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[B1^V:BLANK.]

[B2^R]

DISTRIBVTIO OPERIS.

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Eius constituuntur Partes sex.

Prima; *Partitiones Scientiarum*.

5 Secunda; *Nouum Organum*, siue *Indicia de Interpretatione naturæ*.

Tertia; *Phænomena Vniuersi*, siue *Historia Naturalis & Experimentalis ad
condendam Philosophiam*.

Quarta; *Scala Intellectus*.

Quinta; *Prodromi*, siue *Anticipationes Philosophiæ Secundæ*.

10 Sexta; *Philosophia Secunda*, siue *Scientia Actiua*.

Singularum Argumenta.

Pars autem Instituti nostri est, vt omnia, quantum fieri potest, aperte
& perspicuè proponantur. Nuditas enim animi, vt olim corporis,
innocentiæ, & simplicitatis comes est. Pateat itaque primò Ordo Operis,
15 atque ratio eius. Partes Operis à nobis constituuntur sex.

Prima pars exhibet Scientiæ eius siue Doctrinæ, in cuius possessione

humanum genus hactenùs versatur, ^l Summam, siue Descriptionem
vniuersalem. Visum enim est nobis, etiam in ijs, quæ recepta sunt,
nonnullam facere moram: eo nimirùm consilio, vt faciliùs & Veteribus
20 perfectio, & Nouis aditus detur. Pari enim ferè studio ferimur, & ad
vetera excolenda, & ad vltiora assequenda. Pertinet etiam hoc ad
faciendam fidem: iuxta illud, *Non accipit Indoctus verba Scientiæ, nisi*
priùs ea dixeris, quæ versantur in corde eius. Itaque Scientiarum atque
Artium receptarum oras legere, necnon vtilia quædam in illas importare,
25 tanquam in transitu non negligemus.

Partitiones tamen Scientiarum adhibemus eas, quæ non tantùm iam
inuenta & nota, sed hactenùs omissa, & debita complectantur. Etenim
inueniuntur in globo Intellectuali, quemadmodum in Terrestri, & culta
pariter, & deserta. Itaque nil mirum videri debet, si à diuisionibus
30 vsitatis quandoque recedamus. Adiectio enim, dum totum variat, etiam
partes earumque sectiones necessariò variat: receptæ autem diuisiones,
receptæ summæ Scientiarum, qualis nunc est, tantùm competunt.

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Circa ea verò, quæ ceu omissa notabimus, ita nos geremus; vt non
leues tantùm titulos & argumenta concisa eorum, quæ desiderantur,
proponamus. Nam siquid inter omissa retulerimus, (modò sit dignioris
subiecti) cuius ratio paulò videatur obscurior (adeò vt meritò suspicari
5 possimus, homines non facilè intellecturos, quid nobis velimus, aut
quale sit illud opus quod animo & cogitatione complectimur), perpetuò

nobis curæ ^l erit, aut præcepta huiusmodi Operis conficiendi, aut etiam
partem operis ipsius iam à nobis confectam, ad exemplum totius
subiungere: vt in singulis aut operâ aut consilio iuuemus. Etenim, etiam
10 ad nostram existimationem, non solùm aliorum vtilitatem pertinere
putauimus; ne quis arbitretur, leuem aliquam de istiusmodi
rebus notionem mentem nostram perstrinxisse; atque esse illa, quæ
desideramus ac prensamus, tanquam votis similia. Ea verò talia sunt,
quorum & penes homines (nisi sibi ipsi desint) potestas planè sit; & nos
15 apud nosmet rationem quandam certam & explicatam habeamus.
Neque enim regiones metiri animo, vt Augures, auspiorum causâ: sed
intrare, vt Duces, promerendi studio, suscepimus.

Atque hæc prima Operis pars est.

Porro præteruerti Artes veteres, Intellectum humanum ad traiciendum instruemus. Destinatur itaque Parti secundæ, Doctrina de meliore & perfectiore usu rationis in Rerum inquisitione, & de auxilijs veris Intellectus: vt per hoc (quantum conditio humanitatis ac mortalitatis patitur) exaltetur Intellectus, & facultate amplificetur ad Naturæ ardua & obscura superanda. Atque est ea, quam adducimus, Ars (quam
20 *Interpretationem naturæ* appellare consueuimus) ex genere Logicæ; licet plurimum, atque adeo immensum quiddam intersit. Nam & ipsa illa Logica vulgaris auxilia & præsidia Intellectui moliri ac parare proficitur: & in hoc vno consentiunt. Differt autem planè à Vulgari, rebus præcipue tribus: viz. ipso fine, ordine demonstrandi, & inquirendi
25
30 initijs.

[B3^v]

^l Nam huic nostræ Scientiæ finis proponitur: vt inueniantur non Argumenta, sed Artes; nec Principijs consentanea, sed ipsa Principia; nec Rationes probabiles, sed Designationes & indicationes Operum. Itaque ex intentione diuersâ, diuersus sequitur effectus. Illi enim aduersarius
35 Disputatione vincitur & constringitur; hic Naturâ, Opere.

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Atque cum huiusmodi fine conueniunt Demonstrationum ipsarum natura & Ordo. In Logicâ enim vulgari opera ferè vniuersa circa Syllogismum consumitur. De Inductione verò Dialectici vix seriò cogitasse videntur; leui mentione eam transmittentes, & ad disputandi
5 formulas properantes. At nos demonstrationem per Syllogismum reijcimus, quod confusiùs agat, & Naturam emittat è manibus. Tametsi enim nemini dubium esse possit, quin, quæ in medio termino conueniunt, ea & inter se conueniant, (quod est Mathematicæ cuiusdam certitudinis), nihilominus hoc subest fraudis, quòd
10 Syllogismus ex propositionibus constet, propositiones ex verbis, verba autem notionum tesseræ & signa sint. Itaque si Notiones ipsæ mentis (quæ verborum quasi anima sunt, & totius huiusmodi structuræ ac fabricæ basis) malè ac temerè à rebus abstractæ, & vagæ, nec satis definitæ & circumscriptæ; denique multis modis vitiosæ fuerint, omnia
15 ruunt. Reijcimus igitur Syllogismum; neque id solùm quoad principia, (ad quæ nec illi earn adhibent) sed etiam quoad propositiones medias:

quas educit sanè atque parturit, vtcunque Syllogismus; sed operum

[B4^r]

steriles, & à Practicâ remotas, & plane quo^lad partem actiuam
Scientiarum incompetentes. Quamuis igitur relinquamus Syllogismo &
20 huiusmodi Demonstrationibus famosis ac iactatis, iurisdictionem in
Artes populares & opinabiles (nil enim in hac parte mouemus) tamen
ad Naturam Rerum, Inductione per omnia, & tam ad minores
propositiones, quàm ad maiores, vtimur. *Inductionem* enim censemus
eam esse demonstrandi formam, quæ Sensum tuetur, & Naturam
25 premit, & Operibus imminet ac ferè immiscetur.

Itaque Ordo quoque demonstrandi planè inuertitur. Adhuc enim res
ita geri consuevit; vt à sensu & particularibus primo loco ad maximè
generalia aduoletur, tanquam ad polos fixos circa quos disputationes
vertantur; ab illis cætera per media deriuentur: Viâ certè compendiariâ,
30 sed præcipiti; & ad Naturam imperuiâ, ad Disputationes verò procliui
& accommodatâ. At secundùm nos, Axiomata continentèr, & gradatim
excitantur, vt nonnisi postremo loco ad Generalissima veniatur: Ea verò
Generalissima euadunt, non notionalia, sed benè terminata; & talia quæ
Natura vt reuera sibi notiora agnoscat, quæque rebus hæreant in
35 medullis.

