres clavos cum
diligently in its place and fix-around to-it three nails with
malleo ad hoc opus apto, adjungens ei pectus et brachia
the-hammer for this work fitted joining to-it the-breast and arms
ac reliqua vestimenta; et quamcumque partem stabilieris,
and the-other garments and whatever part you-shall-have-set
confirma eam exterius clavis, ne moveatur a suo loco. Tunc
fix it on-the-outside with-nails lest it-be-moved from its place then
habeas ferrum solidatorium, quod sit longum et gracile, in
have an-iron soldering which be long and slender at
summitate vero grossum ac rotundum, et in summo ipsius
the-top however thick and round and at the-top of-the-very
rotunditatis deductum et gracile, limatum et superstannatum,
roundness drawn-out and slender filed and tinned
ponaturque in ignem. Interim accipe calamos stanneos quos
and-let-it-be-placed into the-fire meanwhile take the-rods tin which
fudisti, et perfunde eos cera ex utraque parte, et radens
you-cast and pour-over them with-wax on each side and scraping
plumbum in superficie per omnia loca, quæ solidanda sunt.
the-lead on the-surface through all the-places which to-be-soldered are
Accepto ferro calido appone ei stagnum, in quocumque
taken the-iron hot apply to-it the-tin in whatever
loco duæ partes plumbi conveniunt, et cum ferro linies
place two parts of-lead meet and with the-iron you-will-smear
donec sibi adhæreant. Statutis vero imaginibus eodem
until to-each-other they-cling set however the-images in-the-same

modo ordinabis campos cujuscumque coloris volueris, et
way you-will-arrange the-fields of-whatever color you-shall-wish and
sic particulatim compones fenestram. Perfecta vero fenestra
thus piece-by-piece you-will-compose the-window finished however the-window
et in uno latere solidata, conversam in aliud simili modo
and on one side soldered turned to the-other in-like way
radendo et solidando confirmabis per omnia.
by-scraping and by-soldering you-will-strengthen-it through all

Caput XXVIII. De gemmis picto vitro imponendis.
Chapter XXVIII about gems on-painted glass to-be-put

In imaginibus vero fenestrarum si volueris in crucibus,
in the-images however of-windows if you-shall-wish on crosses
vel in libris, aut in ornatu vestimentorum, super vitrum
or on books or on the-ornament of-garments on glass
pictum gemmas facere alterius coloris absque plumbo, videlicet
painted gems to-make of-another color without lead namely
iacinctos et smaragdos, hoc modo agas. Cum feceris
jacinths and emeralds in-this way do when you-shall-have-made
in suis locis cruces in capite majestatis, aut librum, sive
in their places crosses on the-head of-the-majesty or a-book or
ornamenta in fine vestium, quæ in pictura fiunt ex auro
ornaments at the-end of-the-garments which in painting are-made from gold
sive ex auripigmento, hæc in fenestris fiant ex
or from orpiment these-things in windows let-them-be-made from
croceo vitro claro. Quæ cum pinxeris opere fabrili,
saffron-yellow glass clear which when you-shall-have-painted by-work smithing
dispone loca in quibus lapides ponere volueris, acceptisque
dispose the-places in which stones to-place you-shall-wish and-taken
particulis saphiri clari, forma inde iacinctos secundum
pieces of-sapphire clear form thence jacinths according-to
quantitatem locorum suorum, et ex viridi vitro smaragdos,
the-size of-places their and from green glass emeralds

et sic age ut inter duos iacinctos semper smaragdus
and thus do that between two jacinths always an-emerald
stet. Quibus diligenter in suis locis conjunctis et stabilitis,
stand which diligently in their places joined and set
densum colorem trahe circa eos cum pincello, ita ut inter
the-dense color draw around them with a-brush so that between
duo vitra nihil fluat, sicque cum reliquis partibus in furno
the-two glasses nothing flow and-thus with the-other parts in the-furnace
coque et adhærebunt sibi ita ut nunquam cadant.
fire-them and they-will-cling to-each-other so that never they-fall

Caput XXIX. De simplicibus fenestris.

Chapter XXIX about simple windows

Si vero volueris simplices fenestras componere, mensuram
if however you-shall-wish simple windows to-compose the-measure
longitudinis et latitudinis primum fac in lignea tabula, deinde
of-the-length and of-the-width first make on a-wooden board then
pertrahe nodos vel aliud quod libuerit, distinctisque
draw knots or other what shall-have-pleased and-the-distinguished
coloribus imponendis, finde vitrum et grosa conjunge,
colors to-be-put-on split the-glass and groze join-it
adhibitisque clavis include plumbo, et solida ex utraque parte,
and-applied nails enclose-it with-lead and solder-it on each side
circumpone ligna clavis firmata et confige ubi volueris.
place-around woods with-nails fastened and fix-it where you-shall-wish

Caput XXX. Quomodo reformetur vas vitreum fractum.

Chapter XXX how be-restored a-vessel glass broken

Si forte vas vitreum cujuscumque generis cadit aut percutitur,
if perhaps a-vessel glass of-whatever kind falls or is-struck
ita ut frangatur vel findatur, hoc modo reparetur. Tolle
so that it-be-broken or be-split in-this way let-it-be-repaired take
cineres et cribra eos diligenter macerans cum aqua, et
ashes and sift them diligently kneading-them with water and

inde imple vas fractum et pone ad solem ut siccetur.
with-them fill the-vessel broken and place-it in-the sun so-that it-be-dried
Cumque omnino cineres sicci fuerint, adjunge vasi
and-when wholly the-ashes dry shall-have-been join to-the-vessel
partem fractam, cavens ne in junctura quicquam cinerum
the-part broken taking-care lest in the-joint anything of-ashes
vel aliquid sordis remaneat, et accipe saphirum ac viride
or any of-dirt remain and take sapphire and green
vitrum quod a calore flammæ levissime liquefiat, terens
glass which by the-heat of-the-flame very-lightly melts grinding-it
diligenter cum aqua super lapidem porfiriticum, et cum
diligently with water on a-stone porphyry and with
pincello linies super fracturam subtilem tractum. Deinde
a-brush you-will-smear over the-break a-fine stroke then
pone super tabulam ferream, et eleva vas aliquantulum ex
place-it on a-plate iron and lift the-vessel somewhat on
ea parte ubi fractura est, ut flamma super eam æqualiter
that part where the-break is so-that the-flame over it equally
transeat, sicque mitte in furnum fenestrarum, supponens
pass and-thus put-it into the-furnace of-the-windows putting-under
ligna faginea sicca et ignem paulatim, donec vas calescat
logs beech dry and fire little-by-little until the-vessel grow-hot
et cineres in eo, statimque auge ignem ut flamma crescat.
and the-ashes in it and-at-once increase the-fire so-that the-flame grow
Cumque videris quod vix rubescat, ejectis lignis
and-when you-shall-have-seen that scarcely it-redden thrown-out the-woods
obstrue diligenter os fornacis et foramen superius, donec
block diligently the-mouth of-the-furnace and the-hole above until
penitus refrigeretur. Ablato vase eice cineres absque aqua,
thoroughly it-be-cooled taken-away the-vessel throw-out the-ashes without water
sicque lavabis illud et habebis ad quos usus volueris.
and-thus you-will-wash it and you-will-have-it for what uses you-shall-wish

Caput XXXI. De anulis.

Chapter XXXI about rings

Ex vitro etiam fiunt anuli hoc modo. Compone furnum
from glass also are-made rings in-this way compose a-furnace
parvulum ordine quo supra, deinde acquire cineres, sal,
very-small in-the-order in-which above then acquire ashes salt
pulverem cupri et plumbum. Hisque compositis distingue
powder of-copper and lead and-these composed distinguish
colores vitri quos volueris, suppositoque igne et lignis
the-colors of-glass which you-shall-wish and-put-under fire and woods
coque. Interim acquire tibi lignum longitudine unius
fire meanwhile acquire for-yourself a-wood in-length of-one
palmi, et grossitudine unius digiti, et in tertia ejus parte
palm and in-thickness of-one finger and in the-third of-it part
pone rotulam ligneam latitudine unius palmæ, ita ut duas
place a-little-wheel wooden in-width of-one palm so that two
partes ligni teneas in manu, et rotula super manum
parts of-the-wood you-hold in hand and the-little-wheel on the-hand
jaceat firmiter ligno conjuncta, et tertia pars ligni
lie firmly to-the-wood joined and the-third part of-the-wood
super rotulam emineat. Quod lignum in summitate gracile
above the-little-wheel project which wood at the-top slender
incidatur, et ita in ferro jungatur sicut jungitur hasta in
let-it-be-cut and thus into an-iron be-joined as is-joined the-shaft in
lancea; quod ferrum habeat longitudinem unius pedis; cui
a-lance which iron have a-length of-one foot into-which
lignum ita inseratur, ut in junctura æquale sit ligno, et ab
the-wood so be-inserted that at the-joint equal it-be to-the-wood and from
ipso loco gracilius sit eductum usque in finem, ubi omnino
that place more-slender be drawn-out up-to into the-end where wholly
sit acutum. Et juxta fenestram fornacis in dextra parte,
it-be sharp and beside the-window of-the-furnace on the-right side

hoc est in sinistra tua, stet lignum grossitudine brachii
that is on left your let-stand a-wood of-the-thickness of-arm
unius in terra fossum, et pertingens usque ad summitatem
of-one in the-earth dug-in and reaching up-to to the-top
fenestræ; in sinistra vero fornacis, hoc est in dextra
of-the-window on the-left however of-the-furnace that is on right
tua, juxta ipsam fenestram, sit fossula in argilla facta.
your beside the-very window let-there-be a-little-pit in clay made
Deinde cocto vitro, accipe lignum cum rotula et ferro,
then fired the-glass take the-wood with the-little-wheel and iron
quod vocatur veru, et pone summitatem ejus in vas vitri,
which is-called spit and place the-top of-it into the-vessel of-glass
modicumque quod ei adhæserit extrahens punge fortiter in
and-the-little which to-it shall-have-stuck drawing-out stab-it strongly into
lignum, ut vitrum transforetur, statimque calefac in flamma
the-wood so-that the-glass be-pierced and-at-once heat-it in the-flame
et percute ferrum super lignum bis, ut vitrum dilatetur,
and strike the-iron on the-wood twice so-that the-glass be-spread
atque cum festinatione volve manum tuam cum eodem ferro,
and with haste turn hand your with the-same iron
ut anulus in rotundum amplificetur; et ita volvendo fac
so-that the-ring into round be-enlarged and thus by-turning make
eum descendere usque ad rotulam, ut æqualis fiat.
it descend up-to to the-little-wheel so-that equal it-become
Quo statim ejecto in fossulam, eodem modo operare
which at-once thrown-out into the-little-pit in-the-same way work
quantum velis. Quod si volueris anulos aliis coloribus
as-much-as you-wish but if you-shall-wish rings with-other colors
variare, cum acceperis vitrum et transpunxeris cum
to-vary when you-shall-have-taken the-glass and you-shall-have-pierced-it with
gracili ferro, eice de alio vase alterius coloris vitrum,
a-slender iron throw-out from another vessel of-another color glass

in modum fili circumdans eo vitrum anuli, deinde
in the-manner of-a-thread surrounding with-it the-glass of-the-ring then
calefactum in flamma, sicut superius, simili modo perfice.
heated in the-flame as above in-like way finish-it
Potes etiam super anulum alterius generis vitrum ponere
you-can also on the-ring of-another kind glass to-place
sicut gemmam, et calefac in flamma ut adhæreat.
as a-gem and heat-it in the-flame so-that it-cling
Explicit liber secundus.
ends book second

Liber Tertius. Prologus

PROLOGUE TO BOOK THREE

David loved the beauty of God's house and wished to build and adorn it, but, having shed blood, left its gold, silver, bronze, and iron to Solomon, knowing from Exodus that God fills craftsmen with His spirit. So the son who has adorned a church should know that the seven gifts of the Spirit move his hands; the beholder of such work is lifted to God. Now let him make the vessels of the altar: chalices, candlesticks, censers, cruets, shrines, and crosses.

Eximius Prophetarum David, quem Dominus Deus præscivit
the-distinguished of-the-Prophets David whom the-Lord God foreknew
ante tempora secularia et prædestinavit, quemque juxta
before times of-the-world and predestined and-whom according-to
simplicitatem et humilitatem mentis illius, secundum cor
the-simplicity and humility of-mind his according-to heart
suum elegit, et sibi dilectæ plebi principem præposuit,
his-own he-chose and for-himself to-the-beloved people as-prince set-over
utque regimen tanti nominis nobiliter et prudenter
and-that the-government of-so-great a-name nobly and prudently
disponeret, spiritu principali confirmavit, tota mentis
he-might-dispose with-the-spirit princely confirmed with-whole of-mind
intentione se colligens in amorem sui conditoris, hæc
the-intention himself gathering into the-love of-his founder these-things
inter alia protulit: Domine, dilexi decorem domus tuæ.
among others brought-forth Lord I-have-loved the-beauty of-house your
Et licet vir tantæ auctoritatis tamque capacis intellectus,
and though a-man of-such authority and-so capacious of-understanding
domum hanc diceret habitationem cœlestis curiæ, in
house this should-call the-dwelling of-the-heavenly court in
qua Deus hymnicis choris angelorum inæstimabili præsidet
which God with-hymning choirs of-angels with-inestimable presides

claritate, quam ipse totis visceribus anhelabat, dicens:
brightness which he-himself with-all entrails panted-for saying
Unam petii a Domino, hanc requiram, ut inhabitem
one-thing I-have-sought from the-Lord this I-will-seek-after that I-may-dwell
in domo Domini omnibus diebus vitæ meæ; sive receptaculum
in the-house of-the-Lord all the-days of-life my or the-receptacle
devoti pectoris et purissimi cordis, cui vere Deus
of-a-devout breast and of-a-most-pure heart in-which truly God
inhabitat, cujus hospitis desiderio idem flagrans orat:
dwells for-which guest by-desire the-same burning prays
Spiritum rectum innova in visceribus meis, Domine: tamen
a-spirit right renew in entrails my Lord nevertheless
ornatum materialis domus Dei, quæ locus est orationis,
the-adornment of-the-material house of-God which the-place is of-prayer
constat eum concupivisse. Nam pene omnes impensas
it-is-plain him to-have-desired for almost all the-expenses
domus, cujus ipse auctor fieri ardentissimo desiderio
of-the-house of-which he-himself the-author to-become with-most-ardent desire
concupivit, sed pro humani sanguinis licet hostili
desired but on-account-of of-human blood although of-enemies
crebra tamen effusione non meruit, in auro, argento, ære
frequent nevertheless the-shedding not he-deserved-it in gold silver bronze
et ferro, Salomon filio delegavit. Legerat namque in Exodo,
and iron to-Solomon his-son he-delegated-it he-had-read for in Exodus
Dominum Moysi de constructione tabernaculi mandatum
the-Lord to-Moses about the-construction of-the-tabernacle a-command
dedisse, et operum magistros ex nomine elegisse, eosque
to-have-given and of-the-works masters by name to-have-chosen and-them
spiritu sapientiæ et intelligentiæ et scientiæ in omni
with-the-spirit of-wisdom and of-understanding and of-knowledge in every
doctrina implesse ad excogitandum et faciendum opus in
teaching to-have-filled for devising and making work in

auro et argento et ære, gemmis, ligno, et universi generis
gold and silver and bronze gems wood and of-every kind
arte, noveratque pia consideratione Deum hujusmodi
art and-he-had-known by-pious consideration God of-this-kind
ornatu delectari, quem construi disponebat magisterio et
by-adornment to-be-delighted which to-be-built he-was-arranging by-the-mastery and
auctoritate Spiritus sancti, credebatque absque ejus instinctu
authority of-the-Spirit Holy and-he-believed without his prompting
nihil hujusmodi quemquam posse moliri. Quapropter, Fili
nothing of-this-kind anyone to-be-able to-undertake wherefore Son
dilectissime, non cuncteris, sed plena fide crede, spiritum
most-beloved not hesitate but with-full faith believe the-spirit
Dei cor tuum implesse, cum ejus ornasti domum tanto
of-God heart your to-have-filled when his you-adorned house with-so-great
decore, tantaque operum varietate; et ne forte diffidas,
beauty and-so-great of-works variety and lest perhaps you-distrust
pandam evidenti ratione, quicquid discere, intelligere, vel
I-will-lay-open by-evident reason whatever to-learn to-understand or
excogitare possis artium, septiformis spiritus gratiam tibi
to-devise you-can of-arts of-the-sevenfold spirit the-grace to-you
ministrare. Per spiritum sapientiæ cognoscis a Deo cuncta
to-supply through the-spirit of-wisdom you-know from God all-things
creata procedere, et sine ipso nihil esse; per spiritum
created to-proceed and without him nothing to-be through the-spirit
intellectus cepisti capacitatem ingenii, quo ordine, qua
of-understanding you-received the-capacity of-wit in-what order in-what
varietate, qua mensura valeas insistere diverso operi
variety in-what measure you-may-be-able to-apply-yourself to-various work
tuo; per spiritum consilii talentum a Deo tibi concessum
your through the-spirit of-counsel the-talent from God to-you granted
non abscondis, sed cum humilitate palam operando et
not you-hide but with humility openly by-working and

docendo, cognoscere cupientibus fideliter ostendis; per
by-teaching to-know to-those-desiring faithfully you-show through
spiritum fortitudinis omnem segnitiei torporem excutis, et
the-spirit of-fortitude all of-sloth torpor you-shake-off and
quicquid non lento conamine incipis, plenis viribus ad
whatever not with-slow effort you-begin with-full strength to
effectum perducis; per spiritum scientiæ tibi concessum,
completion you-bring through the-spirit of-knowledge to-you granted
ex abundanti corde dominaris ingenio, et quo perfecte
from abundant heart you-rule with-wit and what perfectly
abundas plenæ mentis audacia uteris in publico; per
you-abound-in of-full mind with-the-boldness you-use in public through
spiritum pietatis, quid, cui, quando, quantum vel qualiter
the-spirit of-piety what for-whom when how-much or how
operis, et ne surrepat avaritiæ seu cupiditatis vitium,
you-work and lest creep-in of-avarice or of-greed the-vice
mercedis pretium pia consideratione moderaris; per
of-the-wage the-price with-pious consideration you-moderate through
spiritum timoris Domini te nihil ex te posse consideras,
the-spirit of-the-fear of-the-Lord you nothing from you to-be-able you-consider
nihil inconcessum a Deo te habere seu velle cogitas, sed
nothing ungranted by God you to-have or to-wish you-think but
credendo, confitendo et gratias agendo, quicquid nosti, vel
by-believing by-confessing and thanks by-giving whatever you-know or
es, aut esse potes, divinæ misericordiæ reputas. His
you-are or to-be you-can to-the-divine mercy you-reckon by-these
virtutum stipulationibus animatus, carissime Fili, domum Dei,
of-virtues pledges animated dearest Son the-house of-God
fiducialiter aggressus, tanto lepore decorasti, et laquearia
confidently having-approached with-such charm you-have-adorned and the-ceilings
seu parietes diverso opere, diversisque coloribus distinguens
or walls with-various work and-various colors distinguishing

paradysi Dei speciem floribus variis vernantem, gramine
of-the-paradise of-God the-appearance with-flowers various blooming with-grass
foliisque virentem, et sanctorum animas diversi meriti
and-leaves green and of-the-saints the-souls of-various merit
coronis foventem, quodammodo aspicientibus ostendisti,
with-crowns cherishing in-some-way to-the-beholders you-have-shown
quodque creatorem Deum in creatura laudant, et mirabilem
and-that the-creator God in the-creature they-praise and wonderful
in operibus suis prædicant, effecisti. Nec enim
in works his they-proclaim you-have-brought-about nor for
perpendere valet humanus oculus, cui operi primum aciem
to-weigh is-able the-human eye on-what work first its-gaze
infigat; si respicit laquearia, vernant quasi pallia; si considerat
it-should-fix if it-looks-at the-ceilings they-bloom as-if mantles if it-considers
parietes, est paradysi species; si luminis abundantiam ex
the-walls there-is of-paradise the-appearance if of-light the-abundance from
fenestris intuetur, inæstimabilem vitri decorem et operis
the-windows it-beholds the-inestimable of-the-glass beauty and of-the-work
pretiosissimi varietatem miratur. Quod si forte Dominicæ
most-precious the-variety it-marvels-at but if perhaps of-the-Lord
Passionis effigiem liniamentis expressam conspicatur fidelis
of-the-Passion the-likeness in-lineaments expressed it-beholds the-faithful
anima, compungitur; si quanta sancti pertulerint in suis
soul is-pricked if how-great the-saints endured in their
corporibus cruciamina, quantaque vitæ æternæ perceperint
bodies torments and-how-great of-life eternal they-received
præmia conspicit, vitæ melioris observantiam arripit; si quanta
rewards it-beholds of-life better the-observance it-seizes if how-great
sunt in cœlis gaudia, quantaque in tartareis flammis
are in the-heavens joys and-how-great in the-tartarean flames
cruciamenta intuetur, spe de suis bonis actibus animatur,
torments it-beholds by-hope from its good acts it-is-animated

et de peccatorum suorum consideratione formidine concutitur.
and from of-sins its the-consideration with-fear is-shaken
Age ergo nunc, vir bone, felix apud Deum et homines in
come therefore now man good happy before God and men in
hac vita, felicior in futura, cujus labore et studio Deo tot
this life happier in the-future whose by-labor and zeal to-God so-many
exhibentur holocausta, ampliori deinceps accendere sollertia,
are-offered burnt-offerings with-ampler henceforth be-kindled skill
et quæ adhuc desunt in utensiliis domus Domini, ad
and what-things still are-lacking in the-utensils of-the-house of-the-Lord for
explendum aggredere toto mentis conamine, sine quibus
filling-up approach with-whole of-mind effort without which
divina mysteria et officiorum ministeria non valent consistere.
the-divine mysteries and of-the-offices the-ministries not can to-stand
Sunt enim hæc: Calices, Candelabra, Thuribula, Ampullæ,
are for these Chalices Candlesticks Censers Cruets
Urcei, sanctorum pignorum Scrinia, Cruces, Plenaria et
Ewers of-holy relics Shrines Crosses Gospel-covers and
cætera, quæ in usum ecclesiastici ordinis poscit utilitas
the-other-things which for the-use of-the-ecclesiastical order demands utility
necessaria. Quæ si vis componere, hoc incipias ordine.
necessary which if you-wish to-compose in-this you-should-begin order

The workshop is high and long, divided for casting and for working gold and silver, with a pit before each window for the worker to sit in, under a board that catches the filings. The forge is built of clay against a board; the bellows are made of ram skins; and the anvils come in many shapes.

Caput I. De constructione fabricæ.

Chapter I about the-construction of-the-workshop

Ædifica tibi domum spatiosam et altam, cujus longitudo

build for-yourself a-house spacious and high whose length

ad orientem tendatur, in cujus pariete meridiano facies

to the-east be-stretched in whose wall southern you-will-make

fenestras quot volueris et possis, ita ut inter duas

windows as-many-as you-shall-wish and you-can so that between two

fenestras quinque pedes sint. Divide autem medietatem

windows five feet be divide however the-half

domus ad opus fusile faciendum, et cuprum ac stagnum

of-the-house for work cast to-make and copper and tin

et plumbum operandum, uno pariete usque ad summitatem

and lead to-be-worked with-one wall up-to to the-top

altitudinis, et rursum divide quod reliquum est in duo uno

of-the-height and again divide what remaining is in two with-one

pariete, ad operandum in una parte aurum, in altera argentum.

wall for working in one part gold in the-other silver

Fenestræ vero non emineant altius a terra quam uno

the-windows however not let-them-stand-out higher from the-ground than by-one

pede, quorum altitudo sit trium pedum, latitudo duorum.

foot of-which the-height be of-three feet the-width of-two

Caput II. De sede operantium.

Chapter II about the-seat of-the-workers

Deinde fode fossam ante fenestram, a pariete fenestræ

then dig a-pit before the-window from the-wall of-the-window

pede et dimidio, quæ stabit in transverso, habens

by-a-foot and a-half which will-stand in across having

longitudinis trium pedum, latitudinis duorum, quam texes

of-length three feet of-width two which you-will-line

lignis in circuitu, quorum lignorum duo in medio contra

with-woods in circuit of-which woods two in the-middle opposite

fenestram procedant a fossa altitudine dimidii pedis, super

the-window proceed from the-pit in-height of-half a-foot over

quæ jungatur discus unus qui cooperiat genua sedentium

which be-joined board one which cover the-knees of-those-sitting

in fossa, latitudine duorum pedum, longitudine trium, in

in the-pit in-width of-two feet in-length of-three in

transverso super fossam, ita æqualis, ut quicquid minutim

across over the-pit so level that whatever in-bits

auri vel argenti desuper ceciderit, possit diligenter scopari.

of-gold or of-silver from-above shall-have-fallen can diligently to-be-swept

Caput III. De fornace operis.

Chapter III about the-forge of-the-work

Juxta parietem vero prope fenestram in sinistra parte

beside the-wall however near the-window on the-left side

sedentis, figatur lignum in terram, longitudine trium

of-the-one-sitting let-it-be-fixed a-wood in the-ground in-length of-three

pedum, latitudine duorum, spissitudine pene duorum

feet in-width of-two in-thickness of-almost two

digitorum, quod cum firmiter steterit, habeat foramen

fingers which when firmly it-shall-have-stood let-it-have a-hole

grossitudine unius digiti in medio, a terra altitudine

of-the-thickness of-one finger in the-middle from the-ground at-a-height

quatuor digitorum. Habeat quoque in anteriore parte lignum
of-four fingers let-it-have also on the-front side a-wood
strictum sibi conjunctum, et clavis ligneis affixum, latitudine
narrow to-it joined and with-nails wooden fixed of-the-width
quatuor digitorum, cujus longitudo æquetur majori ligno.
of-four fingers whose length be-equal to-the-greater wood
Ante quod stabilies aliud lignum æquæ latitudinis et
before which you-will-set another wood of-equal width and
longitudinis, ita ut inter duo hæc ligna sit amplitudo trium
length so that between the-two these woods be a-breadth of-three
digitorum, et affige illud exterius duobus aut tribus paxillis,
fingers and fix it on-the-outside with-two or three pegs
et accepta argilla non macerata nec aqua mixta, sed
and taken clay not kneaded nor with-water mixed but
noviter effossa, mitte in illud spatium in primis modicum,
newly dug-up put into that space at first a-little
et compinge cum ligno rotundo fortiter, deinde amplius, et
and pack-it with a-wood round strongly then more and
fortiter iterum percute, sicque facies donec duæ partes ipsius
strongly again beat and-thus you-will-do until two parts of-that
spatii impleantur, et tertiam dimitte vacuam. Tunc aufer
space be-filled and the-third leave empty then take-away
anterius lignum, et cum cultello longo incide argillam æqualiter
the-front wood and with a-knife long cut the-clay evenly
ante et sursum, deinde gracili ligno percute fortiter. Post
in-front and above then with-a-slender wood beat strongly after
hæc accipe argillam maceratam et fimo equi mixtam, et
these-things take clay kneaded and with-dung of-horse mixed and
compone fornacem et larem ejus, tegens parietem, ne uratur
compose the-forge and the-hearth of-it covering the-wall lest it-be-burned

igne, et cum gracili ligno perfora argillam trans foramen quod
by-fire and with a-slender wood pierce the-clay across the-hole which
est retro ligno. Hoc modo compone omnes fornaces fabriles.
is behind in-the-wood in-this way compose all forges of-smiths

Caput IV. De follibus.
Chapter IV about the-bellows

Deinde fac tibi folles de pellibus arietum ita. Cum
then make for-yourself bellows from the-skins of-rams thus when
occiduntur arietes, non incidantur pelles sub ventre, sed
are-killed the-rams not let-them-be-cut the-skins under the-belly but
in posterioribus aperiantur, et ita eversentur ut
in the-hind-parts let-them-be-opened and so be-turned-inside-out that
integræ extrahantur, et impletæ stramine modice exsiccentur.
whole they-be-drawn-out and filled with-straw moderately be-dried
Postea jaceant in confectione fæcis et salis una die et
afterward let-them-lie in a-preparation of-lees and of-salt one day and
duabus noctibus, tertia vero trahantur in retorta in
two nights on-the-third however let-them-be-drawn on a-twisted-rope in
longitudine, sed plus in latitudine. Deinde ungantur et
length but more in width then let-them-be-anointed and
iterum trahantur. Posthæc fiat folli caput ligneum,
again be-drawn after-this let-it-be-made for-the-bellows a-head wooden
quod transeat per collum ejus et ibi ligetur, et in capite
which pass through the-neck of-it and there be-bound and in the-head
foramen per quod transeat fistula ferrea. Retro vero in
a-hole through which pass a-pipe iron behind however in
latitudine follis ponantur quatuor ligna, quorum duo
the-width of-the-bellows let-them-be-placed four woods of-which two
sibi conjungantur et colligentur in medio, et duo
to-each-other be-joined and be-bound in the-middle and two
sibi deinde suantur in folle ita, ut juncturæ in
to-each-other then be-sewn into the-bellows so that the-joints in

medio sint superius et inferius, ubi etiam duæ ansæ ex
the-middle be above and below where also two handles from
eadem pelle consuantur, una superius minor, in qua pollex
the-same skin be-sewn-on one above smaller in which the-thumb
imponatur, altera major inferius, ubi reliqui quatuor
be-put the-other larger below where the-remaining four
digiti immittantur. His completis pone fistulam ferream
fingers be-put-in these-things completed place the-pipe iron
in foramen fornacis, retro et ante fornacem carbones et
into the-hole of-the-forge behind and before the-forge coals and
ignem, et suffla ut fornax exsiccetur. Utensiliorum autem
fire and blow so-that the-forge be-dried of-the-utensils however
et ferramentorum nomina in fabrili opere sunt hæc.
and of-the-iron-tools the-names in smithing work are these

Caput V. De incudibus.

Chapter V about anvils

Incudes latæ, æquales et quadræ. Item incudes æquales et
anvils broad level and square likewise anvils level and
cornutæ. Item incudes superius rotundæ in similitudine dimidii
horned likewise anvils above round in the-likeness of-half
pomi, una major, alia minor, tertia brevis, qui vocantur
an-apple one greater another smaller a-third short which are-called
nodi. Item incudes superius longæ et strictæ quasi duo
knots likewise anvils above long and narrow as-if two
cornua ab hastili præcedentia, quorum unum sit rotundum et
horns from the-shaft going-forward of-which one be round and
deductum ita, ut in summitate sit gracile, aliud vero latius
drawn-out so that at the-top it-be slender the-other however broader
et in summitate modice recurvum in rotunda æqualitate ad
and at the-top moderately bent-back in round evenness to
similitudinem unius pollicis. Hæ sint majores et minores.
the-likeness of-one thumb these let-them-be greater and smaller

Hammers, hand and cutting tongs, the draw-plate for wire, the organarium that rolls beaded wire, grooved files, gravers, scrapers, and the punches for repoussé.

Caput VI. De malleis.

Chapter VI about hammers

Mallei multi, majores, minores et parvi, in una parte lati,

hammers many greater smaller and little on one side broad

in altera stricti. Item mallei longi et graciles in summitate

on the-other narrow likewise hammers long and slender at the-top

rotundi, majores et minores.

round greater and smaller

Caput VII. De forcipibus.

Chapter VII about tongs

Forcipes manuales fortes, habentes nodos in summitate, majores

tongs hand strong having knots at the-top greater

et minores. Item forcipes mediocres, quibus liminanda

and smaller likewise tongs middling with-which things-to-be-filed

quoque teneantur, quæ sint in summitate unius caudæ graciles,

also may-be-held which be at the-top of-one tail slender

in altera pendeat ferrum tenue et latum, ac perforatum, cui

on the-other let-hang an-iron thin and broad and pierced to-which

cum posueris aliquid parvum liminandum, comprime

when you-shall-have-placed anything small to-be-filed press

fortiter, et mitte gracilem caudam in quod foramen volueris.

strongly and put the-slender tail into what hole you-shall-wish

Item forcipes parvuli, in una summitate sibi adhærentes,

likewise tongs very-small at one top to-each-other adhering

et in altera graciles, quibus grana et alia quæque minuta

and at-the other slender with-which grains and other-things all small

componantur. Item forcipes, qui dicuntur carponarii, et majores
may-be-composed likewise tongs which are-called carponarii both greater
et minores, quæ sint in una summitate integri et plicati, in
and smaller which be at one top whole and folded at-the
altera aperti et modice curvi. Item forcipes incisorii majores
other open and moderately curved likewise tongs cutting greater
et minores, in duabus partibus compositi et clavo confixi.
and smaller in two parts composed and with-a-nail fastened

Caput VIII. De ferris per quæ fila trahuntur.
Chapter VIII about the-irons through which wires are-drawn

Ferri duo latitudine trium digitorum, superius et inferius
irons two of-the-width of-three fingers above and below
stricti, per omnia tenues, et tribus ordinibus aut quatuor
narrow through all thin and in-three rows or four
perforati, per quæ foramina fila trahantur.
pierced through which holes wires may-be-drawn

Caput IX. De instrumento quod organarium dicitur.
Chapter IX about the-instrument which organarium is-called

Est autem instrumentum ferreum, quod dicitur organarium,
there-is however an-instrument iron which is-called organarium
quod constat duobus ferris, uno inferius, altero superius; sed
which consists of-two irons one below the-other above but
pars inferior habet grossitudinem et longitudinem longioris
the-part lower has the-thickness and length of-a-longer
digiti, et est aliquantulum tenuis, habens duo hastilia, quibus
finger and is somewhat thin having two shafts by-which
lignum figitur inferius, supra quæ in superiori parte eminent
the-wood is-fixed below over which in the-upper part stand-out
duo clavi grossi, qui suscipiunt superiorem partem ferri,
two nails thick which receive the-upper part of-the-iron
quod ferrum habet grossitudinem et longitudinem inferioris,
which iron has the-thickness and length of-the-lower

et habet duo foramina in utraque summitate unum, per quod
and has two holes at each top one through which
duo clavi superiores inducantur, ut sibi conjungantur.
the-two nails upper be-led-in so-that to-each-other they-be-joined
Valde enim conjungi debent cum lima; in quibus utrisque
very for to-be-joined they-ought with a-file in which both
fodiantur fossulæ, ita ut per medium foramina appareant,
be-dug little-pits so that through the-middle holes appear
ut cum in majori argentum vel aurum mittitur longum et
so-that when into the-greater silver or gold is-put long and
æqualiter rotundum percussum, feriatur superior pars ferri
evenly round beaten be-struck the-upper part of-the-iron
fortiter cum malleo corneo, et altera manu rotetur aurum
strongly with a-hammer horn and with-the-other hand be-turned the-gold
vel argentum, et fiant grana rotunda sicut fabæ, in sequenti
or silver and become grains round as beans in the-following
foramine fiant quasi pisa, in tertio quasi lentes, et sic minora.
hole become as-if peas in the-third as-if lentils and thus smaller

Caput X. De limis inferius fossis.

Chapter X about files below grooved

Fiunt etiam ferri graciles ut festuca, longitudine unius
are-made also irons slender as a-straw in-length of-one
digiti, quadri; sed in uno latere latiores, quorum caudæ,
finger square but on one side broader of-which the-tails
in quibus manubria ponuntur, sunt sursum curvæ; inferius
in which handles are-placed are upward curved below
autem per longitudinem est tractus fossus et limatus
however through the-length is a-stroke dug and filed
quasi sulcus, et ex utraque ejus parte sunt costæ acutæ
as-if a-furrow and on each of-its side are ribs sharp

limatæ. His ferris limantur fila aurea et argentea grossa
filed with-these irons are-filed wires golden and silver thick
et subtilia, ita ut in eis grana appareant.
and fine so that on them grains appear

Caput XI. De ferris fossoriis.
Chapter XI about irons for-graving

Fiunt quoque ferri fossorii ad fodiendum hoc modo. Fit
are-made also irons for-graving for engraving in-this way is-made
ferrum ex chalybe puro, longitudine digiti majoris, et
an-iron from steel pure in-length of-a-finger greater and
grossum ut festuca, in medio vero grossius, et est quadrum;
thick as a-straw in the-middle however thicker and it-is square
una cauda ponatur in manubrium, et altera summitate
one tail let-it-be-placed in a-handle and at-the-other top
limetur una costa, quæ est superior, usque ad inferiorem, sed
let-it-be-filed one rib which is upper down-to to the-lower but
inferior est longior, quæ limata gracilis est in cuspide; quod
the-lower is longer which filed slender is at the-point which
calidum temperatur in aqua. Ad hanc speciem fiunt plures
hot is-tempered in water to this form are-made several
majores et minores. Fit et aliud similiter quadrum, et est
greater and smaller is-made also another likewise square and it-is
latius et tenue, cujus acumen sit in ipsa latitudine, ita ut
broader and thin whose edge be in the-very width so that
duæ costæ sint superius et duæ inferius longiores et æquales.
two ribs be above and two below longer and equal
Hoc quoque modo fiant plures parvi et magni. Fit
in-this also way let-them-be-made several small and large is-made
etiam ferrum rotundum et grossum sicut festuca, cujus
also an-iron round and thick as a-straw whose
cuspis ita limetur, ut tractus, quem facit, sit rotundus.
point so be-filed that the-stroke which it-makes be round

Caput XII. De ferris rasoriis.

Chapter XII about irons for-scraping

Fiunt etiam ferri rasorii graciles, sed in fine aliquantulum

are-made also irons for-scraping slender but at the-end somewhat

latiores, una parte acuti, parvi et magni, quorum aliqui

broader on-one side sharp small and large of-which some

recurvi, pro libitu secundum modum operis. Fiunt etiam

bent-back at pleasure according-to the-manner of-the-work are-made also

ferri eodem modo formati, sed obtusi ad poliendum opus.

irons in-the-same way formed but blunt for polishing work

Caput XIII. De ferris ad ductile.

Chapter XIII about irons for repoussé

Fiunt quoque ferri ad exprimendas imagines, aves, bestias, sive

are-made also irons for pressing-out images birds beasts or

flores, ductiles in auro et argento et cupro, longitudine unius

flowers repoussé in gold and silver and copper in-length of-one

palmi, superius lati et capitati, inferius vero graciles, rotundi,

palm above broad and headed below however slender round

tenues, trianguli, quadranguli, recurvi, prout libuerit

thin triangular quadrangular bent-back as shall-have-pleased

varietas operis formati, qui malleo debent percuti. Fit

the-variety of-the-work formed which with-a-hammer ought to-be-struck is-made

vero ferrum eodem modo formatum, sed gracile in fine,

however an-iron in-the-same way formed but slender at the-end

in quo est foramen altero ferro graciliore inditum, et in

in which is a-hole with-another iron more-slender put-in and in

circuitu limatum, quod cum percussum fuerit in auro vel

circuit filed which when struck it-shall-have-been on gold or

argento sive cupro deaurato, apparet quasi subtilissimus circulus.

silver or copper gilded appears as-if a-very-fine circle

Cutting irons, nail-headers, ingot molds, compasses, and files, tempered with burned ox horn and salt or, the small soft-iron ones, in clay; glass-cutting tools in the urine of a goat fed on fern; crucibles of white clay; and silver refined with lead in a pot shard lined with sifted ashes.

Caput XIV. De ferris incisoriis.

Chapter XIV about irons cutting

Fiunt quoque ferri incisorii talis magnitudinis, ut plena

are-made also irons cutting of-such size that with-full

manu teneantur, et super manum emineant, lati et æquales,

hand they-be-held and above the-hand stand-out broad and level

inferius etiam manum excedant, lati, tenues et acuti. Horum

below also the-hand exceed broad thin and sharp of-these

multi fiunt parvi et magni, quibus inciditur aurum et

many are-made small and large with-which is-cut gold and

argentum sive cuprum spissum.

silver or copper thick

Caput XV. De ferris ad faciendos clavos.

Chapter XV about irons for making nails

Sunt et ferri tenues et stricti perforati, in quibus capitantur

there-are also irons thin and narrow pierced in which are-headed

clavi, magni, mediocres et parvi.

nails large middling and small

Caput XVI. De ferris infusoriis.

Chapter XVI about irons casting

Sunt etiam ferri infusorii, longi, rotundi et quadri, in

there-are also irons casting long round and square in

quibus funditur liquefactum aurum, argentum vel cuprum.

which is-cast melted gold silver or copper

Sunt et circini ferrei duabus partibus compositi, majores
there-are also compasses iron of-two parts composed greater
et minores, recti et curvi.
and smaller straight and curved

Caput XVII. De limis.
Chapter XVII about files

Limæ vero fiunt ex puro chalybe, magnæ et mediocres,
files however are-made from pure steel large and middling
quadræ, trium costarum et rotundæ. Fiunt et aliæ,
square of-three ribs and round are-made also others
fortiores sint in medio, intus ex molli ferro, exterius
stronger let-them-be in the-middle within from soft iron on-the-outside
vero cooperiuntur chalybe. Quæ cum percussæ fuerint
however they-are-covered with-steel which when beaten they-shall-have-been
secundum magnitudinem, quam eis auctor earum dare
according-to the-size which to-them the-maker of-them to-give
voluerit, æquantur super runcinam, sicque inciduntur cum
shall-wish are-leveled on a-plane and-thus are-cut with
malleo ex utraque parte acuto. Inciduntur etiam aliæ
a-hammer on each side sharp are-cut also others
cum ferro incisorio, de quo supra diximus; cum quibus
with the-iron cutting about which above we-spoke with which
æquari debet opus, quod cum aliis grossioribus prælimatum
to-be-leveled ought the-work which with others coarser pre-filed
fuerit. Cum ex omni parte incisæ fuerint, fac
shall-have-been when on every side cut they-shall-have-been make
temperamentum eorum hoc modo.
the-tempering of-them in-this way

Caput XVIII. De temperamento limarum.
Chapter XVIII about the-tempering of-files
Combure cornu bovis in igne et rade, atque misce
burn the-horn of-an-ox in the-fire and scrape-it and mix
ei tertiam partem salis, et tere fortiter. Deinde mitte
with-it a-third part of-salt and grind strongly then put
limam in ignem, et cum canduerit, salies illam
the-file into the-fire and when it-shall-have-glowed you-will-sprinkle that
confectionem super eam ex omni parte, aptisque carbonibus
preparation over it on every side and-fitted coals
valde ardentibus cum festinatione sufflabis per omnia sic
very burning with haste you-will-blow through all so
ut temperamentum non cadat, et statim eiciens extingue
that the-tempering not fall and at-once taking-it-out quench-it
æqualiter in aqua, et inde eiciens siccabis modice super
evenly in water and thence taking-it-out you-will-dry-it moderately over
ignem. Hoc modo temperabis omnes quæ sunt ex chalybe.
the-fire in-this way you-will-temper all which are from steel
Caput XIX. Item unde supra.
Chapter XIX likewise whence above
Facies et parvulas similiter quadras, semirotundas,
you-will-make also very-small-ones likewise square half-round
triangulas, tenues ex molli ferro, easque sic temperabis.
triangular thin from soft iron and-them thus you-will-temper
Cum incisæ fuerint cum malleo, sive cum incisorio
when cut they-shall-have-been with a-hammer or with cutting
ferro, aut cum cultello, unges eas veteri aruina porci,
iron or with a-knife you-will-anoint them with-old lard of-pig
et circumdabis coriolis ex hircino corio incisis,
and you-will-surround-them with-little-strips from goat hide cut
ligabisque filo lino. Posthæc cooperies eas argilla
and-you-will-bind-them with-thread linen after-this you-will-cover them with-clay

macerata singulariter, caudasque nudas dimittes. Cumque
kneaded singly and-the-tails bare you-will-leave and-when
siccatæ fuerint, mittes in ignem, et sufflabis
dried they-shall-have-been you-will-put-them into the-fire and you-will-blow
fortiter, combureturque corium, et cum festinatione extrahens
strongly and-will-be-burned the-hide and with haste drawing-them
ab argilla extingues æqualiter in aqua, extractasque
from the-clay you-will-quench-them evenly in water and-drawn-out
siccabis ad ignem.
you-will-dry-them at the-fire

Caput XX. De temperamento ferri.