At in formâ ipsâ quoque Inductionis, & iudicio quod per eam fit,
opus longè maximum mouemus. Ea enim de quâ Dialectici loquuntur,
quæ procedit per Enumerationem simplicem, puerile quiddam est, &

.....
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precariò concludit, & periculo ab instantiâ contradictoriâ exponitur, &
consueta tantùm intuetur; nec exitum reperit.

[B4^v]

^l Atqui opus est ad Scientias Inductionis formâ tali, quæ experientiam
soluat, & separet, & per exclusiones ac reiectiones debitas necessariò
5 concludat. Quòd si Iudicium illud vulgatum Dialecticorum tam
operosum fuerit, & tanta ingenia exercuerit; quantò magis laborandum
est in hoc altero, quod non tantùm ex Mentis penetralibus, sed etiam ex
Naturæ visceribus extrahitur?

Neque tamen hic finis. Nam fundamenta quoque Scientiarum fortiùs
10 deprimimus & solidamus, atque Initia inquirendi altiùs sumimus, quàm
adhuc homines fecerunt: ea subiiciendo examini, quæ Logica vulgaris

tanquam fide alienâ recipit. Etenim Dialectici principia Scientiarum à
Scientiis singulis tanquam mutuò sumunt: rursus notiones mentis
primas venerantur: Postremò informationibus immediatis sensus bene
15 dispositi acquiescunt. At nos Logicam veram singulas Scientiarum
Prouincias maiore cum imperio, quàm penes ipsarum Principia sit,
debere ingredi decreuimus, atque illa ipsa Principia putatiua ad rationes
reddendas compellere, quousque planè constant. Quod verò attinet ad
notiones primas Intellectus; nihil est eorum, quæ Intellectus sibi
20 permissus congegit, quin nobis pro suspecto sit, nec vllo modo ratum,
nisi nouo iudicio se stiterit, & secundùm illud pronuntiatum fuerit.
Quinetiam sensus ipsius informationes multis modis excutimus. Sensus
enim fallunt vtique; sed & errores suos indicant; Verùm errores præstò,
indicia eorum longè petita sunt.

[B5^r]

25 Duplex autem est Sensûs culpa: aut enim destituit^l nos, aut decipit.
Nam primò, plurimæ sunt res quæ sensum etiam rectè
dispositum, nec vllo modo impeditum effugiunt; aut subtilitate totius
corporis, aut partium minutijs, aut loci distantia, aut tarditate atque
etiam velocitate motus, aut familiaritate obiecti, aut alias ob causas.
30 Neque rursùs, vbi Sensus rem tenet, prehensiones eius admodùm firmæ
sunt. Nam testimonium & informatio sensûs semper est ex analogiâ
Hominis, non ex analogiâ Vniuersi: atque magno prorsùs errore
asseritur, Sensem esse mensuram rerum.

Itaque vt his occurratur; nos multo & fido ministerio auxilia
35 Sensui vndique conquisiuius, & contraximus: vt destitutionibus
substitutiones, variationibus rectificationes suppeditentur. Neque
id molimur tam Instrumentis, quàm experimentis. Etenim

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Experimentorum longè maior est subtilitas, quàm Sensûs ipsius, licèt
instrumentis exquisitis adiuti: (de iis loquimur Experimentis, quæ ad
intentionem eius quod quæritur peritè, & secundum artem excogitata &
apposita sunt). Itaque perceptioni Sensûs immediatæ ac propriæ non
5 multùm tribuimus: sed eò rem deducimus, vt Sensus tantùm de
Experimento, Experimentum de Re iudicet. Quare existimamus nos
Sensûs (à quo omnia in Naturalibus petenda sunt, nisi fortè libeat
insanire) Antistites religiosos, & oraculorum eius non imperitos
Interpretes nos præstitisse: vt alii professione quadam, nos re ipsâ,
10 Sensem tueri, ac colere videamur. Atque huiusmodi sunt ea, quæ ad

lumen ipsum Naturæ, eiusque accensionem, & immis^lsionem paramus:
 quæ per se sufficere possent, si Intellectus humanus æquus & instar
 tabulæ abrasæ esset. Sed cùm mentes hominum miris modis adeò
 obsessæ sint, vt ad veros Rerum radios excipiendos sincera & polita area
 15 prorsùs desit; necessitas quædam incumbit, vt etiam huic rei remedium
 quærendum esse putemus.

Idola autem, à quibus occupatur Mens, vel Adscititia sunt, vel Innata.
 Adscititia verò immigrarũnt in mentes hominum, vel ex Philosophorum
 placitis & sectis, vel ex peruersis legibus demonstrationum. At Innata
 20 inhærent Naturæ ipsius Intellectûs, qui ad errorem longè procliuior esse
 deprehenditur, quàm Sensus. Vtcunque enim homines sibi placeant, &
 in admirationem Mentis humanæ ac fere adorationem ruant, illud
 certissimum est; Sicut speculum inæquale rerum radios ex figurâ &
 sectione propriâ immutat; ita & Mentem, cùm à rebus per Sensum
 25 patitur, in notionibus suis expediendis & comminiscendis, haud optimâ
 fide Rerum naturæ suam naturam inserere & immiscere.

Atque priora illa duo *Idolorum* genera ægrè, postrema verò hæc nullo
 modo euelli possunt. Id tantùm relinquitur, vt indicentur; atque vt vis
 ista Mentis insidiatrix notetur & conuincatur, ne fortè à destructione
 30 veterum, noui subindè errorum surculi ex ipsâ malâ complexione
 Mentis pullulent; eoque res recidat, vt errores non extinguantur, sed
 permutentur: Verùm è contra, vt illud tandem in æternum ratum &

fixum sit, Intellectum nisi per Inductionem, eius^lque formam
 legitimam, iudicare non posse. Itaque Doctrina ista de expurgatione
 35 Intellectus, vt ipse ad veritatem habilis sit, tribus redargutionibus
 absoluitur: Redargutione Philosophiarum, Redargutione Demonstrationum, & Redargutione
 Rationis humanæ natiuæ. His verò explicatis,

ac postquam demùm patuerit, quid Rerum natura, quid Mentis
 natura ferat, existimamus nos thalamum Mentis & Vniuersi, pronubâ
 diuinâ bonitate, strauisse & ornasse. Epithalamij autem votum sit, vt ex
 eo connubio auxilia humana, & stirps Inuentorum, quæ necessitates
 5 ac miseras hominum aliquâ ex parte doment & subigant, suscipiatur.
Hæc verò est Operis pars secunda.

At vias non solùm monstrare & munire, sed inire quoque consilium
est. Itaque Tertia pars Operis complectitur *Phænomena Vniuersi*; hoc est,
omnigenam Experientiam, atque Historiam Naturalem, eius generis,
10 quæ possit esse ad condendam Philosophiam fundamentalis. Neque
enim excellens aliqua Demonstrandi via, siue Naturam Interpretandi
forma, vt Mentem ab errore & lapsu defendere ac sustinere, ita ei
materiam ad sciendum præbere & subministrare possit. Verùm ijs,
quibus non conijcere & hariolari, sed inuenire & scire propositum est,
15 quique non simiolas & fabulas Mundorum comminisci, sed huius ipsius
veri Mundi naturam introspicere, & velut dissecare in animo habent,
omnia à Rebus ipsis petenda sunt. Neque huic labori, & inquisitioni, ac

[B6^v]

mundanæ perambulationi vlla ingenij, ^l aut meditationis, aut
argumentationis substitutio, aut compensatio sufficere potest; non si
20 omnia omnium ingenia coierint. Itaque aut hoc prorsùs habendum, aut
negotium in perpetuum deserendum. Ad hunc verò vsque diem ita cum
hominibus actum est, vt minimè mirum sit, si Natura sui copiam non
faciat.

Nam primò, sensus ipsius Informatio, & deserens, & fallens;
25 Obseruatio, indiligens, & inæqualis, & tanquam fortuita; Traditio,
vana, & ex rumore; Practica, operi intenta & seruilis; vis Experimentalis,
cæca, stupida, vaga, & prærupta; denique Historia naturalis, leuis &
inops; vitiosissimam materiam Intellectui ad Philosophiam & Scientias
congesserunt.

30 Deindè, præpostera Argumentandi subtilitas & ventilatio, serum
rebus planè desperatis tentatur remedium; nec negotium vllò modo
restituit, aut errores separat. Itaque nulla spes maioris augmenti, ac
progressus sita est, nisi in Restauratione quadam Scientiarum.

Huius autem exordia omninò a naturali Historiâ sumenda sunt,
35 eâque ipsâ noui cuiusdam generis & apparatus. Frustrà enim fuerit

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speculum expolire, si desint imagines; & planè Materia idonea
præparanda est Intellectui, non solùm præsidia fida comparanda. Differt
verò rursùs Historia nostra (quemadmodum Logica nostra) ab eâ
quæ habetur, multis rebus: fine, siue officio; ipsâ mole & congerie; dein
5 subtilitate; etiam delectu; & constitutione in ordine ad ea quæ
sequuntur.

¹ Primò enim eam proponimus Historiam Naturalem, quæ non tam
 aut rerum varietate delectet, aut præsentis Experimentorum fructu iuuet;
 quàm lucem Inventioni causarum affundat, & Philosophiæ
 10 enutricandæ primam mammam præbeat. Licet enim Opera, atque
 Actiuam Scientiarum partem præcipuè sequamur, tamen messis tempus
 expectamus, nec muscum & segetem herbidam demetere conamur. Satis
 enim scimus Axiomata rectè inuenta, tota agmina Operum secum
 trahere; atque opera non sparsim, sed confertim exhibere.
 15 Intempestiuum autem illum & puerilem affectum, vt pignora
 aliqua nouorum Operum properè captentur, prorsus damnamus &
 amouemus, ceu pomum *Atalantæ* quod cursum retardat. Atque Historiæ
 nostræ Naturalis Officium tale est.

Quoad Congeriem vero, conficimus Historiam non solum Naturæ
 20 liberæ; ac solutæ (cum scilicet illa spontè fluit, & opus suum peragit;
 qualis est Historia Cœlestium, Meteororum, Terræ, & Maris,
 Mineralium, Plantarum, Animalium); sed multò magis Naturæ
 constrictæ & vexatæ; nempè, cùm per Artem & ministerium humanum
 de statu suo detruditur, atque premitur & fingitur. Itaque omnia Artium
 25 Mechanicarum, omnia Operatiuæ partis Liberalium, omnia
 Practicarum complurium, quæ in Artem propriam non coäluerunt,
 Experimenta, (quantum inquirere licuit, & quantum ad finem nostrum
 faciunt) perscribimus. Quin etiam (vt quod res est, eloquamur) fastum
 hominum & speciosa nil morati, multò plus & operæ & præsidii in hac

30 parte, quàm in illâ alterâ, ponimus: ¹ quandoquidem Natura rerum
 magis se prodit per vexationes Artis, quàm in libertate propriâ.

Neque Corporum tantum Historiam exhibemus, sed diligentiae
 insuper nostræ esse putauimus, etiam Virtutum ipsarum (illarum
 dicimus, quæ tanquam Cardinales in Naturâ censi possint, & in
 35 quibus Naturæ primordia planè constituuntur; vtpotè Materiæ primis
 Passionibus ac desiderijs; viz. *Denso, Raro, Calido, Frigido, Consistenti,*

Fluidi, Graui, Leui, alijsque haud paucis) Historiam seorsum
 comparare.

Enimuerò vt de Subtilitate dicamus, planè conquirimus genus

Experimentorum longè subtilius & simplicius quàm sunt ea quæ
5 occurrunt. Complura enim à tenebris educimus & eruimus, quæ nulli
in mentem venisset inuestigare, nisi qui certo & constanti tramite ad
inventionem Causarum pergeret; cùm in se nullius magnoperè sint vsus;
vt liquidò appareat, ea non propter se quæsita esse; sed ita prorsus se
10 habeant ad Res & Opera, quemadmodùm literæ Alphabeti se
habeant ad Orationem & verba: quæ licèt per se inutiles, eædem tamen
omnis sermonis elementa sunt.

In Delectu autem Narrationum & Experimentorum meliùs
hominibus cauissè nos arbitramur, quàm qui adhuc in Historia Naturali
versati sunt. Nam omnia fide oculatâ, aut saltem perspectâ, & summa
15 quadam cum seueritate recipimus; ita vt nil referatur auctum Miraculi
causâ, sed quæ narramus, à fabulis & vanitate casta & intemerata sint.
Quinetiam & recepta quæque ac iactata mendacia (qua; mirabili

[C2']

quo^ldam neglectu per sæcula multa obtinuerunt & inueterata sunt)
nominatim proscribimus & notamus; ne Scientijs ampliùs molesta sint.
20 Quod enim prudentèr animaduertit quidam; fabulas, & superstitiones,
& nugas, quas Nutriculæ pueris instillant, mentes eorum etiam seriò
deprauare: ita eadem nos mouit ratio, vt solliciti atque etiam anxij simus,
ne ab initio, cùm veluti infantiam Philosophiæ sub Historiâ Naturali
tractemus & curemus, illa alicui vanitati assuescat. At in omni
25 Experimento nouo & paulò subtiliore, licèt (vt nobis videtur) certo
ac probato, modum tamen experimenti, quo vsi sumus, apertè
subiungimus: vt, postquàm patefactum sit, quomodò singula nobis
constiterint, videant homines quid erroris subesse & adhærere possit;
atque ad probationes magis fidas, & magis exquisitas (si quæ
30 sint) expergiscantur: Denique vbique monita, & scrupulos, & cautiones
aspergimus, religione quadam, & tanquam exorcismo omnia
phantasmata eiicientes, ac cohibentes.

Postremò, cùm nobis exploratum sit, quantoperè Experientia
& Historia aciem mentis humanæ disgreget; & quàm difficile sit
35 (præsertim animis vel teneris, vel præoccupatis) à principio cum Naturâ
consuescere; adiungimus sæpiùs obseruationes nostras, tanquam primas
quasdam conuersiones & inclinationes, ac veluti aspectus Historiæ ad
Philosophiam: vt & pignoris loco hominibus sint, eos in Historiæ

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fluctibus perpetuo non detentos iri; vtque, cùm ad opus Intellectûs

deueniatur, omnia sint magis in procinctu. Atque per huiusmodi

[C2^v]

(qualem describimus) Historiam Naturalem, aditum quendam fieri
posse ad Naturam tutum & commodum; atque Materiam Intellectui
5 præberi probam & præparatam censemus.

Postquàm verò & Intellectum fidissimis auxiliis ac præsidiis
stipauimus, & iustum Diuinorum Operum exercitum seuerissimo
delectu comparauimus; nil amplius superesse videtur, nisi vt
Philosophiam ipsam aggrediamur. Attamen in re tam arduâ & suspensâ,
10 sunt quædam quæ necessariò videntur interponenda: partim docendi
gratiâ, partim in vsum præsentem.

Horum primum est, vt Exempla proponantur inquirendi &
inueniendi, secundùm nostram rationem ac viam, in aliquibus subiectis
repræsentata: sumendo ea potissimùm subiecta, quæ, & inter ea
15 quæ; quæruntur, sunt nobilissima, & inter se maximè diuersa; vt in
vnoquoque genere Exemplum non desit. Neque de iis Exemplis
loquimur, quæ singulis Præceptis ac Regulis illustrandi gratiâ
adiiciuntur (hoc enim in Secunda Parte operis abundè præstitimus) sed
planè Typos intelligimus & Plasmata, quæ vniuersum Mentis
20 processum, atque inueniendi continuatam fabricam & ordinem in
certis subiectis, iisque variis & insignibus, tanquàm sub oculos ponant.
Etenim nobis in mentem venit, in Mathematicis, astante machinâ,
sequi Demonstrationem facilem & perspicuam; contrà, absque hac
commoditate, omnia videri inuoluta, & quàm reuerà sunt, subtiliora.
25 Itaque huiusmodi Exemplis Quartam partem nostri Operis attribuimus:
quæ reuerà nil aliud est, quam Secundæ Partis applicatio particularis &
explicata.