Chapter XX about the-tempering of-iron

Ferri quoque fossorii temperantur hoc modo. Cum limati
irons also for-graving are-tempered in-this way when filed
fuerint et suis manubriis aptati, summitas eorum
they-shall-have-been and to-their handles fitted the-top of-them
mittitur in ignem, et mox ut cœperit candescere,
is-put into the-fire and as-soon as it-shall-have-begun to-glow
extrahitur et in aqua extinguitur.
it-is-drawn-out and in water is-quenched

Caput XXI. Item de eodem.

Chapter XXI likewise about the-same

Fit etiam ferramentorum aliud temperamentum, quibus
is-made also of-iron-tools another tempering with-which
vitrum inciditur et molliores lapides hoc modo. Tolle
glass is-cut and softer stones in-this way take
hircum triennem, et liga eum intus tribus diebus sine cibo,
a-goat three-year-old and bind him within for-three days without food
quarta da ei filicem comedere et nihil aliud. Quem
on-the-fourth give to-him fern to-eat and nothing else which
cum diebus duobus comederit, sequenti nocte cooperi
when for-days two he-shall-have-eaten on-the-following night cover

eum in dolio inferius perforato, sub quibus foraminibus pone
him in a-cask below pierced under which holes place
aliud vas integrum, in quo colligas urinam ejus. Qua
another vessel whole in which you-may-collect the-urine his which
duabus vel tribus noctibus tali modo sufficienter collecta,
for-two or three nights in-such way sufficiently collected
emitte hircum, et in ipsa urina ferramenta tua tempera. In
let-out the-goat and in the-very urine iron-tools your temper in
urina etiam rufi pueri parvuli temperantur ferramenta,
the-urine also of-a-red-haired boy small are-tempered iron-tools
durius quam in aqua simplici.
harder than in water simple

Caput XXII. De vasculis ad liquefaciendum aurum et
Chapter XXII about little-vessels for melting gold and
argentum.
silver

Hæc omnia præ manibus, habeas argillam albam,
these-things all before hands you-may-have clay white
et tere eam minutissime, acceptisque vasis veteribus in
and grind it very-finely and-taken vessels old in
quibus aurum vel argentum prius infusum fuit, comminue
which gold or silver before poured has-been break-them-up
singulariter. Quæ si non habeas, accipe partes albæ ollæ,
singly which if not you-have take parts of-a-white pot
et mitte eas in carbones donec incandescant, et si non
and put them into coals until they-glow and if not
resiliunt, sine refrigerari et tere singulariter. Deinde
they-spring-apart let-them be-cooled and grind singly then
pone duas partes argillæ tritæ et tertiam coctæ testæ,
place two parts of-clay ground and the-third of-baked shard
et commisceas cum aqua tepida, macera fortiter, et inde
and you-should-mix with water lukewarm knead strongly and thence

compone vascula majora et minora, in quibus liquefacies
compose little-vessels greater and smaller in which you-will-melt
aurum et argentum. Interim vero, dum siccatur, accepta
gold and silver meanwhile however while it-is-dried taken
statera, pondera aurum vel argentum, quod operari volueris.
a-balance weigh the-gold or silver which to-work you-shall-wish
Quod si argentum purum non fuerit, hoc modo purifica.
but if the-silver pure not shall-have-been in-this way purify-it

Caput XXIII. De purificando argento.
Chapter XXIII about purifying silver

Cribra cineres, commiscens eos aqua, et accipe testam ollæ
sift ashes mixing them with-water and take a-shard of-a-pot
in igne probatam, quæ tantæ magnitudinis sit, in qua credas
in fire tested which of-such size be in which you-believe
liquefieri posse argentum, quod purificari debet, ut non
to-be-melted to-be-able the-silver which to-be-purified ought so-that not
effundatur, et mitte cineres in eam, in medio tenues et circa
it-be-poured-out and put the-ashes into it in the-middle thin and around
oram spissos, et sicca ad carbones. Qua siccata amove carbones
the-edge thick and dry-it at the-coals which dried move the-coals
a fornace modicum, et pone ipsam testam cum cineribus
from the-forge a-little and place itself the-shard with the-ashes
sub foramine ante fornacem, sic ut ventus ex folle in eam
under the-hole before the-forge so that the-wind from the-bellows into it
flat, superpositisque carbonibus suffla donec candescant. Deinde
blow and-placed-over coals blow until they-glow then
mitte argentum in eam, et superpone modicum plumbi,
put the-silver into it and place-over a-little of-lead
superque jectis carbonibus liquefac illud, et habeas juxta
and-over thrown coals melt it and have beside
te virgam ex sepe vento siccatam, cum qua discooperies
you a-rod from a-hedge by-the-wind dried with which you-will-uncover

diligenter, et purifica ab argento quicquid immunditiæ super
diligently and purify from the-silver whatever of-impurity over
illud videris, positoque super illud titione, hoc est ligno
it you-shall-have-seen and-placed over it a-brand that is a-wood
igne usto, sufflabis mediocriter longo tractu. Cumque
by-fire burned you-will-blow moderately with-a-long draw and-when
plumbum hoc facto ejeceris, si videris argentum
the-lead this done you-shall-have-cast-out if you-shall-have-seen the-silver
nondum purum esse, rursum pone plumbum, superpositisque
not-yet pure to-be again place lead and-placed-over
carbonibus fac sicut prius. Quod si videris argentum
coals do as before but if you-shall-have-seen the-silver
ebullire et exsilire, scito stagnum vel aurichalcum ei
boil-up and leap-out know tin or brass to-it
admixtum, et confringe particulam vitri minute, et proice
mixed and break a-piece of-glass finely and throw-it
super argentum, plumbumque adde, appositisque carbonibus
over the-silver and-lead add and-applied coals
fortiter suffla. Deinde respice sicut prius, et cum virgula
strongly blow then look as before and with the-little-rod
aufer immunditiam vitri et plumbi, superpositoque
take-away the-impurity of-the-glass and of-the-lead and-placed-over
titione fac sicut prius, et hoc tamdiu donec purum fiat.
a-brand do as before and this so-long until pure it-become

The silver is divided between bowl and foot, cast in a waxed mold, and beaten; the bowl is raised on the anvil in circles, the foot and its knop shaped and ringed, the two joined through a split tail, and a paten engraved with the Lamb or a right hand blessing from heaven.

Caput XXIV. De dividendo argento ad opus.
Chapter XXIV about dividing silver for the-work
Quo purificato si calicem fabricare volueris, divide argentum
which purified if a-chalice to-make you-shall-wish divide the-silver
æqualiter in duo, et medietatem serva ad faciendum
equally into two and the-half keep for making
pedem et patenam; ex altera vero facies vas, cui
the-foot and paten from the-other however you-will-make the-vessel to-which
adicies ex portione patenæ partem; verbi gratia, si marca
you-will-add from the-portion of-the-paten a-part for example if a-mark
argenti fuerit, adde medietatem, pondus duodecim
of-silver it-shall-have-been add to-the-half the-weight of-twelve
nummorum, quos postea inde limabis et rades ut
pennies which afterward thence you-will-file and you-will-scrape so-that
reddas suæ parti. Quod si plus fuerit argenti
you-may-return-them to-its part but if more it-shall-have-been of-silver
vel minus, secundum suam quantitatem addes, et post
or less according-to its quantity you-will-add and after
hæc unicuique parti suum pondus reddes.
these-things to-each part its weight you-will-return

Caput XXV. De fundendo argento.

Chapter XXV about casting silver

His ita dispositis mitte argentum in uno vasculorum,

these-things thus disposed put the-silver into one of-the-little-vessels

et cum liquefactum fuerit, proice modicum salis super

and when melted it-shall-have-been throw a-little of-salt over

illud, moxque effunde in infusorium rotundum quod sit

it and-soon pour-it-out into the-casting-mold round which be

calefactum super ignem, et sit in eo cera liquefacta. Et

heated over the-fire and let-there-be in it wax melted and

si per aliquam negligentiam contigerit, ut argentum

if through any negligence it-shall-have-happened that the-silver

fusum non sit sanum, iterum funde, donec sanum fiat.

cast not be sound again cast until sound it-become

Deinde fac tibi confectionem ex fecibus claris et sale,

then make for-yourself a-preparation from lees clear and salt

in qua extinguas argentum quotiens recoxeris.

in which you-may-quench the-silver as-often-as you-shall-have-reheated-it

Caput XXVI. De fabricando minore calice.

Chapter XXVI about making a-smaller chalice

Cumque cœperis percutere, quære meditullium in eo,

and-when you-shall-have-begun to-beat seek the-center in it

et fac centrum cum circino, et circa eum facies

and make a-center-point with the-compass and around it you-will-make

caudam quadram, in qua pedem configere debes. Cum

a-tail square in which the-foot to-fasten you-ought when

vero sic attenuatum fuerit, ut manu plicari possit,

however so thinned it-shall-have-been that by-hand to-be-folded it-can

fac interius circulos cum circino a centro usque in

make within circles with the-compass from the-center up-to into

medium, et exterius a medio usque ad oram; et cum

the-middle and on-the-outside from the-middle up-to to the-edge and with

rotundo malleo percute interius secundum circulos, ut
a-round hammer beat within according-to the-circles so-that
inde profunditatem capiat, et exterius cum mediocri
thence depth it-take and on-the-outside with a-middling-one
super rotundam incudem secundum circulos usque ad oram,
on a-round anvil according-to the-circles up-to to the-edge
ut inde strictius fiat; et hoc tamdiu fac donec ei
so-that thence narrower it-become and this so-long do until to-it
formam et amplitudinem secundum argenti quantitatem
form and breadth according-to of-the-silver the-quantity
acquiras. Quo facto rade interius et exterius æque cum
you-acquire which done scrape within and on-the-outside evenly with
lima, et circa oram, donec æquale per omnia fiat.
a-file and around the-edge until even through all it-become
Deinde residuam medietatem argenti sicut supra divide in
then the-remaining half of-the-silver as above divide into
duo, et ab una parte aufer pondus sex nummorum,
two and from one part take-away the-weight of-six pennies
et adde alteri, in qua pedem facies, quod postea
and add to-the-other in which the-foot you-will-make which afterward
inde limando auferes et suæ parti reddes. Sicque
thence by-filing you-will-take-away and to-its part you-will-return and-thus
funde et percute pedem sicut vas, usque dum attenuetur,
cast and beat the-foot as the-vessel up-to while it-be-thinned
excepto quod caudam non facies in eo. Quo attenuato
except that a-tail not you-will-make in it which thinned
profunditatem dabis ei cum malleo rotundo interius et
depth you-will-give to-it with a-hammer round within and
exterius, incipiesque nodum formare cum mediocri malleo
on-the-outside and-you-will-begin the-knop to-form with a-middling hammer
super rotundam incudem, et inde super longam ex utraque
on a-round anvil and then on a-long-one on each

parte, donec collum tam gracile facies sicut volueris;
side until the-neck as slender you-will-make as you-shall-wish
hoc diligenter procurans, ne plus in uno loco percutias quam
this diligently taking-care lest more in one place you-beat than
in altero, ne forte nodus se in aliquam partem inclinet, sed
in another lest perhaps the-knop itself to any side incline but
in medio stet, ex omni parte æque spissus et æque latus.
in the-middle stand on every side equally thick and equally broad
Deinde pone eum super carbones, et imple cera, et cum
then place it over coals and fill-it with-wax and when
refrigerata fuerit, tene ipsum pedem in sinistra manu,
cooled it-shall-have-been hold itself the-foot in the-left hand
et in dextera ferrum unum ductile ac tenue; et fac
and in the-right an-iron one for-repoussé and thin and make
puerum sedere juxta te, qui percutiat cum parvulo malleo
a-boy sit beside you who may-strike with a-very-small hammer
super ferrum in quocunque loco illud posueris, et inde
on the-iron in whatever place it you-shall-have-placed and thence
designabis anulum, qui inter nodum et pedem in circuitu
you-will-mark-out a-ring which between the-knop and the-foot in circuit
debet esse. Quo designato effunde ceram et recocto pede
ought to-be which marked-out pour-out the-wax and reheated the-foot
iterum imple, ut anulum profundius percutias sicut prius;
again fill-it so-that the-ring more-deeply you-may-beat as before
sicque facias donec eum æqualiter cum suis granis præparabis.
and-thus do until it equally with its grains you-will-prepare
Deinde lima nodum et rade, et circa pedem interius
then file the-knop and scrape and around the-foot within
et exterius, et oram ejus; sicque facies in medio
and on-the-outside and the-edge of-it and-thus you-will-make in the-middle
nodi foramen quadrangulum secundum quantitatem caudæ
of-the-knop a-hole quadrangular according-to the-size of-the-tail

superioris vasis, et in eo pones spissam partem argenti,
of-the-upper vessel and in it you-will-place a-thick part of-silver
rotundam, eodem modo perforatam. Facies quoque
round in-the-same way pierced you-will-make also
anulum singulariter, qui stare debet inter nodum et vas
a-ring singly which to-stand ought between the-knop and the-vessel
superius, eadem quantitate et specie sicut est ille, quem
above of-the-same size and appearance as is that which
ductili ferro formasti sub nodo, et accipiens ferrum
with-the-repoussé iron you-formed under the-knop and taking an-iron
obtusum fabricabis illud super cotem æqualem, deinde super
blunt you-will-shape it on a-whetstone level then on
lignum quercineum, imposito ei carbone trito, et cum eo
a-wood oaken placed on-it coal ground and with it
polies ipsum vas interius et exterius, nodum et pedem
you-will-polish the-very vessel within and on-the-outside the-knop and foot
et anulum, sicque fricabis cum panno et creta subtiliter
and ring and-thus you-will-rub with a-cloth and chalk finely
rasa, donec omnino lucidum fiat opus. His ita peractis
scraped until wholly shining become the-work these-things thus completed
finde caudam vasis in quatuor usque in medium cum
split the-tail of-the-vessel into four up-to into the-middle with
lima tenue, et eversa illud super incudem rotundam ita ut
a-file thin and turn-back it on an-anvil round so that
æqualiter, et in dextera ferrum ductile mitte in nodum et
evenly and in the-right the-iron for-repoussé put into the-knop and
fac superius percuti cum malleo mediocri donec conflges
make above be-struck with a-hammer middling until you-will-fasten-it
firmiter. Postea funde argentum, quod limasti et rasisti cum
firmly afterward cast the-silver which you-filed and scraped with
eo quod residuum est, et percute rotulam cum circino
that which remaining is and beat a-little-disk with the-compass

æquatam tantæ latitudinis quanta est altitudo calicis a
leveled of-such width as-great-as is the-height of-the-chalice from
pede inferius usque ad oram superius, et modice amplius,
the-foot below up-to to the-edge above and moderately more
et sic percute cavum inferius secundum latitudinem vasis
and thus beat a-hollow below according-to the-width of-the-vessel
superius, ita ut æqualiter in eo possit jacere. Et si volueris,
above so that evenly on it it-can to-lie and if you-shall-wish
fac circulos duos interius cum circino, et pertrahe cum
make circles two within with the-compass and draw with
subula obtusa in medio similitudinem agni, sive dexteram
an-awl blunt in the-middle the-likeness of-a-lamb or a-right-hand
quasi de cœlo descendentem et signantem, et litteras inter
as-if from heaven descending and blessing and letters between
illos duos circulos, atque cum ferro fossorio subtiliter fode,
those two circles and with the-iron graving finely engrave
poliens ad effectum sicut calicem.
polishing to completion as the-chalice

XXVII–XXIX · THE GREATER CHALICE AND NIELLO

A large chalice is cast in a ring mold of iron and clay, its bowl beaten with ribs, alternate ribs gilded and blackened. Niello is silver, copper, and lead fused with sulfur, beaten thin, powdered, and burned into the engraved lines.

Caput XXVII. De majore calice et ejus infusorio.
Chapter XXVII about the-greater chalice and its casting-mold
Quod si calicem magnum argenteum fabricare volueris,
but if a-chalice large silver to-make you-shall-wish
quatuor, aut sex, seu decem marcarum, primo igne probabis
of-four or six or ten marks first by-fire you-will-test

et purgabis totum argentum, deinde dividēs ordine
and you-will-purge all the-silver then you-will-divide-it in-the-order
quo supra. Posthæc accipe duos ferros æque longos
in-which above after-this take two irons equally long
et latos, ad mensuram palmi, et sicut festuca spissos,
and broad to the-measure of-a-palm and as a-straw thick
æqualiter percussos et sanos et ad runcinam diligenter
evenly beaten and sound and on the-plane diligently
æquatos; inter quos facies corrigiam ferream æqualiter
leveled between which you-will-make a-strap iron evenly
percussam ac mediocriter spissam, quam complicabis in
beaten and moderately thick which you-will-fold in
modum circuli ea amplitudine, ut tibi videatur quod
the-manner of-a-circle with-that breadth that to-you it-may-seem that
possit impleri illo argento, quod in eo fundere vis.
it-can to-be-filled with-that silver which into it to-cast you-wish
Et cum plicaveris, non conjunges capita, sed modice
and when you-shall-have-folded-it not you-will-join the-ends but moderately
separabis, ut foramen appareat, per quod infundere
you-will-separate-them so-that an-opening appear through which to-pour-in
possis. Hunc circulum aptabis inter duos ferros æqualiter ita,
you-can this circle you-will-fit between the-two irons evenly so
ut capita ipsius extra ferros parum appareant, et constringes
that the-ends of-it outside the-irons a-little appear and you-will-bind
eos tribus curvis ferris fortibus in tribus locis, videlicet
them with-three curved irons strong in three places namely
inferius et ex utraque parte juxta foramen, sicque linies
below and on each side beside the-opening and-thus you-will-smear
argillam maceratam circa circulum inter ferros et circa
clay kneaded around the-circle between the-irons and around
foramen abundanter. Quam formam, cum siccata fuerit,
the-opening abundantly which mold when dried it-shall-have-been

calefacies, et liquefactum argentum infunde. Omne argentum
you-will-heat and melted silver pour-in all silver
et aurum quod tali modo funditur, nisi contingat ex
and gold which in-such way is-cast unless it-happen from
magna negligentia, semper est sanum ad operandum in eo
great negligence always is sound for working on it
quodcumque volueris. Circulos autem secundum quantitatem,
whatever you-shall-wish the-circles however according-to the-quantity
quam infundere volueris, mensurabis, et facies majores
which to-pour-in you-shall-wish you-will-measure and you-will-make greater
et minores, fusum vero argentum, postquam percusseris
and smaller the-cast however silver after you-shall-have-beaten-it
ut supra, et vasi formam dederis, imple illud
as above and to-the-vessel form you-shall-have-given fill it
cera et percute in ventre, si volueris costas æquales
with-wax and beat on the-belly if you-shall-wish ribs equal
sive rotundas, quæ stent in circuitu sicut cochlearia, quod
or round which stand in circuit as spoons which
opus utrumque magnum ornatum dat calici. Quas costas
work each great adornment gives to-the-chalice which ribs
si volueris cum nigello parare, hoc procura ut argentum
if you-shall-wish with niello to-prepare this take-care that the-silver
spissius sit, et sic age ut una costa deauretur et altera
thicker be and thus do that one rib be-gilded and the-other
denigretur, quas semper oportet pares esse. Quas cum
be-blackened which always it-behooves equal to-be which when
percusseris, lima æqualiter et rades in illis, quas
you-shall-have-beaten file evenly and you-will-scrape on those which
denigrare volueris, pertrahe folia græca et fode grosso
to-blacken you-shall-wish draw leaves Greek and engrave with-thick

tractu, camposque eodem fodies gracilibus circulis
stroke and-the-fields in-the-same-way you-will-engrave with-slender circles
et subtili opere, deinde compone nigellum hoc modo.
and fine work then compose niello in-this way

Caput XXVIII. De nigello.

Chapter XXVIII about niello

Accipe argentum purum, et æquo pondere divide in duo,
take silver pure and by-equal weight divide-it into two
addens ei tertiam partem cupri puri. Quas tres partes, cum
adding to-it a-third part of-copper pure which three parts when
miseris in fusile vasculum, pondera tantum plumbi,
you-shall-have-put into a-casting little-vessel weigh as-much of-lead
quantum appendit medietas ipsius cupri, quod argento
as weighs the-half of-the-very copper which with-the-silver
miscuisti, acceptumque sulphur croceum frange minutatim,
you-mixed and-taken sulfur saffron-yellow break-it in-small-bits
et mitte plumbum et partem sulphuris ipsius super vasculum
and put the-lead and part of-the-sulfur itself over a-little-vessel
cupreum, ac reliquum sulphuris mitte in aliud vas fusile.
copper and the-rest of-the-sulfur put into another vessel casting
Cumque liquefeceris argentum cum cupro, move pariter
and-when you-shall-have-melted the-silver with the-copper stir together
cum carbone, statimque infunde ei plumbum et sulphur ex
with a-coal and-at-once pour-in to-it the-lead and sulfur from
cupreo vasculo, et rursum commisce cum carbone fortiter,
the-copper little-vessel and again mix with a-coal strongly
et cum festinatione funde in aliud vas fusile super sulphur
and with haste pour into the-other vessel casting over the-sulfur
quod in eo miseras, moxque deposito vasculo, cum quo
which into it you-had-put and-soon set-down the-little-vessel with which
fuderas, accipe illud in quod fudisti, et mitte in ignem
you-had-poured take that into which you-poured and put-it into the-fire

donec liquefiat, iterumque commovens funde in ferrum
until it-melt and-again stirring pour into the-iron
infusorium. Quod prius quam frigescat, percute modicum, et
casting-mold which before than it-grow-cold beat a-little and
calefac modicum, rursumque percute, sicque facies donec
heat a-little and-again beat and-thus you-will-do until
omnino attenuetur. Natura enim nigelli talis est, ut si
wholly it-be-thinned the-nature for of-niello such is that if
frigidum percutitur, statim liquescit, frangitur et resilit, nec
cold it-is-struck at-once it-melts-away is-broken and leaps-apart nor
debet sic calefieri, ut rubescat, quia statim liquescit et fluit
ought so to-be-heated that it-redden because at-once it-melts and flows
in cineres. Attenuatum vero nigellum mitte in vasculum
into the-ashes thinned however the-niello put into a-little-vessel
profundum et spissum, et superfundens aquam, confringens
deep and thick and pouring-over water breaking-it
cum malleo rotundo, donec minutissimum fiat, ejectumque
with a-hammer round until very-fine it-become and-taken-out
inde sicca, et quod minutum est mitte in pennam anseris
thence dry-it and what fine is put into a-quill of-a-goose
atque obstrue, quod vero grossius est, mitte in vas et
and stop-it what however coarser is put into a-vessel and
comminue, rursumque siccatum mitte in alteram pennam.
break-up and-again dried put into another quill

Caput XXIX. De imponendo nigello.

Chapter XXIX about putting-on niello

Cumque sic plures pennas impleveris, accipe gummi, quod
and-when thus several quills you-shall-have-filled take gum which
vocatur barabas, et particulam ejus modicam tere cum aqua
is-called barabas and a-particle of-it small grind with water
in eodem vase ita, ut ex ea aqua vix turbida fiat,
in the-same vessel so that from it the-water scarcely turbid become

et locum quem volueris denigrare cum ipsa aqua fac
and the-place which you-shall-wish to-blacken with the-very water make
humidum prius, accipiensque pennam cum levi ferro excute
moist first and-taking a-quill with a-light iron shake-out
tritum nigellum super eum diligenter donec totum cooperias,
the-ground niello over it diligently until all you-cover
sicque per omnia facies. Deinde compone carbones copiose
and-thus through all you-will-do then compose coals copiously
accensos, et in eos missum vas diligenter cooperi sic,
kindled and into them put the-vessel diligently cover so
ut super nigellum nullus carbo ponatur, nec cadat. Cumque
that over the-niello no coal be-placed nor fall and-when
liquefactum fuerit, tene vas cum forcipe, et verte
melted it-shall-have-been hold the-vessel with tongs and turn-it
ex omni parte, qua fluere videris, et ita convertendo
on every side where flow you-shall-have-seen-it and so by-turning
cave ne in terram nigellum cadat. Quod si primo calore
beware lest onto the-ground the-niello fall but if at-the-first heat
non fuerit plenum per omnia, denuo fac humidum,
not it-shall-have-been full through all anew make-it moist
et superpone ut prius, et cave diligenter ne plus opus sit.
and place-over as before and beware diligently lest more need be

The chalice's handles are modeled in wax, invested in clay, cast, and riveted on, then soldered with silver and copper fused under tartar and salt. Niello is rubbed into the handles hot. Gold is refined by cementation, packed with brick dust and salt in a kiln for days.

Caput XXX. De fundendis auriculis calicis.

Chapter XXX about casting the-little-ears of-the-chalice

Si volueris aures calici apponere, mox ut percusseris

if you-shall-wish ears to-the-chalice to-apply as-soon as you-shall-have-beaten

et raseris, priusquam aliud quid operis in eo facias,

and you-shall-have-scraped before other any of-work on it you-do

accepta cera forma inde aures, et sculpe in eis dracones

taken wax form thence the-ears and carve on them dragons

vel bestias vel aves, sive folia quomodocumque volueris. In

or beasts or birds or leaves howsoever you-shall-wish at

summitate vero utriusque auris pone parum ceræ rotundæ,

the-top however of-each ear place a-little of-wax round

sicut gracilis candela longitudine minimi digiti, sed in

as a-slender candle in-length of-the-little finger but at

summitate sit aliquantulum grossior, quæ cera vocatur

the-top let-it-be somewhat thicker which wax is-called

infusorium; quam solidabis calido ferro. Deinde accipe

the-pouring-gate which you-will-solder with-a-hot iron then take

argillam fortiter maceratam, et cooperi diligenter utrasque

clay strongly kneaded and cover diligently both

aures singillatim, ita ut omnia foramina sculpturæ impleantur.

ears singly so that all the-holes of-the-carving be-filled

Quæ cum siccatæ fuerint, iterum cooperi diligenter

which when dried they-shall-have-been again cover diligently

per omnia, excepta summitate infusorii, et tertio
through all except the-top of-the-pouring-gate and a-third-time
similiter facies. Postea mitte ipsas formas juxta carbones,
likewise you-will-do afterward put the-very molds beside the-coals
et cum calefactæ fuerint, effundes ceram. Qua
and when heated they-shall-have-been you-will-pour-out the-wax which
effusa pone eas omnino ad ignem, convertens foramina per
poured-out place them wholly at the-fire turning the-holes through
quæ cera exiit inferius, et sine donec candescant sicut
which the-wax went-out downward and let-them until they-glow as
carbones, statimque liquefac argentum, addens ei modicum
coals and-at-once melt silver adding to-it a-little
de auricalco Hispanico, ut verbi gratia, si fuerit
of brass Spanish as for example if there-shall-have-been
argenti dimidia marca, pondus duorum nummorum, si vero
of-silver half a-mark the-weight of-two pennies if however
plus aut minus, e contra; et eiciens formas ab igne
more or less on the-contrary and taking-out the-molds from the-fire
siste eas firmiter, et infunde in eodem loco, unde ceram
set them firmly and pour-in at the-same place whence the-wax
effudisti. Cumque refrigerata fuerint, aufer argillam,
you-poured-out and-when cooled they-shall-have-been take-away the-clay
et cum lima et ferris fossoriis adjunge eas in suis locis et
and with a-file and irons graving join them in their places and
subjuncturis; facies duo foramina longa, unum superius et
at-the-under-joints you-will-make two holes long one above and
aliud inferius, quæ foris non appareant, in quibus junges
another below which outside not appear in which you-will-join
singillatim duos clavos latos, quos facies transire vas
singly two nails broad which you-will-make pass the-vessel

per duo foramina ex utraque parte superius et inferius,
through two holes on each side above and below
et conflges eos interius atque solidabis hoc modo.
and you-will-fasten them within and you-will-solder in-this way
Caput XXXI. De solidatura argenti.
Chapter XXXI about the-solder of-silver
Pondera duas partes argenti puri, et tertiam cupri rubri, et
weigh two parts of-silver pure and the-third of-copper red and
confunde atque subtiliter lima in vase mundo, et mitte in
melt-together and finely file into a-vessel clean and put-it into
pennam. Deinde tolle vini petram, quæ crescit interius circa
a-quill then take of-wine the-stone which grows within around
vasa, in quibus optimum vinum diu jacet, et particulas ejus
the-vessels in which best wine long lies and the-pieces of-it
liga in panno, et mitte in ignem ut comburatur tamdiu
bind in a-cloth and put-it into the-fire so-that it-be-burned so-long
donec nullus inde fumus procedat. Quo ab igne levato et
until no thence smoke proceed which from the-fire lifted and
refrigerato exsuffla cineres panni et illud ustum tere in
cooled blow-off the-ashes of-the-cloth and that burned grind in
cupreo vase cum rotundo malleo, admixta aqua et sale ut
a-copper vessel with a-round hammer mixed water and salt so-that
sit spissum sicut fex; quod cum ligno tenui linies circa
it-be thick as lees which with a-wood thin you-will-smear around
clavos interius et exterius, et excuties cum brevi ferro
the-nails within and on-the-outside and you-will-shake-out with a-short iron
limatum argentum desuper, sicque siccabis. Iterum linies
the-filed silver over-it and-thus you-will-dry again you-will-smear
mixturam illam desuper spissius quam ante, et mittes in
mixture that above thicker than before and you-will-put-it into
ignem, adhibitisque carbonibus diligenter cooperies leniterque
the-fire and-applied coals diligently you-will-cover and-gently

sufflabis longo flatu, donec solidatura liquefiat sufficienter,
you-will-blow with-a-long blast until the-solder melt sufficiently
eductumque vas ab igne et modice refrigeratum lavabis,
and-drawn-out the-vessel from the-fire and moderately cooled you-will-wash
et si firmi sunt clavi; sin autem, rursum fac eis, sicut
and if firm are the-nails if-not however again do to-them as
prius. Cumque firmi fuerint, elima eos interius et
before and-when firm they-shall-have-been file-off them within and
rade æqualiter, ut nullus considerare queat in quo loco
scrape evenly so-that no-one to-consider be-able in what place
steterint, appositasque exterius auriculas rursum diligenter
they-stood and-applied on-the-outside the-little-ears again diligently
adjunge. Deinde fac per medium auricularum contra clavos
join then make through the-middle of-the-little-ears opposite the-nails
subtilia foramina, et in eodem loco ultra clavos similiter,
fine holes and in the-same place beyond the-nails likewise
in quibus eos configes omni opere consummato, sic ut
in which them you-will-fasten every work completed so that
nemo percipiat qualiter adhæreant. Post hæc sculpe et
no-one perceive how they-cling after these-things carve and
fode ipsas auriculas studiose cum limis et ferramentis,
engrave themselves the-little-ears zealously with files and iron-tools
et si quid volueris in eis denigrare, hoc modo facies.
and if anything you-shall-wish on them to-blacken in-this way you-will-do

Caput XXXII. Item de imponendo nigello.

Chapter XXXII likewise about putting-on niello

Cum miscueris et fuderis nigellum, partem unam
when you-shall-have-mixed and you-shall-have-cast the-niello part one
inde tolles et percuties quadrangulam, longam et
thence you-will-take and you-will-beat-it quadrangular long and
gracilem. Deinde accipe auriculam cum forcipe, et calefac in
slender then take the-little-ear with tongs and heat in

igne donec rubescat, et cum altero forcipe longo et gracili
the-fire until it-redden and with the-other tongs long and slender
tene nigellum et frica super omnia loca, quæ denigrare
hold the-niello and rub over all the-places which to-blacken
volueris, donec tractus omnes pleni sint; ablatumque ab igne
you-shall-wish until the-strokes all full be and-taken-away from the-fire
cum lima æquali diligenter plana, donec argentum sic appareat,
with a-file level diligently smooth-it until the-silver so appear
ut vix tractus considerare possis, et sic cum rasorio
that scarcely the-strokes to-consider you-can and thus with the-scraping
ferro limæ rugas diligenter erade, et quod reliquum est
iron of-the-file the-furrows diligently scrape-off and what remaining is
deaurabis. Quod deauratum hoc modo compones.
you-will-gild which gilding in-this way you-will-compose

Caput XXXIII. De coquendo auro.

Chapter XXXIII about cooking gold

Tolle aurum qualecunque sit, et percute donec tenuis lamina
take gold of-whatever-sort it-be and beat until a-thin plate
fiat, latitudine trium digitorum et longitudine quantum
it-become in-width of-three fingers and in-length as-much-as
possit. Deinde incide partes ut sint æque longæ et latæ,
it-can then cut parts so-that they-be equally long and broad
et conjunges eas pariter atque perfora per omnia cum
and you-will-join them together and pierce-them through all with
rasorio ferro tenui. Postea accipe duas testas ollæ igne
the-scraping iron thin afterward take two shards of-a-pot by-fire
probatas tantæ magnitudinis ut aurum in eis possit jacere,
tested of-such size that the-gold in them it-can to-lie
et frange tegulam minutatim, sive argillam fornacis arsam
and break a-tile in-small-bits or clay of-the-furnace burned
et rubicundam, eamque comminutam pondera in duas
and reddish and-it broken weigh into two

partes æquales, et adde ei tertiam partem salis eodem
parts equal and add to-it a-third part of-salt by-the-same
pondere, quæ modice aspersa cum urina commisceatur ita,
weight which moderately sprinkled with urine be-mixed so
ut non adhæreant sibi, sed vix madida sint, et mitte
that not they-stick to-each-other but scarcely moist be and put
inde parum super unam testam juxta latitudinem auri,
thence a-little on one shard according-to the-width of-the-gold
deinde ipsius auri unam partem, rursumque confectionem,
then of-the-very gold one part and-again the-preparation
et iterum aurum quod semper confectione ita cooperiatur,
and again gold which always with-the-preparation so be-covered
ne aurum auro tangatur, sicque imple testam usque ad
lest gold by-gold be-touched and-thus fill the-shard up-to to
summum, et desuper cooperi cum altera testa, quas diligenter
the-top and above cover-it with the-other shard which diligently
circumlinies argilla mixta et macerata, ponesque
you-will-smear-around with-clay mixed and kneaded and-you-will-place-them
ad ignem, ut siccetur. Interim compone furnum ex
at the-fire so-that it-be-dried meanwhile compose a-furnace from
lapidibus et argilla, altitudine duorum pedum, et latitudine
stones and clay in-height of-two feet and in-width
pedis et dimidii, inferius latum, superius vero strictum,
of-a-foot and a-half below broad above however narrow
ubi foramen sit in medio, in quo eminebunt tres lapides
where an-opening be in the-middle in which will-stand-out three stones
longiores et duri, qui possint flammam diu sustinere, super
rather-long and hard which can the-flame long to-endure on
quos pones testas cum auro, et cooperies cum aliis
which you-will-place the-shards with the-gold and you-will-cover-them with other
testis abundanter. Deinde suppone ignem et ligna, et cave
shards abundantly then put-under fire and logs and beware

ne deficiat ignis copiosus per spatium diei ac noctis.
lest fail the-fire copious through the-space of-a-day and night
Mane vero eiciens aurum, rursum funde, percute et
in-the-morning however taking-out the-gold again melt beat and
impone furno sicut prius. Iterum autem post diem et
put-it on-the-furnace as before again however after a-day and
noctem aufer, et admiscens ei modicum rubri cupri,
night take-it-away and mixing with-it a-little of-red copper
funde sicut prius, et repone super furnum. Cumque tertio
melt as before and put-it-back on the-furnace and-when a-third-time
deposueris, lava diligenter et sicca; sic ponderans vide
you-shall-have-set-it-down wash diligently and dry-it thus weighing see
quantum desit, deinde complica et serva.
how-much be-lacking then fold-it and keep-it

XXXIV–XXXVI · GRINDING GOLD FOR GILDING

Small amounts of gold are refined in a pot of coals; gold is ground with eight times its weight of quicksilver in a hot crucible, or with sand in a stone mill when it will not grind.

Caput XXXIV. Item eodem modo.
Chapter XXXIV likewise in-the-same way
Si vero parum fuerit auri, quod coquere vis, ipsum
if however little there-shall-have-been of-gold which to-cook you-wish it-itself
percute, et compone in testas sicut superius. Postea accipe
beat and set-it in shards as above afterward take
ollam novam et frange in fundo unum foramen, et circa latus
a-pot new and break in the-bottom one hole and around the-side
quatuor, et fac in argilla breve vasculum cum tribus pedibus
four and make of clay a-short little-vessel with three feet

sic ab invicem separatis, ut possint stare super foramen, quod
so from each-other separated that they-can to-stand over the-hole which
est in fundo ollæ; super quod cum siccatum fuerit
is in the-bottom of-the-pot over which when dried it-shall-have-been
pones testas cum auro et elevabis ollam super tres
you-will-place the-shards with the-gold and you-will-raise the-pot on three
lapides a se aliquantulum remotos æque spissos, et
stones from each-other somewhat removed equally thick and
inmitte carbones ardentes, deinde extinctos, sicque quotiens
put-in coals burning then quenched and-thus as-often-as
descenderint superpone frigidos, et nunquam patieris
they-shall-have-sunk place-over cold-ones and never you-will-allow
testas nudas esse ab igne. Interdum vero cum gracili ligno
the-shards bare to-be of fire sometimes however with a-slender wood
per foramina inmisso move carbones, et inferius similiter,
through the-holes put-in stir the-coals and below likewise
ut cineres exeant et ventus aditus habeat. Sicque facies
so-that the-ashes go-out and the-wind access have and-thus you-will-do
cum carbonibus in olla, sicut superius cum lignis in furno.
with coals in the-pot as above with logs in the-furnace

Caput XXXV. De molendo auro.

Chapter XXXV about grinding gold

Coctum vero pleniter si molere volueris, mitte inde in
cooked however fully if to-grind you-shall-wish put thence into
stateram pondus octo nummorum et pondera octies tantum
the-balance the-weight of-eight pennies and weigh eight-times as-much
vivi argenti, cui statim inmitte aurum et frica donec
of-quick silver into-which at-once put-in the-gold and rub until
album fiat, atque particulatim confringe. Tolle quoque
white it-become and piece-by-piece break-it take also
unum vasculum ex his, in quibus aurum vel argentum
one little-vessel from those in which gold or silver

infunditur, quod tamen ad opus istud spissius illis esse
is-poured which nevertheless for work this thicker than-those to-be
debet, et mitte in ignem donec candescat; ferrum etiam
ought and put-it into the-fire until it-glow an-iron also
gracile et curvum, in uno capite manubrio infixum, in altero
slender and curved at one end in-a-handle fixed at the-other
vero habens nodum rotundum, mitte similiter in ignem, et
however having a-knob round put likewise into the-fire and
cum utrumque canduerit, cum forcipe tene vasculum super
when each shall-have-glowed with tongs hold the-little-vessel over
scutellam latam, siccam, et funde in illud vivum argentum
a-dish broad dry and pour into it the-quick silver
cum auro, et festinanter cum ferro curvo et candente
with the-gold and hastily with the-iron curved and glowing
frica illud et mole, donec nihil sentias in vasculo, nisi
rub it and grind until nothing you-feel in the-little-vessel except
humorem; moxque effunde in aquam. Ejecta vero aqua illa,
moisture and-soon pour-it-out into water thrown-out however water that
mitte aurum in manum sinistram, et lava diligenter, probans
put the-gold into hand left and wash diligently testing
digito, si bene molitum sit; et si est, pone super pannum
with-finger if well ground it-be and if it-is place-it on a-cloth
lineum mundum, et jacta hac et illac, donec siccetur aqua.
linen clean and toss-it here and there until be-dried the-water

Caput XXXVI. Item alio modo.