[C3^r]

^l At quinta pars ad tempus tantùm, donec reliqua perficiantur,
adhibetur; & tanquàm fœnus redditur, vsque dum sors haberi possit.
30 Neque enim finem nostrum ita petimus occæcati; vt, quæ occurrunt in
viâ vtilia, negligamus. Quamobrem Quintam partem Operis ex ijs
conficimus, quæ à nobis aut inuenta, aut probata, aut addita sunt:
Neque id tamen ex rationibus atque præscriptis Interpretandi; sed
ex eodem Intellectûs vsu, quem alii in inquirendo & inueniendo
35 adhibere consueuerunt. Etenim cùm, ex perpetuâ nostrâ cum Natura
consuetudine, maiora de Meditationibus nostris, quàm pro ingenii
viribus, speramus; tùm poterunt ista veluti tabernaculorum in viâ

positorum vice fungi, vt mens ad certiora contendens in iis paulispèr

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acquiescat. Attamen testamur interim, nos illis ipsis, quòd ex verâ
interpretandi formâ non sint inuenta, aut probata, teneri minimè velle.
Istam verò ludicii suspensionem, non est quod exhorreat quispiam in
Doctrinâ, quæ non simpliciter nil sciri posse, sed nil nisi certo ordine &
5 certâ viâ sciri posse asserit; atque intereà tamen certos Certitudinis
gradus ad vsum & leuamen constituit, donec Mens in Causarum
explicatione consistat. Neque enim illæ ipsæ Scholæ Philosophorum,
qui *Acatalepsiam* simpliciter tenuerunt, inferiores fuere istis quæ
pronuntiandi licentiam vsurpauerunt. Illæ tamen Sensui & Intellectui
10 auxilia non parauerunt, quod nos fecimus: sed fidem & auctoritatem
planè sustulêrunt; quod longè alia res est, & ferè opposita.

[C3^v]

Sexta tandem pars Operis nostri (cui reliquæ in^lseruiunt ac
ministrant) eam demùm recludit & proponit Philosophiam, quæ ex
huiusmodi (qualem antè docuimus & parauimus) inquisitione legitimâ,
15 & castâ, & seuerâ educitur & constituitur. Hanc verò postremam
Partem perficere & ad exitum perducere, res est & suprâ vires, & vltra
spes nostras collocata. Nos ei initia (vt speramus) non contemnenda,
exitum generis humani fortuna dabit; qualem fortè homines in hoc
Rerum & Animorum statu, haud facilè animo capere aut metiri queant.
20 Neque enim agitur solùm fœlicitas Contemplatiua, sed verè res humanæ
& fortunæ, atque omnis Operum potentia. Homo enim Naturæ
minister & interpres tantum facit & intelligit, quantum de Naturæ
ordine, Opere, vel Mente, obseruauerit: nec amplius scit, aut potest.
Neque enim vllæ vires Causarum catenam soluere aut perfringere
25 possint; neque Natura alitèr quàm parendo vincitur. Itaque intentiones
geminæ illæ, humanæ scilicet *Scientiæ*, & *Potentiae*, verè in idem
coincidunt: & frustratio Operum maximè fit ex ignoratione Causarum.

Atque in eo sunt omnia, siquis oculos Mentis à Rebus ipsis nunquam
deiciens, earum imagines planè vt sunt, excipiat. Neque enim hoc
30 siuerit Deus, vt Phantasiæ nostræ somnium pro Exemplari Mundi
edamus: sed potiùs benignè faueat, vt Apocalypsim, ac veram visionem
vestigiorum & sigillorum Creatoris super Creaturas, scribamus.

Itaque Tu *Pater*, qui lucem visibilem primitias Creaturæ dedisti, &

[C4^r]

35 lucem Intellectualem ad fastigium | Operum tuorum in faciem Hominis
inspirasti; Opus hoc, quod à tua Bonitate profectum, tuam gloriam
repetit, tuere & rege. Tu postquam conuersus es ad spectandum Opera
quæ fecerunt manus tuæ, vidisti quòd omnia essent bona valdè;

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& requieuisti. At Homo conuersus ad Opera quæ fecerunt manus suæ,
vidit quòd omnia essent vanitas & vexatio spiritus; nec vllo modo
requieuit. Quare si in Operibus tuis sudabimus, facies nos visionis tuæ

5 & Sabbati tui participes. Supplices petimus, vt hæc mens
nobis constet; vtque nouis Eleemosynis per manus
nostras & aliorum, quibus eandem mentem
largiêris, familiam humanam
dotatam velis.

I **PLAN OF THE WORK**

It is made up of six parts:

The first: *The Partitions of the Sciences*.

The second: *Novum Organum*, or *Directions concerning the Interpretation of Nature*.

The third: *The Phenomena of the Universe*, or *Natural and Experimental History for the building up of Philosophy*.

The fourth: *The Ladder of the Intellect*.

The fifth: *Precursors*, or *Anticipations of the Philosophy to Come*.

The sixth: *The Philosophy to Come*, or *The Active Science*.

The Arguments of the Particular Parts

Now it is part of my object to set out everything as openly and transparently as I possibly can. For nakedness of mind is, as it once was of the body, a partner of innocence and simplicity. Let me therefore make plain first of all the programme of the work and the reasoning behind it. My idea is that the work have six parts.

The first part displays the sum or universal description of the knowledge or learning which I the human race at present possesses. For it seemed to me that I should spend some time too on received ideas, with the intention of more readily perfecting the old and more easily gaining access to the new. For I am almost as keen to improve on the old as to acquire the new. This will also inspire confidence in what I have to say for, as the proverb has it: *A man untaught cannot take in words of knowledge unless you first tell him what he is thinking in his heart*. I shall therefore not forget to set a course along the coasts of the received sciences and arts, and to import certain useful things into them en route.

Nevertheless, I apply partitions of the sciences which embrace not only those already discovered and known but also those hitherto left out and which should be included. For we find in the intellectual as in the terrestrial globe cultivated tracts and wilderness side by side. Thus it should not appear strange if I sometimes depart from the familiar divisions. For

an addition as it changes the whole also perforce changes its parts and sections; but the received divisions only suit the received sum total of the sciences as it now exists.

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As for the things which I shall note down as missing, I shall proceed not just by setting down bare headings and brief arguments about the things that we lack. For often when I report things as missing and my motive for so doing may not be quite plain (giving me good grounds for imagining that men will not readily grasp what I require or what the task is that I have in mind), I will always be concerned (provided the subject is worthwhile)¹ to devise precepts for the work, or even to attach, as an example of the whole, a part of the actual work that I have already completed, so that in each case I may lend a hand either with works or with counsel. For I have thought not only that the good of others but my own reputation required that people did not think that only a superficial notion of these things had drifted into my mind, and that what I set down as desiderata and try to grasp are nothing more than pious hopes. Rather they are things which are well within men's power (if they do not let themselves down) and I myself have a secure and detailed conception of them. For I will undertake not only to survey these territories in my mind as seers do when consulting the omens, but enter them as generals do when bent on annexing them.

And so much for the first part of the work

After coasting past the old arts, I will next make the human intellect ready to take to the high seas. The purpose then of the second part is to expound the doctrine of improving and perfecting the use of reason in the investigation of things, and of the true helps of the intellect, so that in this way (as far as our human and mortal condition allows) we may raise up the intellect and fit its faculties for overcoming the dark and difficult tracts of nature. And this Art that I set out (which I have grown used to calling the *Interpretation of Nature*) is a kind of logic, though a great gulf separates it from ordinary logic. For the common logic professes to make ready and supply helps and assistance to the intellect, and in that it agrees with mine. But mine plainly differs from it, and in three ways especially: in its end, order of demonstration, and the inquiry's starting points.

¹ For the end set down for this science of mine is not the discovery of arguments but of arts; not what agrees with principles but the principles themselves, not probable reasons but pointers to works in embryo. And different aims beget different effects. For one aims to beat an opponent in debate; the other to bend nature to works.

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Now the nature and order of the actual demonstrations agrees with this latter end. For in the common logic the syllogism takes up practically the whole field. But the dialecticians seem hardly to spare a serious thought for induction, passing over it in a few words as they hasten onwards to the formulae of disputation. But I reject syllogistic demonstration for it works haphazardly and lets nature slip through its fingers. For though no one doubts that things agreeing in a middle term agree with each other (which is a kind of mathematical certainty), yet this conceals sleight of hand, for the syllogism is made up of propositions, propositions of words, and words are the tokens and signs of notions. Thus, if the very notions of the mind (which are as the soul of words and the basis of this whole fabric and structure) are ineptly and recklessly abstracted from things, and vague, insufficiently delimited and circumscribed, and indeed rotten in many ways, everything collapses. Thus I reject the syllogism not only as it relates to principles (for which people do not use it) but also to middle propositions which the syllogism after a fashion does indeed educe and spawn but which are barren in works, remote from practice, and totally ineffective¹ in the active department of the sciences. For though I allow the syllogism and suchlike celebrated and flashy demonstrations their jurisdiction over the popular arts and matters of opinion (for I do not meddle with them), yet in connection with the nature of things I use induction for everything and as much for minor as for major propositions. For I regard *Induction* as that form of demonstration which upholds the senses, bears down on nature, and is bent on and almost tied up with works.

Thus the order of demonstration is also quite turned upside down. For up to now the practice has been to fly up immediately from the sense and particulars to the highest generalisations, as if to fixed poles about which disputations may turn, and from these to derive the rest by intermediate propositions. Now this way is certainly short, but it is headlong and, giving no access to nature, just right for bringing us down to disputations. But my way is to educe axioms successively and step by step, and not to reach the most general ones until last, and these turn out not to be notional but well defined and such as nature really recognises as better known to herself, and such as inhere in the very essence of things.

But by far the greatest matter I move concerns the very form of induction, and the judgement resulting from it. For the form discussed by the dialecticians works by simple enumeration and is a childish thing unsafe

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in its conclusions, vulnerable to a contradictory instance, caring only for the customary, and incapable of getting results.

¹ Now what the sciences require is a form of induction which will unbind experience and separate it out, and reach necessary conclusions by proper exclusions and rejections. And if the common judgement of the dialecticians was such hard work and needed so much

intellectual effort, how much more work should we devote to my alternative, which is drawn not just from the recesses of the mind but from the very innards of nature?

But that is not all. For I also dig deeper and firmer foundations for the sciences, and push back the beginnings of the inquiry further than people have done so far, subjecting things to inspection which the common logic takes on unreasonable trust. For the dialecticians take, as if by reflex, the principles of the sciences from the particular sciences themselves; then they worship the first notions of the mind; and lastly they go along with the immediate informations of sense well managed. But I hold that true logic ought to enter the particular provinces of the sciences with greater authority than that conferred by their own principles, and that the supposed principles should themselves be made to tell us how far they are properly established. As for the first notions of the intellect, none that the intellect left to itself has amassed is above suspicion, and I acquit none unless it has been put on trial anew and judged according to it. And yes, I have many means of testing the informations of the sense itself. For the senses often deceive but they also testify to their own errors. Now the errors are right here, but what testifies to them has to be sought further afield.

Now the sense fails us in two ways: for it either deserts¹ or deceives us. For first there are many things which escape the sense even when it is properly managed and not obstructed at all, because of the subtlety of the body as a whole, or the minuteness of its parts, or its distance from us, or its swiftness or slowness, or the object's familiarity, or other causes besides. And even when the sense does get a grip on something, its hold is not terribly secure. For the testimony and information of the sense is always made to the measure of man and not the universe; and it is a very great mistake to say that the sense is measure of things.

Now to remedy these defects I have with unswerving devotion to duty everywhere sought and gathered in helps for the sense, in order to make good what is lacking and put right what deceives. And I do this not so much with instruments as by experiments. For the subtlety of

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experiments is far greater than that of the sense itself, even when it has precise instruments to help it (and here I speak of those experiments designed specifically for the purpose, and thought out and applied with skill). In fact I set little store by the immediate and peculiar perception of the sense, but carry the matter to the point where the sense judges only the experiment whereas the experiment judges the thing. Hence I believe that I present myself as high priest of the sense (from which all natural knowledge should, unless we prefer madness, be derived), and learned interpreter of its oracles; so that whereas others merely claim to watch over and cherish the sense, I do so in fact. And such are the arrangements I make for the light of nature, for generating¹ and letting it in; and these would do if the

human intellect were flat and like a clean slate. But since men' s minds are so marvellously beset that they altogether lack a clear and polished surface to focus the true rays of things, I believe that I am obliged to find a remedy for this too.

Now the *Idols* which occupy the mind are either extrinsic or innate. The extrinsic have migrated into the minds of men either from the dogmas and sects of the philosophers or from misguided laws of demonstration. But the innate are rooted in the very nature of the intellect, which we know to be much more prone to error than the senses. For however much men flatter themselves and fall over each other in their admiration, or adoration almost, for the human mind, this much is quite certain: that just as an uneven mirror bends the rays of things according to its own shape and section, so the mind when it is affected by things by way of the sense faithlessly implants and intermixes its own nature with the nature of things when sorting out and devising its notions.

Now the first two classes of *Idol* can be rooted out with difficulty; the second not at all. So all we can do is to point them out, and draw attention to and expose the mind' s deceitful power, lest perhaps in extirpating old errors, the shoots of fresh ones immediately spring from that same corrupt complexion of the mind, with the result that we swap new errors for old instead of suppressing them all. But better still would it be to establish and fix it fairly and for good that the intellect cannot make judgements save by induction,¹ i.e. induction in its legitimate form. Now the doctrine of purging the intellect to fit it for the truth is wrought by three refutations: the refutation of the philosophies; the refutation of demonstrations; and the refutation of native human reason. When these

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have been explained, and once I have made clear what may be assigned to the nature of things and what to the nature of the mind, I think that, with God' s goodness showing the way, I shall have adorned and decked out the marriage bed of the mind and the universe. And let the promise of the wedding song be that from this union there spring helps for men and a line of discoveries which may to some degree subdue and mitigate their needs and miseries. *So much for the second part of the Work*

But my intention is not just to point out and pave the ways but also to set out upon them. Thus the third part of the work comprises the *Phenomena of the Universe*, i.e. experience of every kind, and natural history of the sort which can lay foundations for the building up of philosophy. For some outstanding way of demonstration or form of interpreting nature can defend and keep the mind from error and failure, but it cannot supply and furnish the matter for knowledge. But for those who propose not to divine and guess but to discover and know, and make it their purpose not to fabricate apish mockeries of worlds but to examine and, in a way, dissect the nature of the real world itself, everything should be sought from the things themselves. Now there is no substitute or alternative to this hard labour, investigation

and worldwide survey to be had from any force of wit,¹ reflection, or argumentation—not even if all the best minds were to come together to attempt it. This then has to be done or the whole business be given up for good and all. But up to now men have behaved in such a way that it is no surprise that nature has withheld her abundance from them.