Chapter XXXVI likewise in-another way

Quod si natura auri talis est, ut sic non possis molere,
but if the-nature of-the-gold such is that thus not you-can to-grind
accipe lapidem sabuleum, quadrum et æqualem, et in
take a-stone sandy square and level and in
medio ejus fac foramen latitudine trium digitorum et
the-middle of-it make a-hole in-width of-three fingers and

simili profunditate. Deinde para tibi lapidem duriorem
of-like depth then prepare for-yourself a-stone harder
illo, sic gracilem, ut possit in illo foramine converti, et
than-that so slender that it-can in that hole to-be-turned and
sic longum, ut possit in lignum figi et firmari,
so long that it-can into a-wood to-be-fixed and to-be-made-firm
quod lignum trium ulnarum et in inferiori parte, in
which wood of-three ells and in the-lower part in
qua lapis jungendus est, sit grossitudine unius tibiæ.
which the-stone to-be-joined is let-it-be of-the-thickness of-one shin
Super quem lapidem, altitudine dimidii pedis, transforetur
above which stone at-a-height of-half a-foot let-it-be-pierced
ipsum lignum, cui jungatur aliud lignum tenue latitudine
itself the-wood to-which be-joined another wood thin in-width
duarum palmarum, in quo cauda fiat, quæ foramen longi
of-two palms in which a-tail be-made which the-hole of-the-long
ligni pertranseat, superque tenue lignum ligetur lapis
wood pass-through and-above the-thin wood let-it-be-bound a-stone
magnitudinis unius pedis, a quo lapide sursum fiat
of-the-size of-one foot from which stone upward be-made
lignum gracile et rotunde incisum atque planum, ita ut inter
a-wood slender and roundly cut and smooth so that between
manus possit volvi. His ita compositis pone majorem
the-hands it-can to-be-turned these-things thus composed place the-greater
lapidem in pelvim, sive in vas ligneum æquale, et vide ut
stone into a-basin or into a-vessel wooden level and see that
lapis firmiter jaceat, et vas firmiter stet. Cumque aurum
the-stone firmly lie and the-vessel firmly stand and-when the-gold
cum vivo argento in foramen ejus miseris, et sabulum
with quick silver into the-hole of-it you-shall-have-put and sand
desuper atque aquam, impone lapidem minorem, qui ligno
above and water put-in the-stone smaller which to-the-wood

junctus est, tenensque in superiori parte ipsum lignum,
joined is and-holding at the-upper part itself the-wood
converte modicum inter manus tuas, et mox impulsu
turn-it a-little between hands your and soon by-the-impulse
illius lapidis, qui ligatus est inferius, circumferetur, sicque
of-that stone which bound is below it-will-be-carried-around and-thus
circumferendo mole per tres vel quatuor horas. Interdum
by-carrying-around grind through three or four hours sometimes
vero respice et proba digito, et rursum inmitte sabulum
however look and test with-finger and again put-in sand
cum aqua. Cumque girando et regirando ipsum sabulum
with water and-when by-turning and turning-back itself the-sand
cœperit ebullire et per lapidem diffundi, cum ligno
shall-have-begun to-bubble-up and over the-stone to-be-spread with a-wood
gracili longo et tenue recollige semper et in foramen
slender long and thin gather-it-up always and into the-hole
repone, ne forte aurum cum sabulo egeratur et non
put-it-back lest perhaps the-gold with the-sand be-carried-out and not
molatur. Quod cum pleniter molitum fuerit, eiciatur
be-ground which when fully ground it-shall-have-been let-it-be-taken-out
et lavetur et siccetur ut supra, ponaturque super libram.
and be-washed and be-dried as above and-let-it-be-placed on the-balance
Si vero quicquam defuerit, laventur sordes qui
if however anything shall-have-been-lacking let-them-be-washed the-dirt which
fluunt ex lapide, et sic invenitur, quia idcirco idem
flows from the-stone and thus it-is-found because for-that-reason the-same
lapis in vase ponitur. Hoc modo etiam argentum purum
stone in a-vessel is-placed in-this way also silver pure
tenuissime percussum et vivo argento admixtum moli
very-thinly beaten and with-quick silver mixed to-be-ground
debet, quia in calido vasculo cum calido ferro moli
ought because in a-hot little-vessel with a-hot iron to-be-ground

non valet. Sic autem commisceatur ut vivi argenti sint
not it-avails thus however let-it-be-mixed that of-quick silver there-be
quinque pondera, et sextum sit argentum purum.
five weights and the-sixth be silver pure

XXXVII–XXXIX · GILDING AND BURNISHING

A quicker grinding, with a warning against gilding on an empty stomach for the fumes of quicksilver. The silver is quickened with tartar, salt, and quicksilver, the amalgam spread with brushes and copper, the mercury driven off over coals, and the gilding burnished with brass-wire brushes.

Caput XXXVII. Item alio modo.

Chapter XXXVII likewise in-another way

Potes etiam aurum levius molere hoc modo. Accipe testam
you-can also gold more-easily to-grind in-this way take a-shard
ollæ capacem igne probatam, et pone in carbones donec
of-a-pot capacious by-fire tested and place-it in the-coals until
omnino candescant, et mitte in eam aurum vivo argento
wholly they-glow and put into it the-gold with-quick silver
mixtum ac minutatim confractum, tenensque cum forcipe vibra
mixed and in-small-bits broken and-holding-it with tongs shake
manum æqualiter, et mox videbis quomodo liquefiat aurum
hand evenly and soon you-will-see how melt the-gold
et commisceatur vivo argento. Cumque omnino liquidum
and be-mingled with-quick silver and-when wholly liquid
fuerit, mox funde in aquam atque lava et sicca ut supra.
it-shall-have-been soon pour-it into water and wash and dry as above
Hoc omnino cave, ne jejunus molas aut deaures, quia fœtor
this wholly beware lest fasting you-grind or gild because the-stench
vivi argenti magnum periculum est jejuno stomacho et
of-quick silver great danger is to-a-fasting stomach and

infirmitates diversas generat, contra quas uti debes ziduar et
illnesses various it-generates against which to-use you-ought zedoary and
baca lauri, pipere et allio atque vino. Posthæc appende ipsam
the-berry of-laurel pepper and garlic and wine after-this weigh itself
deauraturam in statera, et divide in duo, et medietatem
the-gilding in the-balance and divide-it into two and the-half
ejus rursum in duo, donec invenias singulos denarios, et
of-it again into two until you-find single pennyweights and
mitte eos sigillatim in pennas anseris, ut scias
put them one-by-one into quills of-a-goose so-that you-may-know
quantum unicuique loco deaurando superponas. Deinde percute
how-much on-each place to-be-gilded you-place then beat
partem cupri rubri in similitudinem fossorii ferri et
a-part of-copper red into the-likeness of-a-graving iron and
infige manubrio, summitatemque ejus lima et rade rotundam
fix-it in-a-handle and-the-top of-it file and scrape round
et aliquantum tenuem, quam fricabis cum vivo argento
and somewhat thin which you-will-rub with quick silver
donec alba fiat, et inde possis deaurare. Postea facies
until white it-become and thence you-can to-gild afterward you-will-make
confectionem ad innovandum opus deaurandum hoc modo.
a-preparation for refreshing the-work to-be-gilded in-this way

Caput XXXVIII. De invivandis et deaurandis auriculis.

Chapter XXXVIII about quickening and gilding the-little-ears

Sume vini lapidem, de qua supra diximus, et tere
take of-wine the-stone about which above we-spoke and grind
diligenter super lapidem siccum, addesque ei tertiam
diligently on a-stone dry and-you-will-add to-it a-third
partem salis, et mitte in testam ollæ capacem, infundens
part of-salt and put-it into a-shard of-a-pot capacious pouring-in
ei aquam illam, in quam projecisti aurum noviter molitum,
to-it water that into which you-threw the-gold newly ground

atque imponens modicum vivi argenti, mitte super carbones
and putting-in a-little of-quick silver put-it over the-coals
donec calidum fiat, et cum ligno commove. Habeas etiam
until hot it-become and with a-wood stir-it have also
setas porci grossitudine trium digitorum aut quatuor, ferro
bristles of-pig of-the-thickness of-three fingers or four with-iron
colligatas in medio, duas mundas, cum qua lavabis aurum
bound-together in the-middle two clean with which you-will-wash gold
et argentum, et duas cum quibus deaurabis, unam siccam et
and silver and two with which you-will-gild one dry and
alteram humidam. His omnibus ex hoc ordine compositis,
the-other moist these-things all in this order composed
accipe auriculas argenteas ad manus, et panniculum lineum
take the-little-ears silver into hands and a-little-cloth linen
complicatum tinge in confectionem calidam, cum quo
folded dip into the-preparation hot with which
fricabis omnia loca, quæ deaurare volueris in eis. Cumque
you-will-rub all the-places which to-gild you-shall-wish on them and-when
cœperint invivari, calefac eas super carbones et
they-shall-have-begun to-be-quickened heat them over the-coals and
cum setis ipsa confectione humidis frica illas fortiter,
with the-bristles with-the-very preparation moistened rub them strongly
donec omnes fossuræ vivo argento fiant albæ, interdum
until all the-engravings with-quick silver become white sometimes
calefaciendo et interdum fricando, et ubi cum setis non
by-heating and sometimes by-rubbing and where with the-bristles not
potueris pertingere, cum cupro deauratorio et ligno
you-shall-have-been-able to-reach with the-copper gilding and a-wood
gracili fricabis, faciens hoc super scutellam deauratoriam
slender you-will-rub doing this over a-dish gilding
ligneam, quæ sit ad modicum opus tornatilis et capax, et
wooden which be for small work turned and capacious and

ad magnum quadra, cava et æqualis. Deinde super ipsam
for large square hollow and level then over the-very
scutellam incide deauraturam cum cultello minutatim, et cum
dish cut the-gilding with a-knife in-small-bits and with
cupro deauratorio pone diligenter per omnia, et humidis
the-copper gilding place-it diligently through all and with-the-moist
setis æqua, atque cum forcipe longo et gracili in anteriori
bristles level and with tongs long and slender at the-front
parte duobus panniculis involuto levabis, et pones super
part with-two little-cloths wrapped you-will-lift and you-will-place-it over
carbones donec calefiat, et setis rursum æquabis, sicque
the-coals until it-grow-hot and with-the-bristles again you-will-level and-thus
tamdiu facies usque dum aurum per omnia adhæreat.
so-long you-will-do up-to while the-gold through all adhere
Secundo incide aurum et cum cupro superpone, atque
a-second-time cut gold and with the-copper place-it-over and
cum igne et setis fac sicut superius. Tertio vero similiter
with fire and bristles do as above a-third-time however likewise
facies. Cumque tertia vice aurum cœperit siccari,
you-will-do and-when at-the-third time the-gold shall-have-begun to-be-dried
cum siccis setis fricabis diligenter per omnia, rursumque
with dry bristles you-will-rub diligently through all and-again
calefacies, et iterum fricabis, donec incipiat pallescere.
you-will-heat and again you-will-rub until it-begin to-grow-pale
Si vero ex neglegentia contigerit, ut aliqua macula
if however from negligence it-shall-have-happened that any spot
appareat in argento, ubi aurum tenue sit et inæqualiter
appear on the-silver where the-gold thin be and unevenly
positum, cum cupro superpone, et cum siccis setis æqua,
placed with the-copper place-over and with dry bristles level
donec per omnia æquale sit. Quod cum videris, mitte
until through all even it-be which when you-shall-have-seen put-it

in aquam et mundis setis lava, rursumque ponens super
into water and with-clean bristles wash and-again placing-it over
carbones tamdiu calefac, donec omnino croceum fiat.
the-coals so-long heat until wholly saffron-yellow it-become

Caput XXXIX. De polienda deauratura.
Chapter XXXIX about polishing the-gilding

Tolle fila ex auricalco gracilia, complicans ea ita, ut
take wires from brass slender folding them so that
plicaturæ sint ad longitudinem minimi digiti; et cum
the-folds be to the-length of-the-little finger and when
quadruplices fuerint, colliga eos filo lineo, ut
fourfold they-shall-have-been bind-together them with-thread linen so-that
sit quasi una pars. Ex his partibus fac quatuor aut
it-be as-if one part from these parts make four or
quinque, vel sex, ita ut una pars habeat tres plicaturas,
five or six so that one part have three folds
alia quatuor, tertia quinque, et sic ascendendo usque ad
another four the-third five and thus by-ascending up-to to
octo. Quibus omnibus singillatim colligatis, fac modicum
eight which all singly bound-together make a-small
foramen in ligno, in quod pones ex his particulis unam,
hole in a-wood into which you-will-place from these little-parts one
et infunde plumbum, ita ut cum frigidum fuerit et
and pour-in lead so that when cold it-shall-have-been and
extraxeris, adhæreant sibi ipsæ plicaturæ quasi
you-shall-have-drawn-it-out cling to-each-other themselves the-folds as-if
plumbeo nodo infixæ. Hoc modo fac singulis partibus singulos
in-a-lead knot fixed in-this way make for-single parts single
nodos plumbeos, et incidens plicaturas omnes in altera parte,
knots lead and cutting the-folds all on the-other side
et lima et rade summitates earum, ut rotundæ fiant et
and file and scrape the-tops of-them so-that round they-become and

æquales; cum quibus quasi scalpendo polieris, polies
equal with which as-if by-scratching you-shall-have-polished you-will-polish
auriculas deauratas in aqua pura et vase munda. Quas
the-little-ears gilded in water pure and a-vessel clean which
cum extremi parte sculpendo polieris, pone super
when of-the-end part by-carving you-shall-have-polished place-them over
carbones donec calefactæ in fulvum colorem convertantur, et
the-coals until heated into a-tawny color they-be-turned and
perdant claritatem, quam poliendo acceperant, extinctasque in
lose the-brightness which by-polishing they-had-received and-quenched in
aqua rursum diligenter scalpendo polies, donec eximium
water again diligently by-scratching you-will-polish until a-surpassing
fulgorem accipiant, sicque colorabis eas tali confectione.
brightness they-receive and-thus you-will-color them with-such a-preparation

XL–XLIV · COLORING GOLD AND FINISHING THE CHALICE

Gold is colored with burned vitriol and salt; niello is polished with soft stone and linden wood; the ribs of the bowl are engraved and punched, the handles fixed with golden nails, and the foot and paten finished to match.

Caput XL. De colorando auro.
Chapter XL about coloring gold
Sume atramentum, et mitte in testam ollæ mundam et igne
take vitriol and put-it into a-shard of-a-pot clean and by-fire
probatam, ponens super carbones, donec omnino liquefiat et
tested placing-it over coals until wholly it-melt and
indurescat. Deinde aufer a testa et mitte sub ipsos
harden then take-it-away from the-shard and put-it under themselves
carbones, atque cooperi diligenter, atque cum folle suffla,
the-coals and cover-it diligently and with the-bellows blow

donec comburatur et in rubeum colorem convertatur. Statim
until it-be-burned and into a-red color be-turned at-once
ablatum ab igne cum refrigeratum fuerit, tere in
taken-away from the-fire when cooled it-shall-have-been grind-it in
scutella lignea cum malleo ferreo, addens ei tertiam partem
a-dish wooden with a-hammer iron adding to-it a-third part
salis, temperansque cum vino sive urina, rursum fortiter tere,
of-salt and-tempering-it with wine or urine again strongly grind
donec spissum fiat sicut fex. Ex hac confectione cum penna
until thick it-become as lees with this preparation with a-feather
cooperi quod deauratum est, sic ut nihil auri appareat, et
cover what gilded is so that nothing of-gold appear and
pone super carbones, donec exsiccetur, et fumus ex omni parte
place-it over coals until it-be-dried and smoke from every side
modicum appareat, et mox auferens ab igne mitte in aquam,
a-little appear and soon taking-it from the-fire put-it into water
lavans diligenter cum setis porci mundis, rursumque siccabis
washing diligently with bristles of-pig clean and-again you-will-dry-it
super carbones, involve panno mundo donec refrigeretur.
over coals wrap-it in-a-cloth clean until it-be-cooled

Caput XLI. De poliendo nigello.

Chapter XLI about polishing niello

Tenens vero illud in eodem panno, rade diligenter omnia
holding however it in the-same cloth scrape diligently all
loca, quæ nigello denigrata sunt, cum ferro rasorio. Post
the-places which with-niello blackened are with the-iron scraping after
hæc habeas lapidem nigrum et mollem, qui leviter possit
these-things have a-stone black and soft which lightly it-can
incidi et pene cum ungue radi, et cum illo fricabis
to-be-cut and almost with the-fingernail to-be-scraped and with that you-will-rub
nigellum cum saliva madefactum diligenter ac æqualiter per
the-niello with saliva moistened diligently and evenly through

omnia, donec omnes tractus aperte videantur et omnino
all until all the-strokes openly be-seen and wholly
æquum sit. Habeas etiam lignum de arbore tilia, grossitudine
even it-be have also a-wood from the-tree linden of-the-thickness
et longitudine majoris digiti, siccum et æqualiter incisum;
and length of-a-greater finger dry and evenly cut
super quod pones pulverem illum humidum, qui procedit
on which you-will-place the-powder that moist which proceeds
de lapide et saliva in fricando, et cum ipso ligno ac
from the-stone and saliva in rubbing and with that wood and
eodem pulvere diutissime fricabis nigellum, et leviter
the-same powder very-long you-will-rub the-niello and lightly
semperque adde salivam ut humidum sit, donec lucidum
and-always add saliva so-that moist it-be until shining
fiat per omnia. Deinde tolle sepum de auriculæ tuæ
it-become through all then take tallow from of-the-ear your
foramine, et cum exterseris nigellum lineo panno
the-hole and when you-shall-have-wiped the-niello with-a-linen cloth
subtili, per omnia linies, et cum corio hircino, sive
fine through all you-will-smear-it and with hide of-goat or
cervino leniter fricabis, donec omnino clarum fiat.
of-deer gently you-will-rub until wholly bright it-become

Caput XLII. De ornando vase calicis.

Chapter XLII about adorning the-bowl of-the-chalice

Tali modo auriculis pleniter perfectis, accipe vas calicis,
in-such way the-little-ears fully finished take the-bowl of-the-chalice
cujus costas superius denigrasti dimidias, et illas, quas
whose ribs above you-blackened half and those which
inter has absque nigello reliquisti, lima æqualiter et rade,
between these without niello you-left file evenly and scrape
ac pertrahe in eis opus quodcunque volueris, sic tamen
and draw on them work whatever you-shall-wish thus nevertheless

ut aliquantulum discrepet ab opere nigelli, atque cum
that somewhat it-differ from the-work of-the-niello and with
fossorio ferro gracili subtiliter fode. Post hæc deaurabis
a-graving iron slender finely engrave after these-things you-will-gild
eas, totumque vas interius et exterius excepto nigello, et
them and-the-whole bowl within and on-the-outside except the-niello and
polies atque colorabis sicut auriculas. Deinde cooperies et
you-will-polish and you-will-color as the-little-ears then you-will-cover and
circumligabis rotundam incudem cum pergamena æquali, supra
you-will-bind-around the-round anvil with parchment level on
quæ pones vas, quod teneat puer ante te sedens utrisque
which you-will-place the-bowl which may-hold a-boy before you sitting with-both
manibus, coaptans unamquamque costam incudi æqualiter,
hands fitting each rib to-the-anvil evenly
secundum quod ei jusseris. Interim tolle ferrum gracile,
according-to what him you-shall-have-ordered meanwhile take the-iron slender
quod foramen habet in cuspide, cujus percussura subtilissimum
which a-hole has at the-point whose stroke a-very-fine
circulum fac, et cum illo implebis omnes campos in
circle make and with that you-will-fill all the-fields in
deauratis costis, desuper cum malleo leniter percutiendo, et
the-gilded ribs above with a-hammer gently by-striking and
opere punctorum unumquemque circulum alteri ordinatim
by-work of-dots each circle to-the-other in-order
conjungendo. Quo expleto mitte vas super carbones, donec
by-joining which completed put the-bowl over coals until
illæ percussuræ interius fulvum colorem recipiant, nigellumque
those strokes within a-tawny color receive and-the-niello
limabis et polies sicut superius. Deinde conjunge auriculas
you-will-file and you-will-polish as above then join the-little-ears
unamquamque in suo loco, et trans foramina, quæ in eis
each in its place and across the-holes which in them

sunt, confige eas aureis clavis cum gracili ferreo malleo
are fasten them with-golden nails with a-slender iron hammer
desuper feriendo, et altero ferro subposito donec firmiter
from-above by-striking and with-another iron placed-under until firmly
stent, et rade diligenter atque poli cum obtuso ferro ipsas
they-stand and scrape diligently and polish with a-blunt iron themselves
percussuras, ut nemo percipere possit, qualiter adhæreant.
the-strokes so-that no-one to-perceive can how they-cling

Caput XLIII. De pede calicis.
Chapter XLIII about the-foot of-the-chalice

Post hæc sume quartam partem argenti, addens ei
after these-things take the-fourth part of-the-silver adding to-it
quicquid a vase limasti et rasisti; funde ordine quo
whatever from the-bowl you-filed and scraped cast-it in-the-order in-which
supra; unde facies pedem cum nodo sicut pedem minoris
above whence you-will-make the-foot with the-knop as the-foot of-the-smaller
calicis, excepto quod in hoc majori formabis costas a
chalice except that in this greater-one you-will-form ribs from
latitudine pedis inferius ascendentes usque ad nodum, quas
the-width of-the-foot below ascending up-to to the-knop which
dimidias denigrabis, et alias fodies et deaurabis atque
half you-will-blacken and the-others you-will-engrave and you-will-gild and
modis omnibus decorabis sicut in vase. Quo perfecto anulum
in-ways all you-will-adorn as on the-bowl which finished the-ring
quoque, qui ponendus est inter vas et nodum, deaurabis
also which to-be-placed is between the-bowl and knop you-will-gild
atque conjunges, et configes sicut minorem calicem.
and you-will-join and you-will-fasten as the-smaller chalice

Caput XLIV. De patena calicis.

Chapter XLIV about the-paten of-the-chalice

Deinde quicquid residui fuerit argenti, funde:

then whatever of-remainder there-shall-have-been of-silver cast

unde facies patenam. Quam cum attenuaveris, fac

whence you-will-make the-paten which when you-shall-have-thinned make

in medio ejus circulum secundum latitudinem calicis, et

in the-middle of-it a-circle according-to the-width of-the-chalice and

infra hunc circulum metire octo spatia æqualiter divisa, et

within this circle measure eight spaces equally divided and

in unoquoque spatio fac circulum dimidium, ut sint

in each space make a-circle half so-that there-be

quasi octo arcus, quos cum rotundo malleo percuties donec

as-if eight arches which with a-round hammer you-will-beat until

cavi fiant, et inferius ductili opere percuties angulos

hollow they-become and below by-repoussé work you-will-beat the-angles

inter ipsos arcus, et limbum circa eos latitudine minoris

between themselves the-arches and a-border around them in-width of-the-smaller

ungulæ, qui superemineat æqualitatem totius patenæ; quem

fingernail which rise-above the-evenness of-the-whole paten which

fodies subtiliter et denigrabis, reliquamque patenam

you-will-engrave finely and you-will-blacken and-the-remaining paten

deaurabis, et polies utrumque sicut superius.

you-will-gild and you-will-polish both as above

The drinking tube for the chalice is soldered round a tapered iron. Silver must be scraped before gilding or it blisters. Then the kinds of gold: of Havilah, Arabian gold that the moderns counterfeit with copper, and Spanish gold made from copper, the powder of basilisks hatched by toads, and a red-haired man's blood.

Caput XLV. De fistula.

Chapter XLV about the-tube

Fistulam quoque facies in calice hoc modo. Fac tibi

a-tube also you-will-make on the-chalice in-this way make for-yourself

ferrum longitudine palmi unius et quatuor digitorum, quod

an-iron in-length of-palm one and four fingers which

in una summitate valde sit gracile, et inde procedat grossius

at one top very be slender and thence proceed thicker

et grossius usque ad alteram summitatem, quæ sit sicut

and thicker up-to to the-other top which be as

festuca; sitque ferrum rotundum et æqualiter limatum.

a-straw and-let-be the-iron round and evenly filed

Cumque attenuaveris argentum purum, complica illud

and-when you-shall-have-thinned silver pure fold it

circa hoc ferrum, conjungens summitates æqualiter cum lima,

around this iron joining the-edges evenly with a-file

ejectoque ferro mitte in ignem et solida. Rursum imposito

and-taken-out the-iron put-it into the-fire and solder-it again placed-in

ferro percute cum malleo æqualiter per omnia tamdiu,

the-iron beat with a-hammer evenly through all so-long

donec junctura non appareat. Deinde fac nodum singulariter

until the-joint not appear then make a-knop separately

rotundum et cavum, sive quadrangulum et solidum, et fac

round and hollow or quadrangular and solid and make

in eo foramen, per quod inmittatur fistula ab inferiori
in it a-hole through which be-put-in the-tube from the-lower
parte, usque pene ad summum, sicque ejecto ferro rursum
part up-to almost to the-top and-thus taken-out the-iron again
solidabis per omnia. Cumque firmum fuerit, denuo
you-will-solder through all and-when firm it-shall-have-been anew
imposito ferro percuties undique a nodo deorsum donec
placed-in the-iron you-will-beat on-all-sides from the-knop downward until
æqualis fiat et rigida, et a nodo sursum. Ea parte,
even it-become and stiff and from the-knop upward on-that part
quæ latior et grossior est, impone tenue ferrum, latum
which broader and thicker is put-in a-thin iron broad
secundum amplitudinem fistulæ, atque cum malleolo percute
according-to the-breadth of-the-tube and with a-small-hammer beat
super incudem, ita ut foramen superius sit quadrum et
on an-anvil so that the-opening above be square and
tenue, quod a nodo sursum super calicem eminere debet,
thin which from the-knop upward over the-chalice to-stand-out ought
et ore teneri, inferius vero sit rotundum et gracile.
and by-mouth to-be-held below however let-it-be round and slender
Quo facto, si volueris, nodum cum nigello variare poteris,
which done if you-shall-wish the-knop with niello to-vary you-will-be-able
et reliquam fistulam ordine quo supra deaurabis. Hoc
and the-remaining tube in-the-order in-which above you-will-gild this
omnino cave, ut omne argentum spissum quod deaurare
wholly take-care that all silver thick which to-gild
volueris, sive in calice seu in scypho, vel in scutella aut
you-shall-wish whether on a-chalice or on a-cup or on a-dish or
ampulla, fortiter radas, quia in percutiendo ab igne et
flask strongly you-scrape because in beating from fire and
malleo cutem ex se trahit, quæ si abrasa non fuerit,
hammer a-skin from itself it-draws which if scraped-off not it-shall-have-been

cum deauratur et super ignem frequenter et diu coloratur,
when it-is-gilded and over fire frequently and long is-colored
elevantur per loca subtiles vesicæ, quæ cum franguntur
are-raised in places fine bubbles which when they-are-broken
apparet argentum, et opus deturpatur, nec potest emendari
appears the-silver and the-work is-disfigured nor can-it to-be-amended
nisi deauratura omnino eradatur, et denuo deaurabis.
unless the-gilding wholly be-scraped-off and anew you-will-gild

Caput XLVI. De auro terræ Evilat.
Chapter XLVI about the-gold of-the-land of-Havilah

Auri multa sunt genera, ex quibus præcipuum nascitur
of-gold many are kinds of which the-chief is-born
in terra Evilat, quam Gyon fluvius circuit secundum
in the-land of-Havilah which the-Gihon river encircles according-to
Genesin. Cujus venas, cum sub terra invenerint viri hujus
Genesis whose veins when under the-earth have-found men of-this
artis periti, effodiunt, et igne purificatum atque camino
of-art skilled they-dig-out and by-fire purified and in-the-furnace
probatum in usus suos redigunt.
tested to uses their they-bring

Caput XLVII. De auro Arabico.
Chapter XLVII about gold Arabian

Est et aurum Arabicum pretiosissimum et eximii ruboris,
there-is also gold Arabian most-precious and of-surpassing redness
cujus usus in antiquissimis vasis frequenter reperitur, cujus
whose use in most-ancient vessels frequently is-found with-whose
specie moderni operarii utuntur, dum pallido auro quintam
appearance modern workmen make-use while to-pale gold a-fifth
partem rubei cupri addunt, et multos incautos decipiunt.
part of-red copper they-add and many incautious they-deceive
Quod hoc modo caveri potest, ut mittatur in
which in-this way to-be-guarded-against can that it-be-put into

ignem, et si purum aurum est, non amittit fulgorem, si
fire and if pure gold it-is not it-loses the-brightness if
vero ammixtum, omnino amittit fulgorem.
however mixed wholly it-loses the-brightness

Caput XLVIII. De auro Hispanico.

Chapter XLVIII about gold Spanish

Est etiam aurum, quod dicitur Hispanicum, quod conficitur
there-is also gold which is-called Spanish which is-made
ex rubeo cupro et pulvere basilisci et sanguine humano
from red copper and powder of-basilisk and blood human
atque aceto. Gentiles enim, quorum peritia in hac arte
and vinegar the-gentiles for whose skill in this art
probabilis est, creant sibi basiliscos hoc modo. Habent
commendable is create for-themselves basilisks in-this way they-have
sub terra domum superius et inferius et ex omni parte
under the-earth a-house above and below and on every side
lapideam, cum duabus fenestellis tam brevibus, ut vix
stone with two little-windows so short that scarcely
aliquid appareat per eas; in quam ponunt duos gallos
anything appear through them into which they-place two cocks
veteres duodecim aut quindecim annorum, et dant eis
old of-twelve or fifteen years and they-give to-them
sufficienter cibum. Qui cum ingrassati fuerint, ex calore
sufficiently food who when fattened they-shall-have-been from the-heat
pinguedinis conveniunt inter se et ponunt ova. Quibus
of-fatness come-together among themselves and lay eggs which
positis eiciuntur galli et immittuntur bufones, qui ova
laid are-thrown-out the-cocks and are-put-in toads which the-eggs
foveant, quibus datur panis in cibum. Fotis autem ovis
may-brood to-which is-given bread for food hatched however the-eggs
egrediuntur pulli masculi sicut pulli gallinarum, quibus post
come-out chicks male as chicks of-hens on-whom after

dies septem crescunt caudæ serpentium, statimque, si non
days seven grow tails of-serpents and-at-once if not
esset pavimentum domus lapideum, terram intrarent.
there-were the-pavement of-the-house of-stone the-earth they-would-enter
Quod caventes eorum magistri habent vasa ænea rotunda,
which guarding-against their masters have vessels bronze round
magnæ amplitudinis, ex omni parte perforata, quorum ora
of-great breadth on every side pierced whose mouths
sunt constricta, quibus imponunt ipsos pullos et obstruunt
are narrowed in-which they-put themselves the-chicks and they-block
ora cupreis cooperculis atque sub terra infodiunt, et
the-mouths with-copper lids and under the-earth bury-them and
ingrediente subtili terra per foramina nutriuntur sex
entering fine earth through the-holes they-are-nourished for-six
mensibus. Post hæc discooperiunt et copiosum ignem
months after these-things they-uncover-them and copious fire
apponunt, donec bestiæ interius omnino comburantur. Quo
apply until the-beasts within wholly be-burned which
facto cum refrigeratum fuerit, eiciunt et diligenter
done when cooled it-shall-have-been they-take-out and diligently
terunt, addentes ei tertiam partem sanguinis hominis rufi,
grind adding to-it a-third part of-the-blood of-a-man red-haired
qui sanguis exsiccatus tritus erit. Hæc duo composita
which blood dried ground will-be these two composed
temperantur aceto acri in vase mundo; deinde accipiunt
are-tempered with-vinegar sharp in a-vessel clean then they-take
tenuissimas tabulas rubei cupri purissimi, et super eas liniunt
very-thin plates of-red copper very-pure and on them they-smear
hanc confectionem ex utraque parte atque mittunt in ignem.
this preparation on each side and they-put-them into the-fire
Cumque canduerint, extrahunt et in eadem confectione
and-when they-shall-have-glowed they-draw-them-out and in the-same preparation

extingunt et lavant, sicque tamdiu faciunt donec ipsa
they-quench and wash and-thus so-long they-do until itself
confectio cuprum transmordeat, et inde pondus et colorem
the-preparation the-copper eat-through and thence the-weight and color
auri suscipiat. Hoc aurum omnibus operibus aptum est.
of-gold take-on this gold for-all works fit is

XLIX–LII · THE GOLD CHALICE AND ITS SOLDER

Gold is washed from Rhine sand. A gold chalice is cast and divided as the silver one; its handles are set with gems and pearls in wire collets and filigree flowers, fixed with flour paste and soldered with a lye-and-copper flux, then joined to the bowl in the fire.

Caput XLIX. De auro arenario.
Chapter XLIX about gold sand
Est aurum arenarium quod reperitur in litoribus Rheni
there-is gold sand which is-found on the-shores of-the-Rhine
hoc modo. Fodiuntur arenæ in locis illis, ubi spes reperiendi
in-this way are-dug the-sands in places those where hope of-finding
fuerit, et ponuntur super ligneas tabulas. Deinde
shall-have-been and are-placed on wooden boards then
superfunditur aqua frequenter et diligenter, effluentibusque
is-poured-over water frequently and diligently and-flowing-away
arenis remanet aurum subtilissimum, quod singulariter
the-sands remains gold very-fine which separately
in vasculo ponitur. Cumque vas dimidium fuerit,
in a-little-vessel is-placed and-when the-vessel half shall-have-been
imponitur vivum argentum, et manu fortiter fricatur, donec
is-put-in quick silver and by-hand strongly is-rubbed until
omnino commisceatur, sicque positum in pannum subtile
wholly it-be-mingled and-thus placed in a-cloth fine

extorquetur vivum argentum; quod vero remanserit
is-wrung-out the-quick silver what however shall-have-remained
ponitur in vas fusorium et funditur.
is-placed in a-vessel casting and is-melted
Caput L. De fabricando aureo calice.
Chapter L about making a-golden chalice
Igitur cujuscunque generis aurum habueris, si calicem inde
therefore of-whatever kind gold you-shall-have if a-chalice thence
componere volueris et ornare lapidibus et electris atque
to-compose you-shall-wish and to-adorn with-stones and enamels and
margaritis, hoc modo incipias. Primum proba singulas
pearls in-this way you-should-begin first test the-single
partes auri, si possint cum malleo percuti sic ut non
parts of-gold if they-can with a-hammer to-be-beaten so that not
findantur, et quicquid non finditur singulariter pone; quod
they-be-split and whatever not is-split separately place what
vero finditur, singulariter ut coquatur. Deinde accipe
however is-split separately so-that it-be-cooked then take
partem lateris cocti, et secundum quantitatem auri coquendi,
a-part of-brick baked and according-to the-quantity of-gold to-be-cooked
fode in ea fossulam, quæ illud capere possit; et si non
dig in it a-little-pit which it to-hold can and if not
habeas laterem, in lapide sabuleo item quadro, facta fossula
you-have a-brick in a-stone sandy likewise square made a-little-pit
cum ferro, mitte in carbones et suffla. Cumque canduerit,
with iron put-it into the-coals and blow and-when it-shall-have-glowed
impone aurum, superjectisque carbonibus suffla diutissime
put-in the-gold and-thrown-over coals blow very-long
atque ejectum percute cum malleo; si non frangitur, sufficit
and taken-out beat with a-hammer if not it-is-broken it-suffices
ei; si vero frangitur, super alium lapidem iterum repone, et
for-it if however it-is-broken on another stone again put-it and

hoc tamdiu facias, donec percussum non frangatur. Quod si
this so-long do until beaten not it-be-broken but if
modice finditur, funde illud cum sulphure, et sic emendabitur.
slightly it-is-split melt it with sulfur and thus it-will-be-amended
Quo facto aurum omne pariter funde, et in unam massam
which done the-gold all together melt and into one mass
redige, atque super stateram eo modo, quo argentum
bring and on the-balance in-that way in-which the-silver
superius divisisti, divide, parique ordine secundum formam
above you-divided divide and-in-like order according-to the-form
quam volueris, sicque ut prolibuerit auriculas formabis. Quod
which you-shall-wish and-thus as shall-please the-little-ears you-will-form but
si opere gemmato facere volueris, percute per duas partes
if by-work gemmed to-make you-shall-wish beat through two parts
auri tantum, ut vestigium ungulæ possit ei leniter
of-gold so-much that the-trace of-the-fingernail can on-it gently
imprimi, et eas incide ea forma, qua volueris auriculas
to-be-impressed and them cut in-that form in-which you-shall-wish the-little-ears
habere, quæ partes utræque ad unam pertinent auriculam.
to-have which parts both to one belong little-ear

Caput LI. De solidatura auri.

Chapter LI about the-solder of-gold

Deinde compone solidaturam hoc modo. Tolle cineres fagineos,
then compose the-solder in-this way take ashes beech
et fac inde laxivam, quam rursum colabis per eosdem
and make thence lye which again you-will-strain through the-same
cineres, ut spissa fiat. Rursum mitte in patellam et coque
ashes so-that thick it-become again put-it into a-dish and boil
usque ad tertiam partem, et impone ei modicum smigmatis
up-to to the-third part and put-in to-it a-little of-soap
et parum arvinæ suillæ veteris. Cumque frigidum fuerit
and a-little of-lard pig old and-when cold it-shall-have-been

et resederit, cola diligenter per pannum et mitte in vas
and shall-have-settled strain diligently through a-cloth and put-it into a-vessel
cupreum, quod sit ex omni solidum, excepto modico foramine,
copper which be on every-side solid except a-small hole
quod superius emineat, rotundum, ut possit digito obstrui.
which above stand-out round so-that it-can by-finger to-be-stopped
Post hæc tolle partem cupri tenuem, quem madefacies
after these-things take a-part of-copper thin which you-will-wet
aqua, et fricabis super eum salem ex utraque parte,
with-water and you-will-rub over it salt on each side
mittesque in ignem, et cum canduerit extingue in
and-you-will-put-it into the-fire and when it-shall-have-glowed quench-it in
pelvi munda et aqua pura, in qua servetur quicquid ex cupro
a-basin clean and water pure in which be-kept whatever from the-copper
comburitur. Rursumque frica salem supra cuprum et fac sicut
is-burned and-again rub salt over the-copper and do as
prius, et hoc tamdiu donec sufficiat. Deinde effunde aquam
before and this so-long until it-suffice then pour-off the-water
et exsicca pulverem in cupreo vase, et tere eum in eodem
and dry the-powder in a-copper vessel and grind it in the-same
vase cum ferreo malleo donec tenuissimus fiat, ponensque
vessel with an-iron hammer until very-fine it-become and-placing-it
super carbones rursum combure, atque ut prius tere. Cumque
over coals again burn and as before grind and-when
imposueris smigma, commisce diligenter, ponensque super
you-shall-have-put-in the-soap mix diligently and-placing-it over
prunas pariter combure ac denuo tere. Postea ex anteriori
the-embers likewise burn and anew grind afterward from the-earlier
vase funde laxivam in illud, in quo est pulvis, et commisce
vessel pour the-lye into that in which is the-powder and mix
atque fac bullire diu, et cum frigidum fuerit refunde
and make it-boil long and when cold it-shall-have-been pour-back

simul cum pulvere ubi prius erat, ubi etiam quatuor particulas
together with the-powder where before it-was where also four little-pieces
cupri imponas, per quas commisceatur pulvis per omnia
of-copper you-should-put through which be-mixed the-powder through all
quoties movere volueris. Hac confectione solidatur aurum
as-often-as to-stir you-shall-wish with-this preparation is-soldered gold
et argentum; sed in solidando auro commoveatur pulvis, ut
and silver but in soldering gold let-it-be-stirred the-powder as
supra dictum est, in argento vero solidando non moveatur.
above said it-is in silver however soldering not let-it-be-stirred

Caput LII. De imponenda solidatura in auro.