Now in the first place the very information of the sense is both defective and deceptive; observation slack, patchy and left to chance; what has been handed down empty and founded on hearsay; practice fixed on its work and servile; experimental effort blind, stupid, wandering and prematurely broken off; and finally natural history is trivial and meagre—and between them these have assembled thoroughly unsound matter for the intellect to build philosophy and the sciences.

Then again unseasonable subtlety and juggling of arguments comes too late to remedy these desperate illnesses, to improve matters in any way, or isolate errors. Thus no hope of greater growth or progress can be founded save on a kind of restoration of the sciences.

Now for the beginnings of this we must have recourse wholly to natural history, and that of a new kind and construction. For it would be a

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waste of time to polish the mirror if it had no images to reflect; and clearly suitable material must be prepared for the intellect and not just reliable assistance to secure it. But our history (like our logic) differs from the current one in many ways—in its end or function, in its very mass, in its subtlety, and also in its selection and organisation for the procedures to come after it.

¹ For the first of these, I propose a natural history which is not so much to give pleasure by displaying the variety of things, or to make the results of existing experiments better, as to illuminate the discovery of causes and nourish philosophy with its mother's milk. For although works and the active part of the sciences are mainly what I am after, I nevertheless wait for the ripened crop, and do not try to mow the moss or green corn. For it is enough for me to know that axioms rightly discovered bring floods of works in their wake; and reveal them not in dribs and drabs but in whole clusters. And I absolutely renounce and reject that unseasonable and childish craving for some guarantee of new works which is clutched at hastily and, like *Atalanta's* apple, slows down the race. So much then for the function of my natural history.

But as for its mass, I do not just put together a history of nature free and unconstrained (when, that is, it goes its own way and does its own work—as in the history of the heavenly bodies, meteors, the Earth and sea, minerals, plants and animals) but much more of nature restrained and vexed, namely when it is forced from its own condition by human agency, and

squeezed and moulded. Therefore I record in detail (as far as I have been able to investigate them, and as far as they contribute to my aim) all the experiments of the mechanical arts, of the operative department of the liberal arts, and of the many practices which have not yet coalesced into a proper art. In fact (to tell it as it is) I am not put off by men's arrogant superiority or by outward appearances but place more effort and resources into this part than into the history of nature free, ¹ seeing that the nature of things shows itself more openly under the vexations of art than in its natural freedom.

Now I do not just bring out a history of bodies, but I thought that I should also put my efforts into a separate history of those very virtues which (I say) can be regarded as cardinal in nature and which clearly constitute the primordia of nature and, indeed, the primary passions and desires of matter, viz. *Dense, Rare, Hot, Cold, Consistent, Fluid, Heat' y, Light*, and quite a few others besides.

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But, turning to subtlety, we are surely looking for a class of experiments much more subtle and simple than those which we just bump into. For I am unearthing and adumbrating many things which no one who was not pressing forward on a certain and direct road to the discovery of causes would have thought to investigate; for in themselves these things have no great use, and are quite obviously not sought out for their own sake but stand in the same relation to things and works as the letters of the alphabet do to speech and words which, though useless in themselves, are still the fundamental elements of all discourse.

Now in the choice of narratives and experiments I judge that I have been more cautious than people who have dealt with natural history so far. For I accept only what I have seen myself or at least examined with the utmost severity, such that I do not exaggerate to make things seem miraculous but record only what is unsullied and undefiled by fables and vanity. And so that they will trouble the sciences no longer, I expressly identify and nail every one of the lies still received and bandied about— lies which, ¹ through many generations of breathtaking neglect, have prevailed and grown chronic. For someone has wisely remarked that the fables, superstitions and nonsense that nurses instil into children do serious harm to their minds, and the same thought makes me concerned and anxious in case, while I tend and watch over the infancy of philosophy in the shape of natural history, it grows used at the start to any kind of foolishness. And in every new or slightly more subtle experiment, though (it seems to me) certain and proved, I still subjoin a clear account of the way I performed it, so that after revealing its every detail, people can see if any latent fault clings to it, and push themselves to find (if any there be) more reliable and accurate proofs. Lastly, as if I were performing the sacred rite of exorcism I sprinkle advice, precautions, and warnings everywhere to drive away and suppress all spectres.

Finally, since I know how much experience and history take the edge off the human mind, and how difficult it is (especially for tender or prejudiced souls) to begin to get acquainted with nature, I quite often adjoin my own observations, which are like the first gestures, nods, or glances of history towards philosophy, to give men some guarantee that they will not forever be tossed on the waves of history, and to make

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everything readier for when we come to the work of the intellect. And by means of natural history (of the kind I describe)¹ I suppose that a safe and sensible approach to nature can be opened up, and serviceable and well sorted matter be provided for the intellect.

But once I have surrounded the intellect with a bodyguard of trusty helpers, and assembled a hand-picked and crack regiment of divine works, it may seem nothing remains but to proceed to philosophy itself. Yet in a matter so hard and tricky, there are still certain things which I need to include, partly for the purposes of instruction and partly for present use.

The first of these is to set out examples of investigating and discovering according to my plan and way. These examples are exhibited in certain subjects, taking, above all, those most noble among those under investigation and most different among themselves, so that no class of example is left unrepresented. And here I am not speaking of examples adduced to illustrate particular teachings or rules (for I have given plenty of those in part two of the work), rather I mean types or models which set before our eyes the whole process the mind goes through, and the seamless fabric and order of investigation in specific subjects both various and remarkable. For I recall that when you have a machine to hand a demonstration in mathematics is easy and transparent, but that without one everything seems obscure and more subtle than it actually is. And it is to the fourth part of my work that I have assigned such examples, which part is really nothing other than the application of the second part in detail and at large.

¹ But the fifth part is brought in only as a temporary measure pending completion of the rest, rather like interest payable until the principal can be had. For I do not hasten to my destination so blindly that I overlook things of use that I come across on my way. For this reason I make up the fifth part of the work from things which I myself have either discovered, proved or added, yet not by the proper process and prescriptions for interpreting, but by those same ways of using the intellect which others usually employ in the business of inquiring and interpreting. For while I hope from my unceasing acquaintance with nature that my reflections may be greater than the measure of my mind leads me to expect, these things can serve as wayside inns in which the mind may find rest for a while as it presses onwards towards more certain

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conclusions. All the same I declare that I do not in the least wish to be held to these discoveries of mine, since they have not been found out or proved by the true form of interpretation. But let no one be upset by this suspension of judgement in a doctrine which claims not merely that nothing can be known but that nothing can be known save by proper procedure and a sure way, and which nevertheless establishes in the meantime certain degrees of certitude for use and solace until the mind can come to rest in causes truly unravelled. For those very schools of philosophers who frankly argued for *Acatalepsy* were not inferior to those who arrogated to themselves the licence to lay down the law. Yet the former did not make helps ready for the sense and intellect as I have done, but simply undermined their credit and authority—which is a quite different matter and almost the opposite.

The sixth part of my work (which the others subserve^l and underpin) at last discloses and sets forth that philosophy drawn from and established on the kind of legitimate, chaste and rigorous form of investigation (which I have explained and prepared previously). But in truth completion and a successful conclusion to this last part lies beyond my power and expectations. Now I have started the work (as I hope) in a manner not to be despised, but the outcome will be a matter for the fortune of the human race, and a thing perhaps which men in their current situation and state of mind may not be readily able to grasp or size up. For this is no mere matter of contemplative success but of human welfare and fortune, and of all power to carry out works. For man, the servant and interpreter of nature, does and understands only as much as he has observed, by work or mental activity, concerning the order of nature; beyond that he has neither knowledge nor power. For no powers can loosen or break the chain of causes, and nature can only be overcome by being obeyed. And so those twin objectives, human *Knowledge* and *Power*, do in fact come together, and lack of success with works stems mainly from ignorance of causes.

And the whole idea is never to take one's eyes off things themselves, and to take in their images just as they are. For God forbid that we give out a fantastic dream for a pattern of the world, but rather may He graciously grant that we write a revelation and true vision of the Creator's footprints and impressions upon His creatures.

Therefore, *Father*, who has given us visible light as the first fruits of Creation, and breathed intellectual light into the face of man as the^l culmination of Your works, protect and reign over this work which, proceeding from Your goodness, returns to Your glory. When You turned back to look upon Your handiwork, You saw that all of it was very good,

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and You rested. But man when he turned back to look upon his own handiwork, saw that all of it was vanity and vexation of the spirit, and tested not at all. Wherefore if we sweat and

strain in Your works, You will make us to share in Your vision and sabbath. We humbly pray
that we
remain in this mind; and that by our hands, and the hands
of others to whom You grant the same mind, You
will vouchsafe new mercies to the
human family.

NOTES

Page 26, ll. 1–2: *DISTRIBVTIO OPERIS*—for the possibility that this preliminary may have existed long before *NO* reached its final form see Introduction, sect. 1 (d), pp. xlviii–xlix. 'Distributio' is a technical term in rhetoric, a fact which translation as 'plan' disguises. See, for instance, [Cicero], *Ad C. Herennium* (Loeb Classical Library), Cambridge, Mass., and London, 1954, pp. 6–7: 'Dispositio est ordo et distributio rerum, quae demonstrat quid quibus locis sit conlocandum'. Also see Thomas Wilson, *The Art of Rhetoric* (1560), ed. Peter. E. Medine, Pennsylvania State University Press: University Park, Pa., 1994, p. 211: 'It is also called a distribution, when we divide the whole into several parts, and say we have four points, whereof we purpose to speak, comprehending our whole talk within compass of the same'.

ll. 3–10: *Eius constituuntur Partes sex*—for the history of the six-part plan see Introduction, sect. I (a) and *OFB*, VI, pp. xvii–xix; XIII, pp. xix–xxv. The fact that *IM* has six parts may have been meant (among other things) to recall hexameral notions more directly alluded to in, for example, *NA*, C4^r (*SEH*, III, p. 146) whose research institution is, 'sometimes called Salomons House; And sometimes the Colledge of the sixe Daies Workes'. For the title of Part V see *cmts* (pp. 505–6 below) on p. 74, l. 4–p. 76, l. 14 above.

5 *Organum*,] ~ ^

10 *Secunda*] lc

Page 26, l. 16–p. 28, l. 18: *Prima pars*—just before Bacon begins *NO* proper he reminds us (p. 48, ll. 1–9 above) that Part I of *IM* has yet to be written, and that the partitions of the sciences are the subject of Book II of *AL* (1605). The first part was soon (1623) to be supplied by *DAS*, the expanded Latin version of *AL*, an expansion in part modelled on the unfinished *DGI* (1612); see *OFB*, VI, pp. xviii, xix–xxi. The expansion resulted from insertions of sometimes substantial bodies of text which fulfil the promise made here to develop by way of precept or example some of the uncultivated parts of knowledge. Bacon's consciousness here of the originality of his classification of learning was well founded—as the introduction to the *OFB* edition of *DAS* Will show.

22 *illud*,] ~;

Page 26, ll. 22–3: *Non accipit Indoctus*—Proverbs, 18: 2; the Vulgate version is rather different: 'Non recipit stultus verba prudentiae, Nisi ea dixeris quae versantur in corde eius'.

4 *obscurior*] ~;

6 *complectimur*,] ~:)

Page 28, ll. 19–30: *Porro præteruerti Artes*—Bacon now moves on to Part II of *IM*, a part whose functions are incompletely discharged by *NO*. He habitually called his new way of acquiring knowledge the *interpretation of nature*, and habitually contrasted it with the bad set of mental habits called *anticipation*, and with the 'vulgar' logic, i.e. the logic of the schools; see, for instance, p. 74, l. 4–p. 76, l. 14 above, and *cmts* thereon (pp. 505–6 below).

31 *proponitur*;] ~;

Page 28, ll. 31–5: *Scientiæ finis*—the end of science is not speculative, probabilistic conclusions but works and certainty. For the end of science see p. 116, l. 12–p. 118, l. 2; p. 186, ll. 7–28; and esp. p. 366, l. 14–p. 368, l. 7 and *cmts* thereon (pp. 570–1 below). The word 'invention' here carries its technical, rhetorical meaning as well as the idea of discovery in natural philosophy.

35 *constringitur*;] ~:

Page 30, ll. 2–25: *In Logicâ enim*—for criticism of the syllogism see *cmts* (pp. 502–3 below) on p. 66, l. 20–p. 68, l. 16 above. For the idea that the use of syllogistic logic and disputation should be confined to the popular arts (i.e. the traditional, liberal arts) see p. 190, l. 24–p. 192, l. 6 above.

8 *conueniant*;] ~;

9 *certitudinis*);] ~:)

21 *opinabiles*] ~,

Page 30, l. 26–p. 32, l. 24: *Itaque Ordo*—for generalizations better known to nature see p. 72, ll. 11–13; p. 84, ll. 32–4; and esp. p. 204, ll. 26–9 above and *cmts* thereon (p. 537 below). For the puerility of induction by simple enumeration see p. 108, l. 25–p. 110, l. 12; and esp. p. 162, l. 6–p. 164, l. 2 above and *cmts* thereon (p. 531 below).

2 *tantùm*] *tântùm* / some copies (e.g. St John's College Oxford)

17 *decreuimus*;] ~:

23 *indicant*;] ~:

25 *aut*] *Aut* / first occurrence

Page 32, ll. 25–33: *Duplex autem est Sensûs culpa*—lot the defects of the senses see p. 86, ll. 16–32 above; for means of rectifying them, and for what Bacon thinks elude the senses

see p. 342, ll. 10–23 above. The remark that sense is proportional to man, not the universe, is echoed on p. 78, l. 28–p. 80, l. 4 in connection with Idols of the Tribe. On the function of artificial experiment and instrumentation see Introduction, sect. 1 (c) and (k).

4 sunt).] ~.)

Page 34, ll. 6–10: Quare existimamus ... videamur—this may echo H. C. Agrippa, *De occulta philosophia libri tres*, ed. V. Perrone Compagni, E. J. Brill: Leiden, 1992, p. 411: 'Superstitio itaque, licet a vera religione aliena sit, non tamen tota aut omnis reprobata est, quoniam in multis etiam toleratur et a religionis antistitibus observatur'. For clear evidence that Bacon had read Agrippa compare *ibid.*, p. 153 ('et pilus ex cauda equi, in aquam proiectus, vitam concipit et transit in vermem perniciosum') with *OFB*, XIII, p. 230, ll. 27–8, pp. 328–9. These worms are also mentioned in Giovan Battista della Porta, *Natural magick*, Thomas Young and Samuel Speed: London, 1658, facsim. repr. Basic Books: New York, 1957 [English trans. of *Magiæ naturalis libri XX*, Naples, 1589], p. 29.

9 ipsâ,] ~ ^

12 æquus] / some copies (e.g. St Andrews) with comma

Page 34, l. 13: tabulæ abrasæ—the phrase tabula abrasa was suggested quite possibly by Latin versions of Aristotle's *De anima*, III, 4; see, for instance, John Argyropulos' translation in *Aristoteles latine; interpretibus variis*, ed. Academia Regia Borussica, Berlin, 1831, reissued by Eckhard Kessler, Fink: Munich, 1995, p. 223: 'at enim ipsum pati divisum est prius, una quadam ratione communi. atque intellectus potentia quidem est quodam modo intelligibilia ipsa, actu vero nihil est eorum antequam intelligat ipsa, oportet autem in ipso nihil esse, perinde atque in tabula nihil est actu scriptum, antequam in ipsa scribatur'. Also see p. 172, ll. 10–35 above and *cmts* thereon (p. 532 below).