Chapter LII about putting solder on gold

His ita compositis accipe illas duas partes auri, in
these-things thus composed take those two parts of-gold in
quibus auriculam formasti, et pone coram te, gemmasque
which the-little-ear you-formed and place-them before you and-the-gems
quas imponere volueris, colloca super eas, et margaritas,
which to-put-on you-shall-wish set on them and the-pearls
unamquamque in suo loco. Deinde percute aurum gracile et
each in its place then beat gold slender and
longum, et trahe inde fila grossa, mediocria et subtilia, et
long and draw thence wires thick middling and fine and
lima ea ferro supradicto, ita ut in eis grana formentur.
file them with-the-iron above-said so that on them grains be-formed
Quibus recoctis, repositis et colligatis singulariter gemmis,
which reheated put-back and bound-together singly the-gems
partem majoris fili aptabis cum forcipe subtili circa oram
a-part of-the-greater wire you-will-fit with tongs fine around the-edge
auris in superficie in utrisque partibus illis, et cum
of-the-ear on the-surface on both parts those and with
forcipe incisorio facies subtilissimas incisuras in circuitu,
tongs cutting you-will-make very-fine cuts in circuit

quibus confirmabis ipsa fila ne cadant, donec solidentur.
by-which you-will-fix themselves the-wires lest they-fall until they-be-soldered
Postmodum accipe partem auri tenuem et ligneo
afterward take a-part of-gold thin and with-a-wooden
malleo æquatam, et colloca super eam fila mediocria multa
hammer leveled and set on it wires middling many
ordinatim, ita ut non sibi adhæreant, sed habeant spatia
in-order so that not to-each-other they-cling but have spaces
inter se; in summitatibus eorum fiant subtiles
between themselves at the-tops of-them let-them-be-made fine
incisuræ in tenui auro, quibus ligentur. Acceptoque
cuts in the-thin gold by-which they-may-be-bound and-taken
vasculo in quo est solidatura, concute fortiter, ut
the-little-vessel in which is the-solder shake strongly so-that
commisceatur pulvis, et cum penna gracili linies ipsam
be-mixed the-powder and with a-quill slender you-will-smear itself
solidaturam super aurum illud et super fila diligenter
the-solder over gold that and over the-wires diligently
per omnia, mittesque in ignem atque sufflabis ore
through all and-you-will-put-it into the-fire and you-will-blow with-mouth
et folle, donec videas ipsam solidaturam ita circumquaque
and bellows until you-see itself the-solder so all-around
discurrere, quasi aqua perfundatur. Et mox asperges
run as-if water were-poured-over and soon you-will-sprinkle-it
aqua modice atque eicies, et diligenter lavabis,
with-water moderately and you-will-take-it-out and diligently you-will-wash
rursumque linies solidaturam ac sicut prius solidabis,
and-again you-will-smear solder and as before you-will-solder
donec omnia fila firmiter stent. Post hæc incide per
until all the-wires firmly stand after these-things cut into
particulas quasi corrigias ita, ut unaquæque corrigia habeat
little-pieces as-if straps so that each strap have

filum unum, quas statim complicabis et facies inde
wire one which at-once you-will-fold and you-will-make thence
domunculas, quibus lapides claudantur, minores et majores
little-houses by-which the-stones be-enclosed smaller and greater
ad mensuram uniuscujusque, ordinabisque eas in suis locis.
to the-measure of-each and-you-will-arrange them in their places
Habebis quoque farinam de simila frumenti sive siliginis,
you-will-have also flour from fine-meal of-wheat or of-rye
quam miscebis aqua in parvulo vasculo, et pones
which you-will-mix with-water in a-very-small little-vessel and you-will-place-it
super carbones, ut parum calefiat; in quam tinges
over coals so-that a-little it-grow-warm into which you-will-dip
modice domunculas illas, unamquamque in inferiorem partem,
moderately little-houses those each on the-lower part
sicque stabilies in suo loco. Omnibus vero stabilitis
and-thus you-will-set-it in its place all however set
pone super carbones partem auri super quam stabilisti,
place over coals the-part of-gold on which you-set-them
donec exsiccetur humor farinæ, et mox adhærebunt.
until be-dried the-moisture of-the-flour and soon they-will-cling
Tolle quoque fila subtilia, et percute ea modice super
take also wires fine and beat them moderately on
incudem, ita ut aliquantulum tenuia sint, et tamen grana
the-anvil so that somewhat thin they-be and nevertheless the-grains
superius et inferius non procedant vel perdant formam
above and below not go-forth or lose form
suam, in quibus complicabis flosculos majores et minores,
their in which you-will-fold little-flowers greater and smaller
unde implebis campos omnes inter domunculas; quos cum
whence you-will-fill the-fields all between the-little-houses which when
formaveris subtili forcipe, intinges eos in humida farina,
you-shall-have-formed with-fine tongs you-will-dip them in moist flour

sicque collocabis unamquamque in suo loco. Quo facto pone
and-thus you-will-set each in its place which done place-it
super carbones, ut farina siccetur, statimque superlinies
over coals so-that the-flour be-dried and-at-once you-will-smear-over
solidaturam, et solidabis sicut superius. Hoc modo utrisque
the-solder and you-will-solder as above in-this way both
partibus unius auriculæ solidatis ac firmatis, conjunge eas et
parts of-one little-ear soldered and made-firm join them and
interpone eis fundum in circuitu juxta oram interiorem,
put-between to-them a-bottom in circuit beside the-edge inner
videlicet unam tenuem partem auri, quæ sit lata sicut
namely one thin part of-gold which be broad as
festuca, et æqualis per omnia. Quam partem cum inter
a-straw and even through all which part when between
illas duas junxeris, complica tres particulas ferri tenues,
those two you-shall-have-joined fold three little-pieces of-iron thin
et fac inde retinacula, quæ teneant exteriores partes auri
and make thence clamps which hold the-outer parts of-the-gold
exterius in tribus locis, ut tertia, quæ interius juxta
on-the-outside in three places so-that the-third which within beside
oras circuit, non possit disjungi. Quo facto linies ex
the-edges goes-around not it-can to-be-disjoined which done you-will-smear on
omni parte solidaturam, et siccabis modice super ignem;
every side solder and you-will-dry-it moderately over the-fire
dispositisque carbonibus et accensis, facies inter eos
and-disposed coals and kindled you-will-make between them
fossulam, in quam pones ipsam auriculam, et circa eam
a-little-pit into which you-will-place itself the-little-ear and around it
collocabis carbones ita, ut non contingant aurum, sed in
you-will-set coals so that not they-touch the-gold but in
similitudinem muri ascendant in circuitu, donec emineant
the-likeness of-a-wall rise in circuit until they-stand-out

super aurum; et tunc collocabis desuper graciles ferros
above the-gold and then you-will-set above slender irons
duos, vel tres, qui pertranseant, super quos collocabis per
two or three which pass-across over which you-will-set through
omnia carbones, et cooperies diligenter, sic tamen ut
all coals and you-will-cover diligently thus nevertheless that
aliqua foramina inter ipsos carbones remaneant, per quæ
some holes between themselves the-coals remain through which
possis considerare, qualiter solidatura circumfluat. Quod cum
you-can to-consider how the-solder flow-around which when
videris, statim aspersa modica aqua, eicies atque
you-shall-have-seen at-once sprinkled a-little water you-will-take-it-out and
lavabis leniter et siccabis, circumspiciensque diligenter si
you-will-wash gently and you-will-dry and-looking-around diligently if
quid corrigendum est, corrigas, rursumque liniens sicut
anything to-be-corrected is you-should-correct and-again smearing as
prius, solidabis, sicque facies, donec per omnia firmum
before you-will-solder and-thus you-will-do until through all firm
fiat. Hoc modo partem auriculam formabis et solidabis.
it-become in-this way on-one-part the-little-ear you-will-form and you-will-solder
Quo peracto junge eas utrasque ad vas calicis in suis
which completed join them both to the-bowl of-the-chalice in their
locis, et circa eas facies duos tractus in ipso vase
places and around them you-will-make two strokes on the-very bowl
cum subula, per quos possis considerare, ut recte stent
with an-awl through which you-can to-consider that rightly they-stand
in solidando. Deinde funde purum aurum et admisce ei
in soldering then cast pure gold and mix-in to-it
tertiam partem cupri rubei et puri, quod pariter fusum et
a-third part of-copper red and pure which together cast and
modice percussum limabis penitus et pones in pennam
moderately beaten you-will-file thoroughly and you-will-place-it in a-quill

anseris. Post hæc accumula ante fornacem magnum
of-a-goose after these-things heap before the-forge a-great
acervum carbonum, et in eos pone vas calicis, ita ut
heap of-coals and into them place the-bowl of-the-chalice so that
medietas ejus omnino sub carbonibus sit, et illa pars desuper
the-half of-it wholly under the-coals be and that part above
emineat, super quam una auris ponenda est; quam statim
stand-out over which one ear to-be-placed is which at-once
conjunges ei, et linies ipsum vas cum auricula interius
you-will-join to-it and you-will-smear the-very bowl with the-little-ear within
et exterius cum solidatura, atque limatum aurum, quod in
and on-the-outside with solder and the-filed gold which in
penna posueras, seminabis circa juncturas, qua auris vasi
the-quill you-had-placed you-will-sow around the-joints where the-ear to-the-bowl
conjungitur, sicque circumposito igne aggerabis carbones in
is-joined and-thus placed-around fire you-will-heap coals in
circuitu, sicut superius fecisti, circa auriculam, et ferros
circuit as above you-did around the-little-ear and irons
desuper carbones, quos carbonibus abundanter cooperies. In
above the-coals which with-coals abundantly you-will-cover on
anteriori vero parte intra cavum vasis compone carbones
the-front however side within the-hollow of-the-bowl compose coals
in similitudinem modici furni, ita ut carbones in circuitu
in the-likeness of-a-small furnace so that the-coals in circuit
densi jaceant, et foramen in medio appareat per quod
dense lie and a-hole in the-middle appear through which
possit sufflari, ut calor inferius et superius æqualis sit.
it-can to-be-blown so-that the-heat below and above equal be
Cumque videris solidaturam circumfluere, et quasi
and-when you-shall-have-seen the-solder flow-around and as-if
tertio inundare, asperge diligenter modica aqua, eiciensque
a-third-time overflow sprinkle diligently a-little water and-taking-it-out

lava et sicca, rursumque simili modo solida, et tamdiu
wash and dry and-again in-like way solder and so-long
donec firmissime adhæreat. Conversumque vas in alteram
until most-firmly it-cling and-turned the-bowl to the-other
partem, auriculam pariter eodem modo conjunge et solida.
part the-little-ear likewise in-the-same way join and solder

LIII · ENAMEL

Cloisonné enamel: gold strips are bent into flowers, birds, and figures inside each cell and soldered; powdered colored glass is laid in with a quill, fired under a pierced iron cover, and refilled until the cells are full.

Caput LIII. De electro.

Chapter LIII about enamel

Quo facto tolle partem auri tenuem et conjunge ad oram
which done take a-part of-gold thin and join-it to the-edge
vasis superiorem, atque metire ab una auricula usque ad
of-the-bowl upper and measure from one little-ear up-to to
alteram, quæ pars tantæ latitudinis sit, quanta est grossitudo
the-other which part of-such width be as-great-as is the-thickness
lapidum, quos imponere volueris; et collocans eos in suo
of-the-stones which to-put-on you-shall-wish and setting them in their
ordine, sic dispone, ut in primis stet lapis unus cum quatuor
order thus dispose that at first stand a-stone one with four
margaritis in angulo positis, deinde electrum, juxta quem
pearls in the-corner placed then an-enamel beside which
lapis cum margaritis, rursumque electrum, sicque ordinabis
a-stone with pearls and-again an-enamel and-thus you-will-arrange
ut juxta auriculas semper lapides stent, quorum domunculas
that beside the-little-ears always stones stand of-which the-little-houses

et campos, easque domunculas, in quibus electra ponenda
and fields and-those little-houses in which enamels to-be-placed
sunt, compones et solidabis ordine quo supra. Et
are you-will-compose and you-will-solder in-the-order in-which above and
in altera parte vasis similiter facies. Si vero volueris
on the-other side of-the-bowl likewise you-will-do if however you-shall-wish
in medio ventris gemmas et margaritas ponere, eodem
in the-middle of-the-belly gems and pearls to-place in-the-same
modo facies. Quo facto conjunges eas et solidabis sicut
way you-will-do which done you-will-join them and you-will-solder as
auriculas. Post hæc in omnibus domunculis, in quibus
the-little-ears after these-things in all the-little-houses in which
electra ponenda sunt, coaptabis singulas partes auri tenues,
enamels to-be-placed are you-will-fit single parts of-gold thin
conjunctasque diligenter eicies, atque cum mensura
and-joined diligently you-will-take-out and with measure
et regula incides corriolam auri, quod aliquantulum sit
and rule you-will-cut a-little-strap of-gold which somewhat be
spissius, et complicabis eas circa oram unius cujusque partis
thicker and you-will-fold them around the-edge of-one of-each part
dupliciter, ita ut inter ipsas corriolas subtile spatium sit
doubly so that between themselves the-little-straps a-fine space be
in circuitu, quod spatium vocatur limbus electri. Deinde
in circuit which space is-called the-border of-the-enamel then
eadem mensura atque riga incides corriolas omnino
with-the-same measure and rule you-will-cut little-straps wholly
subtilissimi auri, in quibus subtili forcipe complicabis et
of-very-fine gold in which with-fine tongs you-will-fold and
formabis opus quodcunque volueris in electris facere, sive
you-will-form work whatever you-shall-wish on the-enamels to-make whether
circulos, sive nodos, sive flosculos, sive aves, sive bestias, sive
circles or knots or little-flowers or birds or beasts or

imagines, et ordinabis particulas subtiliter et diligenter
images and you-will-arrange the-little-pieces finely and diligently
unamquamque in suo loco, atque firmabis humida
each in its place and you-will-fix-them with-moist
farina super carbones. Cumque impleveris unam partem,
flour over coals and-when you-shall-have-filled one part
solidabis eam cum maxima cautela, ne opus gracile et
you-will-solder it with the-greatest caution lest the-work slender and
aurum subtile disjungatur aut liquefiat, sicque bis aut ter
the-gold fine be-disjoined or melt and-thus twice or three-times
facies, donec aliquantulum singulæ particulæ adhæreant. Hoc
you-will-do until somewhat the-single little-pieces cling in-this
modo omnibus electris compositis et solidatis, accipe omnia
way all the-enamels composed and soldered take all
genera vitri, quod ad hoc opus aptaveris, et de singulis
kinds of-glass which for this work you-shall-have-fitted and from single
partibus parum confringens, colloca omnes fracturas simul
parts a-little breaking set all the-fragments together
super unam partem cupri, unamquamque tamen partem
on one part of-copper each nevertheless part
per se; mittens in ignem compone carbones in circuitu
by itself putting into the-fire compose coals in circuit
et desuper, sufflansque diligenter considerabis si æqualiter
and above and-blowing diligently you-will-consider if equally
liquefiant: si sic, omnibus utere; si vero aliqua particula
they-melt if so all use if however any little-piece
durior est, singulariter repone. Accipiensque singulas probati
harder is separately put-it-aside and-taking single-ones of-the-tested
vitri, mitte in ignem singillatim, et cum canduerit,
glass put-them into the-fire one-by-one and when it-shall-have-glowed
proice in vas cupreum in quo sit aqua, et statim
throw-it into a-vessel copper in which be water and at-once

resiliet minutatim, quod mox confringas cum rotundo
it-will-spring-apart in-bits which soon you-should-break with a-round
malleo donec subtile fiat, sicque lavabis et pones
hammer until fine it-become and-thus you-will-wash and you-will-place-it
in concha munda, atque cooperies panno laneo. Hoc
in a-shell clean and you-will-cover-it with-a-cloth woolen in-this
modo singulos colores dispones. Quo facto tolle unam
way the-single colors you-will-dispose which done take one
partem auri solidati, et super tabulam æqualem adhærebis
part of-gold soldered and on a-board level you-will-fasten-it
cum cera in duobus locis, accipiensque pennam anseris
with wax in two places and-taking a-quill of-a-goose
incisam gracile sicut ad scribendum, sed longiori rostro et
cut slender as for writing but with-longer beak and
non fisso, hauries cum ea unum ex coloribus vitri,
not split you-will-draw-up with it one from the-colors of-glass
qualem volueris, qui erit humidus, et cum longo cupro
which you-shall-wish which will-be moist and with a-long copper
gracili et in summitate subtili rades a rostro pennæ
slender and at the-top fine you-will-scrape from the-beak of-the-quill
subtiliter et implebis quemcunque flosculum volueris, et
finely and you-will-fill whatever little-flower you-shall-wish and
quantum volueris. Quod vero superfuerit repone in
as-much-as you-shall-wish what however shall-have-been-over put-back into
vasculum suum et cooperi, sicque facies ex singulis
little-vessel its and cover and-thus you-will-do from the-single
coloribus, donec pars una impleatur, auferensque ceram cui
colors until part one be-filled and-taking-away the-wax to-which
inhæserat, pone ipsam partem super ferrum tenue, quod
it-had-clung place itself the-part over an-iron thin which
habeat brevem caudam, et cooperies cum altero ferro quod
have a-short tail and you-will-cover-it with another iron which

sit cavum in similitudinem vasculi, sitque per omnia
be hollow in the-likeness of-a-little-vessel and-let-it-be through all
transforatum gracile, ita ut foramina sint interius plana et
pierced finely so that the-holes be within flat and
latiora, et exterius subtiliora et hispida, propter arcendos
broader and on-the-outside finer and rough for keeping-off
cineres, si forte supercecideriнt; habeatque ipsum ferrum in
ashes if perhaps they-shall-have-fallen-on and-let-have itself the-iron in
medio superius brevem annulum, cum quo superponatur
the-middle above a-short ring with which it-may-be-placed-over
et elevetur. Quo facto compone carbones magnos et
and be-lifted which done compose coals large and
longos, incendens illos valde; inter quos facies locum et
long kindling them strongly between which you-will-make a-place and
æquabis cum ligneo malleo, in quem elevetur ferrum per
you-will-level-it with a-wooden hammer into which be-lifted the-iron by
caudam cum forcipe; ita coopertum collocabis diligenter, atque
the-tail with tongs so covered you-will-set-it diligently and
carbones in circuitum compones et sursum ex omni parte,
coals in circuit you-will-compose and above on every side
acceptoque folle utrisque manibus undique sufflabis donec
and-taking the-bellows with-both hands on-all-sides you-will-blow until
carbones æqualiter ardeant. Habeas etiam alam integram
the-coals equally burn have also a-wing whole
anseris, sive alterius avis magnæ, quæ sit extensa et ligno
of-a-goose or of-another bird large which be extended and to-a-stick
ligata; cum qua ventilabis et flabis fortiter ex omni parte,
bound with which you-will-fan and you-will-blow strongly on every side
donec perspicias inter carbones ut foramina ferri interius
until you-see-through between the-coals that the-holes of-the-iron within
omnino candeant, sicque flare cessabis. Expectans vero
wholly glow and-thus to-blow you-will-cease waiting however

quasi dimidiam horam discooperies paulatim donec omnes
about half an-hour you-will-uncover little-by-little until all
carbones amoveas, rursumque expectabis donec foramina
the-coals you-remove and-again you-will-wait until the-holes
ferri interius nigrescant, sicque elevans ferrum per caudam,
of-the-iron within grow-black and-thus lifting the-iron by the-tail
ita coopertum pones retro fornacem in angulo donec
so covered you-will-place-it behind the-forge in the-corner until
omnino frigidum fiat. Aperiens vero tolles electrum
wholly cold it-become opening however you-will-take the-enamel
et lavabis, rursumque implebis et fundes sicut prius,
and you-will-wash and-again you-will-fill and you-will-fuse as before
sicque facies donec liquefactum æqualiter per omnia
and-thus you-will-do until melted evenly through all
plenum sit. Hoc modo reliquas partes compones.
full it-be in-this way the-other parts you-will-compose

LIV–LVIII · POLISHING ENAMEL AND OTHER VESSELS

Enamels are polished on sandstone, whetstone, lead, and goatskin. The gold foot and paten are bordered with gems and enamels, the tube made like the silver one; crosses and shrines likewise. A strainer with lion heads, a cruet raised over wax, and the pitch preparation called tenax for repoussé are described.

Caput LIV. De poliendo electro.

Chapter LIV about polishing enamel

Quo facto tolle partem ceræ ad longitudinem dimidii pollicis,
which done take a-part of-wax to the-length of-half a-thumb
in quam aptabis electrum ita, ut cera ex omni parte
into which you-will-fit the-enamel so that the-wax on every side
sit, per quam tenebis, et fricabis ipsum electrum super
be by which you-will-hold and you-will-rub itself the-enamel on

lapidem sabuleum æqualem diligenter cum aqua, donec aurum
a-stone sandy level diligently with water until the-gold
æqualiter appareat per omnia. Deinde super duram cotem
evenly appear through all then on a-hard whetstone
et æqualem fricabis diutissime donec claritatem accipiat;
and level you-will-rub very-long until brightness it-receive
sicque super eandem cotem saliva humidam fricabis partem
and-thus on the-same whetstone with-saliva moist you-will-rub a-part
lateris, quæ ex antiquis vasculis fractæ inveniuntur, donec
of-brick which from ancient little-vessels broken are-found until
saliva spissa et rubea fiat; quam linies super tabulam
the-saliva thick and red become which you-will-smear on a-plate
plumbeam æqualem, super quam leniter fricabis electrum
lead level on which gently you-will-rub the-enamel
usque dum colores ejus translucide et clari fiant; rursumque
up-to while the-colors of-it translucent and clear become and-again
fricabis laterem cum saliva super cotem, et linies
you-will-rub the-brick with saliva on the-whetstone and you-will-smear-it
super corium hircinum, tabulæ ligneæ æqualiter affixum;
on a-hide goat to-a-board wooden evenly fixed
super quod polies ipsum electrum donec omnino fulgeat,
on which you-will-polish itself the-enamel until wholly it-shine
ita ut si dimidia pars ejus humida fiat et dimidia sicca
so that if the-half part of-it moist become and the-half dry
sit, nullus possit considerare, quæ pars sicca, quæ humida sit.
be no-one can to-consider which part dry which moist be

Caput LV. De patena calicis et pede atque fistula.

Chapter LV about the-paten of-the-chalice and the-foot and the-tube

Deinde funde aurum in quo formabis pedem cum nodo,
then cast the-gold in which you-will-form the-foot with the-knop
in cujus nodi medio atque in ora pedis in circuitu
in of-which knop the-middle and on the-edge of-the-foot in circuit

dispones limbum cum lapidibus et electris ut supra.
you-will-dispose a-border with stones and enamels as above
Patenam quoque cum formaveris mensura et forma,
the-paten also when you-shall-have-formed with-measure and form
qua volueris, circa oram ejus eodem opere et ordine
which you-shall-wish around the-edge of-it with-the-same work and order
limbum operaberis, facies et fistulam auream ordine et
a-border you-will-work you-will-make also a-tube golden in-order and
modo quo superius argenteam.
manner in-which above the-silver-one
Cruces quoque et plenaria et sanctorum pignorum scrinia,
crosses also and gospel-covers and of-holy relics shrines
simili opere cum lapidibus et margaritis atque electris,
with-like work with stones and pearls and enamels
ornabis.
you-will-adorn
Caput LVI. De colatorio.
Chapter LVI about the-strainer
Facies quoque colatorium aureum sive argenteum hoc
you-will-make also a-strainer golden or silver in-this
modo. Percute vas parvulum ad similitudinem modicæ pelvis,
way beat a-vessel very-small to the-likeness of-a-small basin
latitudinem modice amplius palmæ manus, cui impones
in-width a-little more of-the-palm of-the-hand to-which you-will-put
caudam longitudinis unius ulnæ et latitudine unius pollicis, quæ
a-tail of-the-length of-one ell and of-the-width of-one thumb which
cauda habebit in summitate caput leonis fusile et decentissime
tail will-have at the-top a-head of-a-lion cast and most-becomingly
sculptum, quod caput tenebit pelviculam in ore suo. Habebit
carved which head will-hold the-little-basin in mouth its it-will-have
etiam in altera summitate caput simili modo sculptum, in
also at the-other top a-head in-like way carved in

cujus ore pendebit anulus, per quem inserto digito portari
whose mouth will-hang a-ring through which inserted a-finger to-be-carried
possit. Reliqua vero cauda inter duo capita decorari debet
it-can the-remaining however tail between the-two heads to-be-adorned ought
nigello per tota, et per loca opere fusili et punctorio et
with-niello through all and in places with-work cast and dotted and
litteris versuum exarari in suo loco. Pelvicula vero quæ
with-letters of-verses to-be-inscribed in its place the-little-basin however which
in summitate est, in medio fundo perforari debet, latitudine
at the-top is in the-middle bottom to-be-pierced ought in-the-width
duorum digitorum in rotunditate, subtilissimis foraminibus
of-two fingers in roundness with-very-fine holes
per quæ colari debet vinum et aqua in calice ponenda,
through which to-be-strained ought the-wine and water in the-chalice to-be-placed
per quæ sacramentum Dominici sanguinis conficitur.
through which the-sacrament of-the-Lord of-blood is-made

Caput LVII. De ampulla.

Chapter LVII about the-cruet

Si autem volueris ampullam componere ad fundendum vinum,
if however you-shall-wish a-cruet to-compose for pouring wine
percute argentum eodem modo, quo percutitur nodus pedis
beat silver in-the-same way in-which is-beaten the-knop of-the-foot
in calice, excepto quod venter ampullæ multo latior debet
in the-chalice except that the-belly of-the-cruet much broader ought
formari, et collum ejus super incudem longam et gracilem
to-be-formed and the-neck of-it on an-anvil long and slender
malleo corneo et mediocri ferreo debet constringi. Interdum
with-a-hammer horn and a-middling iron-one ought to-be-narrowed sometimes
etiam ampulla ipsa, cum cœperit formari, impleatur
also the-cruet itself when it-shall-have-begun to-be-formed let-it-be-filled
cera et malleo mediocri ferreo leniter percutiatur, ut
with-wax and with-a-hammer middling iron gently be-beaten so-that

ei rotunditas ventris et effigies colli decentius et
to-it the-roundness of-the-belly and the-shape of-the-neck more-becomingly and
æqualius aptetur. Sicque ejecta cera super carbones iterum
more-evenly be-fitted and-thus thrown-out the-wax over coals again
recoquatur, et denuo cera imponatur, ac sicut prius percutiatur,
let-it-be-reheated and anew wax let-it-be-put-in and as before be-beaten
donec omnino formetur. Quo facto si volueris in ipsa
until wholly it-be-formed which done if you-shall-wish on the-very
ampulla imagines aut bestias sive flores opere ductili facere,
cruet images or beasts or flowers by-work repoussé to-make
compone in primis confectionem ex pice et cera et tegula.
compose at first a-preparation from pitch and wax and tile

Caput LVIII. De confectione quæ dicitur tenax.
Chapter LVIII about the-preparation which is-called tenax

Tere partem lateris sive tegulæ minutissime, et liquefac
grind a-part of-brick or of-tile very-finely and melt
picem in testa ollæ, modicumque ceræ adde. Quibus pariter
pitch in a-shard of-a-pot and-a-little of-wax add which together
liquefactis commisce pulverem tegulæ et fortiter commove
melted mix-in the-powder of-tile and strongly stir
atque in aquam effunde. Cumque cœperit refrigerari,
and into water pour-it-out and-when it-shall-have-begun to-be-cooled
intinge manus utrasque in aquam et macera diu, donec possis
dip hands both into the-water and knead long until you-can
ipsam confectionem extendere et trahere sicut pellem. Hanc
itself the-preparation to-stretch and to-draw as a-skin this
confectionem statim liquefacies et implebis ampullam usque ad
preparation at-once you-will-melt and you-will-fill the-cruet up-to to
summum. Cumque refrigerata fuerit, pertrahe in ventre
the-top and-when cooled it-shall-have-been draw on the-belly
et in collo quodcumque volueris, tollensque ferros ductorios
and on the-neck whatever you-shall-wish and-taking irons for-tracing

graciles et parvulum malleum, designa, quod pertraxisti, in
slender and a-very-small hammer mark-out what you-drew in
circuitu, leniter percutiendo. Deinde da puero, qui contra te
circuit gently by-striking then give to-a-boy who opposite you
sedet, malleolum, et tu tene in sinistra manu ampullam,
sits the-small-hammer and you hold in the-left hand the-cruet
et dextera ferros unumquodque in suo loco, et fac puerum
and in-the-right the-irons each in its place and make the-boy
desuper percutere quocumque modo volueris, leniter aut
from-above to-strike in-whatever way you-shall-wish gently or
fortiter, ac depone campos, ut cavi sint, et opus elevetur.
strongly and set-down the-fields so-that hollow they-be and the-work be-raised
Cumque per omnia semel percusseris, apposita ampulla
and-when through all once you-shall-have-beaten applied the-cruet
igni eice confectionem, recoctaque ampulla ejecta ab
to-the-fire throw-out the-preparation and-reheated the-cruet taken from
igne, rursum imple eam, ac sicut prius percute eam, sicque
the-fire again fill it and as before beat it and-thus
facies donec omnes campos æqualiter deponas, et omne
you-will-do until all the-fields evenly you-set-down and all
opus ita conformes ut appareat quasi fusum sit. Hoc autem
the-work so you-shape that it-appear as-if cast it-be this however
omnino procura ut argentum ampullæ ita spissum sit, ut cum
wholly take-care that the-silver of-the-cruet so thick be that when
opus percutiendo formaveris, cum ferris fossoriis possis
the-work by-beating you-shall-have-formed with irons graving you-can
illud decenter incidere, fodere et radere. Quo peracto, si
it becomingly to-cut to-engrave and to-scrape which completed if
volueris, fac auriculam fusilem eodem modo quo formasti
you-shall-wish make a-little-ear cast in-the-same way in-which you-formed
auriculas argentei calicis, et in anteriori parte deductorium,
the-little-ears of-the-silver chalice and on the-front part a-spout

unde vinum effundatur, quæ confirmabis solidatura, argento
whence the-wine be-poured-out which you-will-fasten with-solder with-silver
et cupro mixta, ut supra. Deinde, ubicumque volueris,
and copper mixed as above then wherever you-shall-wish
nigello ornabis, et reliquam deaurabis ut supra.
with-niello you-will-adorn and the-rest you-will-gild as above
Eodem modo facies scyphos argenteos et aureos atque
in-the-same way you-will-make cups silver and golden and
scutellas, et pixides ad oblatas imponendas et capsulas
dishes and pyxes for hosts to-be-put-in and little-boxes
thymiamatis et manubria in cultellis, et imagines in
of-incense and handles on little-knives and images on
crucibus et plenariis ex auro sive argento aut cupro.
crosses and gospel-covers from gold or silver or copper

LIX–LX · THE BEATEN AND THE CAST CENSER

A beaten censer is raised with towers, windows, angels, the four rivers of Paradise, and the evangelists. A cast censer models the heavenly city the prophet saw: twelve gates with the apostles and their stones, angels on the walls, the Lamb at the summit, the prophets and the virtues below, cast in brass by the lost-wax method.

Caput LIX. De thuribulo ductili.
Chapter LIX about the-censer repoussé
Si vero thuribula ductili opere componere volueris in
if however censers by-repoussé work to-compose you-shall-wish in
auro vel argento sive cupro, primum purificabis ordine
gold or silver or copper first you-will-purify in-the-order
quo supra, atque funde in fusoriis ferreis duas marcas vel
in-which above and cast in casting-molds iron two marks or
tres sive quatuor, secundum quantitatem quam vis habere
three or four according-to the-quantity which you-wish to-have

superiorem partem thuribuli. Deinde attenuabis in rotulam
the-upper part of-the-censer then you-will-thin into a-disk
eo ordine quo superius calicem argenteum majorem,
in-that order in-which above the-chalice silver greater
excepto quod hoc opus spissius et profundius ducendum
except that this work thicker and deeper to-be-drawn
est interius, ut altius sit exterius, ita ut altitudo in se
is within so-that higher it-be on-the-outside so that the-height in itself
ipsius latitudinem totam habeat et ejus medietatem. Cujus
of-it the-width whole have and of-it the-half whose
altitudinem cum produxeris, priusquam latitudinem
height when you-shall-have-drawn-out before the-width
constringas, pertrahe in eo turres, videlicet in supremo
you-narrow draw on it towers namely at-the top
unam octoangulatam, in qua fiant ejusdem numeri fenestræ,
one eight-angled in which be-made of-the-same number windows
sub qua fiant quatuor quadratæ, quibus singulis imponantur
under which be-made four square to-which singly be-put
tres columnellæ, et inter eas duæ fenestræ productæ, in
three little-columns and between them two windows drawn-out in
quarum medio super mediam columnam fiat fenestella
of-which the-middle over the-middle column be-made a-little-window
rotunda; sub quibus in tertio loco formentur aliæ turres
round under which in the-third place let-them-be-formed other towers
octo; quatuor videlicet rotundæ contra superiores quadras,
eight four namely round opposite the-upper square-ones
in quibus fiant flosculi aut aviculæ vel bestiolæ, seu
in which let-them-be-made little-flowers or little-birds or little-beasts or
fenestellæ, et inter eas quatuor quadræ, quæ et latiores sint,
little-windows and between them four square which also broader be
in quibus fiant dimidiæ imagines angelorum, quasi in eis
in which be-made half images of-angels as-if in them

cum alis suis sedentium. Sub quibus in ipsa rotunditate
with wings their sitting under which on the-very roundness
vasis fiant quatuor arcus in supremo modice producti,
of-the-vessel be-made four arches at-the top moderately drawn-out
in quibus fiant quatuor evangelistæ sive in specie
in which be-made the-four evangelists either in the-appearance
angelorum, seu in figura animalium; inter quos arcus super
of-angels or in the-figure of-animals between which arches on
ipsam oram rotunditatis ponantur quatuor capita leonum
the-very edge of-the-roundness let-them-be-placed four heads of-lions
sive hominum fusilia, per quæ catenæ transeant. His ita
or of-men cast through which the-chains pass these-things thus
pertractis cum ferris ductoriis et malleis, interius et exterius
drawn with irons tracing and hammers within and on-the-outside
percutiantur, donec omnino formentur, sicque limentur et
let-them-be-beaten until wholly they-be-formed and-thus be-filed and
radantur, ferrisque fossoriis fodiantur. Hæc est superior pars
be-scraped and-with-irons graving be-engraved this is the-upper part
thuribuli. Deinde percutiatur inferior cum suo pede, in qua
of-the-censer then let-it-be-beaten the-lower with its foot in which
fiant quatuor arcus, qui respondeant superioribus, in quibus
be-made four arches which answer to-the-upper in which
sedeant quatuor flumina Paradysi humana specie cum suis
sit the-four rivers of-Paradise in-human appearance with their
amphoris, quibus effundatur quasi species fluentis aquæ.
jars from-which be-poured-out as-if the-appearance of-flowing water
In angulis vero, quibus conjunguntur circuli, figantur
in the-corners however where are-joined the-circles let-them-be-fixed
capita leonum sive facies hominum de quibus supra
heads of-lions or faces of-men about which above
diximus, ita ut in inferiori parte adhæreant facies in quibus
we-spoke so that on the-lower part cling the-faces in which

firmentur catenæ, et in superiori capilli vel comæ, per quas
be-fastened the-chains and on the-upper the-hair or locks through which
transeant ipsæ catenæ. Quod si pes cum ipsa inferiori
pass themselves the-chains but if the-foot with the-very lower
parte nequeat percuti, fiat singulariter sive ductili
part cannot to-be-beaten let-it-be-made separately either by-repoussé
sive fusili opere, et imponatur cum solidatura argento et
or by-cast work and let-it-be-put-on with solder with-silver and
cupro mixta, de qua supra diximus. Lilium vero cui
copper mixed about which above we-spoke the-lily however on-which
anulus imponendus est, et cui catenæ superius infigendæ
the-ring to-be-placed is and in-which the-chains above to-be-fixed
sunt, fiat similiter ductili sive fusili opere, in quo
are let-it-be-made likewise by-repoussé or cast work in which
formentur flores aut aviculæ sive bestiolæ secundum qualitatem
be-formed flowers or little-birds or little-beasts according-to the-quality
inferioris operis. Hoc thuribulum si fuerit argenteum
of-the-lower work this censer if it-shall-have-been silver
aut cupreum, poterit deaurari ordine quo supra. Quod
or copper will-be-able to-be-gilded in-the-order in-which above but
si quis voluerit laborem apponere, ut thuribulum pretiosioris
if anyone shall-wish labor to-apply that a-censer of-more-precious
operis componat, similitudinem civitatis, quam vidit propheta
work he-compose the-likeness of-the-city which saw the-prophet
in monte, hoc modo poterit exprimere,
on the-mount in-this way he-will-be-able to-express

Caput LX. De thuribulo fusili.

Chapter LX about the-censer cast

Tolle argillam fimo mixtam et bene maceratam, et fac
take clay with-dung mixed and well kneaded and make-it
siccari ad solem, siccatamque comminue et diligenter cribra.
be-dried in-the sun and-dried break-it-up and diligently sift-it

Deinde cribratam aqua commisce et fortiter macera, et
then the-sifted with-water mix and strongly knead and
exinde compone tibi duas massas ad magnitudinem
thence compose for-yourself two masses to the-size
quam vis thuribulum habere, unam inferiorem, alteram
which you-wish the-censer to-have one lower the-other
superiorem, quæ altior erit; quæ massæ vocantur nuclei. Quos
upper which higher will-be which masses are-called cores which
statim perforabis ligno in longitudine in quatuor costis
at-once you-will-pierce with-a-wood in length on four ribs
æqualiter inciso, sicque siccabis ad solem. Post hæc
evenly cut and-thus you-will-dry-them in-the sun after these-things
transduces eis ferrum, quod dicitur tornatile, longum et
you-will-pass-through them an-iron which is-called for-turning long and
mediocriter gracile, quod sit in una summitate grossius et in
moderately slender which be at one top thicker and into
tres costas percussum æqualiter, ac magis magisque gracile
three ribs beaten evenly and more and-more slender
deductim usque in finem, in cujus grossiori parte imponetur
drawn-out up-to into the-end on of-which the-thicker part will-be-put
aliud ferrum breve et curvum, sive lignum, cum quo possit
another iron short and curved or a-wood with which it-can
circumverti. Deinde habebis duas columnellas ligneas
to-be-turned-around then you-will-have two little-columns wooden
super scamnum fixas et ab invicem sejunctas secundum
on a-bench fixed and from each-other separated according-to
longitudinem ferri, quæ singulæ habeant in anteriori parte
the-length of-the-iron which singly have on the-front part
singulos clavos similiter ligneos, ad mensuram palmi longos,
single pegs likewise wooden to the-measure of-a-palm long
et ad similitudinem gradus incisos; super quos ponetur
and to the-likeness of-a-step cut on which will-be-placed

lignum aliud rotundum, ita ut possit propius et longius
a-wood another round so that it-can nearer and farther
removeri, super quod requiescat manus tornantis. His ita
to-be-moved on which may-rest the-hand of-the-turner these-things thus
compositis inter duas ipsas columnas pone ferrum tornatile,
composed between the-two very columns place the-iron for-turning
quod nucleos continet, et coram te ad lævam manum
which the-cores holds and before you on the-left hand
sedente adjutore, qui circumvertat illud, tornabis ferris
sitting a-helper who may-turn-around it you-will-turn with-irons
acutis et latioribus ex omni parte usque ad æqualitatem,
sharp and broader on every side up-to to evenness
sicque formabis nucleos illos ut sibi conjungantur
and-thus you-will-form the-cores those so-that to-each-other they-be-joined
æquali latitudine et spissitudine in medio. Intercides
with-equal width and thickness in the-middle you-will-cut-off
vero inferiorem partem a medietate inferius, ita, ut
however the-lower part from the-half downward so that
latitudo superior duabus mensuris inferiorem superet, in qua
the-width upper by-two measures the-lower exceed in which
formabis et pedem. Eadem quoque mensura intercides
you-will-form also the-foot with-the-same also measure you-will-cut-off
superiorem partem, cujus tamen altitudo tanta erit, ut
the-upper part whose nevertheless height so-great will-be that
ter intercidatur ad similitudinem lignei campanarii, ita
three-times it-be-cut-off to the-likeness of-a-wooden bell-tower so
ut quælibet incisura sursum magis magisque gracilis sit.
that each cut upward more and-more slender be
His ita tornatis eice ferrum, et cum cultello incide
these-things thus turned take-out the-iron and with a-knife cut
in latiori limbo superioris nuclei quatuor angulos usque ad
in the-broader border of-the-upper core four angles up-to to

incisuram, quæ ei proxima est, ita ut in crucis modum
the-cut which to-it next is so that in of-a-cross the-manner
formetur, et unumquodque cornu æquales habeat latitudines
it-be-formed and each arm equal have widths
in tribus parietibus, sed altitudo contineat mensuram et
on three walls but the-height contain the-measure and
dimidiam latitudinis: in qua etiam pinnacula ad similitudinem
a-half of-the-width in which also pinnacles to the-likeness
tectorum formabis; facies quoque in proxima turri octo
of-roofs you-will-form you-will-make also on the-next tower eight
costas, quatuor latiores, et quatuor strictiores, quas etiam
ribs four broader and four narrower which also
rotundas facies, ita ut anguli latiorum promineant, et
round you-will-make so that the-angles of-the-broader stand-out and
strictiorum cavi sint, ut sic rotunditas appareat; in quibus
of-the-narrower hollow be so-that thus roundness appear on which
ad mensuram suam tecta convenientia formabis. Turrim vero
to measure their roofs fitting you-will-form the-tower however
penultimam eodem modo formabis, sic tamen ut rotundæ
next-to-last in-the-same way you-will-form thus nevertheless that the-round
costæ super inferioris latas formentur, et inferioris rotundæ
ribs over of-the-lower the-broad be-formed and of-the-lower the-round
sub superiorum latis aptentur. Superior vero turris octo
under of-the-upper the-broad be-fitted the-upper however tower with-eight
costis æqualiter latis et absque tectis formetur. Hæc erit
ribs equally broad and without roofs let-it-be-formed this will-be
superior pars thuribuli.
the-upper part of-the-censer
Inferioris partis autem latior limbus, incisis angulis similiter
of-the-lower part however the-broader border cut the-angles likewise
in crucis modum formabis, ut superiori coaptetur, et
in of-a-cross the-manner you-will-form so-that to-the-upper it-be-fitted and

inferior limbus in rotundum finiatur. His taliter aptatis
the-lower border into round be-finished these-things in-such-way fitted
tolle duo ligna ad longitudinem pedis et grossitudinem
take two woods to the-length of-a-foot and the-thickness
unius digiti, et attenuabis ea ad spissitudinem, qua ceram
of-one finger and you-will-thin them to the-thickness which the-wax
habere volueris, aliudque lignum tantæ longitudinis rotundum
to-have you-shall-wish and-another wood of-such length round
et grossum ut hasta lanceæ; et habebis ascellam latam
and thick as the-shaft of-a-lance and you-will-have a-little-board broad
longitudine pedis, et duabus ulnis longam et valde æqualem,
in-length of-a-foot and by-two ells long and very level
super quam configes prædicta duo ligna, ita ut a se
on which you-will-fasten the-aforesaid two woods so that from each-other
spatio dimidii pedis disjuncta lignum contra lignum æqualiter
by-a-space of-half a-foot separated wood opposite wood evenly
aptetur. Deinde tolle ceram puram quam igni appositam
be-fitted then take wax pure which to-the-fire applied
fortiter macerabis, sicque calidam inter duo ligna super
strongly you-will-knead and-thus hot between the-two woods on
ascellam collocabis, prius aqua subposita ne adhæreant, et
the-little-board you-will-place first water put-under lest they-stick and
illud rotundum lignum madefactum utrisque manibus fortiter
that round wood moistened with-both hands strongly
superducens secundum spissitudinem lignorum attenuabis.
drawing-over according-to the-thickness of-the-woods you-will-thin-it
Et cum multas partes æquales ceræ paraveris, sedens
and when many parts equal of-wax you-shall-have-prepared sitting
juxta ignem incide eas particulatim secundum spatia, quæ
beside the-fire cut them piece-by-piece according-to the-spaces which
in argilla thuribuli incideras, et unicuique spatio suam
in the-clay of-the-censer you-had-cut and to-each space its

particulam modice calefactam aptabis, atque cum ferro ad
piece moderately heated you-will-fit and with an-iron for
hoc opus apto et calefacto circumsolidabis. Cumque hoc
this work fitted and heated you-will-solder-around and-when in-this
modo totum nucleum exterius cooperueris, accipe ferrum
way the-whole core on-the-outside you-shall-have-covered take an-iron
tenue ex utraque parte acutum in modum gracilis sagittæ,
thin on each side sharp in the-manner of-a-slender arrow
cum parvula cauda ligneo manubrio infixum, et cum illo
with a-very-small tail into-a-wooden handle fixed and with it
ex omni parte circumcides, et cum buxeo ligno eodem
on every side you-will-cut-around and with a-boxwood wood in-the-same
modo formato planabis, et ut in nullo loco cera spissior
way formed you-will-smooth and that in no place the-wax thicker
sit sive tenuior quam in alio, procurabis. Deinde pertrahe
be or thinner than in another you-will-take-care then draw
in singulis frontibus singulos arcus, et in obliquis parietibus
on the-single fronts single arches and on the-slanting walls
similiter, et sub singulis arcubus ex utraque singulas valvas,
likewise and under the-single arches on each single doors
ita ut unaquæque valva quartam partem spatii contineat, et
so that each door a-fourth part of-the-space contain and
duæ partes in medio remaneant; in quibus spatiis pertrahes
two parts in the-middle remain in which spaces you-will-draw
sub unoquoque arcu singulas imagines apostolorum, quæ
under each arch single images of-the-apostles which
singulæ teneant singulos breves in manibus, effigie qua
singly hold single scrolls in hands in-the-form in-which
volueris, quorum nomina scribes in limbo circa arcus.
you-shall-wish whose names you-will-write on the-border around the-arches
In spatiis vero triangulis, qui tectorum pinnas sustinent,
in the-spaces however triangular which of-the-roofs the-gables support

formabis similitudines duodecim lapidum, disponens unicuique
you-will-form the-likenesses of-twelve stones disposing to-each
apostolo convenientem lapidem, secundum significationem
apostle a-fitting stone according-to the-meaning
nominis sui, quorum nomina scribes in inferiori limbo
of-the-name his whose names you-will-write on the-lower border
ejusdem spatii, et in singulis angulis juxta lapides facies
of-the-same space and in the-single angles beside the-stones you-will-make
singulas fenestellas. Hæc erit similitudo de qua propheta
single little-windows this will-be the-likeness of which the-prophet
dicit: Ab Oriente portæ tres, et ab Occidente portæ tres,
says from the-East gates three and from the-West gates three
et ab Meridiano portæ tres, et a Septentrione portæ
and from the-South gates three and from the-North gates
tres. In quatuor autem angulis, qui sunt inter divisiones
three on the-four however angles which are between the-divisions
portarum, formabis in cera singulas turriculas rotundas, per
of-the-gates you-will-form in wax single little-towers round through
quas catenæ transibunt. His ita dispositis facies in
which the-chains will-pass these-things thus disposed you-will-make in
proxima superiori turri singulas imagines angelorum integras
the-next upper tower single images of-angels whole
in quadrangulis spatiis, cum scutis et lanceis suis, quasi
in the-quadrangular spaces with shields and lances their as-if
ad custodiam murorum stantes, et in rotundis turriculis
for the-guard of-the-walls standing and in the-round little-towers
formabis columnellas cum capitellis suis et basibus. Eodem
you-will-form little-columns with capitals their and bases in-the-same
modo facies in penultima turri, quæ brevior est, dimidias
way you-will-make in the-next-to-last tower which shorter is half
imagines angelorum et pari modo columnellas. In superiori
images of-angels and in-like way little-columns in the-upper

vero turri, quæ gracilior erit, facies fenestras longas et
however tower which more-slender will-be you-will-make windows long and
rotundas, et in summitate turris propugnacula in circuitu,
round and at the-top of-the-tower battlements in circuit
in quorum medio formabis agnum, et in capite ejus
in of-which the-middle you-will-form a-lamb and on the-head of-it
coronam et crucem, et circa dorsum ejus brevem arcum,
a-crown and a-cross and around the-back of-it a-short arch
in cujus summitate sit anulus, cui imponatur media
at whose top be a-ring on-which be-placed the-middle
catena. Hæc est superior pars thuribuli cum opere suo.
chain this is the-upper part of-the-censer with work its
Inferiori vero parte simili modo cooperta cera, formabis
the-lower however part in-like way covered with-wax you-will-form
in singulis spatiis singulas imagines prophetarum cum
in the-single spaces single images of-the-prophets with
suis brevibus, et aptabis unicuique apostolo convenientem
their scrolls and you-will-fit to-each apostle a-fitting
prophetam, ut testimonia eorum, quæ brevibus sunt
prophet so-that the-testimonies of-them which on-the-scrolls are
inscribenda, sibi concordent. Circa prophetas vero
to-be-inscribed with-each-other agree around the-prophets however
non facies portas, sed tantum spatia earum sint
not you-will-make gates but only the-spaces of-them let-them-be
quadrangula, et in limbis super capita scribantur eorum
quadrangular and on the-borders over the-heads be-written their
nomina. Facies quoque in angulis quatuor turres in quibus
names you-will-make also in the-corners four towers in which
catenæ firmentur ut superioribus coaptentur. In inferiori
the-chains be-fastened so-that to-the-upper-ones they-be-fitted on the-lower
vero rotundo spatio facies circulos quot potueris,
however round space you-will-make circles as-many-as you-shall-be-able

vel volueris, in quibus formabis singulas imagines virtutum,
or you-shall-wish in which you-will-form single images of-virtues
dimidias specie feminea, quarum nomina scribes in
half in-appearance feminine whose names you-will-write on
circulis. Ad postremum autem in fundo formabis pedem
the-circles at-the last however on the-bottom you-will-form the-foot
et tornabis, et omnia spatia circa imagines superius
and you-will-turn-it and all the-spaces around the-images above
et inferius erunt transforata. Deinde unicuique parti suis
and below will-be pierced-through then to-each part its
infusoriis atque spiraculis impositis, circumlinies diligenter
pouring-gates and vents put-on you-will-smear-around diligently
argillam tenuem et siccabis ad solem, rursumque et
clay thin and you-will-dry-it in-the sun and-again and
tertio facies similiter; quæ partes jam vocantur formæ.
a-third-time you-will-do likewise which parts now are-called molds
Quas omnino siccatas pones ad ignem, et cum calefactæ
which wholly dried you-will-place at the-fire and when heated
fuerint, ceram liquescentem funde in aquam, rursumque
they-shall-have-been the-wax melting pour into water and-again
pone ad ignem, sicque facies donec ceram omnino
place-them at the-fire and-thus you-will-do until the-wax wholly
eicias. Post hæc in loco apto et æquali pones
you-throw-out after these-things in a-place fit and level you-will-place
carbones grossos et frigidos, super quos stabilibis formas
coals coarse and cold on which you-will-set the-molds
foraminibus inferius conversis, et circumpones eis lapides
with-the-holes downward turned and you-will-place-around them stones
duros, qui resilire non possunt ad calorem ignis, et
hard which to-spring-apart not they-can at the-heat of-the-fire and
ordinabis eos lapidem super lapidem in similitudinem muri
you-will-arrange them stone upon stone in the-likeness of-a-wall

absque temperamento siccos, ita ut inter lapides multa
without mortar dry so that between the-stones many
foramina et parvula remaneant. Quibus ita compositis, altius
holes and small remain which thus composed higher
quam formæ sint spatio dimidii pedis, circumfunde carbones
than the-molds be by-a-space of-half a-foot pour-around coals
ardentes, ac deinde frigidos usque ad summum, et cave
burning and then cold-ones up-to to the-top and take-care
ut tanti spatii sit inter formas et lapides, quod carbones
that of-so-great space it-be between the-molds and the-stones that the-coals
capere possit. Cumque carbones omnes incanduerint, interdum
to-hold it-can and-when the-coals all shall-have-glowed sometimes
cum gracili ligno movendi sunt circumquoque per foramina
with a-slender wood to-be-stirred they-are all-around through the-holes
inter lapides ut se conjungant, et calor ex omni parte
between the-stones so-that themselves they-join and the-heat on every side
æqualis sit. Et cum in tantum descenderint ut formas videre
even be and when to so-much they-shall-have-sunk that the-molds to-see
possis, iterum imple frigidis carbonibus usque ad summum,
you-can again fill with-cold coals up-to to the-top
sicque tertio facies. Et cum videris formas exterius
and-thus a-third-time you-will-do and when you-shall-have-seen the-molds on-the-outside
candescere, pone vas in ignem cum auricalco quod fundere
glow place the-vessel in the-fire with the-brass which to-cast
volueris, et primum modice, deinde magis magisque sufflabis,
you-shall-wish and first moderately then more and-more you-will-blow
donec omnino liquefiat. Quo facto cum curvo ferro et ligno
until wholly it-melt which done with a-curved iron and in-a-wood
infixo diligenter commove, et vas in latus aliud converte,
fixed diligently stir and the-vessel onto side other turn
rursumque auricalco imple et liquefac, sicque facies donec
and-again with-brass fill and melt and-thus you-will-do until

vas plenum fiat. Quo facto cum curvo ferro denuo
the-vessel full become which done with the-curved iron anew
commovebis, et a carbonibus purgabis, et sufflatore
you-will-stir and from the-coals you-will-clean-it and with-the-blower
fortiter flante cooperies magnis carbonibus. Deinde amotis
strongly blowing you-will-cover-it with-large coals then removed
lapidibus formas eicies ab igne, et argillam abundanter
the-stones the-molds you-will-take-out from the-fire and clay abundantly
aqua perfusam atque in modum fecis attenuatam cum panno
with-water soaked and in the-manner of-lees thinned with a-cloth
diligenter circumlinies, sicque juxta fornacem, in quam
diligently you-will-smear-around and-thus beside the-furnace in which
fundis, fossa facta formas impone et terram circumquaque
you-cast a-pit made the-molds put-in and earth all-around
exaggera, et ligno inferius æquali crebrius inpingendo
heap-up and with-a-wood below level more-frequently by-ramming
diligenter comprime. Statimque panniculum multipliciter
diligently press and-at-once a-little-cloth many-times
complicatum et fisso ligno impositum præ manibus habeas,
folded and in-a-split wood put before hands have
ejectoque vasculo ab igne cum forcipe curvato rostro, et
and-taken-out the-little-vessel from the-fire with tongs of-curved beak and
panniculo apposito, qui sordes et favillas defendat, diligenter
the-little-cloth applied which the-dirt and ashes may-ward-off diligently
infunde. Hoc modo formis utrisque fusis sine sic stare, donec
pour-in in-this way the-molds both cast let-them thus stand until
infusorium superius nigrescat; deinde remota terra et a
the-pouring-gate above grow-black then removed the-earth and from
fossis extractas repone in tuto loco, donec omnino frigeant,
the-pits drawn-out put-them-back in a-safe place until wholly they-grow-cold
cavens summopere ne calidis formis aquam superjacias,
taking-care above-all lest on-the-hot molds water you-throw

quia interiores nuclei, si humorem persenserint, statim
because the-inner cores if moisture they-shall-have-felt at-once
inflantur et omne opus disrumpetur. Cumque per se
swell and all the-work will-be-burst and-when by themselves
refrigeratis argillam removeris, diligenter circumspice, et
cooled the-clay you-shall-have-removed diligently look-around and
si quid per negligentiam vel casu defuerit, locum
if anything through negligence or by-chance shall-have-been-lacking that
illum circumlimando attenuabis, et apposita cera, nec non
place by-filing-around you-will-thin and applied wax and also
argilla superaddita, cum sicca fuerit, calefacies, sicque
clay added-over when dry it-shall-have-been you-will-heat-it and-thus
superfundes, donec rivo in partem decurrente, quod
you-will-pour-over until with-a-stream into the-part running-down what
superfundis adhæreat. Quod cum respexeris, si minus
you-pour-over cling which when you-shall-have-looked-at if less
fuerit firmum, cum combustione vinitreæ petræ, et
it-shall-have-been firm with the-burning of-wine stone and
limatura ex mixtura argenti et cupri, sicut præscripsimus,
the-filings from the-mixture of-silver and of-copper as we-prescribed
solidabis. Post hæc diversis limis quadrangulis, triangulis,
you-will-solder after these-things with-various files quadrangular triangular
atque rotundis campos omnes primo translimabis, deinde
and round the-fields all first you-will-file-over then
ferris fossoriis fodies, et rasoriis rades; ad
with-irons graving you-will-engrave and with-scraping-ones you-will-scrape at-the
ultimum sabulo cum lignis in summitate modice conquassatis
last with-sand with woods at the-top moderately crushed
undique purgatum opus deaurabis.
on-all-sides cleaned the-work you-will-gild

Censer chains are plaited and drawn through holes in oak. Copper ore is roasted and smelted day and night; mixed with a fifth of tin it makes bell metal. Calamine is roasted and smelted with copper in a natural-draft furnace.

Caput LXI. De catenis.

Chapter LXI about chains

Catenas facturus primum trahe fila subtilia sive grossiora
chains about-to-make first draw wires fine or thicker
in cupro sive argento, et circumflecte cum subula in tribus
in copper or silver and bend-around-them with an-awl in three
auriculis, aut quatuor, vel quinque, sive sex, secundum
little-loops or four or five or six according-to
grossitudinem quam volueris, ad mensuram uniuscujusque
the-thickness which you-shall-wish to the-measure of-each
thuribuli minoris sive majoris. Et cum omnes catenas unius
censer smaller or greater and when all the-chains of-one
thuribuli in unam partem plexueris, tolle lignum tenue
censer into one part you-shall-have-plaited take a-wood thin
ex quercu sive fagineo, et fac in eo multa foramina cum
from oak or beech and make in it many holes with
gracili ferro rotundo et calido, per quæ foramina catenam
a-slender iron round and hot through which holes the-chain
igne recoctam et refrigeratam transduces et denuo recoques,
by-fire reheated and cooled you-will-draw and anew you-will-reheat
rursumque per aliud foramen transduces et recoques,
and-again through another hole you-will-draw and you-will-reheat
sicque tam diu facies, donec per omnia æqualiter sit
and-thus so long you-will-do until through all evenly it-be
grossum et rotundum. Deinde incide ipsam catenam per
thick and round then cut itself the-chain into

partes ad quantitatem thuribuli, mediam partem breviorem,
parts to the-size of-the-censer the-middle part shorter
et reliquas longiores, aptatisque foraminibus in summitatibus
and the-rest longer and-fitted holes at the-tops
utrisque catenarum, obfirmabis eas, quæ longiores sunt,
both of-the-chains you-will-fasten them which longer are
in inferiore parte thuribuli clavis firmis et transductis,
on the-lower part of-the-censer with-nails firm and passed-through
compositæ per superiorem partem impones anulos parvulos,
composed through the-upper part you-will-put rings very-small
cum quibus aptabis et obfirmabis eas ad lilium inferius,
with which you-will-fit and you-will-fasten them to the-lily below
per quod manu gestari debet cum magno anulo eidem
by which by-hand to-be-carried it-ought with a-great ring to-the-same
superius imposito. Mediam vero catenam, quæ brevior est,
above put-on the-middle however chain which shorter is
obfirmabis clavo in superiori parte thuribuli in uno capite,
you-will-fasten with-a-nail on the-upper part of-the-censer at one end
et alterum imposito anulo aptabis inferius sub lilio; et sic
and the-other put-on a-ring you-will-fit below under the-lily and thus
procurabis ut thuribulum ex omni parte æqualiter pendeat.
you-will-take-care that the-censer on every side evenly hang
Possunt etiam eodem modo et ordine, quo prædiximus,
can also in-the-same way and order in-which we-said-before
thuribula diversæ formæ et diversi operis percuti et
censers of-various form and of-various work to-be-beaten and
fundi in auro et argento atque auricalco. Sed magnopere
to-be-cast in gold and silver and brass but greatly
cavendum est, ut auricalcum, quod deaurari debet, omnino
to-be-taken-care-of it-is that the-brass which to-be-gilded ought wholly
purum sit et purgatum a plumbo, propter diversa infortunia,
pure be and cleaned of lead on-account-of the-various misfortunes

quæ deaurantibus evenire solent. Quod auricalcum si vis
which to-those-gilding to-happen are-wont which brass if you-wish
componere, primo naturam cupri, ex quo efficitur, disce.
to-compose first the-nature of-copper from which it-is-made learn

Caput LXII. De cupro.

Chapter LXII about copper

Cuprum in terra nascitur. Cujus vena cum invenitur,
copper in the-earth is-born whose vein when it-is-found
summo labore fodiendo et frangendo acquiritur. Est enim
with-highest labor by-digging and by-breaking is-acquired it-is for
lapis colore viridis ac durissimus et plumbo naturaliter
a-stone in-color green and very-hard and with-lead naturally
mixtus. Qui lapis abundanter effossus imponitur rogo et
mixed which stone abundantly dug-out is-put on-a-pyre and
comburitur in modum calcis, nec tamen mutat colorem,
is-burned in the-manner of-lime nor however does-it-change color
sed duritiam amittit ut confrangi possit. Deinde minutatim
but hardness it-loses so-that to-be-broken it-can then in-bits
confractus imponitur fornaci, follibus atque carbonibus
broken it-is-put into-a-furnace bellows and coals
adhibitis incessanter die ac nocte conflatur. Quod ipsum
applied unceasingly by-day and night it-is-smelted which itself
diligenter et caute fieri debet; id est ut in primo
diligently and cautiously to-be-done ought that is that at first
carbones imponantur, deinde lapidis minutiæ superfundantur,
coals be-put-in then of-the-stone the-bits be-poured-over
rursumque carbones et denuo lapides; sic fiat donec
and-again coals and anew stones thus let-it-be-done until
ad capacitatem fornacis sufficiat. Cumque lapis cœperit
to the-capacity of-the-furnace it-suffice and-when the-stone shall-have-begun
liquefieri, per cavernulas quasdam plumbum effluit et cuprum
to-melt through little-hollows certain the-lead flows-out and the-copper

intro remanet. Quod cum diutissime conflatum fuerit,
within remains which when very-long smelted it-shall-have-been
refrigeratur et eicitur; rursum aliud imponitur eodem
is-cooled and is-taken-out again another is-put-in in-the-same
ordine. Huic cupro taliter fuso quinta pars stagni admiscetur,
order to-this copper so cast a-fifth part of-tin is-mixed
et conficitur metallum, quo campanæ funduntur.
and is-made the-metal with-which bells are-cast
Invenitur etiam genus lapidis subcrocei coloris, et interdum
is-found also a-kind of-stone of-yellowish color and sometimes
rufus, qui calamina dicitur, qui non confractus, sed ita ut
red which calamine is-called which not broken but thus as
effoditur, lignis congestis et abundanter succensis imponitur,
it-is-dug-out on-woods heaped and abundantly kindled is-placed
et donec omnino candeat comburitur. Qui lapis post hæc
and until wholly it-glow is-burned which stone after these-things
refrigeratus et minutissime confractus miscetur carbonibus
cooled and very-finely broken is-mixed with-coals
omnino comminutis, et supradicto cupro commiscetur in
wholly broken-up and with-the-above-said copper is-mixed in
fornace, quæ hoc modo componitur. Stant quatuor lapides in
a-furnace which in-this way is-composed stand four stones in
modum crucis, a se longitudine unius pedis separati,
the-manner of-a-cross from each-other by-the-length of-one foot separated
partim in terra firmati, sed altitudine pedis unius super
partly in the-earth made-firm but in-height of-foot one above
terram æqualiter prominentes, et omnes in superiori parte
the-earth evenly standing-out and all on the-upper part
æquales. Super hos lapides ponuntur quatuor ferri quadranguli
even on these stones are-placed four irons quadrangular
grossitudine unius digiti, et longitudine ut possint ab uno
of-the-thickness of-one finger and of-length that they-can from one

lapide ad alterum protendi. Inter hos medii ponuntur alii
stone to the-other to-be-stretched between these in-the-middle are-placed other
ferri ejusdem mensuræ, æquali spatio, id est latitudine trium
irons of-the-same measure with-equal space that is by-the-width of-three
digitorum a se separati: super quos etiam in transverso
fingers from each-other separated over which also in across
ponuntur alii forma et mensura inferiorum æquali, ita ut
are-placed others in-form and measure to-the-lower equal so that
foramina videantur esse quadrangula. His ita distinctis,
the-holes seem to-be quadrangular these-things thus distinguished
super ipsos ferros ponatur argilla fortiter macerata et
over themselves the-irons let-it-be-placed clay strongly kneaded and
fimo equi commixta, spissitudine trium digitorum, ita ut
with-dung of-horse mixed in-thickness of-three fingers so that
ipsis ferris atque lapidibus ex omni parte adhæreat, et ita
to-the-very irons and stones on every side it-cling and so
sit, quasi lares rotunda super lapides jaceat. Deinde cum
be as-if a-hearth round over the-stones it-lie then with
rotundo ligno in spatiis inter ferros foramina fiant per
a-round wood in the-spaces between the-irons holes let-them-be-made through
omnia quanto possint ampliora; et sic diligenter siccetur.
all as-much-as they-can wider and thus diligently let-it-be-dried

Caput LXIII. De fornace.

Chapter LXIII about the-furnace

Deinde ab ipso lare sursum fiat murus cum minutis
then from itself the-hearth upward let-it-be-made a-wall with small
lapidibus, et eadem argilla in modum ollæ, ita ut a
stones and the-same clay in the-manner of-a-pot so that from
medietate superius aliquantulum strictior sit, et fiat altior
the-half above somewhat narrower it-be and it-be-made higher
quam latitudo sit, atque cum ligaminibus ferreis quinque
than the-width be and with bands iron five

aut quatuor circumligetur, et eadem argilla interius et
or four be-bound-around and with-the-same clay within and
exterius diligenter illinietur. Quo facto imponantur carbones
on-the-outside diligently will-be-smeared which done let-them-be-put-in coals
ardentes commixti extinctis, et mox ventus per inferiora
burning mixed with-quenched-ones and soon the-wind through the-lower
foramina ingrediens absque flatu follis educit flammas, et
holes entering without blast of-bellows draws-out flames and
quicquid metalli imponitur statim per se liquescit. Deinde
whatever of-metal is-put-in at-once by itself melts then
hoc modo componantur vascula huic operi necessaria.
in-this way let-them-be-composed little-vessels for-this work necessary

LXIV–LXVI · CRUCIBLES, BRONZE, AND PURE COPPER

Crucibles of shards from old crucibles and raw clay; copper melted with calamine to make cauldron bronze, which will not gild; and copper purified of its lead in a clay-lined pan so that brass made from it takes gilding.

Caput LXIV. De compositione vasorum.

Chapter LXIV about the-composition of-the-vessels

Tolle fragmina veterum vasorum, in quibus ante cuprum
take fragments of-old vessels in which before copper
sive auricalcum fusum fuerat, et super lapidem minutatim
or brass cast had-been and on a-stone in-bits
confringe. Deinde terram, ex qua fiunt ollæ, cujus genera
break-them then the-earth from which are-made pots of-which kinds
sunt duo; unum album, aliud grisium; ex quibus album valet
are two one white the-other gray from which the-white avails
ad colorandum aurum, aliud vero ad hæc vasa componenda;
for coloring gold the-other however for these vessels to-be-composed

et cum diutissime contriveris, hanc crudam terram in
and when very-long you-shall-have-ground this raw earth by
mensura commisces alteri, id est combustæ, quam primum
measure you-mix with-the-other that is the-burned which first
triveras, hoc modo. Accipe vasculum quodcunque et imple
you-had-ground in-this way take a-little-vessel any and fill
illud bis ex cruda terra, et ter ex cocta, ita ut duæ
it twice from the-raw earth and three-times from the-baked so that two
partes sint crudæ et tres coctæ, et ponens simul in vas
parts be raw and three baked and placing-them together into a-vessel
magnum perfunde aqua tepida, et malleis ac manibus
large pour-over with-water lukewarm and with-mallets and hands
fortiter macera, donec omnino in se tenax sit. Deinde accipe
strongly knead until wholly in itself tenacious it-be then take
lignum rotundum et incide illud ad mensuram, quam volueris
a-wood round and cut it to the-measure which you-shall-wish
habere vas secundum quantitatem fornacis, et super illud
to-have the-vessel according-to the-size of-the-furnace and over it
formabis vasculum unum, et formatum mox circumlinies
you-will-form a-little-vessel one and formed soon you-will-smear-it-around
cineribus siccis, et sic juxta ignem pone donec siccetur. Hoc
with-ashes dry and thus beside the-fire place-it until it-be-dried in-this
modo compone vasa quot volueris. Cumque diligenter siccata
way compose vessels as-many-as you-shall-wish and-when diligently dried
fuerint, pone in fornacem tria vel quatuor aut quinque,
they-shall-have-been place into the-furnace three or four or five
in quantum fornax capere possit, et circumfunde carbones.
in as-many-as the-furnace to-hold can and pour-around coals

Caput LXV. De compositione æris.

Chapter LXV about the-composition of-bronze

Cumque canduerint, tolle calaminam, de qua supra

and-when they-shall-have-glowed take the-calamine about which above

dixi, cum carbonibus minutissime tritam et in singulis

I-spoke with coals very-finely ground and into the-single

vasculis quasi ad sextam partem pone, et eam penitus

little-vessels as-if to a-sixth part place-it and it thoroughly

cupro supradicto imple et carbonibus operi. Interdum

with-copper above-said fill and with-coals cover sometimes

etiam cum ligno gracili et recurvo foramina inferius inpinge,

also with a-wood slender and bent-back the-holes below poke

ne forte obstruantur, ut et favillæ exeant ventusque

lest perhaps they-be-blocked so-that both the-ashes go-out and-the-wind

magis ingrediatur. Cum vero cuprum omnino liquefactum

more enter when however the-copper wholly melted

fuerit, tolle ferrum gracile, longum et curvum, ligneoque

shall-have-been take an-iron slender long and curved and-in-a-wooden

manubrio infixum, et diligenter commove, ut calamina

handle fixed and diligently stir so-that the-calamine

cupro commisceatur. Deinde forcipe longo vascula

with-the-copper be-mixed then with-tongs long the-little-vessels

singula modicum eleva et a locis suis paululum remove,

single a-little lift and from places their a-little remove

ne forte lari adhæreant, rursumque in omnibus ut prius

lest perhaps to-the-hearth they-cling and-again in all as before

calaminam pone, et cupro reple atque carbonibus operi.

calamine place and with-copper fill-up and with-coals cover

Cumque denuo penitus liquefactum fuerit, rursumque

and-when anew thoroughly melted it-shall-have-been and-again

diligentissime commove, et cum forcipe vas unum eiciens,

most-diligently stir and with tongs vessel one taking-out

sulcis in terra fossis totum effunde, vasque in suo loco
into-furrows in the-earth dug all pour-out and-the-vessel in its place
repone. Et mox calaminam ut prius impone, cuprumque quod
put-back and soon calamine as before put-in and-the-copper which
effudisti, quantum capere possit superpone. Eoque ut prius
you-poured-out as-much-as to-hold it-can place-over and-it as before
liquefacto commove et calaminam repone, atque effuso
melted stir and calamine put-back and with-the-poured-out
cupro reple et sine liquefieri. Sic singulis vasis facito.
copper fill-up and let-it melt thus with-the-single vessels do
Cumque per omnia penitus fuerit liquefactum atque
and-when through all thoroughly it-shall-have-been melted and
diutissime commotum, effunde ut prius, et serva donec opus
very-long stirred pour-out as before and keep until need
habueris. Hæc commixtio vocatur æs, unde caldaria, lebetes
you-shall-have this mixture is-called bronze whence cauldrons kettles
et pelves funduntur, sed non potest deaurari, quando ante
and basins are-cast but not can to-be-gilded when before
commixtionem cuprum non fuit penitus a plumbo purgatum.
the-mixture the-copper not was thoroughly from lead purged
Deinde facturus auricalcum, quod possit deaurari, sic incipe.
then about-to-make brass which can to-be-gilded thus begin

Caput LXVI. De purificatione cupri.

Chapter LXVI about the-purification of-copper

Tolle patellam ferream cujus magnitudinis volueris, et
take a-pan iron of-what size you-shall-wish and
lini eam interius et exterius argilla fortiter macerata et
smear it within and on-the-outside with-clay strongly kneaded and
mixta, et diligenter exsicca. Deinde pone eam ante fornacem
mixed and diligently dry-it then place it before the-furnace
ferrarii super carbones, ita ut cum folles flaverint,
of-the-smith over coals so that when the-bellows shall-have-blown

ventus partim interius partim superius procedat et non
the-wind partly within partly above proceed and not
inferius. Et circumpositis minutis carbonibus, æqualiter
below and placed-around small coals evenly
impone cuprum, et superadde carbonum congeriem. Quod
put-in the-copper and add-over a-heap of-coals which
cum diu sufflando fuerit liquefactum, discooperi et
when long by-blowing it-shall-have-been melted uncover and
mox minutam carbonum favillam super illud proice, et cum
soon the-fine of-coals ash over it throw and with
gracili ligno et sicco quasi miscendo commove, videbisque
a-slender wood and dry as-if by-mixing stir and-you-will-see
statim plumbum combustum ipsi favillæ quasi gluten
at-once the-lead burned to-the-very ash as-if glue
adhærere. Quo ejecto iterum carbones superpone, ut primo
cling which thrown-out again coals place-over as at-first
diu sufflans, rursumque discooperi, et tunc fac ut ante fecisti.
long blowing and-again uncover and then do as before you-did
Quod tam diu facies donec plumbum omnino excoquendo
which so long you-will-do until the-lead wholly by-boiling-out
eicias. Deinde infunde super infusorium, quod ad hoc
you-throw-out then pour-it over the-casting-mold which for this
aptaveris, et sic probabis si bene purum sit. Tene
you-shall-have-fitted and thus you-will-test if well pure it-be hold
illud cum forcipe prius quam refrigeretur, sed ita candens,
it with tongs before that it-be-cooled but so glowing
et percute grandi malleo super incudem fortiter, et si
and beat with-a-great hammer on an-anvil strongly and if
frangitur aut finditur, denuo oportebit te illud liquefieri sicut
it-is-broken or is-split anew it-will-behoove you it to-be-melted as
prius. Si vero sanum permanserit, refrigerabis in aqua, et
before if however sound it-shall-have-remained you-will-cool-it in water and

aliud eodem modo coques. Hoc cuprum vocatur torridum.
another in-the-same way you-will-cook this copper is-called roasted
Ex hoc cupro quicquid facere volueris ductili opere, in
from this copper whatever to-make you-shall-wish by-repoussé work in
imaginibus, bestiis et avibus, in thuribulis et diversis vasis,
images beasts and birds in censers and various vessels
in limbis tabularum, in filis et catenis, ad deaurandum operari
in borders of-panels in wires and chains for gilding to-work
poteris. Ex hoc cupro perfice auricalcum cum adjectione
you-will-be-able from this copper make brass with the-addition
calaminæ, eodem modo quo superius æs caldariorum
of-calamine in-the-same way in-which above the-bronze of-cauldrons
composuisti. Quod cum quater aut quinquies recoxeris
you-composed which when four-times or five-times you-shall-have-reheated
in vasculis furno impositis, quicquid exinde in diversorum
in little-vessels in-the-furnace put whatever thence in of-various
operum varietate fuderis, optime deaurare poteris.
works the-variety you-shall-have-cast excellently to-gild you-will-be-able

LXVII–LXX · GILDING BRASS AND SEPARATING METALS

Brass is gilded with more care than silver, soap curing its white spots. Gold is recovered from gilded copper on a bone-ash test, and from silver with sulfur. Copper is blackened with linseed oil and the pattern scraped bright and gilded.

Caput LXVII. Qualiter deauretur auricalcum.

Chapter LXVII how be-gilded brass

Deauraturus igitur thuribulum ex auricalco, fac eodem modo
about-to-gild therefore a-censer from brass do in-the-same way
sicut superius deaurasti auriculas argentei calicis, sed cum
as above you-gilded the-little-ears of-the-silver chalice but with

majori cautela, quia argentum et simplex cuprum facilius
greater caution because silver and simple copper more-easily
deaurari possunt quam auricalcum. Debet enim morosius et
to-be-gilded can than brass it-ought for more-slowly and
diligentius invivari et spissius deaurari, et frequentius
more-diligently to-be-quickened and more-thickly to-be-gilded and more-frequently
lavari, et diutius siccari. Quod cum cœperit croceum
to-be-washed and longer to-be-dried which when it-shall-have-begun a-saffron-yellow
colorem trahere, si videris albas maculas inde exire,
color to-draw if you-shall-have-seen white spots thence come-out
ut nolit æqualiter siccari, hæc est culpa calaminæ, quod
so-that it-will-not evenly be-dried this is the-fault of-the-calamine that
non fuit æqualiter commixta, sive plumbi, quod cuprum non
not it-was evenly mixed or of-the-lead that the-copper not
fuit purgatum et excoctum, quod sic emendabis. Tolle smigma
was purged and boiled-out which thus you-will-amend take soap
et pone in vasculum mundum, et infunde ei aquam, et
and place-it in a-little-vessel clean and pour-in to-it water and
digitis tuis quasi lavando commisce diligenter, donec fiat
with-fingers your as-if by-washing mix diligently until it-become
quasi fex cerevisiæ, atque cum setis porci linies illud
as-if the-lees of-beer and with bristles of-pig you-will-smear it
æqualiter per omnia super deauratum thuribulum. Deinde
evenly through all over the-gilded censer then
pone super carbones, et tam diu calefac, donec confectio illa
place-it over coals and so long heat-it until preparation that
incipiat nigrescere, et sic elevans cum forcipe per omnia
begin to-grow-black and thus lifting-it with tongs through all
diligenter asperges aqua, sicque lavabis, et cum filis
diligently you-will-sprinkle-it with-water and-thus you-will-wash and with wires
ex auricalco, sicut supra dictum est, polies. Quo facto
from brass as above said it-is you-will-polish which done

rursum circumfricabis cum confectione vinei lapidis, et vivo
again you-will-rub-around with the-preparation of-wine stone and quick
argento, et denuo deaurabis propter calorem carbonum,
silver and anew you-will-gild on-account-of the-heat of-the-coals
qui sæpius in illud mittuntur, ne forte, si tenue deauratum
which more-often onto it are-put lest perhaps if thin gilded
fuerit, ipsum aurum comburatur, sicque iterum polies
it-shall-have-been itself the-gold be-burned and-thus again you-will-polish
cum filis, ac denuo super carbones ponens diutius calefacies,
with wires and anew over coals placing-it longer you-will-heat
donec rubeum colorem trahat, et mox refrigerabis in aqua,
until a-red color it-draw and soon you-will-cool-it in water
et cum ferris æqualibus et ad hoc aptis polies, sicque
and with irons even and for this fitted you-will-polish and-thus
cum atramento combusto incolorabis, ut prædiximus.
with vitriol burned you-will-color-it as we-said-before

Caput LXVIII. Qualiter separetur aurum a cupro.

Chapter LXVIII how be-separated gold from copper

Quod si aliquando vasa cuprea seu argentea deaurata
but if sometimes vessels copper or silver gilded
fregeris, vel aliud quodlibet opus, hoc ordine aurum
you-shall-have-broken or other any work in-this order gold
adquirere poteris. Tolle ossa cujuscumque animalis, quæ
to-acquire you-will-be-able take the-bones of-any animal which
per plateam inveneris, et conbure, quæ refrigerata
through the-street you-shall-have-found and burn-them which cooled
minutatim tere, et tertiam partem cinerum ex fago commisce,
in-bits grind and a-third part of-ashes from beech mix
et fac testas sicut in purificando argento superius diximus;
and make shards as in purifying silver above we-said
quas igne sive sole siccabis. Deinde aurum a cupro diligenter
which by-fire or sun you-will-dry then the-gold from the-copper diligently

abrades, et ipsam rasuram complicabis in plumbo tenue
you-will-scrape and itself the-scraping you-will-fold in lead thinly
percusso, atque una ex testis illis coram fornace prunis
beaten and one of shards those before the-furnace on-the-embers
imposita, jam calefactam ipsam complicaturam plumbi
placed already heated the-very folding of-lead
cum rasura impones, et superjectis carbonibus conflabis.
with the-scraping you-will-put-in and thrown-over coals you-will-smelt
Cumque liquefactum fuerit, eo modo quo solet
and-when melted it-shall-have-been in-that way in-which is-wont
argentum purificari, interdum prunas amovendo et plumbum
silver to-be-purified sometimes the-embers by-removing and lead
addendo, interdum retegendo et morose flando combures,
by-adding sometimes by-uncovering and slowly by-blowing you-will-burn
donec cupro penitus absumpto, purum aurum appareat.
until the-copper thoroughly consumed pure gold appear

Caput LXIX. Quomodo separetur aurum ab argento.

Chapter LXIX how be-separated gold from silver

Cum raseris aurum de argento, imponas ipsam
when you-shall-have-scraped gold from silver put the-very
rursum rasuram in vasculum, in quo solet aurum et
again scraping into the-little-vessel in which is-wont gold and
argentum liquefieri, et superinprime panniculum lineum, ne
silver to-be-melted and press-over a-little-cloth linen lest
forte quid inde eiciatur vento follis, atque coram
perhaps anything thence be-thrown-out by-the-wind of-the-bellows and before
fornace ponens liquefac, et mox fragmina sulphuris impone,
the-furnace placing-it melt and soon fragments of-sulfur put-in
secundum quantitatem ipsius rasuræ, et cum carbone
according-to the-quantity of-the-very scraping and with a-coal
gracili diligenter commove, donec fumus ejus cesset; statim
slender diligently stir until the-smoke of-it cease at-once

infunde in ferrum infusorium. Deinde super incudem leviter
pour into the-iron casting-mold then on an-anvil lightly
percute, ne forte quid inde resiliat illius nigri, quod sulphur
beat lest perhaps anything thence spring-off of-that black which the-sulfur
combussit, quia ipsum est argentum. Non enim sulphur
burned because it-itself is silver not for the-sulfur
auri quicquam consumit, sed solum argentum, quod taliter
of-gold anything consumes but only silver which in-such-way
ab auro separat, quodque diligenter servabis. Rursumque
from the-gold it-separates and-which diligently you-will-keep and-again
in eodem vasculo sicut prius liquefac ipsum aurum et adice
in the-same little-vessel as before melt itself the-gold and add
sulphur. Quo commoto atque effuso, quod nigrum fuerit
sulfur which stirred and poured-out what black shall-have-been
frange et serva, sicque facies donec aurum purum
break and keep and-thus you-will-do until the-gold pure
appareat. Deinde omne illud nigrum, quod servasti diligenter,
appear then all that black which you-kept diligently
compone super testam compositam ex osse et cinere, et
set on a-shard composed from bone and ash and
adice plumbum, sicque combure, ut recipias argentum
add lead and-thus burn-it so-that you-may-recover silver
tuum. Quod si ad usum nigelli servare volueris, prius
your but if for the-use of-niello to-keep-it you-shall-wish before
quam combures, adde ei cuprum et plumbum secundum
that you-burn-it add to-it copper and lead according-to
mensuram superius memoratam, et confunde cum sulphure.
the-measure above mentioned and fuse-it with sulfur

Caput LXX. Quomodo denigretur cuprum.

Chapter LXX how be-blackened copper

De cupro supradicto, quod rubeum dicitur, fac tibi

of the-copper above-said which red is-called make for-yourself

laminas attenuari, quantæ longitudinis et latitudinis velis.

plates be-thinned of-what length and width you-wish

Quas cum incideris et aptaveris operi tuo, pertrahe in

which when you-shall-have-cut and you-shall-have-fitted to-work your draw on

illis flosculos, sive bestiolas, aut aliud quod volueris, et fode

them little-flowers or little-beasts or other what you-shall-wish and engrave

cum gracili ferro fossorio. Deinde tolle oleum, quod fit

with a-slender iron graving then take oil which is-made

de semine lini, et cum digito superlinies per omnia

from the-seed of-flax and with the-finger you-will-smear-over through all

tenue, atque cum penna anseris æquabis, et tenens cum

thinly and with a-feather of-a-goose you-will-level-it and holding-it with

forcipe pones super prunas ardentes. Cumque modicum

tongs you-will-place-it over embers burning and-when a-little

incaluerit, et oleum liquefactum fuerit, denuo

it-shall-have-grown-warm and the-oil melted shall-have-been anew

cum penna æquabis rursumque impones prunis, sicque

with the-feather you-will-level and-again you-will-place-it on-the-embers and-thus

facies donec exsiccetur. Quod si videris per omnia

you-will-do until it-be-dried but if you-shall-have-seen through all

æqualiter esse, mitte super carbones valde ignitos, et tam

evenly it-to-be put-it over coals very fiery and so

diu jaceat, donec omnino cesset fumare. Et si satis nigrum

long let-it-lie until wholly it-cease to-smoke and if enough black

fuerit, bene; sin autem, valde parum olei cum penna

it-shall-have-been well if-not however very little of-oil with a-feather

super calidum ita linies, æquatumque denuo conflatis

over the-hot-one so you-will-smear and-leveled anew to-blown-up

carbonibus superpone, faciens sicut prius. Cumque refrigeratum
coals place-it-over doing as before and-when cooled
fuerit, non in aqua sed per se, cum ferris rasoriis valde
it-shall-have-been not in water but by itself with irons scraping very
acutis rade diligenter flosculos, ita ut campi remaneant nigri.
sharp scrape diligently the-little-flowers so that the-fields remain black
Si vero litteræ fuerint, in tuo sit arbitratu, utrum eas
if however letters there-shall-have-been in your let-it-be judgment whether them
volueris esse nigras an deauratas. Cum vero lamina diligenter
you-shall-wish to-be black or gilded when however the-plate diligently
rasa fuerit, statim invivabis eam cum confectione vinicii
scraped it-shall-have-been at-once you-will-quicken it with the-preparation of-wine
lapidis et vivo argento, et mox deaurabis, deauratamque non
stone and quick silver and soon you-will-gild-it and-gilded not
exstingues in aqua, sed per se refrigerabitur, poliesque
you-will-quench-it in water but by itself it-will-be-cooled and-you-will-polish
sicut supra dictum est, et eodem modo colorabis.
as above said it-is and in-the-same way you-will-color-it

LXXI–LXXIII · PIERCED, PUNCHED, AND REPOUSSÉ WORK

Plates are engraved and pierced with chisels, or engraved and punched with a ring punch in tiny circles. In repoussé a sound gold or silver sheet is raised from the back and front, annealed between blows, mended with solder where it tears, gilded in part, and filled with wax and tile dust.

Caput LXXI. De opere interrasili.

Chapter LXXI about pierced work

Attenuato tibi laminas ex eodem cupro sicut superius,
thin for-yourself plates from the-same copper as above
sed spissius, quas pertractas quocumque volueris opere
but thicker which drawn in-whatever you-shall-wish work

fodies, ut supra. Deinde habeas ferros graciles et
you-will-engrave as above then have irons slender and
latiores, secundum quantitatem camporum, qui sint in una
broader according-to the-size of-the-fields which be at one
summitate tenues et acuti, in altera obtusi, qui vocantur
top thin and sharp at-the other blunt which are-called
meizel; ponensque laminam super incudem, campos omnes
chisels and-placing the-plate on an-anvil the-fields all
perforabis, cum supradictis ferris percutiens cum malleo.
you-will-pierce with the-above-said irons striking with a-hammer
Cumque omnes campi tali modo fuerint perforati, cum
and-when all the-fields in-such way shall-have-been pierced with
limis parvulis æquabis eos per omnia usque ad tractos.
files very-small you-will-level them through all up-to to the-strokes
Quo facto deaurabis et polies laminam, ut supra. Eodem
which done you-will-gild and you-will-polish the-plate as above in-the-same
modo fiunt tabulæ, et laminæ argenteæ super libros cum
way are-made panels and plates silver on books with
imaginibus, floribus atque bestiolis et avibus, ex quibus
images flowers and little-beasts and birds of which
pars deauratur, videlicet coronæ imaginum et capilli atque
part is-gilded namely the-crowns of-the-images and the-hair and
vestimenta per loca, atque pars remanet argentea. Fiunt etiam
the-garments in places and part remains silver are-made also
et laminæ cupreæ et fodiuntur, et denigrantur ac raduntur;
also plates copper and are-engraved and are-blackened and are-scraped
deinde in patella liquefacto stagno mittuntur, ut rasuræ
then in a-pan melted tin are-put so-that the-scrapings
albæ fiant, quasi deargentatæ sint. Ex his ligantur cathedræ
white become as-if silvered they-were with these are-bound chairs
pictæ, et sedilia, atque lecti; ornantur etiam libri pauperum.
painted and seats and beds are-adorned also the-books of-the-poor

Caput LXXII. De opere punctili.

Chapter LXXII about dotted work

Fiunt etiam laminæ de cupro, modo quo superius, et

are-made also plates of copper in-the-way in-which above and

fodiuntur gracili opere imaginum, florum sive bestiarum,

are-engraved with-slender work of-images of-flowers or of-beasts

et ita disponitur opus, ut campi parvuli sint, deinde

and so is-disposed the-work that the-fields very-small be then

purgantur cum subtili sabulo, et cum ferris ad hoc opus

they-are-cleaned with fine sand and with irons for this work

aptis poliuntur sicque deaurantur rursumque poliuntur et

fitted are-polished and-thus are-gilded and-again are-polished and

incolorantur. Post hæc ferro punctorio punctatur, quod

are-colored after these-things with-an-iron punch it-is-dotted which

hoc modo formatur. Ex chalybe fit ferrum ad mensuram

in-this way is-formed from steel is-made an-iron to the-measure

digiti longum, in una summitate gracile, in altera grossius.

of-a-finger long at one top slender at-the other thicker

Quod cum in graciliori parte æqualiter limatum fuerit,

which when on the-more-slender part evenly filed it-shall-have-been

cum subtilissimo ferro et malleolo percutitur in medio

with a-very-fine iron and small-hammer is-struck in the-middle

ejus subtile foramen, deinde circa ipsum foramen diligenter

of-it a-fine hole then around the-very hole diligently

limatur, donec ora ejus in circuitu æqualiter acuta fiat, ita

it-is-filed until the-edge of-it in circuit evenly sharp become so

ut quocunque percutiatur brevissimus circulus appareat. Post

that wherever it-be-struck a-very-short circle appear after

hæc ipsum ferrum modice calefactum, ut vix candescat,

these-things itself the-iron moderately heated so-that scarcely it-glow

temperetur in aqua. Deinde tene ipsum ferrum sinistra

let-it-be-tempered in water then hold itself the-iron with-the-left

manu et malleolum dextera, sedeatque puer ante te qui
hand and the-small-hammer with-the-right and-let-him-sit a-boy before you who
laminam teneat super incudem, et aptet in locis illis in quibus
the-plate may-hold on the-anvil and may-fit in places those in which
percussurus es, sicque mediocriter percutiens super ferrum
about-to-strike you-are and-thus moderately striking on the-iron
cum malleolo imple campum unum subtilissimis circulis
with the-small-hammer fill field one with-very-fine circles
quanto propius possis conjungere unum alteri. Impletis campis
as-much nearer you-can to-join one to-the-other filled the-fields
omnibus in hunc modum pone laminam ipsam super prunas
all in this way place the-plate itself over embers
candentes, donec percussiones illæ fulvum colorem recipiant.
glowing until strokes those a-tawny color receive

Caput LXXIII. De opere ductili.

Chapter LXXIII about repoussé work

Percute tabulam auream sive argenteam quantæ longitudinis
beat a-panel gold or silver of-what length
et latitudinis velis ad elevandas imagines. Quod aurum vel
and width you-wish for raising images which gold or
argentum, cum primo fuderis, diligenter circumradendo
silver when first you-shall-have-cast diligently by-scraping-around
et fodiendo inspice, ne forte aliqua vesica sive fissura in eo
and by-engraving inspect lest perhaps any bubble or crack in it
sit, quæ sæpe contingunt ex incuria, sive negligentia vel
be which often happen from the-carelessness or negligence or
ignorantia aut inscitia fundentis, cum aut nimis calidum,
ignorance or unskill of-the-caster when either too hot
aut nimis frigidum, aut nimis festinato, aut nimis productim
or too cold or too hastily or too slowly
effunditur. Cumque considerate et caute fuderis,
it-is-poured-out and-when deliberately and cautiously you-shall-have-cast

si hujusmodi vitium in eo deprehenderis, cum ferro ad
if of-this-kind a-fault in it you-shall-have-caught with an-iron for
hoc apto diligenter effodies, si possis. Quod si tantæ
this fitted diligently you-will-dig-it-out if you-can but if of-such
profunditatis vesica sive fissura fuerit, ut effodere non
depth the-bubble or crack shall-have-been that to-dig-out not
possis, rursumque oportebit te fundere, et tamdiu donec
you-can again it-will-behoove you to-cast and so-long until
sanum sit. Quod cum fuerit, provide, ut incudes
sound it-be which when it-shall-have-been take-care that the-anvils
et mallei tui omnino æquales et politi sint, cum quibus
and hammers your wholly even and polished be with which
operari debes, et omni diligentia procura, ut tabula aurea
to-work you-ought and with-all diligence take-care that the-panel gold
vel argentea ita æqualiter ex omni parte attenuetur, ut in
or silver so evenly on every side be-thinned that in
nullo loco spissius sit quam in alio. Cumque sic attenuata
no place thicker it-be than in another and-when so thinned
fuerit ut unguis vix inpressus appareat ex altera
it-shall-have-been that the-fingernail scarcely impressed appear from the-other
parte, et omnino sanissima, statim pertrahe imagines quot
side and wholly most-sound at-once draw images as-many-as
volueris secundum libitum tuum. Pertrahes autem in ea
you-shall-wish according-to pleasure your you-will-draw however on that
parte, quæ sanior et decorior videtur, leniter tamen et
side which sounder and comelier seems gently nevertheless and
sic ex altera parte modice appareat. Deinde cum curvo
thus on the-other side moderately it-appear then with a-curved
ferro bene polito fricabis leniter caput imprimis, quod
iron well polished you-will-rub gently the-head first which
altius debet esse, sicque convertens tabulam in recta
higher ought to-be and-thus turning the-panel on the-right

parte fricabis circa caput cum ferro æquali et polito,
side you-will-rub around the-head with an-iron even and polished
ita ut caput descendat, caput elevetur, et statim circa
so that the-head descend the-head be-raised and at-once around
ipsum caput cum malleo mediocri super incudem percuties
the-very head with a-hammer middling on an-anvil you-will-beat
leniter, sicque coram fornace superpositis carbonibus in
gently and-thus before the-furnace placed-over coals in
ipso loco recoques, donec candescat. Quo facto et tabula
the-very place you-will-reheat until it-glow which done and the-panel
per se refrigerata, iterum in inferiore parte cum curvo
by itself cooled again on the-lower side with the-curved
ferro fricabis leniter et diligenter fossam capitis interius,
iron you-will-rub gently and diligently the-hollow of-the-head within
convertensque tabulam in superiori parte denuo cum æquali
and-turning the-panel on the-upper side anew with the-even
ferro fricabis, et depones campum ut monticulum
iron you-will-rub and you-will-set-down the-field so-that the-little-mount
capitis elevetur, rursumque cum malleo mediocri circa
of-the-head be-raised and-again with the-hammer middling around
ipsum leniter percutiens, appositis carbonibus recoques; sic
it gently striking applied coals you-will-reheat thus
sæpe facies diligenter elevando interius et exterius, et
often you-will-do diligently by-raising within and on-the-outside and
crebro percutiendo, totiensque recoquendo donec monticulus
frequently by-beating and-as-often by-reheating until little-mount
ille ducatur ad altitudinem trium digitorum aut quatuor, sive
that be-drawn to a-height of-three fingers or four or
plus vel minus secundum quantitatem imaginum. Si autem
more or less according-to the-size of-the-images if however
ipsum aurum vel argentum adhuc aliquantum spissius est,
itself the-gold or silver still somewhat thicker is

poteris interius cum longo malleo et gracili percutere
you-will-be-able within with a-long hammer and slender to-beat
et attenuare, si opus fuerit. Quod si duo capita, vel tria
and to-thin if need shall-be but if two heads or three
seu plura in tabula esse debeant, circa unumquodque ita
or more on the-panel to-be ought around each so
facere debes sicut dixi, usque ad altitudinem quantam
to-do you-ought as I-said up-to to the-height as-great-as
volueris. Deinde cum pertractorio ferro designa corpus vel
you-shall-wish then with the-tracing iron mark-out the-body or
corpora imaginum, et ita deducendo et interdum percutiendo
bodies of-the-images and so by-drawing-out and sometimes by-beating
elevabis ea, quantum libuerit; hoc tamen procurans ut
you-will-raise them as-much-as shall-please this nevertheless taking-care that
caput semper altius sit. Post hæc designabis nares
the-head always higher be after these-things you-will-mark-out the-nostrils
et oculorum supercilia, os et aures, capillos et oculos,
and of-the-eyes the-brows the-mouth and ears the-hair and the-eyes
manus et brachia, cæteraque, vestimentorum umbras, scabella
hands and arms and-the-other of-the-garments shadows the-footstools
et pedes, et sic interius cum minoribus curvis ferris
and the-feet and thus within with smaller curved irons
elevabis leniter et diligenter, summopere cavens ut non
you-will-raise gently and diligently above-all taking-care that not
rumpatur opus aut perforetur. Quod si ex ignorantia vel
be-broken the-work or be-pierced but if from ignorance or
negligentia contigerit, hoc modo solidari debet. Tolle
negligence it-shall-have-happened in-this way to-be-soldered it-ought take
ipsius auri vel argenti modicum, et admisce tertiam partem
of-the-very gold or silver a-little and mix a-third part
cupri, fundensque pariter limabis subtiliter, combustoque
of-copper and-casting together you-will-file finely and-burned

vinicio lapide, et addito sale commiscebis aqua, ex quo
wine stone and added salt you-will-mix with-water from which
tenuiter liniens, fracturam supersparge limaturam. Qua siccata
thinly smearing the-break sprinkle-over the-filings which dried
denuo confectionem superlinies spissius, et sic inferius et
anew the-preparation you-will-smear-over thicker and thus below and
superius admotis carbonibus leniter flabis, donec videas
above applied coals gently you-will-blow until you-see
solidaturam diffluere. Quod videns statim asperge leniter
the-solder flow-out which seeing at-once sprinkle gently
aqua, et si firmum fuerit, bene; sin autem, denuo
with-water and if firm it-shall-have-been well if-not however anew
similiter fac usque dum firmum fiat. Si autem fractura
likewise do up-to while firm it-become if however the-break
lata fuerit, diligenter conjunge ei particulam ejusdem
broad shall-have-been diligently join to-it a-little-piece of-the-same
auri vel argenti æqualiter tenuem, quam solidabis eodem
gold or silver evenly thin which you-will-solder in-the-same
modo, donec ex omni parte adhæreat. Cumque elevatura
way until on every side it-cling and-when the-raising
imaginum perducta fuerit usque ad subtiles tractus,
of-the-images brought it-shall-have-been up-to to the-fine strokes
si aurum fuerit, statim facies eos et polies
if gold it-shall-have-been at-once you-will-make them and you-will-polish
diligenter, atque colorabis cum atramento usque ad ruborem
diligently and you-will-color with vitriol up-to to redness
combusto, et sale, ut supra in opere calicis. Si vero
burned and salt as above in the-work of-the-chalice if however
argentea fuerit tabula, et volueris in ipsis imaginibus
silver shall-have-been the-panel and you-shall-wish on the-very images
deaurare coronas, capillos et barbas, et partes vestimentorum,
to-gild the-crowns the-hair and beards and parts of-the-garments

hoc oportet fieri prius, quam subtiles tractus fiant,
this it-behooves to-be-done before that the-fine strokes be-made
hoc modo. Compone duas partes argillæ simplicis, subtiliter
in-this way compose two parts of-clay simple finely
tritæ, et tertiam salis, et in vasculo commisce cum fece
ground and a-third of-salt and in a-little-vessel mix with the-lees
cerevisiæ mediocriter spissæ, qua confectione cooperies
of-beer moderately thick with-which preparation you-will-cover
omne argentum quod volueris ut album remaneat, et quod
all the-silver which you-shall-wish that white it-remain and what
deaurandum est, maneat intectum. Quod cum siccaveris
to-be-gilded is let-remain uncovered which when you-shall-have-dried
super prunas, deaurabis loca singula diligenter sine aqua,
over embers you-will-gild the-places single diligently without water
deauratæque lavabis et polita incolorabis. Deinde cum
and-gilded you-will-wash and polished you-will-color then with
carbonibus subtiliter tritis et lignis gracilibus et grossioribus
coals finely ground and woods slender and thicker
fricabis diligenter, donec per omnia æque clarum sit.
you-will-rub diligently until through all equally bright it-be
Post hæc et in auro et argento fac subtiles tractus,
after these-things both on gold and silver make the-fine strokes
quos et faciendo pariter polies, donec ad perfectionem
which also by-making together you-will-polish until to perfection
perduces. Cum vero tabulas illas aureas vel argenteas
you-bring-them when however panels those gold or silver
pleniter elevatas atque politas configere volueris, tolle ceram
fully raised and polished to-fasten you-shall-wish take wax
et liquefac in vase fictili vel cupreo, atque commisce ei
and melt in a-vessel earthen or copper and mix with-it
tegulam subtiliter tritam sive sabulum, ita ut sint hujus
tile finely ground or sand so that there-be of-this

duæ partes et ceræ tertia. Quod cum pariter liquefactum
two parts and of-wax a-third which when together melted
fuerit, cum cochleari ligneo fortiter commovebis, et
it-shall-have-been with a-spoon wooden strongly you-will-stir and
inde implebis omnes imagines in auro et argento, sive cupro,
thence you-will-fill all the-images in gold and silver or copper
vel quodcunque in his elevatum fuerit, et refrigeratum
or whatever in these raised shall-have-been and cooled
confige ubi velis. In cupreis vero tabulis eodem modo
fasten where you-wish on copper however panels in-the-same way
attenuatis simile opus fit, sed majori virium instantia
thinned like work is-made but with-greater of-strength urgency
et diligentia, quo durioris naturæ est. Quod opus cum
and diligence because of-harder nature it-is which work when
pervenerit ad subtiles tractus, debet in exteriori parte
it-shall-have-come to the-fine strokes ought on the-outer side
purgari cum laneo panno et sabulo, donec nigra cutis
to-be-cleaned with a-woolen cloth and sand until the-black skin
auferatur, et sic deaurari atque poliri, perfectis tractibus
be-taken-away and thus be-gilded and be-polished finished the-strokes
incolorari, et prædicta confectione impleri.
be-colored and with-the-aforesaid preparation be-filled

Thin silver, copper, or brass is struck into carved iron dies under lead for borders, crucifixes, the Lamb, evangelists, and kings; nail heads are stamped as rosettes and fixed to tin shanks for saddle straps and bridles.

Caput LXXIV. De opere quod sigillis imprimitur.
Chapter LXXIV about the-work which with-dies is-impressed
Fiant ferri ad mensuram unius digiti spissi, tribus
let-them-be-made irons to the-measure of-one finger thick three
digitis et quatuor lati, longitudine pedis unius, qui sanissimi
fingers and four broad in-length of-foot one which very-sound
debent esse, ut in eis nulla sit macula, nulla fissura
ought to-be so-that in them no be spot no crack
in superiori latere. In his sculpantur in similitudine
on the-upper side in these let-them-be-carved in the-likeness
sigillorum limbi graciles et latiores, in quibus sint flores,
of-seals borders slender and broader in which be flowers
bestiæ, et aviculæ sive dracones concatenati collis et caudis,
beasts and little-birds or dragons linked by-necks and tails
et non sculpantur profunde nimis, sed mediocriter ac
and not let-them-be-carved deeply too but moderately and
studiose. Deinde attenuabis argentum multo tenuius quam ad
zealously then you-will-thin silver much thinner than for
elevandum quantæ longitudinis volueris, atque purgabis
raising of-what length you-shall-wish and you-will-clean-it
cum carbonibus subtiliter tritis et panno, ac polies
with coals finely ground and a-cloth and you-will-polish-it
cum creta desuper rasa. Quo facto conjunge argentum
with chalk from-above scraped which done join the-silver
cuicunque limbo, positoque ferro super incudem ita ut
to-whatever border and-placed the-iron on the-anvil so that

sculptura superius sit, ac superlocato ei argento desuper
the-carving above be and placed-over on-it the-silver from-above
pone plumbum spissum, percutiesque cum malleo fortiter,
place lead thick and-you-will-strike with a-hammer strongly
ita ut plumbum impingat argentum tenue in sculpturam
so that the-lead drive the-silver thin into the-carving
tam valide, ut omnes tractus in eo pleniter appareant. Quod
so powerfully that all the-strokes on it fully appear but
si lamina longior fuerit, trahe eam de loco ad locum,
if the-plate longer shall-have-been draw it from place to place
et conjunctam ferro cum forcipe æqualiter tene, ut
and joined to-the-iron with tongs evenly hold-it so-that
una parte percussa, alia percutiatur, sicque fiat donec
one part struck another be-struck and-thus let-it-be-done until
lamina tota impleatur. Hoc opus satis utile est circa limbos
the-plate whole be-filled this work quite useful is around borders
in fabricandis tabulis altarium, in pulpitis, in sanctorum
in making panels of-altars on pulpits on of-saints
corporum scriniis, in libris et in quibuscunque locis opus
of-the-bodies shrines on books and in whatever places need
fuerit, quando elevatura decora est et subtilis, et leviter
shall-be when the-raising comely is and fine and lightly
fit. Fit etiam in cupro hujusmodi opus quod simili modo
is-made is-made also in copper of-this-kind work which in-like way
attenuatur, purgatur et deauratur atque politur, quod ferro
is-thinned is-cleaned and is-gilded and is-polished which on-the-iron
superpositum, ita ut deauratura vertatur ad ferrum, plumbo
placed so that the-gilding be-turned to the-iron lead
superposito percutitur donec tractus appareant. Sculpitur
placed-over is-struck until the-strokes appear is-carved
quoque in ferro, modo supradicto, imago crucifixi
also in iron in-the-way above-said the-image of-the-crucified

Domini, quæ cum argento vel cupro deaurato impingitur,
Lord which with silver or copper gilded is-impressed
et fabricantur inde phylacteria, item capsellæ reliquiarum
and are-made thence phylacteries likewise little-boxes of-relics
et scriniola Sanctorum. Fit etiam sculptura imaginis
and little-shrines of-the-Saints is-made also the-carving of-the-image
Agni Dei in ferro, et imagines quatuor Evangelistarum,
of-the-Lamb of-God in iron and the-images of-the-four Evangelists
quibus auro vel argento impressis ornantur scyphi ligni
with-which in-gold or silver impressed are-adorned cups of-wood
pretiosi, stante rotula agni in medio scyphi, quatuor
precious standing the-little-disk of-the-lamb in the-middle of-the-cup the-four
Evangelistis in modum crucis in circuitu, et procedentibus
Evangelists in the-manner of-a-cross in circuit and proceeding
quatuor limbis ab agno usque ad quatuor Evangelistas;
four borders from the-lamb up-to to the-four Evangelists
fiunt imagines pisciculorum et avium atque bestiarum, quæ
are-made images of-little-fish and of-birds and of-beasts which
figuntur per reliquum scyphi campum, præbentes ornatum
are-fixed through the-remaining of-the-cup field offering adornment
multum; fit etiam imago Majestatis eodem modo, aliæque
much is-made also the-image of-the-Majesty in-the-same way and-other
imagines, cujusque formæ sive sexus, quæ impressæ auro
images of-every form or sex which impressed in-gold
vel argento seu cupro deaurato, plurimum decoris præstant
or silver or copper gilded very-much of-beauty lend
locis, quibus imponuntur, propter sui subtilitatem et
to-the-places on-which they-are-put on-account-of their fineness and
operositatem; fiunt et imagines regum et equitum eodem
laboriousness are-made also images of-kings and of-horsemen by-the-same
opere in ferro, ex quibus auricalco Hispanico impressis
work in iron from which in-brass Spanish impressed

ornantur pelves, quibus aqua in manibus funditur, eodem
are-adorned basins with-which water on hands is-poured in-the-same
modo quo ornantur scyphi auro et argento cum suis
way in-which are-adorned cups with-gold and silver with their
limbis ejusdem metalli, in quibus stant bestiolæ vel aves et
borders of-the-same metal on which stand little-beasts or birds and
flosculi, qui tamen non configuntur, sed stagno solidantur.
little-flowers which nevertheless not are-nailed but with-tin are-soldered

Caput LXXV. De clavis.

Chapter LXXV about nails

Fiunt etiam clavi ferrei longitudine unius digiti, in una
are-made also nails iron in-length of-one finger at one
summitate grossiores, in altera graciliores, in qua etiam
top thicker at-the other thinner on which also
chalybe solidandi sunt, quorum unus limetur quadrangulus,
with-steel to-be-soldered they-are of-which one let-it-be-filed quadrangular
alius triangulus, tertius rotundus, secundum convenientem
another triangular the-third round according-to fitting
grossitudinem. Deinde sculpantur in eis flosculi eodem
thickness then let-them-be-carved on them little-flowers in-the-same
modo, quo supra, ita ut ora ferri circa flosculum
way in-which above so that the-edge of-the-iron around the-little-flower
acuta fiat. Cumque valde attenuatum fuerit argentum
sharp become and-when very thinned it-shall-have-been the-silver
sive cuprum deauratum, vel auricalcum in superiori parte,
or copper gilded or brass on the-upper side
polies, sicut supra; in inferiori vero superstagnes valde
you-will-polish as above on the-lower however you-should-tin very
tenue cum ferro, quo fenestræ solidantur, ponesque
thinly with the-iron with-which windows are-soldered and-you-will-place
plumbum spissum super incudem et desuper argentum,
lead thick on the-anvil and from-above the-silver

sive cuprum deauratum, ita ut deauratura superius sit, et
or copper gilded so that the-gilding above be and
stagnum inferius sit; sumptoque uno ex ferris, quale velis,
the-tin below be and-taken one of the-irons which you-wish
junge sculpturam ad argentum, percutiesque cum malleo ita
join the-carving to the-silver and-you-will-strike with a-hammer so
ut sculptura appareat, et cum acuta ora ferri in circuitu
that the-carving appear and with the-sharp edge of-the-iron in circuit
incidatur. Quod cum per totum argentum feceris,
be-cut which when through the-whole silver you-shall-have-done
serva tibi flosculos omnes, quia illi erunt capita
keep for-yourself the-little-flowers all because they will-be the-heads
clavorum, quorum caudas hoc modo facies. Commisce
of-the-nails whose tails in-this way you-will-make mix
duas partes stagni, et tertiam plumbi, et percute illud
two parts of-tin and a-third of-lead and beat it
gracile et longum, deinde pertrahe per foramina ferri, in
slender and long then draw-it through the-holes of-the-iron in
quo fila trahuntur, ita ut longissimum filum fiat, et non
which wires are-drawn so that a-very-long wire become and not
gracile nimis fiat, sed mediocre. Post hæc fac tibi
slender too become but middling after these-things make for-yourself
ferrum gracile, longitudine pedis unius dimidii, quod in una
an-iron slender in-length of-foot one half which at one
summitate sit modice latum, ad mensuram unguis, et
top be moderately broad to the-measure of-a-fingernail and
mediocriter cavum, et altera summitas infigatur ligneo
moderately hollow and the-other top let-it-be-fixed in-a-wooden
manubrio. Deinde sedens juxta fornacem ad hoc opus aptam,
handle then sitting beside the-furnace for this work fitted
ante quam stet vasculum cupreum cum cera liquefacta,
before which stand a-little-vessel copper with wax melted

tenensque sinistra manu manubrium illius gracilis ferri in
and-holding with-the-left hand the-handle of-that slender iron on
latiori parte calefacti, in dextra vero filum stagneum quasi
the-broader part heated in the-right however the-wire tin as-if
globum involutum, cujus caput facies in cera liquefacta
a-ball rolled-up whose head you-will-make in the-wax melted
humidum, ponensque super unum ex flosculis, in ea ubi
moist and-placing-it on one of the-little-flowers on it where
stagnum est, ita ut hæreat, levabis, et pones in
the-tin is so that it-cling you-will-lift-it and you-will-place-it into
fossulam ferri candentis, tenebisque donec liquefiat,
the-little-pit of-the-iron glowing and-you-will-hold-it until it-melt
statimque removebis utrumque ab igne, incidesque filum
and-at-once you-will-remove both from the-fire and-you-will-cut the-wire
cum forcipe secundum longitudinem quam vis habere
with tongs according-to the-length which you-wish to-have
caudam clavi. Sicque facies donec expendas in hujusmodi
the-tail of-the-nail and-thus you-will-do until you-spend in of-this-kind
clavis argentum illud cuprumque deauratum. Cumque clavorum
nails silver that and-copper gilded and-when of-nails
copiam habueris, et eos configere volueris in corrigiis
a-store you-shall-have and them to-fasten you-shall-wish in the-straps
ascensoriis sellæ equi, sive circa capitium freni,
stirrup of-the-saddle of-a-horse or around the-headstall of-the-bridle
primum cum subula fac foramina, et sic impone clavos
first with an-awl make holes and thus put-in the-nails
ordinatim, ita ut sint tres aurei, tres argentei, rursumque
in-order so that there-be three golden three silver and-again
tres aurei, et simili modo per totum. Si vero duos ordines
three golden and in-like way through the-whole if however two rows
vel tres habere volueris, pone semper unum argenteum, et
or three to-have you-shall-wish place always one silver and

alterum aureum per omnia, sicque ponens corrigiam cum
the-other golden through all and-thus placing the-strap with
capitibus super tabulam ligneam æqualem, confige caudas
the-heads on a-board wooden level fasten the-tails
cum mediocri malleo. Fiunt etiam eodem modo clavi ex
with a-middling hammer are-made also in-the-same way nails from
auricalco, sed spissiores, quorum caudæ cupreæ solidantur
brass but thicker whose tails copper are-soldered
interius stagno puro eodem modo. His configuntur vaginæ
within with-tin pure in-the-same way with-these are-fastened the-sheaths
cultellorum, et coria super libros, multaque hujusmodi.
of-knives and hides on books and-many-things of-this-kind

LXXVI–LXXIX · GOLD ON SILVER, CHASED COPPER, AND CLEANING

Gold soldered onto silver and beaten thin gilds borders and the gold thread of orphreys. Copper is raised and chased with figures and set with gems; old gilding is cleaned with soap, and blackened gold and silver with charcoal and chalk.

Caput LXXVI. De solidando auro et argento pariter.
Chapter LXXVI about soldering gold and silver together
Purificatur argentum pondere duodecim nummorum, et
is-purified silver by-the-weight of-twelve pennies and
percutitur strictim longitudine dimidii digiti minoris, deinde
is-beaten narrowly in-length of-half the-finger little then
percutitur aurum coctum pondere unius nummi eadem
is-beaten gold cooked by-the-weight of-one penny of-the-same
latitudine et longitudine, atque consolidantur hæc duo
width and length and are-soldered these two
præscripta solidatura auri, donec omnino sibi invicem
with-the-prescribed solder of-gold until wholly to-each other

adhæreant, sicque insimul percutiantur usque dum tenuissima
they-cling and-thus together let-them-be-beaten up-to while a-very-thin
lamina fiat. Hoc opus videtur, quasi argentum in una
plate it-become this work seems as-if silver on one
parte deauratum sit, nec posset cum duobus aut tribus
side gilded it-be nor could-it with two or three
nummis auri tantæ longitudinis lamina tam fulgide deaurari.
pennies of-gold of-such length a-plate so brightly be-gilded
Ex hac lamina fiunt limbi, modo quo superius impressi
from this plate are-made borders in-the-way in-which above impressed
ferro. Inde etiam inciduntur subtiles corrigiæ, et in serico
with-the-iron thence also are-cut fine strips and on silk
filando circumtorquentur, unde texuntur aurifrigia apud
in-spinning are-twisted-around whence are-woven orphreys among
pauperes eodem modo quo apud divites ex auro puro.
the-poor in-the-same way in-which among the-rich from gold pure

Caput LXXVII. De opere ductili, quod sculpitur.

Chapter LXXVII about repoussé work which is-carved

Percute tabulam cupream quantæ latitudinis et longitudinis
beat a-panel copper of-what width and length
volueris, sic spissam ut vix plicari possit, et sit
you-shall-wish so thick that scarcely to-be-folded it-can and let-it-be
sanissima ab omni fissura et macula, et pertrahe in ea
most-sound from every crack and spot and draw on it
imaginem, quam volueris. Deinde percute in loco capitis
the-image which you-shall-wish then beat in the-place of-the-head
fossam cum mediocri malleo rotundo in inferiori parte, et
a-hollow with a-middling hammer round on the-lower side and
ex superiori parte cum tenui malleo in circuitu, sicque
from the-upper side with a-thin hammer in circuit and-thus
recoques in prunis. Qua refrigerata per se, facies per
you-will-reheat in the-embers which cooled by itself you-will-do through

totam imaginem cum malleis sicut fecisti in tenui cupro cum
the-whole image with hammers as you-did on thin copper with
curvis ferris et æqualibus, semper ex utraque parte diligenter
curved irons and even always from each side diligently
deducendo et frequenter recoquendo. Cumque elevaveris
by-drawing-out and frequently by-reheating and-when you-shall-have-raised
imaginem quam alte volueris, accipe ferros ad mensuram
the-image as high you-shall-wish take irons to the-measure
palmi longos, in una summitate grossiores, super quos
of-a-palm long at one top thicker on which
possit cum malleo percuti, et in altera graciliores, tenues
it-can with a-hammer to-be-struck and at-the other more-slender thin
et rotundos atque subtiles, quos ad hoc opus aptaveris,
and round and fine which for this work you-shall-have-fitted
et sedente coram te puero hujus artis docto, tene sinistra
and sitting before you a-boy in-this art taught hold with-the-left
manu tabulam, et dextera ferros puero desuper feriente
hand the-panel and with-the-right the-irons the-boy from-above striking
cum mediocri malleo, designabis oculos et nares, capillos
with a-middling hammer you-will-mark-out the-eyes and nostrils the-hair
et manuum digitos, pedum articulos, et omnes tractus
and of-the-hands the-fingers of-the-feet the-joints and all the-strokes
vestimentorum in superiori parte, ita ut interius appareant, ubi
of-the-garments on the-upper side so that within they-appear where
etiam cum eisdem ferris percuties, ut exterius eleventur
also with the-same irons you-will-strike so-that on-the-outside be-raised
tractus. Quod cum tam diu feceris donec omnino
the-strokes which when so long you-shall-have-done until wholly
formetur, cum ferris fossoriis et rasoriis fodies circa
it-be-formed with irons graving and scraping you-will-engrave around
oculos et nares, os et mentum et aures, designabisque
the-eyes and nostrils the-mouth and chin and ears and-you-will-mark-out

capillos et omnes subtiles tractus vestimentorum, et ungues
the-hair and all fine strokes of-the-garments and the-nails
manuum et pedum. Quo facto, si volueris coronas
of-the-hands and of-the-feet which done if you-shall-wish the-crowns
imaginum ornare gemmis, electro atque margaritis, statim
of-the-images to-adorn with-gems enamel and pearls at-once
operare singulas partes in auro cum filis et solidatura, sicut
work the-single parts in gold with wires and solder as
superius in opere calicis, et adjungens unamquamque
above in the-work of-the-chalice and joining each
loco suo, fac foramina, per quæ configi debent, videlicet
to-place its make holes through which to-be-fastened they-ought namely
sub majoribus gemmis, et in cupro æqualiter; sicque
under the-greater gems and in the-copper evenly and-thus
deaurabis tabulam et polies eam in primis cum filis ex
you-will-gild the-panel and you-will-polish it at first with wires from
auricalco sicut supra, deinde cum ferris æqualibus; sicque
brass as above then with irons even and-thus
colorabis et configes auri partes unamquamque in suo
you-will-color-it and you-will-fasten the-gold parts each in its
loco, imponesque gemmas et circumligabis margaritas.
place and-you-will-put-in the-gems and you-will-bind-around the-pearls
Eodem modo, si facultas in censu fuerit, potes in
in-the-same way if the-means in the-fortune shall-have-been you-can in
auro et argento facere imagines super libros evangeliorum
gold and silver make images on books of-the-gospels
et missales, et bestiolas atque aviculas ac flores super
and missals and little-beasts and little-birds and flowers on
sellas equestres matronarum exterius. Fiunt etiam eodem
saddles equestrian of-ladies on-the-outside are-made also by-the-same
opere, in scyphis aureis sive argenteis vel scutellis, in medio
work on cups golden or silver or dishes in the-middle

equites contra dracones sive leones vel gryphes pugnantes,
horsemen against dragons or lions or griffins fighting
imago Samsonis vel David ora leonum confringentes,
the-image of-Samson or of-David the-mouths of-lions breaking
leones quoque simplices et gryphes, idem singuli singulas
lions also simple and griffins likewise singly single
pecudes suffocantes, sive aliud quod libuerit, quodque
cattle strangling or other what shall-please and-what
secundum operis quantitatem decens vel aptum fuerit.
according-to of-the-work the-size becoming or fit shall-have-been

Caput LXXVIII. De purganda antiqua deauratura.

Chapter LXXVIII about cleaning old gilding

Tolle smigma et pone in pelve, sive in alio vase mundo,
take soap and place-it in a-basin or in another vessel clean
et superfunde ei aquam, atque digitis tuis commisce
and pour-over to-it water and with-fingers your mix
donec sit sicut fex spissum, ita ut ubicumque superponatur
until it-be as lees thick so that wherever it-be-placed-over
non possit fluere. Deinde cum setis porci linies illud
not it-can to-flow then with bristles of-pig you-will-smear it
diligenter super vetustam deauraturam in cupro sive argento,
diligently over the-old gilding on copper or silver
quæ fulgorem suum perdiderit, sic ut omnino cooperietur,
which brightness its shall-have-lost so that wholly it-will-be-covered
et sines ita permanere per diem et noctem. Secunda
and you-will-let-it thus remain through a-day and night on-the-second
vero die aqua lavabis cum eisdem setis semel et
however day with-water you-will-wash with the-same bristles once and
iterum, ac tertio perfundas limpida aqua, videbisque
again and a-third-time you-should-pour-over-it with-clear water and-you-will-see
fulgere eam sicut placuerit oculis tuis.
shine it as it-shall-have-pleased eyes your

Caput LXXIX. De purgando auro et argento.
Chapter LXXIX about cleaning gold and silver
Si aurum et argentum laminis attenuatum atque clavis
if gold and silver in-plates thinned and with-nails
alicubi confixum denigratum vetustate fuerit, tolle
somewhere fastened blackened by-age shall-have-been take
carbones nigros et minutissime tere eos atque per pannum
coals black and very-finely grind them and through a-cloth
cribra, sumensque pannum lineum sive laneum madefactum in
sift-them and-taking a-cloth linen or woolen soaked in
aqua, pones super ipsos carbones, elevansque fricabis
water you-will-place-it over themselves the-coals and-lifting-it you-will-rub
diligenter per omnia aurum et argentum, donec omnem
diligently through all the-gold and silver until all
nigredinem auferas, sicque lavabis aqua, et sole sive
blackness you-take-away and-thus you-will-wash with-water and by-sun or
igne vel panno siccabis; deinde tolle cretam candidam, et
by-fire or with-a-cloth you-will-dry then take chalk white and
minutissime rade in vase, et cum lineo panno ita siccam
very-finely scrape-it into a-vessel and with a-linen cloth so dry
fricabis super ipsum aurum vel argentum tamdiu, donec
you-will-rub over the-very gold or silver so-long until
pristinum fulgorem recipiat. Eodem modo vasa purgantur.
its-former brightness it-receive in-the-same way vessels are-cleaned

Copper organ pipes are rolled on a tapered iron, soldered, turned true, and fitted with a lip, their pitch set by ear. The organ's house of plane-tree wood holds sliding tongues, lettered for the notes, that open the wind to each pipe.

Caput LXXX. De organis.

Chapter LXXX about organs

Facturus organa primum habeat lectionem mensuræ, qualiter
about-to-make organs first let-him-have the-reading of-the-measure how
metiri debeant fistulæ graves et acutæ et superacutæ;
to-be-measured ought the-pipes low and high and very-high
deinde faciat sibi ferrum longum et grossum ad
then let-him-make for-himself an-iron long and thick to
mensuram, qua vult esse fistulas, quod sit rotundum,
the-measure in-which he-wishes to-be the-pipes which be round
in circuitu summa diligentia limatum et politum, in una
in circuit with-highest diligence filed and polished at one
summitate grossius et modice attenuatum, ita ut possit
top thicker and moderately thinned so that it-can
imponi in alterum ferrum curvum per quod circumducatur,
to-be-put into another iron curved by which it-may-be-turned-around
juxta modum ligni in quo volvitur runcina, et in
according-to the-manner of-the-wood in which is-turned the-plane and at-the
altera summitate gracile, secundum mensuram inferioris capitis
other top slender according-to the-measure of-the-lower end
fistulæ, quod conflatorio debet imponi. Deinde attenuetur
of-the-pipe which into-the-wind-trunk ought to-be-put then let-it-be-thinned
cuprum purum et sanissimum, ita ut unguis impressus
copper pure and most-sound so that the-fingernail impressed
ex altera parte appareat. Quod cum fuerit secundum
from the-other side appear which when it-shall-have-been according-to

mensuram ferri limatum et incisum ad longiores fistulas,
the-measure of-the-iron filed and cut for the-longer pipes
quæ dicuntur graves, fiat secundum præceptum lectionis
which are-called low let-it-be-made according-to the-precept of-the-reading
foramen, in quo plectrum imponi debet, et circumradatur
the-hole in which the-plectrum to-be-put ought and let-it-be-scraped-around
modice ad mensuram fistulæ, atque superlineatur stagnum
moderately to the-measure of-the-pipe and let-it-be-smeared-over tin
cum ferro solidatorio, radaturque in una ora longitudinis
with the-iron soldering and-let-it-be-scraped on one edge of-the-length
interius, et in altera ora exterius eadem mensura, et
within and on the-other edge on-the-outside by-the-same measure and
superstagnetur tenue. Quæ stagnatura, priusquam fiat, ac
let-it-be-tinned thinly which tinning before it-be-made and
sint tractus noviter facti, modice calefacto cupro lineatur
be the-strokes newly made moderately heated the-copper let-it-be-smeared
cum resina abietis, ut stagnum levius et citius
with resin of-fir so-that the-tin more-easily and more-quickly
adhæreat. Quo facto complicetur ipsum cuprum circa ferrum
cling which done let-it-be-folded itself the-copper around the-iron
et circumligetur filo ferreo mediocriter grosso fortiter,
and let-it-be-bound-around with-wire iron moderately thick strongly
ita ut stagnati tractus conveniant sibi. Quod filum primo
so that the-tinned strokes meet each-other which wire first
induci debet parvulo foramini, quod est in gracili
to-be-led-in ought into-the-very-small hole which is at the-slender
summitate ferri, et in eo bis contorqueri, sicque deduci
top of-the-iron and in it twice be-twisted and-thus be-led-down
in volvendo usque ad alteram summitatem, ibique similiter
in turning up-to to the-other top and-there likewise
obfirmari. Deinde juncturis sibi invicem convenientibus et
be-fastened then with-the-joints to-each other agreeing and

diligenter jungentibus, ponatur ipsa ligatura pariter cum
diligently joining let-it-be-placed itself the-binding together with
ferro ante fornacem super prunas ardentes, et sedente puero
the-iron before the-furnace over embers burning and sitting a-boy
ac mediocriter flante, teneatur dextera manu lignum gracile,
and moderately blowing let-it-be-held with-the-right hand a-wood slender
in cujus summitate fissa hæreat panniculus cum resina,
in whose top split cling a-little-cloth with resin
et sinistra teneatur stagnum longum gracile percussum,
and with-the-left let-it-be-held tin long slender beaten
ut mox cum fistula incaluerit, lineat juncturam
so-that soon when the-pipe it-shall-have-grown-hot it-may-smear the-joint
cum panniculo resina infecto, appositumque stagnum
with the-little-cloth with-resin soaked and-applied the-tin
liquefiat, ipsamque juncturam diligenter consolidet. Quo facto
may-melt and-itself the-joint diligently solder which done
refrigerata fistula, ponatur ferrum in instrumento tornatoris
cooled the-pipe let-it-be-placed the-iron in the-instrument of-a-turner
modo parato, impositoque curvo ferro et filo soluto
in-the-manner prepared and-put-on the-curved iron and the-wire loosened
circumvolvat unus ferrum curvum, alter vero utrisque
let-him-turn-around one the-iron curved the-other however with-both
manibus chirothecis jam indutis fortiter fistulas teneat, ita
hands with-gloves now clothed strongly the-pipes let-him-hold so
ut ferrum circumducatur et fistula quieta maneat, donec
that the-iron be-turned-around and the-pipe still remain until
omnino oculis gratiosa appareat, quasi tornata sit. Deinde
wholly to-the-eyes pleasing it-appear as-if turned it-were then
educto ferro percutiatur ipsa fistula cum malleo mediocri
drawn-out the-iron let-it-be-struck itself the-pipe with a-hammer middling
juxta foramen superius et inferius, ita ut pene usque ad
beside the-hole above and below so that almost up-to to

medium descendat ipsa rotunditas spatio duorum digitorum;
the-middle descend itself the-roundness by-the-space of-two fingers
fiatque plectrum ex cupro aliquantulum spissiori,
and-let-it-be-made a-plectrum from copper somewhat thicker
quasi dimidia rotula, et superstagnetur circa rotunditatem
as-if a-half little-disk and let-it-be-tinned around the-roundness
sicut fistula superius, sicque imponatur in inferiori parte
as the-pipe above and-thus let-it-be-put on the-lower part
foraminis, ita sub ipsius ora æqualiter stet, nec procedat
of-the-hole so under its edge evenly it-stand nor proceed
inferius aut superius. Habeat quoque ferrum solidatorium
lower or higher let-him-have also an-iron soldering
ejusdem latitudinis et rotunditatis, qua plectrum est. Quo
of-the-same width and roundness of-which the-plectrum is which
calefacto ponat modicas particulas stagni super plectrum,
heated let-him-place small pieces of-tin on the-plectrum
parum resinæ, et diligenter circumducat ferrum calidum ne
a-little of-resin and diligently let-him-lead-around the-iron hot lest
plectrum moveatur, sed liquefacto stagno sic adhæreat ut in
the-plectrum be-moved but melted the-tin so it-cling that in
circuitu ejus nihil spiraminis exeat, nisi tantum superiori
circuit of-it nothing of-breath go-out except only by-the-upper
foramine. Quo facto apponat fistulam ori et sufflet
hole which done let-him-apply the-pipe to-the-mouth and let-him-blow
primum modice, deinde amplius, sicque fortiter, et secundum
first moderately then more and-thus strongly and according-to
quod auditu discernit, disponat vocem, ut si eam vult
what by-hearing he-discerns let-him-dispose the-voice so-that if it he-wishes
esse grossam, foramen fiat latius; si vero graciliorem,
to-be thick the-hole let-it-be-made broader if however more-slender
fiat strictius. Hoc ordine omnes fistulæ fiant;
let-it-be-made narrower in-this order all pipes let-them-be-made

mensuram vero singularum, a plectro superius, secundum
the-measure however of-each from the-plectrum upward according-to
magisterium lectionis faciat, a plectro autem inferius,
the-mastery of-the-reading let-him-make from the-plectrum however downward
omnes unius mensuræ et ejusdem grossitudinis erunt.
all of-one measure and of-the-same thickness will-be

Caput LXXXI. De domo organaria.

Chapter LXXXI about the-organ house

Domus vero facturus super quam statuendæ sint fistulæ,
the-house however about-to-make on which to-be-set are the-pipes
vide utrum volueris eam ligneam habere aut cupream. Si
see whether you-shall-wish it wooden to-have or copper if
ligneam, acquire tibi duo ligna de platano, valde sicca,
wooden acquire for-yourself two woods of plane-tree very dry
longitudine duorum pedum et dimidii, et latitudine modice
in-length of-two feet and a-half and in-width moderately
amplius quam unius, unum quatuor, alterum duobus digitis
more than of-one one four the-other two fingers
spissum, quæ non sint nodosa sed pura. Quibus diligentissime
thick which not be knotty but pure which most-diligently
sibi conjunctis, in inferiori parte spissioris ligni fiat
to-each-other joined on the-lower part of-the-thicker wood let-it-be-made
in medio foramen quadrangulum, amplitudine quatuor
in the-middle a-hole quadrangular in-breadth of-four
digitorum et circa quod reliquantur de eodem ligno limbus,
fingers and around which be-left of the-same wood a-border
unius digiti latitudinis et altitudinis, in quo conflatorium
of-one finger of-width and height in which the-wind-trunk
inponatur. In superiori parte vero lateris fiant
be-put on the-upper part however of-the-side let-them-be-made
cavaturæ, per quas flatus ad fistulas possit pervenire.
hollows through which the-breath to the-pipes can to-come

Altera vero pars ligni, quæ et superiori esse debet,
the-other however part of-the-wood which also upper to-be ought
metiatur interius æqualiter, ubi disponantur septem vel
let-it-be-measured within evenly where be-disposed seven or
octo cavaturæ, in quibus diligenter jungantur linguæ, ita ut
eight hollows in which diligently be-joined the-tongues so that
habeant facilem cursum educendi et reducendi, sic tamen
they-have easy course of-drawing-out and of-drawing-back thus nevertheless
ut nichil spiraminis inter juncturas exeat. In superiori autem
that nothing of-breath between the-joints go-out on the-upper however
parte tonde cavaturæ, contra inferiores, quæ sint aliquantulum
part cut hollows opposite the-lower which be somewhat
latiores, in quibus jungantur totidem ligna, ita ut inter
broader in which be-joined as-many woods so that between
hæc et majus, ligni cavatura remaneat vacua, per
these and the-greater of-the-wood hollow remain empty through
ventus ascendat ad fistulas, nam in eisdem lignis foramina
the-wind ascend to the-pipes for in the-same woods holes
fieri debent, in quibus fistulæ stabiliendæ sunt. Cavaturæ
to-be-made ought in which the-pipes to-be-set are the-hollows
in quibus linguæ junctæ sunt in anteriori parte, procedere
in which the-tongues joined are on the-front part to-proceed
debeant quasi obliquæ fenestræ, per quas ipsæ linguæ
ought as-if slanting windows through which themselves the-tongues
introducantur et extrahantur. In posteriori vero parte, sub
be-led-in and be-drawn-out on the-back however part under
fine ipsarum linguarum, fiant foramina æqualiter lata
the-end of-the-very tongues let-them-be-made holes evenly broad
et longa, mensura duorum digitorum, per quas ventus
and long by-the-measure of-two fingers through which the-wind
possit ascendere ab inferioribus ad superiora, ita ut cum
can to-ascend from the-lower to the-upper so that when

linguæ impinguntur, illa foramina ab eis obstruantur, cum
the-tongues are-pushed-in those holes by them be-blocked when
vero trahuntur denuo pateant. In his vero lignis quæ super
however they-are-drawn anew they-be-open in these however woods which over
linguas junguntur fiant foramina diligenter et ordinate,
the-tongues are-joined let-them-be-made holes diligently and orderly
secundum numerum fistularum, uniuscujusque toni, in quibus
according-to the-number of-the-pipes of-each tone in which
ipsæ fistulæ imponantur, ita ut firmiter stent, et ab
themselves the-pipes be-put so that firmly they-stand and from
inferioribus ventum suscipiant. In caudis autem linguarum
the-lower the-wind receive on the-tails however of-the-tongues
scribantur litteræ secundum ascensum et descensum,
let-them-be-written letters according-to the-ascent and descent
cantus quibus possit cognosci quis ille, vel ille tonus
of-the-chant by-which can to-be-known which that or that tone
sit. In singulis autem linguis fiant foramina singula
be on the-single however tongues let-them-be-made holes single
gracilia, longitudine dimidii digiti minoris, in anteriore
slender in-length of-half the-finger little on the-front
parte, juxta caudas in longitudine, in quibus ponantur singuli
part beside the-tails in length in which be-placed single
clavi cuprei capitati, qui pertranseant in medio fenestellas,
nails copper headed which pass-through in the-middle the-little-windows
quibus inducuntur ipsæ linguæ a superiori latere domus
by-which are-led-in the-very tongues from the-upper side of-the-house
usque ad inferius, et appareant clavorum capita superius ita,
up-to to the-lower and appear of-the-nails the-heads above so
ut cum linguæ cantantibus organis educuntur, non penitus
that when the-tongues singing the-organs are-drawn-out not wholly
extrahantur. His ita dispositis conglutinentur hæc duo
they-be-drawn-out these-things thus disposed let-them-be-glued these two

ligna, quæ domum organorum conficiunt glutine casei;
woods which the-house of-the-organs make-up with-the-glue of-cheese
deinde partes illæ quæ super linguas sunt junctæ, in quibus
then the-parts those which over the-tongues are joined in which
foramina stant, sicque circumcidantur diligenter et radantur.
the-holes stand and-thus let-them-be-cut-around diligently and be-scraped

The wind trunk, two plane-tree boards channeled from a hole for each bellows, is joined to the organ's house by a curved oak pipe; the organ may be set through a wall, the bellows beyond it and only the house and its pipes showing in the church, under a cloth canopy raised on a cord. A copper house and its wind trunk may be cast instead, with flap valves at the bellows.

Caput LXXXII. De conflatorio.

Chapter LXXXII about the-wind-trunk

Conflatorium facturus, conjunge tibi duo ligna de platano
the-wind-trunk about-to-make join for-yourself two woods of plane-tree
modo quo supra, longitudine pedis unius, quorum sit
in-the-way in-which above in-length of-foot one of-which let-be
una palma spissum, alterum tribus digitis, sintque in una
one a-palm thick the-other three fingers and-let-them-be at one
fronte rotunda in modum scuti, et ibi pede et dimidio
front round in the-manner of-a-shield and there a-foot and a-half
lata; in altera fronte obtusa, latitudine unius palmi. Quæ
broad at-the other front blunt in-width of-one palm which
cum diligenter conjuncta fuerint incide in spissiori
when diligently joined they-shall-have-been cut in the-thicker
ligno in rotunda fronte foramina quod volueris, secundum
wood in the-round front holes as-many-as you-shall-wish according-to
numerum follium, et in obtusa fronte unum, quod sit majus.
the-number of-the-bellows and in the-blunt front one which be greater
Deinde incide ab unoquoque foramine fossam unam deductim
then cut from each hole a-channel one drawn-down
usque ad majus, per quas viam possit habere ventus
up-to to the-greater through which a-way can to-have the-wind
flantibus follibus. Sicque conglutinabis ipsa ligna glutine
blowing the-bellows and-thus you-will-glue themselves the-woods with-the-glue

casei, et circumdabis panno lineo novo et forti, quem
of-cheese and you-will-surround-them with-a-cloth linen new and strong which
linies eodem glutine ut adhæreat, facies quoque
you-will-smear with-the-same glue so-that it-cling you-will-make also
ligaturas ferreas fortes, interius et exterius circumstagnatas,
bands iron strong within and on-the-outside tinned-around
ne possint ex tignea dissolvi, quas configes clavis longis
lest they-can from wood-rot to-be-loosened which you-will-fasten with-nails long
capitatis atque stagnatis, ita ut inter duo foramina ligatura
headed and tinned so that between two holes a-band
sit, quæ comprehendat utrumque lignum a superius latere
be which may-take-in each wood from the-upper side
usque ad inferius. Deinde acquire tibi lignum curvum
up-to to the-lower then acquire for-yourself a-wood curved
de quercu, sanum et forte, quod habeat in una fronte,
of oak sound and strong which have at one front
a curvatura longitudinem pedis unius, in altera duorum,
from the-bend a-length of-foot one at-the other of-two
quod perforabis in utraque fronte terebro magno, quo
which you-will-bore at each front with-an-auger great with-which
forantur medioli in rotis aratri. Sed quia foramina non
are-bored the-naves in the-wheels of-a-plow but because the-holes not
possunt sibi obviare propter curvaturam, fac tibi
can each-other to-meet on-account-of the-bend make for-yourself
ferrum quod habeat caput rotundum in modum ovi, et
an-iron which have a-head round in the-manner of-an-egg and
caudam longam gracilem, quæ imponatur manubrio, sitque
a-tail long slender which be-put in-a-handle and-let-it-be
juxta caput modice curvum, cum quo calefacto, combures
beside the-head moderately curved with which heated you-will-burn
foramina interius in curvatura, donec sibi æqualiter
the-holes within at the-bend until to-each-other evenly

conveniant. Quo facto, incide ipsum lignum quadricostatum,
they-meet which done cut itself the-wood four-sided
ita ut in unoquoque latere uno palmo latum sit, ad
so that on each side by-one palm broad it-be to
mensuram conflatorii in obtusa parte. Post hæc conjunge
the-measure of-the-wind-trunk on the-blunt part after these-things join
ipsum lignum in longiori parte, ad inferius foramen domus
itself the-wood on the-longer part to the-lower hole of-the-house
organariæ, ita ut eidem ligno cauda incidatur, unius pollicis
of-the-organ so that to-the-same wood a-tail be-cut of-one thumb
longa, quæ ipsi foramini inponatur, vel inferatur, et
long which into-the-very hole be-put or be-brought-in and
junctura tam subtiles sit, ut nichil flatus inter eam exire
the-joint so fine be that nothing of-blast between it go-out
quæat. Alteram vero frontem conjunges eodem modo ad
can the-other however front you-will-join in-the-same way to
conflatorium, et ipsum lignum glutine casei firmabis,
the-wind-trunk and the-very wood with-the-glue of-cheese you-will-make-firm
atque circumvolves panno totum lignum cum junctura,
and you-will-wrap with-cloth the-whole wood with the-joint
cui etiam circumfiges cuprum latum quod utriusque
around-which also you-will-fix copper broad which of-each
ligni oram capiat. His ita completis, si volueris organa
wood the-edge may-take these-things thus completed if you-shall-wish the-organs
ultra maceriam muri stabilire, ita ut infra monasterium
beyond the-masonry of-the-wall to-set so that within the-minster
nichil appareat, nisi sola domus cum fistulis, et ex altera
nothing appear except only the-house with the-pipes and on the-other
parte muri folles jaceant, ita oportebit te ipsam domum
side of-the-wall the-bellows lie so it-will-behoove you itself the-house
convertere ut linguæ versus folles extrahantur, et in ipso
to-turn that the-tongues toward the-bellows be-drawn-out and in the-very

muro arcus fiat in quo cantor sedeat, cujus sedes ita
wall an-arch be-made in which the-singer may-sit whose seat so
aptetur, ut pedes supra conflatorium teneat. Est autem
be-fitted that the-feet above the-wind-trunk he-may-hold there-is however
foramen quadrum in medio arcus transmaceriam, per quod
a-hole square in the-middle of-the-arch through-the-masonry through which
domus cum fistulis exponitur; et super collum conflatorii,
the-house with the-pipes is-set-out and on the-neck of-the-wind-trunk
quod in muro infra foramen lapidibus obfirmatum est, in sua
which in the-wall below the-hole with-stones made-firm is in its
junctura sistitur, atque super duos clavos ferreos æqualiter
joint it-is-set and on two nails iron evenly
in muro confixos nititur, cui foramini fenestra lignea
in the-wall fixed it-rests to-which hole a-window wooden
appendet, quæ dum clausa, sera et clave munitur, nemo
will-hang which while closed with-a-bolt and key is-secured no-one
ignotus superveniens congnoscere valet quid in ea contineatur.
unknown coming-upon to-know is-able what in it be-contained
Exterius quoque, super organa, pannus spissus lignis interius
on-the-outside also over the-organs a-cloth thick by-woods within
extensus, in modum domunculæ, a laqueari in funiculo
stretched in the-manner of-a-little-house from the-ceiling on a-little-cord
ad arcendum pulverem dependeat, qui funiculus super ipsum
for keeping-off dust let-hang which little-cord over the-very
laquear circa rotulam arte compositus, dum cantandum est
ceiling around a-little-wheel with-art composed when to-be-sung it-is
organis trahitur, et domunculam elevat, finitoque cantu,
with-the-organs is-drawn and the-little-house lifts and-finished the-chant
denuo super organa deponitur. Habet quoque ipsa domuncula
anew over the-organs is-set-down it-has also itself the-little-house
pinnam ex eodem panno, lignis quatuor in speciem
a-gable from the-same cloth by-woods four into the-shape

trianguli extensam, in cujus summo spherula lignea stet,
of-a-triangle stretched at whose top a-little-ball wooden may-stand
cui funiculus inhæret. Folles et instrumentum super quod
to-which the-little-cord clings the-bellows and the-frame on which
jaceant, secundum situm loci ad libitos tuos dispone.
they-lie according-to the-situation of-the-place to pleasures your dispose

Caput LXXXIII. De domo cuprea et conflatorio ejus.

Chapter LXXXIII about the-house copper and the-wind-trunk its

Secundum abundantiam fistularum dispone longitudinem et
according-to the-abundance of-the-pipes dispose the-length and
latitudinem domus, et fac formam in argilla macerata,
width of-the-house and make a-form in clay kneaded
siccatamque diligenter incide quacunque mensura volueris, et
and-dried diligently cut-it with-whatever measure you-shall-wish and
cooperi cera, diligenter inter duas æqualiter spissas hastulas
cover-it with-wax diligently between two equally thick little-rods
cum rotundo ligno attenuata. Deinde incide foramina linguarum
with a-round wood thinned then cut the-holes of-the-tongues
in ipsa cera, et foramen inferius, per quod ventus introeat;
in the-very wax and the-hole below through which the-wind may-enter
additis spiraculis, cum infusorio cooperi eadem argilla
added vents with the-pouring-gate cover-it with-the-same clay
semel, et iterum ac tertio. Cunque siccata fuerit
once and again and a-third-time and-when dried shall-have-been
forma, eodem modo funde quo supra formam turibuli.
the-form in-the-same way cast in-which above the-form of-the-censer
Conflatorium quoque formabis in argilla procedentibus undique
the-wind-trunk also you-will-form in clay proceeding on-all-sides
inferius venti aditibus, ad similitudinem radicis unius
below of-the-wind the-entries to the-likeness of-the-root of-one
arboris, et in summo in unum foramen convenientibus.
tree and at-the top into one hole coming-together

Quod cum mensurate dispositum cultello incideris, cooperi
which when by-measure disposed with-a-knife you-shall-have-cut cover-it
cera, et fac sicut supra. Cumque domus fuderis
with-wax and do as above and-when the-house you-shall-have-cast
conjunges interius altitudine unius digiti a fundo, tabulam
you-will-join within at-the-height of-one finger from the-bottom a-plate
cupream ductilem sub foraminibus linguarum æqualiter, ut
copper hammered under the-holes of-the-tongues evenly so-that
supra eam ipsæ linguæ jaceant, ita ut possint æqualiter
over it themselves the-tongues lie so that they-can evenly
produci et induci, illitisque ipsis linguis tenui
to-be-drawn-out and to-be-drawn-in and-smeared the-very tongues with-thin
argilla, reliquum domus perfundes liquefacto plumbo,
clay the-rest of-the-house you-will-pour-over with-melted lead
per omnia, super ipsas linguas usque ad summum. Quo
through all over the-very tongues up-to to the-top which
facto, ejicies ipsum plumbum diligenter designabisque
done you-will-take-out itself the-lead diligently and-you-will-mark-out
foramina fistularum in linguis; deinde in ipso plumbo et
the-holes of-the-pipes in the-tongues then in the-very lead and
cum gracili ferro, vel terebro, perforabis diligentissime. Deinde
with a-slender iron or auger you-will-pierce most-diligently then
sub linguis ventorum aditibus facies, induces ipsas
under the-tongues of-the-winds entries you-will-make you-will-lead-in themselves
linguas singulas in suis locis, atque repones plumbum
the-tongues singly in their places and you-will-put-back the-lead
et cum malleo in percutiendo conjunges domui, ut
and with a-hammer in beating you-will-join-it to-the-house so-that
nichil spiraminis exeat, nisi per foramina quibus fistulæ
nothing of-breath go-out except through the-holes in-which the-pipes
inponendæ sunt. Cum vero conflatorium fuerit fusum
to-be-put are when however the-wind-trunk shall-have-been cast

et limatum, atque uniuscujusque follis fistula suo inductorio
and filed and of-each bellows the-pipe to-its inlet
coaptata, conjungi et firmiter consolidari debet ad domum
fitted to-be-joined and firmly to-be-soldered ought to the-house
organariam inferius, ita ut ventus suos aditus libere inveniat,
of-the-organ below so that the-wind its entries freely find
et per alias juncturas nullatenus exeat. Hoc quoque
and through other joints in-no-way go-out this also
sollertius procurandum est, ut in capite uniuscujusque
more-skillfully to-be-taken-care-of it-is that on the-head of-each
follis, ante foramen fistulæ suæ, cuprum tenue dependeat,
bellows before the-hole of-the-pipe its a-copper thin hang
quod spiraminis claudat aditum, ita ut cum follis flando
which of-the-breath may-close the-entry so that when the-bellows by-blowing
deponitur illud cuprum se elevet, et ventus pleniter exeat;
is-set-down that copper itself lift and the-wind fully go-out
cumque follis elevatur ut per ventilabrum suum flatum
and-when the-bellows is-raised so-that through vent its breath
resumat, illud cuprum os ejus penitus claudat, et
it-may-take-back that copper the-mouth of-it thoroughly may-close and
ventum quem emisit redire non permittat.
the-wind which it-sent-out to-return not may-allow

A clay core is turned on a spindle, modeled in tallow, and invested in clay bound with iron hoops; the mold is fired in a pit, and the metal, melted in clay-lined cauldrons blown by bellows, is poured with care or run through a clay-covered channel. The bell is dug out, turned, and hung.

Caput LXXXIV. De campanis fundendis.
Chapter LXXXIV about bells to-be-cast

Compositurus campanam primum incides tibi lignum
about-to-compose a-bell first you-will-cut for-yourself a-wood
siccum de quercu, longum secundum quod vis habere
dry of oak long according-to what you-wish to-have
campanam, ita ut ex utraque parte extra formam emineat
the-bell so that on each side outside the-mold it-stand-out
longitudine unius palmi, et quadrum in una summitate
by-the-length of-one palm and square at one top
grossius, in aliam gracilius et rotundum, ut possit
thicker at the-other more-slender and round so-that it-can
in foramine circumvolvi. Sitque deductim grossius et
in a-hole to-be-turned-around and-let-it-be gradually thicker and
grossius, ut cum opus fuerit perfectum facile possit
thicker so-that when the-work shall-have-been finished easily it-can
educi. Quod lignum in grossiori parte una palma ante
to-be-drawn-out which wood on the-thicker part one palm before
summitatem incidatur in circuitu, ut fiat fossa duobus
the-top let-it-be-cut in circuit so-that be-made a-groove two
digitis lata, sitque lignum ibi rotundum, juxta quam fossam
fingers broad and-let-be the-wood there round beside which groove
summitas ipsius ligni fiat tenuis, ut in aliud lignum
the-top of-the-very wood be-made thin so-that into another wood

curvum jungi possit, per quod valeat in modum
curved to-be-joined it-can by which it-may-avail in the-manner
runcinæ circumverti. Fiunt etenim duo asseres longitudine
of-a-plane to-be-turned-around are-made for two boards in-length
et latitudine æquales qui altrinsecus conjungantur et
and width equal which on-both-sides be-joined and
confirmentur quatuor lignis, ita ut sint ampli inter se
be-made-firm with-four woods so that they-be wide between themselves
secundum longitudinem prædicti ligni; ut in uno assere
according-to the-length of-the-aforesaid wood so-that in one board
fiat foramen in quo convertatur rotunda summitas, et
be-made a-hole in which be-turned the-round top and
in altero e contra æqualiter fiat incisura duobus digitis
in the-other from opposite evenly be-made a-notch two fingers
profunda, in qua volvatur rotunda incisura. Quo facto, sume
deep in which may-roll the-round cut which done take
ipsum lignum et circumpone ei argillam fortiter maceratam,
itself the-wood and place-around it clay strongly kneaded
inprimis duobus digitis spissam, qua diligenter siccata, suppone
at-first two fingers thick which diligently dried put-under
ei alteram, sicque facies donec forma compleatur quantam
to-it another and-thus you-will-do until the-mold be-completed as-great-as
eam habere volueris, et cave ne unquam superponas argillam
it to-have you-shall-wish and beware lest ever you-place-over clay
alteri nisi inferior omnino sicca fuerit. Deinde colloca
on-another unless the-lower wholly dry shall-have-been then set
ipsam formam inter asseres superscriptos, et sedente puero
itself the-mold between the-boards above-written and sitting a-boy
qui vertat, cum ferris, ad hoc opus aptis, tornabis eam sicut
who may-turn-it with irons for this work fitted you-will-turn it as
volueris et tenens pannum in aqua madefactum eam æquabis.
you-shall-wish and holding a-cloth in water soaked it you-will-level

Post hæc tollens adipem concide subtiliter in vase
after these-things taking tallow cut-it finely in a-vessel
atque manibus macera, confixisque duobus æqualibus ligni
and with-hands knead-it and-fastened two equal woods
spissitudine qua volueris, super asserem æqualem in medio
in-thickness in-which you-shall-wish on a-board level in the-middle
eorum positum adipem attenuabis, et æquabis cum rotundo
of-them placed the-tallow you-will-thin and you-will-level with a-round
ligno, sicut cera superius, supposita aqua ne adhereat,
wood as the-wax above put-under water lest it-stick
statimque ita repente levabis et colocabis super formam,
and-at-once so suddenly you-will-lift-it and you-will-place-it on the-mold
atque calido ferro circumsolidabis. Rursum attenuans
and with-a-hot iron you-will-solder-it-around again thinning
eodem modo unam partem adipis, juxta priorem collocabis,
in-the-same way one part of-tallow beside the-earlier you-will-place
sicque facies donec formam cooperies. Oram vero campanæ
and-thus you-will-do until the-mold you-will-cover the-rim however of-the-bell
ad libitum tuum spissam facies. Adipem autem omnino
at pleasure your thick you-will-make the-tallow however wholly
refrigeratum ferris acutis tornabis, et si quid rari operis
cooled with-irons sharp you-will-turn and if any of-rare work
volueris circa latera campanæ, florum, sive literarum, in
you-shall-wish around the-sides of-the-bell of-flowers or of-letters in
adipe exarabis, quatuorque foramina triangula juxta collum
the-tallow you-will-inscribe and-four holes triangular beside the-neck
ut melius tinniat formabis. Deinde argillam cribratam
so-that better it-ring you-will-form then clay sifted
et diligenter mixtam superpones, qua siccata, alteram et
and diligently mixed you-will-place-over which dried another also
superaddes. Ea itidem omnino siccata convertes formam
you-will-add the-same likewise wholly dried you-will-turn the-mold

in latus, atque leniter percutiendo educes lignum,
onto its-side and gently by-striking you-will-draw-out the-wood
rursumque, elevata forma, foramen superius implebis argilla
and-again raised the-mold the-hole above you-will-fill with-clay
molli, et curvum ferrum, in quo batillus pendere debet, in
soft and a-curved iron on which the-clapper to-hang ought in
meditullio imprimes, ita ut summitates ejus foris emineant.
the-center you-will-press-in so that the-tops of-it outside stand-out
Cumque siccata fuerit argilla, fac ut æqualis sit
and-when dried shall-have-been the-clay make that even it-be
reliquæ formæ, atque cooperi adipe, ita ut summitates
to-the-remaining mold and cover-it with-tallow so that the-tops
ferri in ipso abundanter hæreant. Post hæc forma
of-the-iron in it abundantly cling after these-things form
collum, atque aures, et spiraculum sive infusorium desuper,
the-neck and ears and the-vent or pouring-gate above
et cooperi argilla. Dumque tertio argilla per omnia
and cover-it with-clay and-while a-third-time the-clay through all
fuerit siccata, circumpone ferreos circulos tam dense, ut
shall-have-been dried place-around iron hoops so densely that
non plus inter duos circulos quam latitudo manus, quibus
not more between two hoops than the-width of-a-hand on-which
circulis duas argillas superpone. Quibus siccatis converte ipsam
hoops two clays place-over which dried turn itself
formam in latus, et in interiori argilla, incide fossam magnam
the-mold onto its-side and in the-inner clay cut a-hollow great
in circuitu et in profundo, ut non remaneat spissior
in circuit and in depth so-that not it-remain thicker
uno pede, quia si integra esset forma interius, præ nimio
than-one foot because if whole were the-mold within from too-great
pondere non possit levari, ne præ spissitudine transcoqui.
weight not it-could to-be-lifted nor from thickness be-fired-through

Deinde fac foveam in loco ubi volueris ipsam formam
then make a-pit in the-place where you-shall-wish the-very mold
subintrare ad recoquendum, profundam secundum altitudinem
to-go-under for refiring deep according-to the-height
ejus in latitudine, et cum lapidibus atque argilla fac
of-it in width and with stones and clay make
in similitudinem fundamenti, pedem fortem, supra quem
in the-likeness of-a-foundation a-foot strong on which
forma stabit altitudine unius pedis, ita ut in medio
the-mold will-stand in-height of-one foot so that in the-middle
ultra indirectum remaneat, spatium quasi via, pede
beyond in-a-straight-line remain a-space as-if a-way by-a-foot
et dimidio lata, in qua ardeat ignis sub forma. Quo
and a-half broad in which may-burn the-fire under the-mold which
facto confige quatuor ligna sursum procedentia usque ad
done fasten four woods upward proceeding up-to to
æqualitatem terræ, juxta ipsum pedem, et statim reple
the-level of-the-earth beside itself the-foot and at-once fill
foveam terra. Statimque deduces ipsam formam et
the-pit with-earth and-at-once you-will-lead-down itself the-mold and
statues eam in medio lignorum illorum æqualiter et ex
you-will-set it in the-middle of-the-woods those evenly and on
una parte, sub ipsa forma, incipe terram ejicere. Cumque
one side under the-very mold begin the-earth to-throw-out and-when
se inclinaverit, fode in parte altera, donec se rursum
itself it-shall-have-inclined dig on the-side other until itself again
illic inclinet, sicque facies ex utraque parte quousque
there it-incline and-thus you-will-do on each side until
forma super pedem lapideum æqualiter sedeat. Mox ejectis
the-mold on the-foot stone evenly sit soon thrown-out
lignis, quæ ad hoc solum confixa fuerint, ut formam recte
the-woods which for this alone fixed had-been that the-mold rightly

deducerent, assumptisque lapidibus qui flammam possint
they-might-lead-down and-taken stones which the-flame can
sustinere atque argilla fac oram ex utraque parte ante
to-endure and clay make a-rim on each side before
illud spatium viæ, quam in medio pedis reliquisti,
that space of-the-way which in the-middle of-the-foot you-left
atque in circuitu operare fornacem, spatio dimidii pedis
and in circuit work a-furnace by-the-space of-half a-foot
a forma. Cumque operando perveneris ad medium
from the-mold and-when by-working you-shall-have-reached to the-middle
formæ, purga oram fornacis, et in ora ipsius formæ ex
of-the-mold clean the-rim of-the-furnace and on the-rim of-the-very mold on
utraque parte fac unum foramen, per quod adeps possit
each side make one hole through which the-tallow can
effluere, suppositisque vasis, ignem et sicca ligna adhibe.
to-flow-out and-put-under vessels fire and dry woods apply
Et cum calefacta forma cœperit adeps exire, perfice
and when heated the-mold shall-have-begun the-tallow to-come-out finish
pede tepentem fornacem usque ad summum formæ,
from-the-foot lukewarm furnace up-to to the-top of-the-mold
et super os pones operculum ex argilla sive ex
and over the-mouth you-will-place a-lid from clay or from
ferro. Educto autem penitus adipe, obstrue foramina utraque
iron drawn-out however thoroughly the-tallow block the-holes both
argilla macerata recta mensura, ita ut non violetur ora
with-clay kneaded in-right measure so that not be-violated the-rim
campanæ, et circa formam abundantius adhibe ligna, ut
of-the-bell and around the-mold more-abundantly apply woods so-that
per totam diem sequentemque noctem ignis non deficiat.
through the-whole day and-the-following night the-fire not fail
Interim tolle cacabum ferreum in fundo rotundum, huic
meanwhile take a-cauldron iron at the-bottom round for-this

solummodo operi aptum, qui ex utraque parte aures ferreas
only work fit which on each side ears iron
duas habeat, aut si maxima campana erit, duos vel tres, et
two have or if very-great the-bell shall-be two or three and
illinies eos interius et exterius argilla fortiter macerata,
you-will-smear them within and on-the-outside with-clay strongly kneaded
semel et iterum ac tertio, donec duobus digitis spissa sit,
once and again and a-third-time until by-two fingers thick it-be
et sistes eos altrinsecus contra se, ita ut inter eos
and you-will-set them on-both-sides opposite each-other so that between them
iri possit, et sub eis pones terram simplicem atque
to-be-gone can and under them you-will-place earth simple and
circumfiges paxillos ligneos in duobus vero locis, vel si
you-will-fix-around pegs wooden in two however places or if
opus fuerit tribus, ubi folles apponi debent, figes
need shall-be three where the-bellows to-be-applied ought you-will-fix
duos paxillos fortiter æqualiter latos, in inter eos facies
two pegs strongly equally broad in between them you-will-make
foramen contra oram cacabi, ita ut ventus inter eum
a-hole opposite the-rim of-the-cauldron so that the-wind between it
veniat, et singulis foraminibus inpones singulos ferros tenues
come and on-the-single holes you-will-put single irons thin
atque complicatos, ita ut in eis possint fistulæ follium
and folded so that on them can the-pipes of-the-bellows
firmiter jacere; sicque cum lapidibus et argilla facies
firmly lie and-thus with stones and clay you-will-make
super ipsum cacabum in circuitu fornacem, pede et dimidio
over itself the-cauldron in circuit a-furnace a-foot and a-half
altam, atque interius æqualiter linies cum eadem argilla,
high and within evenly you-will-smear with the-same clay
sicque carbones ignitos appones. Cumque singulis cacabis
and-thus coals fiery you-will-apply and-when for-the-single cauldrons

similiter feceris, folles, et cum instrumentis suis in
likewise you-shall-have-done the-bellows and with frames their in
quibus firmiter jaceant, appones, unicuique foramini duos,
which firmly they-may-lie you-will-apply to-each hole two
et unicuique folli deputabis fortes viros duos. Cum autem
and to-each bellows you-will-assign strong men two when however
cacabi interius bene canduerint, incide unicuique duo
the-cauldrons within well shall-have-glowed cut for-each two
ligna de quercu sicca et grossa, sic apta ut possint fundum
woods of oak dry and thick so fitted that they-can the-bottom
interius implere, et inter ea foramen facies per quod
within to-fill and between them a-hole you-will-make through which
possit eis influere, atque super hæc duo ligna, alia ejusdem
can to-them to-flow-in and over these two woods others of-the-same
mensuræ, et in circuitu ex eodem ligno pone quasi paxillos
measure and in circuit from the-same wood place as-if pegs
prominentes ab his lignis usque super oram fornacis.
standing-out from these woods up-to over the-rim of-the-furnace
Quo facto, ponderabis omne æramentum quod habes, ut
which done you-will-weigh all the-bronze which you-have so-that
quatuor partes sint cupri et quinta stagni, atque dispones
four parts be of-copper and the-fifth of-tin and you-will-dispose
unicuique cacabo, secundum suam capacitatem, suas partes.
to-each cauldron according-to its capacity its parts
Deinde vadens ad fornacem formæ, eleva superius operculum
then going to the-furnace of-the-mold lift above the-lid
et considera qualiter se habeat. Si omnino canduerit
and consider how itself it-has if wholly it-shall-have-glowed
interius recurra ad cacabos et primitus immitte carbones
within run-back to the-cauldrons and first put-in coals
grossos. Deinde impone cuprum ordinatim absque stagno,
large then put-in the-copper in-order without tin

atque intermisce carbones adjiciens abundanter superius,
and mix-in coals adding abundantly above
interjectisque ignitis carbonibus fac ut folles incipiant
and-put-between fiery coals make that the-bellows begin
flare, primo mediocriter, deinde magis ac magis. Cumque
to-blow first moderately then more and more and-when
videris flammam viridem ascendere, jam incipit cuprum
you-shall-have-seen a-flame green ascend already begins the-copper
liquescere, moxque super ponens carbones abundanter, recurre
to-melt and-soon over placing coals abundantly run-back
ad fornacem formæ, et a superiori incipe longis forcipibus
to the-furnace of-the-mold and from the-upper-part begin with-long tongs
lapides evellere et foras projicere. Hoc opus in hoc loco
the-stones to-tear-out and outside to-throw this work in this place
non quærit pigros operarios, sed agiles atque studiosos, ne
not seeks lazy workmen but agile and zealous lest
cujusquam incuria, vel forma frangatur, vel quis alium
of-anyone by-the-carelessness either the-mold be-broken or anyone another
impediat aut lædat, sive ad iracundiam provocet, quod omnino
hinder or hurt or to anger provoke which wholly
cavendum est. Ejectis vero omnino lapidibus et igne denuo
to-be-avoided is thrown-out however wholly the-stones and the-fire anew
certatim reponatur terra, ut fossa omnis circa formam
vying let-it-be-put-back earth so-that the-pit all around the-mold
diligenter repleatur, et sint qui semper circumeant cum
diligently be-filled and let-there-be who always go-around with
lignis obtusis, mediocriter impingendo et pedibus fortiter
woods blunt moderately by-ramming and with-feet strongly
calcando, ut terra quæ inponitur formam premat, ne
by-treading so-that the-earth which is-put-in the-mold press lest
cum pondus æris infunditur ullomodo frangi possit.
when the-weight of-bronze is-poured-in in-any-way to-be-broken it-can

Repleta igitur hoc modo fossa usque ad summum, recurre
filled therefore in-this way the-pit up-to to the-top run-back
ad cacabos, et ligno longo et torrido commove cuprum,
to the-cauldrons and with-a-wood long and dried stir the-copper
et si senseris omnino liquefactum inpone stagnum,
and if you-shall-have-sensed-it wholly melted put-in the-tin
rursumque commove diligenter ut bene commisceatur,
and-again stir diligently so-that well it-be-mixed
fractaque fornace in circuitu induce duo ligna fortia et longa
and-broken the-furnace in circuit bring-in two woods strong and long
in aures cacabi, adhibitisque viris strenuis et in hac arte
into the-ears of-the-cauldron and-applied men vigorous and in this art
peritis, fac eum levari cum omni diligentia et ad formam
skilled make it be-lifted with all diligence and to the-mold
deferri, ejectisque carbonibus et favillis atque imposito
be-carried and-thrown-out the-coals and ashes and placed-on
collatorio panno fac morose infundi. Interim cuba juxta
the-straining cloth make slowly it-be-poured-in meanwhile lie-down beside
os formæ auditu diligenter considerans qualiter eo
the-mouth of-the-mold with-hearing diligently considering how it
intro procedat; et si senseris quasi leve murmur
within proceeds and if you-shall-have-sensed as-if a-light murmur
tonitru, dic ut modice teneant, rursumque infundant; sicque
of-thunder say that moderately they-hold and-again pour-in and-thus
interdum tenendo et iterum infundendo fiat ut æs
sometimes by-holding and again by-pouring-in let-it-be-done that the-bronze
æqualiter resideat, donec evacuetur cacabus ille. Quo amoto,
evenly settle until be-emptied cauldron that which removed
mox alter delatus in eodem loco statuatur, fiat de
soon another brought in the-same place let-it-be-set let-it-be-done with
eo sicut ex priori, et pari modo de tertio donec æs
it as from the-earlier and in-like way with the-third until the-bronze

in infusorio videatur. Nec statim cacabus amoveatur,
in the-pouring-gate be-seen nor at-once the-cauldron let-it-be-removed
sed aliquanto spatio teneatur, ut si æs descenderit
but for-some space let-it-be-held so-that if the-bronze shall-have-sunk
denuo superfundatur. Quod si tu ab hoc labore portantium
anew it-be-poured-over but if you from this labor of-carrying
et diverse fundentium retrahere volueris, acquire tibi
and variously of-those-pouring to-withdraw you-shall-wish acquire for-yourself
maximum cacabum qui sit in fundo æqualis, et fac ei
a-very-great cauldron which be at the-bottom even and make for-it
foramen unum in latere ejusdem fundi, atque cooperi eum
a-hole one on the-side of-the-same bottom and cover it
argilla intus et extra, sicut superius. Quo facto sistes eum
with-clay within and without as above which done you-will-set it
juxta formam non longius quam quinque pedum spatio, et
beside the-mold not farther than five of-feet by-space and
circumfige ei paxillos atque ignem cum carbonibus inpone.
fix-around for-it pegs and fire with coals put-in
Cumque canduerit obstrue foramen cum argilla, quod
and-when it-shall-have-glowed block the-hole with clay which
versum erit ad formam, et compone ei ligna quatuor, et
turned will-be toward the-mold and compose for-it woods four and
paxillos interius fornacemque facito in circuitu, sicut superius.
pegs within and-the-furnace make in circuit as above
Deinde inposito cupro cum carbonibus et igne, adpositisque
then put-in the-copper with coals and fire and-applied
tribus ordinibus follium, fac flari viriliter. Interim habeas
three rows of-bellows make it-be-blown manfully meanwhile have
lignum siccum tantæ longitudinis ut possit procedere a
a-wood dry of-such length that it-can to-proceed from
foramine cacabi usque ad os formæ, cujus curvatura
the-hole of-the-cauldron up-to to the-mouth of-the-mold whose curve

sit ampla. Quod cum ex omni parte cooperiveris argilla
be ample which when on every side you-shall-have-covered with-clay
et maxime superius, infodies ita ut æquale sit terræ
and especially above you-will-bury-it so that level it-be with-the-earth
sed juxta cacabum modice altius, atque superfunde ei ignitos
but beside the-cauldron moderately higher and pour-over to-it fiery
carbones. Mox inposito stagno atque commoto cupro, sicut
coals soon put-in the-tin and stirred the-copper as
superius cum curvo ferro quod sit ligno fortiter affixum,
above with a-curved iron which be to-a-wood strongly fixed
aperi foramen, et astantibus, qui teneant duos colatorios
open the-hole and standing-by those-who may-hold two straining
pannos, sine eis fluere; interdum tamen tenendo sicut
cloths let it flow sometimes nevertheless by-holding as
superius. Cumque forma plena fuerit, si quid æris in
above and-when the-mold full shall-have-been if any of-bronze in
cacabo remansit, in summitate ligni grossi pone massam
the-cauldron remained on the-top of-a-wood thick place a-mass
argillæ et ante foramen fortiter impinge ut eum obstruas.
of-clay and before the-hole strongly drive-it so-that it you-block
Hoc utroque modo fundendi possint etiam minores campanæ
in-this either way of-casting can also smaller bells
fundi ut secundum quantitatem earum fiant cacabi.
to-be-cast so-that according-to the-size of-them be-made the-cauldrons
Cum vero æs in infusorio duraverit, fac ut
when however the-bronze in the-pouring-gate shall-have-hardened make that
certatim terra ejiciatur a fossa et exterius aliquantum
vying the-earth be-thrown-out from the-pit and on-the-outside somewhat
refrigeretur terra. Ejecta vero terra, ipsa forma inclinetur
be-cooled the-earth thrown-out however the-earth itself the-mold let-it-be-inclined
in uno latere et terra supponatur, sicque fiat donec,
onto one side and earth let-it-be-put-under and-thus let-it-be-done until

eodem modo quo inposita, est a fossa ejiciatur.
in-the-same way in-which put-in it-was from the-pit it-be-taken-out
Quo facto, super unum latus omnino deponatur, et cum
which done on one side wholly let-it-be-laid and with
securibus aliisque ferris acutis qui sint infixi longis lignis,
axes and-other irons sharp which be fixed in-long woods
interior argilla certatim ejiciatur, quia si permittatur in
the-inner clay vying be-thrown-out because if it-be-allowed in
ea refrigerari, ab humore terræ inflaretur et campana
it to-be-cooled from the-moisture of-the-earth it-would-swell and the-bell
absque dubio finderetur. Qua ejecta, ipsa forma iterum
without doubt would-be-split which thrown-out itself the-mold again
erigatur super terram, sicque stet, donec exterius omnino
let-it-be-raised on the-earth and-thus stand until on-the-outside wholly
refrigeretur; sicque frangatur argilla et circuli ejiciantur,
it-be-cooled and-thus let-it-be-broken the-clay and the-hoops let-them-be-thrown-out
et quicquid inæquale exterius fuerit, malleis acutis
and whatever uneven on-the-outside shall-have-been with-hammers sharp
incidatur. Deinde in medio campanæ ponatur lignum,
let-it-be-cut then in the-middle of-the-bell let-it-be-placed a-wood
huic simile in quo primum forma tornata est, et quatuor
to-this like in which first the-mold turned was and with-four
aliis lignis in modum crucis obfirmetur ora ejus, ita ut
other woods in the-manner of-a-cross let-it-be-made-firm the-rim of-it so that
infusorium jaceat super unum asserem, et illud lignum super
the-pouring-gate lie on one board and that wood on
alterum, ut inposito curvo ligno, possit campana tornari,
the-other so-that put-on the-curved wood can the-bell to-be-turned
atque cum sabuleo lapide per omnia æquari. Post hæc,
and with a-sandy stone through all be-leveled after these-things
infusorium ex utraque parte limatum, diligenter frangatur,
the-pouring-gate on each side filed diligently let-it-be-broken-off

et circa collum duo ligna conjungantur, inferius per
and around the-neck two woods be-joined below through
medium minus, et superius in circuitu majus; quæ ligna
the-middle smaller and above in circuit greater which woods
duobus circulis fortiter constringantur, atque ferreis vinculis
with-two hoops strongly be-bound and with-iron bonds
ex omni parte circa aures colligantur. Illud vero majus
on every side around the-ears be-bound-together that however greater
lignum sit modice longius quam campana sit lata, sitque
wood let-it-be moderately longer than the-bell be broad and-let-it-be
in summitatibus aliquantum gracilius quam in medio, et in
at the-tops somewhat more-slender than in the-middle and on
ipsis summitatibus habeat duos ferros grossos et rotundos,
the-very tops have two irons thick and round
quorum longitudo sit intra lignum spacii dimidii pedis
whose length be within the-wood of-the-space of-half a-foot
et extra unius palmi. Cumque aptaveris duas trabes ad
and outside of-one palm and-when you-shall-have-fitted two beams for
suscipiendam campanam, fac in eis duas mensuras duobus
receiving the-bell make in them two measures by-two
digitis profundas, in quibus clavi illi magni involvantur, sub
fingers deep in which nails those great may-turn under
quibus etiam pones duos ferros curvos, ad servandas trabes.
which also you-will-place two irons curved for protecting the-beams
Habeat etiam illud grossius lignum in quo pendet campana in
let-have also that thicker wood in which hangs the-bell on
utraque parte singula foramina, in quibus ponantur duo ligna
each side single holes in which be-placed two woods
sursum respicientia, quibus funes innectantur ad pulsandum.
upward looking to-which ropes be-tied for ringing
Corium etiam spissum, de collo cervi circumponatur ferro
a-hide also thick from the-neck of-a-stag let-it-be-put-around the-iron

illi curvo, quod interius hæret in medio campanæ, in quo
that curved which within clings in the-middle of-the-bell on which
batillus pendeat; qui sit tantæ longitudinis ut promineat
the-clapper may-hang which be of-such length that it-project
extra campanam spatio latitudinis manus, sitque grossior
outside the-bell by-the-space of-the-width of-a-hand and-let-it-be thicker
in fine longitudine unius palmæ, sursumque gracilior.
at the-end by-the-length of-one palm and-upward more-slender

LXXXV–LXXXVII · TUNED CYMBALS AND TIN FLASKS

Wax for chime bells is weighed by the ratios of the scale, tone and semitone, so that the cast bells sound true, and they are corrected with the file. Tin flasks are cast on a clay core turned on a lathe and tinned bright.

Caput LXXXV. De mensura cymbalorum.
Chapter LXXXV about the-measure of-the-cymbals

Quicunque vult facere cymbala ad cantandum recte sonantia,
whoever wishes to-make cymbals for singing rightly sounding
ad unumquodque debet ceram dividere cum pondere, et a
for each ought the-wax to-divide by weight and from
superioribus incipiat ut descendendo possit pervenire ad
the-higher let-him-begin so-that by-descending he-can to-arrive at
graviora. Unumquodque autem notet cum propria littera
the-lower each however let-him-mark with its-own letter
ut illud in divisione cognoscat. Inprimis faciat duas
so-that it in the-division he-may-know at-first let-him-make two
partes ceræ æquales cum libra, unam ad a litteram, alteram
parts of-wax equal with the-balance one for A the-letter the-other
ad G. Ceram a litteræ dividat in octo æquales partes,
for G the-wax of-A the-letter let-him-divide into eight equal parts

et tantum ad ceram G litteræ quantum est in octava parte
and so-much to the-wax of-G the-letter as-much-as is in the-eighth part
ceræ a. Similiter dividat ceram G per octo et tantum
of-the-wax of-A likewise let-him-divide the-wax of-G by eight and so-much
det F litteræ quantum est in summa ejus, et insuper
let-him-give to-F the-letter as-much-as is in the-sum of-it and besides
octavam ejus partem, et habebit duos tonos continuos. In
the-eighth of-it part and he-will-have two tones continuous in
illo loco semitonium debet esse, et hoc ita inveniat. Summam
that place a-semitone ought to-be and this so let-him-find the-sum
ceræ a litteræ dividat in tres partes, ipsamque summam
of-the-wax of-A the-letter let-him-divide into three parts and-itself the-sum
det E litteræ, et insuper ejus terciam partem. Deinde
let-him-give to-E the-letter and besides of-it a-third part then
det tantum ceræ D litteræ, quantum est in summa a
let-him-give so-much of-wax to-D the-letter as-much-as is in the-sum of-A
et octavam ejus partem. Item tantum ceræ det litteræ
and the-eighth of-it part likewise so-much of-wax let-him-give to-the-letter
C quantum habet G, et mediam ejus partem, itaque haberet
C as-much-as has G and the-half of-it part and-so he-would-have
duos tonos post semitonium. Deinde tantum ceræ tribuat
two tones after the-semitone then so-much of-wax let-him-give
B litteræ quantum est in tota summa F litteræ, et
to-B the-letter as-much-as is in the-whole sum of-F the-letter and
insuper terciam ejus partem, et habebit iterum semitonium;
besides a-third of-it part and he-will-have again a-semitone
atque septem symphonias ab a littera usque ad B inveniat.
and seven symphonies from A the-letter up-to to B let-him-find
Dyapason vero necdum haberet sine octavo cymbalo.
the-diapason however not-yet he-would-have without the-eighth cymbal
Duplicet igitur totam ceram a litteræ et sic eam tribuat
let-him-double therefore the-whole wax of-A the-letter and thus it let-him-give

A litteræ, et nichil deerit. Dyatesseron, Dyapason, atque
to-A the-letter and nothing will-be-lacking the-diatessaron the-diapason and
Dyapente Synemenon autem inveniat ita, tollat summam
the-diapente the-synemmenon however let-him-find thus let-him-take the-sum
ceræ litteræ et tantum det F litteræ, et insuper
of-the-wax of-the-letter and so-much let-him-give to-F the-letter and besides
medietatem ejus, ac constituat illam inter A et B. Omnino
the-half of-it and let-him-set that between A and B wholly
autem caveat qui cymbala formare aut fundere debet,
however let-him-take-care who cymbals to-form or to-cast ought
ut de supradicta cera quæ tam caute ponderata et divisa
that of the-above-said wax which so cautiously weighed and divided
est, nichil mittat ad juga et spiramina, sed de altera
is nothing he-put to the-yokes and vents but of the-other
cera faciat illa omnia. In magna providentia habeat
wax let-him-make those-things all in great providence let-him-have
ut, priusquam aliquid cymbalum fundatur, stagnum cum
that before any cymbal be-cast the-tin with
cupro misceatur, ut rectum sonum habeat. Quod si aliter
the-copper be-mixed so-that a-right sound it-have but if otherwise
fecerit non veniunt ad tonos. Quinta aut sexta pars
he-shall-have-done not they-come to the-tones the-fifth or the-sixth part
debet esse stagnum, utrumque bene purificatum priusquam
ought to-be tin each well purified before
permisceatur ut clare sonent. Si autem fusa cymbala
it-be-mixed so-that clearly they-sound if however the-cast cymbals
minus recte sonuerint, hoc emendetur lima vel lapide.
less rightly shall-have-sounded this let-it-be-amended with-the-file or stone

Caput LXXXVI. De cymbalis musicis.

Chapter LXXXVI about cymbals musical

Facturus cymbala, primum aquire tibi lectionem et

about-to-make cymbals first acquire for-yourself the-reading and

secundum quod docuerit formam facito, atque ceram

according-to what it-shall-have-taught the-form make and the-wax

diligenter pondera. Quas cum fuderis, sicut supra

diligently weigh which when you-shall-have-cast as above

dictum est, si quid per negligentiam vel incuriam de

said it-is if anything through negligence or carelessness of

equitate tonorum defuerit, corriges. Si volueris

the-evenness of-the-tones shall-have-been-lacking you-will-correct if you-shall-wish

cymbalum altius habere, in ora inferius limabis, si vero

a-cymbal higher to-have on the-rim below you-will-file if however

humilius, circa oram in circuitu.

lower around the-rim in circuit

Caput LXXXVII. De ampullis stagneis.

Chapter LXXXVII about flasks tin

Fac tibi duos ferros longitudine manus et modice

make for-yourself two irons in-length of-a-hand and moderately

graciliores minimo digito, qui sunt in una parte grossiores,

more-slender than-the-little finger which are on one part thicker

in altera summitate deductim graciliores, ut possint

at-the other top drawn-down more-slender so-that they-can

ex forma deduci; habeantque in grossiori parte caudas

from the-mold to-be-drawn-out and-let-them-have on the-thicker part tails

tenues, ut singulis manubriis confingantur, quæ manubria

thin so-that into-single handles they-be-fixed which handles

sint rotunda; et habeant in altera summitate breves

let-be round and let-them-have at-the other top short

clavos rotundos, in quibus tornari possint. His ferris

nails round on which to-be-turned they-can to-these irons

circumpone argillam, primo parum, deinde amplius secundum
place-around clay first a-little then more according-to
magnitudinem quam volueris. Qua siccata fac tornatorium
the-size which you-shall-wish which dried make lathe
tuum eodem modo quo tornantur scutellæ et alia vasa
your in-the-same way in-which are-turned dishes and other vessels
lignea, ita ut una columpna firmiter stet, et altera moveatur,
wooden so that one column firmly stand and the-other be-moved
quæ tamen cum apposita fuerit inferius clavo tenui
which nevertheless when placed it-shall-have-been below with-a-nail thin
firmabitur. Inter columpnas statue formam et utrosque clavos
will-be-made-firm between the-columns set the-mold and both nails
in suis foraminibus, corrigiaque circa lignum posita, atque
in their holes and-a-strap around the-wood placed and
sedente puero qui eam trahat, tornabis sicut placuerit
sitting a-boy who it may-draw you-will-turn-it as it-shall-have-pleased
ceramque superpones. Qua similiter tornata, educ a
and-wax you-will-place-over which likewise turned draw from
manubrio formam cum ferro, appositisque spiraculis et argilla
the-handle the-mold with the-iron and-applied vents and clay
superducta atque siccata, ejice ceram et ad recoquendum
drawn-over and dried throw-out the-wax and for refiring
in fornacem pone, modo quo superius. Cumque interius
into the-furnace place-it in-the-way in-which above and-when within
omnino canduerit ejice ab igne, et sic sine jacere
wholly it-shall-have-glowed take-it-out from the-fire and thus let to-lie
donec refrigeretur, ita ut in manu aliquantum possit teneri.
until it-be-cooled so that in the-hand somewhat it-can to-be-held
Statimque liquefacto stagno in patella ferrea, sive in testa,
and-at-once melted the-tin in a-pan iron or in a-shard
cum tempus fuerit infundendi adjiciatur ei modicum
when the-time shall-have-been of-pouring let-it-be-added to-it a-little

vivi argenti, ita ut, si est libra stagni quadrans sit
of-quick silver so that if there-is a-pound of-tin a-quarter be
vivi argenti, et sine mora formæ infundatur. Quæ cum
of-quick silver and without delay into-the-mold let-it-be-poured which when
fuerit omnino refrigerata, frangatur exterius argilla,
it-shall-have-been wholly cooled let-it-be-broken on-the-outside the-clay
et reposito manubrio, denuo in tornatorium reponatur,
and put-back the-handle anew into the-lathe let-it-be-put-back
atque ex omni parte æqualiter tornetur, ad ultimum
and on every side evenly let-it-be-turned at-the last
vero asperella poliatur. Post hæc modicum accipe
however with-shave-grass let-it-be-polished after these-things a-little take
de eisdem rasuris stagni et commisce parum vivi argenti,
of the-same scrapings of-tin and mix a-little of-quick silver
digitisque tuis fricabis donec omnino liquefiat; sicque cum
and-with-fingers your you-will-rub until wholly it-melt and-thus with
panniculo circa ampullam tornando linies quoadusque
a-little-cloth around the-flask by-turning you-will-smear until
sicca et clara remaneat; deducto autem ferro et interiori
dry and bright it-remain drawn-out however the-iron and the-inner
argilla, circa foramen inferius in quo erat ferrum, fodies
clay around the-hole below in which was the-iron you-will-dig
in medio stagno fossulam, et in eo junges particulam
in the-middle tin a-little-pit and in it you-will-join a-little-piece
ejusdem stagni, modice spissiorem quam sit ampulla, atque
of-the-same tin moderately thicker than be the-flask and
interius pone lignum rotundum, cui innitatur ut non
within place a-wood round on-which it-may-lean so-that not
complicetur, et cum mediocri malleo exterius percute,
it-be-folded and with a-middling hammer on-the-outside strike
donec fossuris illis inducatur et firmiter stet. Aliter etiam
until into-grooves those it-be-led and firmly stand otherwise also

ipsum foramen obstruere potes. Impone ampullæ lignum ut
the-very hole to-stop you-can put-in to-the-flask a-wood as
supra, quod in summitate panniculo involves, plumbumque
above which at the-top with-a-little-cloth you-will-wrap and-lead
simplex, in foramine, rasa et cera illico, liquefactum
simple in the-hole scraped and with-wax at-once melted
infundes, et ita festinanter cum malleolo æquabis.
you-will-pour-in and so hastily with the-small-hammer you-will-level

LXXXVIII–XC · SOLDERING TIN AND INLAYING IRON

Tin is soldered with a tin-lead mix and resin; spouts are cast in a split wooden mold. Iron is smelted from its stone, and spurs and bridles are inlaid with silver and gold, the iron cross-hatched on a ratchet wheel.

Caput LXXXVIII. Qualiter stagnum solidetur.
Chapter LXXXVIII how tin be-soldered
Percute in stagno quasi duos cyphos æquales, et conjunge
beat in tin as-if two cups equal and join
illos in medio, ita ut ora unius in altera procedat,
them in the-middle so that the-rim of-one into the-other proceed
inpositoque illo qui continet cineribus calidis, partem ejusdem
and-put that which contains on-ashes hot a-part of-the-same
stagni, plumbi tercia parte admixta, percute tenuissime,
tin with-lead by-a-third part mixed beat very-thinly
et intercidens particulatim circumpone; adhibitisque modicis
and cutting piece-by-piece place-it-around and-applied small
carbonibus ignitis, mox ut incaluerit circumunge
coals fiery soon as it-shall-have-grown-hot anoint-around
resinam abietis, et mox ipsas particulas liquescere ac
resin of-fir and soon the-very pieces melt and

circumfluere videbis. Mox carbonibus amotis, refrigeratum
flow-around you-will-see soon the-coals removed cooled
firmum erit. Hoc modo solidari potest quicquid in puro
firm it-will-be in-this way to-be-soldered can whatever in pure
stagno est opus, videlicet, effusoria in ampullis et auriculæ,
tin is work namely spouts on flasks and little-ears
atque ligaturæ in quibus opercula pendent, et si aliquid
and bands in which lids hang and if any
foramen in fusili ampulla per negligentiam contigerit.
hole in a-cast flask through negligence shall-have-happened

Caput LXXXIX. De fundendo effusorio.

Chapter LXXXIX about casting a-spout

Potest etiam effusorium facile ita formari, ut incidatur
can also a-spout easily so to-be-formed that be-cut
fissile lignum rotundum, et foretur terebro in longitudine,
a-splittable wood round and be-bored with-an-auger in length
non usque ad finem, et findatur per medium, atque in
not up-to to the-end and be-split through the-middle and in
integro illo formetur foramen, cui ferrum rotundum
the-whole-part that let-it-be-formed a-hole to-which an-iron round
secundum interiorem amplitudinem infusorii, tenui argilla
according-to the-inner width of-the-casting-mold with-thin clay
illitum injungatur, et foris valide circumligetur, stagnumque,
smeared let-it-be-joined and outside strongly let-it-be-bound-around and-the-tin
illi calefacto, infundatur. Quo refrigerato lignum solvatur,
to-it heated let-it-be-poured-in which cooled the-wood let-it-be-loosened
et ferrum ejiciatur, effusoriumque limatum et planatum,
and the-iron be-taken-out and-the-spout filed and smoothed
modo quo superius dictum est, vasi consolidetur.
in-the-way in-which above said it-is to-the-vessel be-soldered

Caput XC. De ferro.

Chapter XC about iron

Ferrum nascitur in terra in modum lapidum, quod,

iron is-born in the-earth in the-manner of-stones which

effossum eodem modo quo cuprum superius frangitur et

dug-out in-the-same way in-which copper above is-broken and

in massas confunditur, deinde in fornace ferrarii liquatur,

into masses is-melted then in the-furnace of-the-smith is-smelted

et percutitur ut aptum fiat unicuique operi. Calibs

and is-beaten so-that fit it-become for-each work steel

dicitur a monte Calibe, in quo ejus usus plurimus

is-called from the-mountain Calibe on which its use very-much

invenitur; qui simili modo preparatur ut operi aptus

is-found which in-like way is-prepared so-that for-work fit

fiat. Cum ergo ferrum præparaveris et inde calcaria,

it-become when therefore iron you-shall-have-prepared and thence spurs

sive cætera equestria utensilia feceris, et ea auro vel

or the-other equestrian utensils you-shall-have-made and them with-gold or

argento decorare volueris, sume argentum purissimum, et

silver to-adorn you-shall-wish take silver very-pure and

percutiendo valde attenua. Deinde habeas rotulam ligneam

by-beating very thin-it then have a-little-wheel wooden

de quercu, longitudine pedis latam et tornatam, quæ sit

of oak in-length of-a-foot broad and turned which be

in circuitu tenuis et in medio ex utraque parte spissam,

in circuit thin and in the-middle on each side thick

ubi ei aliud lignum curvum transfigatur in quo possit

where through-it another wood curved be-fixed on which it-can

volvi, cui etiam in una summitate aliud lignum curvum

to-be-turned to-which also at one top another wood curved

apponatur cum quo circumrotetur. Cumque ipsam rotam

be-applied with which it-may-be-turned-around and-when itself the-wheel

aptaveris inter duas columpnellas, fac circa oram ejus
you-shall-have-fitted between two little-columns make around the-rim of-it
exterius incisuras in modum gradus, quæ retro respiciunt,
on-the-outside notches in the-manner of-a-step which backward look
ut ipsæ columpnellæ in quibus rota vergitur, firmiter
so-that themselves the-little-columns in which the-wheel is-turned firmly
sint fixæ super scamnum in latitudine, ita ut curvum lignum
be fixed on a-bench in width so that the-curved wood
ad dexteram manus sit. Stet quoque adhuc una columpnella
at the-right hand be let-stand also besides one little-column
ad sinistram manum in anteriori parte juxta rotam, in qua
at the-left hand on the-front part beside the-wheel in which
sit fixum gracile lignum, ita ut super rotam jaceat et
be fixed a-slender wood so that over the-wheel it-lie and
habeat in summitate sua particulam calibis, longitudine et
have at top its a-little-piece of-steel in-length and
latitudine majoris unguis, firmiter per foramen infixam,
width of-a-greater fingernail firmly through a-hole fixed
et valde acutam, ita ut cum rota volvitur illud lignum
and very sharp so that when the-wheel is-turned that wood
semper cadat ab uno gradu in alterum, ut sic vibratus
always fall from one step onto another so-that thus vibrated
calibs quicquid adponitur incidat. Cum vero limaveris
the-steel whatever is-applied may-cut when however you-shall-have-filed
calcar unum æqualiter, pone illud super carbones ardentes
spur one evenly place it over coals burning
donec nigrescat, refrigeratumque tene manu sinistra et
until it-grow-black and-cooled hold-it with-hand left and
rotam volve dextra, appositumque calibi, incide subtiliter
the-wheel turn with-the-right and-applied to-the-steel cut finely
per omnia exterius in longitudine, et rursum dupliciter
through all on-the-outside in length and again doubly

in latitudine. Quo facto, cum parvulo forcipe frica particulas
in width which done with very-small tongs rub pieces
argenti sicut volueris et superpone, atque cum eodem
of-silver as you-shall-wish and place-them-over and with the-same
forcipe frica summitates argenti ut adhereant. Cumque
tongs rub the-tops of-the-silver so-that they-cling and-when
totum operaveris, denuo pone super prunas ardentes
the-whole you-shall-have-worked anew place-it over embers burning
donec rursum nigrum fiat, atque elevans forcipe, cum longo
until again black it-become and lifting-it with-tongs with a-long
ferro ex calibe valde æquali et manubrio infixo diligenter
iron from steel very even and in-a-handle fixed diligently
polies, supposituмque prunis, iterum calefaties rursumque
you-will-polish and-put-under the-embers again you-will-heat and-again
cum eodem ferro fortiter polies. Quod si volueris illud
with the-same iron strongly you-will-polish but if you-shall-wish it
per partes aut ex toto deaurare, in tua sit potestate. Hoc
in parts or in whole to-gild in your let-it-be power in-this
modo fræna et cetera instrumenta equestria vel quodcunque
way bridles and other instruments equestrian or whatever
in ferro volueris incide modo quo superius, sed
in iron you-shall-wish cut in-the-way in-which above but
profundius, habeasque fila ex argento subtilissima atque ex
deeper and-have wires from silver very-fine and from
auro, formabis tibi inde brevissimos flosculos et circulos,
gold you-will-form for-yourself thence very-short little-flowers and circles
sive aliud quodcunque libuerit, et cum gracili forcipe super
or other whatever shall-please and with slender tongs on
ferrum qualiter volueris pone, atque cum brevi malleo
the-iron as you-shall-wish place and with a-short hammer
leniter percute ut adhæreat; sitque semper unus flosculus
gently strike so-that it-cling and-let-be always one little-flower

aureus alter argenteus. Impleto autem taliter spacio
golden the-other silver filled however in-such-way the-space
ferri totius, pone super prunas donec nigrescat, atque
of-the-iron whole place-it over embers until it-grow-black and
cum mediocri malleo percute diligenter, donec ubicunque
with a-middling hammer strike diligently until wherever
ferrum apparet incisuræ illæ æquales fiant, et sic opus illud
the-iron appears the-notches those even become and thus work that
videatur quasi nigellum sit. Si vero in cultellis sive in aliis
seem as-if niello it-be if however on knives or on other
ferris litteras habere volueris, cum fossorio ferro fode eas
irons letters to-have you-shall-wish with a-graving iron engrave them
inprimis, deinde facto filo argenteo grosso, forma cum gracili
first then made a-wire silver thick form with slender
forcipe litteras, et inpone eas fossuris illis, percutiensque
tongs the-letters and put them in-grooves those and-striking
superius cum malleo imple eas. Hoc modo etiam flosculos
above with a-hammer fill them in-this way also little-flowers
et circulos facere potes in ferro, et cum filis ex cupro et
and circles to-make you-can on iron and with wires from copper and
auricalco imple. Si quid vero hujus operis vetustate seu
brass fill if anything however of-this work by-age or
negligentia fractum fuerit, si argentum quod est volueris
negligence broken shall-have-been if the-silver which is you-shall-wish
acquirere, mitte illud in ignem donec candeat, tenensque
to-acquire put it into the-fire until it-glow and-holding-it
sinistra manu cum forcipe, dextera longum plumbum
with-the-left hand with tongs with-the-right long lead
frica super omnia loca ubi argentum apparet, et mox
rub over all the-places where silver appears and soon

liquescente plumbo ipsum liquescit, et ei commiscetur;
melting the-lead it-itself melts and with-it is-mingled
sicque plumbum comburitur et argentum acquiritur.
and-thus the-lead is-burned and the-silver is-acquired

XCI–XCII · SOLDERING IRON AND CARVING BONE

Iron rings are brazed with copper and locks with a copper-tin solder, and iron is tinned or blackened with horn. Bone and ivory are carved in panels and openwork handles backed with gilded copper, and knives are set in their handles with powdered frankincense.

Caput XCI. De solidatura ferri.

Chapter XCI about the-solder of-iron

Fiunt etiam ex ferro circuli tenues qui ponuntur in
are-made also from iron rings thin which are-placed on
manubriis ferramentorum qui non possunt per se
the-handles of-iron-tools which not can by themselves
solidari, quibus in junctura circumvolvitur cuprum tenue,
to-be-soldered on-which at the-joint is-wrapped-around copper thin
atque circumponitur modicum argillæ. Qua siccata, cum
and is-placed-around a-little of-clay which dried when
ante fornacem sub carbonibus sufflat canduerit, mox
before the-furnace under coals it-blows it-shall-have-glowed soon
liquefactum cuprum circumfluit et solidat. Hoc modo etiam
the-melted copper flows-around and solders in-this way also
claves stagnatae, si franguntur, et alia quælibet in ferro
keys tinned if they-are-broken and other any-things in iron
solidari possunt. Quod si vis seras componere quibus
to-be-soldered can but if you-wish locks to-compose with-which
manticæ serantur, percute ferrum tenue et circa aliud ferrum
bags are-locked beat iron thin and around another iron

rotundum complica, atque conjunge ei fundum superius et
round fold-it and join to-it a-bottom above and
inferius. Deinde circumpone ei corrigiolos ex eodem ferro
below then place-around it little-straps from the-same iron
et inter eos flosculos sive circulos qualiter volueris, sic
and between them little-flowers or circles as you-shall-wish thus
tamen ut una particula semper inpingatur alteri ut
nevertheless that one piece always be-driven into-another so-that
adhæreat, ne cadere possit. Commisce quoque duos partes
it-cling lest to-fall it-can mix also two parts
cupri et tertiam stagni, et comminue illud malleo in
of-copper and a-third of-tin and break it with-a-hammer in
vasculo ferreo subtiliter, comburensque viniceum lapidem,
a-little-vessel iron finely and-burning wine stone
adde ei modicum salis atque commisce aqua, et liniens
add to-it a-little of-salt and mix with-water and smearing
in circuitu circumsparge ipsum pulverem. Quo siccato,
in circuit sprinkle-around itself the-powder which dried
rursum superlinies confectionem illam spissius, inponensque
again you-will-smear-over preparation that thicker and-putting-it
prunis ac diligenter circumtegens, sicut argentum superius,
on-the-embers and diligently covering-it-around as silver above
eodem modo solidabis; refrigeratumque per se lavabis. Hoc
in-the-same way you-will-solder and-cooled by itself you-will-wash in-this
modo quicquid volueris in ferro solidare potes, quod tamen
way whatever you-shall-wish in iron to-solder you-can which nevertheless
nullo modo deauratur. Quicquid superstagnare volueris in
in-no way is-gilded whatever to-tin you-shall-wish in
ferro, primum lima et priusquam manu tangas, noviter
iron first file and before with-hand you-touch newly
limatum in patellam stagni liquefacti cum adipe projice, et
filed into a-pan of-tin melted with fat throw and

cum forcipe commove, donec candidum fiat, eductumque
with tongs stir until white it-become and-drawn-out
fortiter excute, atque cum furfure et lineo panno purga.
strongly shake and with bran and a-linen cloth clean-it
Seras ferreas atque ligaturas scriniorum et ostiorum cum
locks iron and the-bands of-shrines and of-doors when
feceris, ad ultimum calefacies et pice linies,
you-shall-have-made at-the last you-will-heat and with-pitch you-will-smear
clavi vero stagnati sint. Cum feceris calcaria,
the-nails however tinned let-be when you-shall-have-made spurs
frenos et instrumenta sellae humilium clericorum et
bridles and the-instruments of-the-saddle of-the-humble clerics and
monachorum, et ea æqualiter limaveris, calefac mediocriter
monks and them evenly you-shall-have-filed heat moderately
et frica super ea cornu bovis, sive pennas anseris, quæ cum
and rub over them the-horn of-an-ox or feathers of-a-goose which when
a calore modicum liquefacta ferro adhæserint, nigrum
by the-heat a-little melted to-the-iron they-shall-have-clung a-black
colorem et quod a modo ei convenientem praebebit.
color and which from now to-it fitting will-provide

Caput XCII. De sculptura ossis.

Chapter XCII about the-carving of-bone

Sculpturus os, primum forma tabulam cujus magnitudinis
about-to-carve bone first form a-panel of-what size
volueris, et superponens cretam, pertrahe cum plumbo
you-shall-wish and placing-on chalk draw with lead
imagines secundum libitum, atque cum gracili ferro designa
images according-to pleasure and with a-slender iron mark-out
tractus ut appareant; deinde cum diversis ferris fode
the-strokes so-that they-appear then with various irons engrave
campos quam profunde volueris, et sic demum ingenium
the-fields as deep you-shall-wish and thus at-last the-ingenuity

et scientiam tuam sculpe imagines, vel aliud quod libuerit.
and knowledge your carve images or other what shall-please
Quod si volueris opus tuum auri petula ornare, gluten de
but if you-shall-wish work your of-gold with-leaf to-adorn glue from
vesica piscis qui dicitur huso subpone, et incisa petula
the-bladder of-the-fish which is-called sturgeon put-under and cut the-leaf
per particulas sicut volueris suppone. Forma etiam manubria
into pieces as you-shall-wish put-it-under form also handles
ex ebore rotunda sive costata, et fac foramen per medium
from ivory round or ribbed and make a-hole through the-middle
in longitudine, deinde cum limis diversis ad hoc opus aptis
in length then with files various for this work fitted
amplifica foramen ut sit interius sicut exterius, et sit
widen the-hole so-that it-be within as on-the-outside and let-it-be
per totum æqualiter et mediocriter tenue; atque pertrahe
through the-whole evenly and moderately thin and draw
in circuitu subtiliter flosculos, sive bestias, aves, vel dracones
in circuit finely little-flowers or beasts birds or dragons
collibus et caudis concatenatos, et cum subtilibus ferris
by-necks and tails linked and with fine irons
campos transfora, deinde sculpe quam gracilius et operosius
the-fields pierce then carve as more-slenderly and more-laboriously
possis. Quo facto, imple foramen interius ligno quercineo,
you-can which done fill the-hole within with-wood oak
quod cooperies cupro tenui deaurato, ita ut per omnes
which you-will-cover with-copper thin gilded so that through all
campos aurum videri possit; sicque ex eodem osse particulis
the-fields the-gold to-be-seen can and-thus from the-same bone with-pieces
duabus injunctis, obstrue foramen ante et retro, quas
two joined stop the-hole in-front and behind which
obfirmabis osseis clavis, tam subtiliter, ut nullus considerare
you-will-fasten with-bone nails so finely that no-one to-consider

possit qualiter aurum impositum sit. Post hæc in anteriori
can how the-gold put-in was after these-things on the-front
particula fac foramen in quo cultellus inponatur, cujus cauda
piece make a-hole in which the-knife be-put whose tail
calefacta leviter potest inponi, quia lignum est interius
heated easily can to-be-put-in because wood is within
et firmiter stabit: fac etiam manubrium simplex qualiter
and firmly it-will-stand make also a-handle simple as
volueris, et secundum quantitatem ejus fac foramen cui
you-shall-wish and according-to the-size of-it make a-hole into-which
cultellus imponi debet, atque injunge ei lignum diligenter, et
the-knife to-be-put ought and join to-it wood diligently and
sicut lignum formatum est, ita fac formari caudam cultelli.
as the-wood formed is so make be-formed the-tail of-the-knife
Deinde tere thus lucidum in tenuissimum pulverum, et
then grind frankincense clear into very-fine powder and
inde imple foramen manubrij, atque cum lineo panno humido
with-it fill the-hole of-the-handle and with a-linen cloth moist
involve cultellum juxta caudam tripliciter, ponensque ante
wrap the-knife beside the-tail triply and-placing-it before
fornacem, calefac ipsam caudam donec modicum candescat,
the-furnace heat itself the-tail until a-little it-glow
statimque infige manubrio diligenter ut bene conjungatur,
and-at-once fix-it in-the-handle diligently so-that well it-be-joined
et firmiter stabit. Quod si aliquando vetustate, vel incuria,
and firmly it-will-stand but if ever by-age or carelessness
cultellus frangatur, ita ut particula ejus extra manubrium
the-knife be-broken so that a-piece of-it outside the-handle
emineat, calefac forcipem ferrarii atque adprehende ipsam
stand-out heat the-tongs of-the-smith and grasp itself
caudam et aliquantisper tene, donec incalescat, et statim
the-tail and for-a-while hold-it until it-grow-hot and at-once

extrahe. Cum sulphure, quo trito, eodem modo firmari
draw-it-out with sulfur which ground in-the-same way to-be-made-firm
potest cultellus, non solum in osse sed in duro ligno.
can a-knife not only in bone but in hard wood

XCIII–XCIV · REDDENING BONE AND POLISHING GEMS

Bone is dyed red with madder and turned into knobs for croziers. Rock crystal is ground and polished; it is carved after warming in a goat's blood, drilled with steel hammers, used as a burning glass, and sawn with sand; other stones are polished with crystal dust and the jacinth with ismaris.

Caput XCIII. De rubricando osse.

Chapter XCIII about reddening bone

Est etiam herba rubrica dicta, cujus radix est longa, gracilis
there-is also a-plant madder called whose root is long slender
et rubicunda, quæ effossa sole siccatur, atque in mortario
and reddish which dug-up in-the-sun is-dried and in a-mortar
pila tunditur, et sic lexiva perfusa in olla rudi coquitur.
with-a-pestle is-pounded and thus with-lye soaked in a-pot raw is-boiled
Cui cum bene bulluerit, os elephantis seu piscis vel cervi
in-which when well it-shall-have-boiled bone of-elephant or of-fish or of-stag
impositum, rubrum fit. Possunt etiam ex his ossibus vel
put-in red becomes can also from these bones or
cornibus tornatili opere fieri noda in baculis episcoporum,
horns by-turned work to-be-made knobs on the-staffs of-bishops
abbatium, atque minores noduli diversis utensilibus apti.
of-abbots and smaller little-knobs for-various utensils fit
Quos cum acutis ferris tornaveris cum asperella æquabis,
which when with-sharp irons you-shall-have-turned with shave-grass you-will-level
et colligens rasuras in panno lineo desuper tornando fortiter
and gathering the-shavings in a-cloth linen from-above by-turning strongly

fricabis, et omnino lucidi fient. Cineribus cribatis
you-will-rub and wholly shining they-will-become with-ashes sifted
et laneo panno inditis poteris manubria cornea,
and in-a-woolen cloth put you-will-be-able handles horn
et venatorum cornua, vel tabulas in lucernis polire; ad
and of-hunters horns or panels in lanterns to-polish at-the
ultimum vero ne obliviscaris ea nucis oleo superlinire.
last however lest you-forget them of-nut with-oil to-smear-over

Caput XCIV. De poliendis gemmis.
Chapter XCIV about polishing gems

Cristallum quod aqua durata in glaciem, et multorum
crystal which water hardened into ice and of-many
annorum glacies duratur in lapidem, hoc modo limatur
years the-ice is-hardened into stone in-this way is-filed
et politur. Tolle confectionem quæ dicitur tenax, de
and is-polished take the-preparation which is-called tenax about
qua supradictum est, adhibitamque igni donec liquefiat,
which above-said it-is and-applied to-the-fire until it-melt
consolidabis christallum ad lignum longum quod ei simile sit
you-will-solder the-crystal to a-wood long which to-it like be
in grossitudine. Quod cum refrigeratum fuerit utrisque
in thickness which when cooled it-shall-have-been with-both
manibus fricabis super lapidem sabuleum durum, addita
hands you-will-rub on a-stone sandy hard added
aqua donec formam accipiat quam ei dare volueris, deinde
water until form it-receive which to-it to-give you-shall-wish then
super alteram lapidem ejusdem generis qui sit subtilior et
on another stone of-the-same kind which be finer and
æqualior donec omnino æquum fiat. Et accipiens tabulam
more-even until wholly even it-become and taking a-board
plumbeam æqualem, pone super eam tegulam humidam quam
lead level place on it tile moist which

cum saliva fricabis super cotem duram, atque desuper
with saliva you-will-rub on a-whetstone hard and from-above
polies ipsum christallum, donec fulgorem accipiat. Ad
you-will-polish itself the-crystal until brightness it-receive at-the
ultimum vero super hyrcinum corium non denigratum
last however on goat hide not blackened
neque unctum, sed in ligno tensum et clavis inferius
nor greased but on wood stretched and with-nails below
affixum, fricaturam tegulæ pone saliva humidam, et
fixed the-rubbings of-the-tile place with-saliva moist and
desuper diligenter frica, donec omnino lucidum fiat. Quod
from-above diligently rub until wholly shining it-become but
si christallum sculpere volueris, accepto hyrco duorum vel
if crystal to-carve you-shall-wish taken a-goat of-two or
trium annorum, colligatisque pedibus ejus, incide foramen
three years and-bound-together the-feet of-it cut a-hole
inter pectus ejus et ventrem, in loco cordis, et impone
between the-breast of-it and the-belly in the-place of-the-heart and put-in
christallum, ita ut in sanguine ejus jaceat, donec calefiat.
the-crystal so that in the-blood of-it it-lie until it-grow-warm
Quod mox ejiciens incide in eo quod volueris, quamdiu calor
which soon taking-out cut in it what you-shall-wish as-long-as heat
ille durat, et cum ceperit refrigescere atque durescere,
that lasts and when it-shall-have-begun to-grow-cold and to-harden
rursum repone in sanguine hyrci, calefactumque denuo
again put-it-back in the-blood of-the-goat and-heated anew
ejice et incide, sicque facies donec sculpturam compleas;
take-it-out and cut and-thus you-will-do until the-carving you-complete
ad ultimum vero calefactum et ejectum cum panno laneo
at-the last however heated and taken-out with a-cloth woolen
fricabis ut cum eodem sanguine ei fulgorem acquiras.
you-will-rub so-that with the-same blood to-it brightness you-acquire

Si autem nodos facere volueris ex christallo, qui baculis
if however knobs to-make you-shall-wish from crystal which on-the-staffs
episcoporum vel candelabris possint inponi, hoc modo
of-bishops or candlesticks can to-be-put in-this way
perforabis eos; fac tibi duos malleos mensura minoris
you-will-pierce them make for-yourself two hammers by-the-measure of-the-little
digiti grossos, et pene palmi mensura longos, et in
finger thick and almost of-a-palm by-the-measure long and at
utraque summitate valde graciles et bene calibatos. Cumque
each top very slender and well steeled and-when
nodum formaveris incide in ligno foramen, ita ut
the-knob you-shall-have-formed cut in a-wood a-hole so that
dimidius in eo jacere possit, et cum cera confirmabis eum
half in it to-lie it-can and with wax you-will-make-firm it
in eodem ligno ut adhæreat; tollensque unum malleolum
in the-same wood so-that it-cling and-taking one small-hammer
percute leniter in medio nodi in uno loco, donec
strike gently in the-middle of-the-knob in one place until
foramen parvum facias, sicque in medio percutiendo et in
a-hole small you-make and-thus in the-middle by-striking and in
circuitu diligenter frangendo, cavaturam augebis. Cumque,
circuit diligently by-breaking the-hollow you-will-increase and-when
sic persistendo, ad meditullium nodi perveneris,
thus by-persisting to the-center of-the-knob you-shall-have-arrived
converte illum et in alteram partem fac similiter. Quem
turn it and on the-other part do likewise which
cum transforaveris, percute cuprum longitudine pedis unius
when you-shall-have-pierced beat copper in-length of-foot one
et rotundum, ita ut foramen transire possit, accipiensque
and round so that the-hole to-pass-through it-can and-taking
sabulum acutum aqua mixtum, mitte in foramen et cum
sand sharp with-water mixed put-it into the-hole and with

cupro lima. Cum vero foramen aliquantum dilataveris,
the-copper file when however the-hole somewhat you-shall-have-widened
percute aliud cuprum grossius, cum quo similiter limabis; et
beat another copper thicker with which likewise you-will-file and
si opus fuerit addes cuprum tertium grossius. Cumque ut
if need shall-be you-will-add a-copper third thicker and-when as
volueris foramen ampliaveris, frange sabuleum lapidem
you-shall-wish the-hole you-shall-have-enlarged break a-sandy stone
subtiliter, et hoc imposito cum cupro novo limabis donec
finely and this put-in with copper new you-will-file until
æquale fiat. Deinde tolle plumbum pari modo rotundum,
even it-become then take lead in-like way round
additaque fricatura tegulæ, cum saliva, polies foramen
and-added the-rubbings of-tile with saliva you-will-polish the-hole
interius, ipsumque nodum sicut supra exterius. Purissimum
within and-itself the-knob as above on-the-outside the-purest
christallum rotundissimum formatum et politum, aquaque
crystal most-round formed and polished and-with-water
vel saliva madefactum et claro soli adhibitum, isca
or saliva moistened and to-the-clear sun applied tinder
quam tenturam vocant supposita ita, ut splendor in eam
which tentura they-call put-under so that the-brilliance onto it
vibret, ignem velocissimum trahit. Quod si christallum secare
may-dart fire most-swift draws but if crystal to-cut
volueris, infige quatuor clavos ligneos super scamnum, inter
you-shall-wish fix four pegs wooden on a-bench between
quos christallum firmiter jaceat, qui clavi sic stabunt, ut
which the-crystal firmly may-lie which pegs so will-stand that
duo superius et duo inferius sic strictim conjungantur,
two above and two below so narrowly be-joined
ut serra inter eos trahi vix possit, et in nullam
that a-saw between them to-be-drawn scarcely can and to no

partem flecti, imponensque serram ferream atque superjaciens
side to-be-bent and-putting-in a-saw iron and throwing-over
sabulum acutum aqua commixtum, fac stare duos qui
sand sharp with-water mixed make stand two who
eam trahant, quique sabulum cum aqua sine intermissione
it may-draw and-who the-sand with water without interruption
desuper jaciant. Hoc tamdiu fiat, donec christallum in
from-above may-throw this so-long let-it-be-done until the-crystal into
duabus partibus dividatur, quas superfricabis et polies
two parts be-divided which you-will-rub-over and you-will-polish
ut supra. Eodem modo secantur, fricantur atque poliuntur
as above in-the-same way are-cut are-rubbed and are-polished
onix et berillus, smaragdus, jaspis et calcedonius, ceterique
onyx and beryl emerald jasper and chalcedony and-the-other
lapides preciosi; fit etiam tenuissimus pulvis de fragmentis
stones precious is-made also a-very-fine powder from fragments
christalli qui, mixtus aqua, ponitur super æqualem lignum
of-crystal which mixed with-water is-placed on a-level wood
de tilia, et desuper fricantur iidem lapides atque poliuntur.
of linden and from-above are-rubbed the-same stones and are-polished
Jacinctus, qui durior est, hoc modo politur. Est lapis qui
the-jacinth which harder is in-this way is-polished there-is a-stone which
dicitur ismaris qui comminutus donec sit sicut sabulum,
is-called ismaris which broken-up until it-be as sand
poniturque super cupream tabulam æqualem aqua mixtus,
and-is-placed on a-copper plate level with-water mixed
et desuper jacinctus fricando formatur. Lotura vero quæ
and from-above the-jacinth by-rubbing is-formed the-washing however which
inde fluit diligenter in pelvi munda suscipiatur, et cum
thence flows diligently in a-basin clean let-it-be-caught and when
steterit per noctem, sequenti die aqua penitus
it-shall-have-stood through the-night on-the-following day the-water thoroughly

ejiciatur, et pulvis siccetur, qui postea super tabulam
let-it-be-thrown-out and the-powder let-it-be-dried which afterward on a-board
æqualem de tilia saliva humidus ponatur, atque desuper
level of linden with-saliva moist be-placed and from-above
jacinctus poliatur. Lapides quoque eodem modo vitrei
the-jacinth let-it-be-polished stones also in-the-same way glass
quo cristallum fricantur et poliuntur.
in-which crystal are-rubbed and are-polished

XCV · PEARLS

Pearls from the sea and rivers are drilled with a steel bow drill and enlarged with thread and sand; pieces of shell are filed and polished into pearls for setting in gold.

Caput XCV. De margaritis.
Chapter XCV about pearls
Margaritæ inveniuntur in conchis marinis et aliorum fluminum;
pearls are-found in shells marine and of-other rivers
quæ perforantur subtili ferro calibato, quod infixum sit ligno
which are-pierced with-a-fine iron steeled which fixed be in-a-wood
habenti rotulam plumbi parvulam, et alterum lignum in quo
having a-little-wheel of-lead very-small and another wood in which
volvatur, cui sit inposita corrigia per quam circumducatur.
it-may-turn to-which be put a-strap through which it-may-be-led-around
Quod si opus sit ut alicujus margaritæ foramen majus
but if need be that of-any pearl the-hole larger
fiat, filum cum modico subtili sabulo foramini inponatur,
become a-thread with a-little fine sand into-the-hole let-it-be-put
cujus fili summitas una dentibus, altera sinistra manu
of-which of-the-thread the-top one with-the-teeth the-other with-the-left hand
teneatur, dexteraque sursum ac deorsum margarita ducatur,
let-it-be-held and-with-the-right up and down the-pearl let-it-be-led

interimque sabulum ut foramen latius fiat apponatur.
and-meanwhile sand so-that the-hole wider become be-applied
Secantur etiam chonchæ marinæ per partes et inde limantur
are-cut also shells marine into parts and thence are-filed
margaritæ, in auro satis utiles, poliunturque ut supra.
pearls in gold quite useful and-are-polished as above