Page 34, l. 17–p. 36, l. 6: *Idola* autem—for doctrine of idols see p. 78, ll. 11 ff. above, and *cmts* thereon (pp. 506–20 below). The three refutations entioned in *DO*—of philosophies, demonstrations, and native human reason—are in fact dealt with in reverse order in *NO* (see p. 172, ll. 16–20 above); aspects of the refutation of human reason are dealt with successively in the treatments of Idols of the Tribe, Idols of the Cave, and Idols of the Market, and the refutations of demonstrations and philosophies are left to the treatment of Idols of the Theatre. Spedding (*SEH*, I, pp. 116–17, 139 n. 2) took the reversal, and the fact that the distinction between innate and extrinsic idols disappears in *NO*, to mean that *DO* was written before Bacon had decided on the arrangement of *NO*. For these issues and the history of the doctrine of idols see Introduction, sect. I (d) and (f).

27 genera] ~,

ægrè,] ~;

35 sit,] ~;

2 ferat,] ~;

5 suscipiatur] / as Spedding remarks (*SEH*, I, p. 140 n. 1), it is not unknown for Bacon to follow two nominatives with a singular verb

Page 36, l. 7–p. 38, l. 6: At vias non solùm monstrare—for the points made here see *PAH*, pp. 450–2 above; *HNE*, B1^r–C6^v (*SEH*, II, pp. 13–18).

12 forma,] ~;

14 est,] ~;

16 habent,] ~;

24 fallens;] ~:

25 fortuita;] ~:

26 rumore;] ~:

seruilis;] ~:

27 prærupta;] ~:

31 remedium;] ~:

1 imagines;] ~:

6 sequuntur] / final u turned in c–t

7 Naturalem,] ~;

Page 38, ll. 7–31: proponimus Historiam Naturalem—for the function of natural history see *PAH*, p. 454, l. 27–p. 456, l. 9 above; for Atalanta (a myth Bacon often recalled in connection with prematurity) see *NO*, p. 110, l. 36; p. 176, ll. 14–19 above; for history of nature in her ordinary course as distinct from history of the mechanical arts see *PAH*, p. 458, l. 25–p. 462, l. 5 above; for Bacon's imperfect attempts to illustrate the requirements of his natural-historical programme see *HV* and *HVM passim*.

20 solutæ] ~;

22 Animalium);] ~:)

Page 38, l. 32–p. 40, l. 2: Neque Corporum tantum—see *cmts* (p. 590 below) on *PAH*, p. 472, ll. 3–9 above.

35 Materiæ] Materia (*c-t* reading) *Err* have Materiæ

Page 40, ll. 3–11: Enimuerò vt de Subtilitate—cf. p. 32, l. 34–p. 34, l. 6 above. The notion of 'subtlety', an important one for Bacon, is discussed in some of its aspects in Graham Rees, 'Atomism and "subtlety" in Francis Bacon's philosophy', *Annals of science*, 37, 1980, pp. 549–71. The Latin term 'subtilitas' occurs often in Pliny's *Historia naturalis*, but it was made famous (or notorious) by Cardan and Scaliger; see esp. Cardan, *De subtilitate*, p. 357: 'Est autem subtilitas ratio quædam, qua sensibilia à sensibus, intelligibilia ab intellectu, difficile compræhenduntur ... Sed vt ad rem ipsam reuertar, quanquam obscura tenuia sint plerunque, & exilia subtilia, non tamen omnia neque semper ... Constat ergo subtilitas in tribus substantiis, accidentibus, ac repræsentationibus'. Also see *The first book of Jerome Cardan's De subtilitate: translated from the original Latin with text, introduction and commentary*, ed. and trans. Myrtle Marguerite Cass, Bayard Press: Williamsport, Pa., 1934. Cass (pp. 137–9) distinguishes subjective and objective uses of the term. The former comprise mental process, intelligence or skill in execution; the latter something requiring careful discrimination, or something ingeniously devised. Also see Ian Maclean, 'The interpretation of natural signs: Cardano's *De subtilitate* versus Scaliger's *Exercitationes*', in *Occult and Scientific Mentalities*, ed. Brian Vickers, Cambridge University Press: Cambridge, 1984, pp. 231–52. For letters of the alphabet as metaphor see *OFB*, XIII, pp. xxxix–xli.

Page 40, l. 12–p. 42, l. 9: In Delectu autem—that natural history should be purged of fable and falsehood is a recurrent theme in *IM*: see, for instance, p. 298, ll. 22–32, p. 458, ll. 1–12. Bacon's declaration of his own practices is echoed in the *Norma Historiæ præsentis* of *HNE*, C2^r–C6^v (*SEH*, II, pp. 17–18). On the stories told to children by nurses cf. Plato, *The Republic*, in *The dialogues of Plato*, trans. B. Jowett, 5 vols., 2nd. edn., Clarendon: Oxford, 1875, III, pp. 249–50, 260; and *Laws* in *ibid.*, V, pp. 363–4. On the exorcism of phantoms cf. *HNE*, C4^v (*SEH*, II, p. 18).

15 recipimus;] ~:

24 curemus;] ~;

28 constiterint;] ~;

Page 42, ll. 6–26: Postquàm verò—on Part IV see *NO*, p. 148, l. 6–p. 150, l. 13; p. 174, l. 11–p. 176, l. 19 above. The principles for selecting examples to be presented in Part IV ('taking, above all, those most noble among those under investigation and most different among themselves, so that no class of example is left unrepresented') are much the same as those Bacon used to select his specimen natural histories; see *HNE*, C3^v (*SEH*, II, p. 17). *ANN* was writren as an introduction to Part IV; *IDM*, *TDL*, and *SI* may have been meant for it or connected with it; see *OFB*, VI, p. xviii; XIII, pp. xxi–xxv, 172.

18 adiiciuntur] ~:

23 perspicuam;] ~:

Page 42, l. 28–p. 44, l. 7: At quinta pars—for Part V of *IM*, which was to have been devoted to Bacon's own system of *substantive* theories, see *OFB*, VI, pp. xviii–xix, xxxv, xxxvi–xxxvii; XIII, pp. xix–xx, 337. Some of the imagery of this passage echoes *PA* (*OFB*, XIII, pp. 260–5). The system of theories is almost omnipresent in *NO*; see, for instance, *cmts* (pp. 560–1 below) on p. 318, l. 28–p. 320, l. 11.

29 adhibetur;] ~:

5 asserit;] ~:

6 constituit,] ~;

Page 44, ll. 7–II: illæ ipsæ Scholæ Philosophorum, qui *Acatalepsiam*—see *cmts* (p. 520 below) on p. 108, ll. 3–16 above.

Page 44, ll. 12–27: Sexta tandem pars—Part VI was to have been a repository of the philosophy established by the severe and legitimate mode of inquiry explained in Part II and exemplified in Parts III and IV. Bacon did not produce anything meant for inclusion in Part VI; see *OFB*, VI, p. xix.

Page 44, ll. 21–7: Homo enim Naturæ minister—see *cmts* (p. 502 below) on p. 64, l. 7–p. 66, l. 3 above.

25 possint;] ~:

31 Apocalypsim] Apocalipsim (*c–t* reading) *Err* have Apocalypsim

Page 44, l. 33–p. 46, l. 9: Itaque Tu *Pater*—cf. prayer at end of *AC*, T9^v–T10^r (*SEH*, III, p. 794).

Page 46, l. 2: vanitas & vexatio—cf. Vulgate, Ecclesiastes 1: 14: 'Vidi cuncta quæ fiunt sub sole, Et ecce universa vanitas et afflictio spiritus'.

5 constet;] ~: