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PLINY'S
NATURAL HISTORY.



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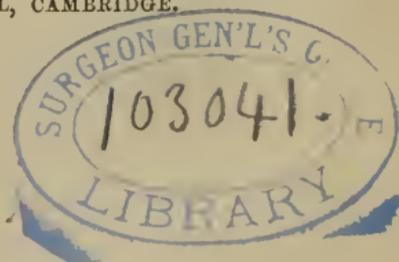
THE
NATURAL HISTORY
OF
PLINY.

TRANSLATED,
WITH COPIOUS NOTES AND ILLUSTRATIONS

BY THE LATE
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VOL. I.



LONDON:
HENRY G. BOHN, YORK STREET, COVENT GARDEN.

MDCCCLV.

WZ

290

P727h

1857

v. 1

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

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NATURAL HISTORY OF PLINY.

BOOK I.¹

DEDICATION.

C. PLINIUS SECUNDUS TO HIS FRIEND TITUS VESPASIAN.

THIS treatise on Natural History, a novel work in Roman literature, which I have just completed, I have taken the liberty to dedicate to you, most gracious² Emperor, an appellation peculiarly suitable to you, while, on account of his age, that of *great* is more appropriate to your Father ;—

“ For still thou ne'er wouldst quite despise
The trifles that I write³ ;”

if I may be allowed to shelter myself under the example of Catullus, my fellow-countryman⁴, a military term, which you well understand. For he, as you know, when his napkins had been changed⁵, expressed himself a little harshly, from

¹ Lemaire informs us, in his title-page, that the two first books of the Natural History are edited by M. Alexandre, in his edition.

² “ Jucundissime ;” it is not easy to find an epithet in our language which will correctly express the meaning of the original, affectionate and familiar, at the same time that it is sufficiently dignified and respectful.

³ Lamb's trans. ; Carm. i. 4. of the original.

⁴ “ Conterraneus ;” we have no word in English which expresses the idea intended by the original, and which is, at the same time, a military term. There is indeed some reason to doubt, whether the word now inserted in the text was the one employed by the author : see the remarks of M. Alexandre, in Lem. i. 3 ; also an observation in Cigalino's dissertation on the native country of Pliny ; Valpy, 8.

⁵ “ Permutatis prioribus sætabis ;” Carm. xii. 14 ; xxv. 7 ; see the notes in Lamb's trans. pp. 135 & 149.

his anxiety to show his friendship for his dear little *Veranius* and *Fabius*¹. At the same time this my importunity may effect, what you complained of my not having done in another too forward epistle of mine; it will put upon record, and let all the world know, with what kindness you exercise the imperial dignity. You, who have had the honour of a triumph, and of the censorship, have been six times consul, and have shared in the tribunate; and, what is still more honourable, whilst you held them in conjunction with your Father, you have presided over the Equestrian order, and been the Prefect of the Prætorians²: all this you have done for the service of the Republic, and, at the same time, have regarded me as a fellow-soldier and a messmate. Nor has the extent of your prosperity produced any change in you, except that it has given you the power of doing good to the utmost of your wishes. And whilst all these circumstances increase the veneration which other persons feel for you, with respect to myself, they have made me so bold, as to wish to become more familiar. You must, therefore, place this to your own account, and blame yourself for any fault of this kind that I may commit.

But, although I have laid aside my blushes³, I have not gained my object; for you still awe me, and keep me at a distance, by the majesty of your understanding. In no one does the force of eloquence and of tribunitian oratory blaze out more powerfully! With what glowing language do you thunder forth the praises of your Father! How dearly do you love your Brother! How admirable is your talent for poetry! What a fertility of genius do you possess, so as to

¹ These names in the original are *Varaniolus* and *Fabullus*, which are supposed to have been changed from *Veranius* and *Fabius*, as terms of familiarity and endearment; see *Poinsinet*, i. 24, and *Lemaire*, i. 4.

² The narrative of *Suetonius* may serve to illustrate the observation of *Pliny*: "Triumphavit (*Titus*) cum patre, censuramque gessit una. Eisdem collega et in tribunicia potestate, et in septem consulatibus fuit. Receptaque ad se prope omnium officiorum cura, cum patris nomine et epistolas ipse dictaret, et edicta conscriberet, orationesque in Senatu recitaret etiam quæstoris vice, præfecturam quoque prætorii suscepit, nunquam ad id tempus, nisi ab Equite Romano, administratum." (viii. 5.)

³ "Perfricui faciem." This appears to have been a proverbial expression among the Romans; *Cicero*, *Tusc. Quæ.* iii. 41, employs "os perfricui," and *Martial*, xi. 27. 7, "perfricuit frontem," in the same sense.

enable you to imitate your Brother¹! But who is there that is bold enough to form an estimate on these points, if he is to be judged by you, and, more especially, if you are challenged to do so? For the case of those who merely publish their works is very different from that of those who expressly dedicate them to you. In the former case I might say, Emperor! why do you read these things? They are written only for the common people, for farmers or mechanics, or for those who have nothing else to do; why do you trouble yourself with them? Indeed, when I undertook this work, I did not expect that you would sit in judgement upon me²; I considered your situation much too elevated for you to descend to such an office. Besides, we possess the right of openly rejecting the opinion of men of learning. M. Tullius himself, whose genius is beyond all competition, uses this privilege; and, remarkable as it may appear, employs an advocate in his own defence:—"I do not write for very learned people; I do not wish my works to be read by Manius Persius, but by Junius Congus³." And if Lucilius, who first introduced the satirical style⁴, applied such a remark to himself, and if Cicero thought proper to borrow it, and that more especially in his treatise "*De Republica*," how much reason have I to do so, who have such a judge to defend myself against! And by this dedication I have deprived myself of the benefit of challenge⁵; for it is a very different thing whether a person has a judge given him by lot, or whether he voluntarily selects one; and we always make more preparation for an invited guest, than for one that comes in unexpectedly.

¹ Suetonius speaks of Domitian's taste for poetry, as a part of his habitual dissimulation, viii. 2; see also the notes of Poinset, i. 26, and of Alexandre, in Lemaire, i. 351.

² "Non eras in hoc albo;" see the note of Alexandre, in Lemaire, i. 8. A passage in Quintilian, xii. 4, may serve to illustrate this use of the term 'album'; "... quorum alii se ad album ac rubricas transtulerunt...."

³ It appears that the passage in which Cicero makes this quotation from Lucilius, is not in the part of his treatise *De Republica* which was lately discovered by Angelus Maius; Alexandre in Lemaire, i. 9. Cicero refers to this remark of Lucilius in two of his other works, although with a variation in the expression and in the individuals specified; *De Orat.* ii. 6, and *De Fin.* i. 3.

⁴ "Qui primus condidit styli nasum."

⁵ "Sed hæc ego mihi nunc patrocina ademi nuncupatione."

When the candidates for office, during the heat of the canvass, deposited the fine¹ in the hands of Cato, that determined opposer of bribery, rejoicing as he did in his being rejected from what he considered to be foolish honours, they professed to do this out of respect to his integrity; the greatest glory which a man could attain. It was on this occasion that Cicero uttered the noble ejaculation, "How happy are you, Marcus Porcius, of whom no one dares to ask what is dishonourable²!" When L. Scipio Asiaticus appealed to the tribunes, among whom was Gracchus, he expressed full confidence that he should obtain an acquittal, even from a judge who was his enemy. Hence it follows, that he who appoints his own judge must absolutely submit to the decision; this choice is therefore termed an appeal³.

I am well aware, that, placed as you are in the highest station, and gifted with the most splendid eloquence and the most accomplished mind, even those who come to pay their respects to you, do it with a kind of veneration: on this account I ought to be careful that what is dedicated to you should be worthy of you. But the country people, and, indeed, some whole nations offer milk to the Gods⁴, and those who cannot procure frankincense substitute in its place salted cakes; for the Gods are not dissatisfied when they are worshipped by every one to the best of his ability. But my temerity will appear the greater by the consideration, that these volumes, which I dedicate to you, are of such inferior importance. For they do not admit of the display of genius, nor, indeed, is mine one of the highest order; they admit of no excursions, nor orations, nor discussions, nor of any wonderful adventures, nor any variety of transactions, nor, from the barrenness of the matter, of anything particularly pleasant in the narration, or agreeable to the reader. The na-

¹ "Pecunias deponent." Ajasson, i. 11, remarks on these words, "Qui videri volebant ambitu alicuissimum, pecuniam apud sanctum aliquem virum deponent, qua scilicet multarentur, si unquam hujus criminis manifesti fierent."

² This expression is not found in any of the works of Cicero which are now extant, nor, indeed, is it certain that it was anything more than a remark made in conversation.

³ "Provocatio," calling forth.

⁴ Horace, Epist. ii. l. 143; Ovid, Fast. iv. 746 and v. 121, and Tibullus, i. l. 26 and ii. 5. 37, refer to the offerings of milk made by the country people to their rural deities.

ture of things, and life as it actually exists, are described in them; and often the lowest department of it; so that, in very many cases, I am obliged to use rude and foreign, or even barbarous terms, and these often require to be introduced by a kind of preface. And, besides this, my road is not a beaten track, nor one which the mind is much disposed to travel over. There is no one among us who has ever attempted it, nor is there any one individual among the Greeks who has treated of all the topics. Most of us seek for nothing but amusement in our studies, while others are fond of subjects that are of excessive subtilty, and completely involved in obscurity. My object is to treat of all those things which the Greeks include in the *Encyclopædia*¹, which, however, are either not generally known or are rendered dubious from our ingenious conceits. And there are other matters which many writers have given so much in detail that we quite loathe them. It is, indeed, no easy task to give novelty to what is old, and authority to what is new; brightness to what is become tarnished, and light to what is obscure; to render what is slighted acceptable, and what is doubtful worthy of our confidence; to give to all a natural manner, and to each its peculiar nature. It is sufficiently honourable and glorious to have been willing even to make the attempt, although it should prove unsuccessful. And, indeed, I am of opinion, that the studies of those are more especially worthy of our regard, who, after having overcome all difficulties, prefer the useful office of assisting others to the mere gratification of giving pleasure; and this is what I have already done in some of my former works. I confess it surprises me, that T. Livius, so celebrated an author as he is, in one of the books of his history of the city from its origin, should begin with this remark, "I have now obtained a sufficient reputation, so that I might put an end to my work, did not my restless mind require to be supported by employment²." Certainly he ought to have composed this work, not for his own glory, but for that of the Roman name, and

¹ "... id est, artium et doctrinarum omnium circulus;" Alexandre in Lem. i. 14.

² These words are not found in any of the books of Livy now extant; we may conclude that they were introduced into the latter part of his work.

of the people who were the conquerors of all other nations. It would have been more meritorious to have persevered in his labours from his love of the work, than from the gratification which it afforded himself, and to have accomplished it, not for his own sake, but for that of the Roman people.

I have included in thirty-six¹ books 20,000 topics, all worthy of attention, (for, as Domitius Piso² says, we ought to make not merely books, but valuable collections,) gained by the perusal of about 2000 volumes, of which a few only are in the hands of the studious, on account of the obscurity of the subjects, procured by the careful perusal of 100 select authors³; and to these I have made considerable additions of things, which were either not known to my predecessors, or which have been lately discovered. Nor can I doubt but that there still remain many things which I have omitted; for I am a mere mortal, and one that has many occupations. I have, therefore, been obliged to compose this work at interrupted intervals, indeed during the night, so that you will find that I have not been idle even during this period. The day I devote to you, exactly portioning out my sleep to the necessity of my health, and contenting myself with this reward, that while we are musing⁴ on these subjects (according to the remark of Varro), we are adding to the length of our lives; for life properly consists in being awake.

In consideration of these circumstances and these difficulties, I dare promise nothing; but you have done me the most essential service in permitting me to dedicate my work to you. Nor does this merely give a sanction to it, but it determines its value; for things are often conceived to be of great value, solely because they are consecrated in temples.

I have given a full account of all your family—your

¹ "Quem nunc primum historiæ Plinianæ librum vocamus, hic non numeratur, quod sit operis index." Hardouin in Lem. i. 16.

² Nothing is known of Domitius Piso, either as an author or an individual.

³ The names of these authors will be found, arranged by Hardouin alphabetically, with a brief account of them and their works, in Lem. i. 157 *et seq.*; we have nearly the same list in Valpy, p. 4903.

⁴ "Musinamur." We learn from Hardouin, Lem. i. 17, that there is some doubt as to the word employed by our author, whether it was *musinamur* or *muginamur*; I should be disposed to adopt the former, as being, according to the remark of Turnebus, "verbum a Musis deductum."

Father, yourself, and your Brother, in a history of our own times, beginning where Aufidius Bassus concludes¹. You will ask, Where is it? It has been long completed and its accuracy confirmed²; but I have determined to commit the charge of it to my heirs, lest I should have been suspected, during my lifetime, of having been unduly influenced by ambition. By this means I confer an obligation on those who occupy the same ground with myself; and also on posterity, who, I am aware, will contend with me, as I have done with my predecessors.

You may judge of my taste from my having inserted, in the beginning of my book, the names of the authors that I have consulted. For I consider it to be courteous and to indicate an ingenuous modesty, to acknowledge the sources whence we have derived assistance, and not to act as most of those have done whom I have examined. For I must inform you, that in comparing various authors with each other, I have discovered, that some of the most grave and of the latest writers have transcribed, word for word, from former works, without making any acknowledgement; not avowedly rivalling them, in the manner of Virgil, or with the candour of Cicero, who, in his treatise "*De Republica*³," professes to coincide in opinion with Plato, and in his Essay on Consolation for his Daughter, says that he follows Crantor, and, in his Offices⁴, Panæcius; volumes, which, as you well know, ought not merely to be always in our hands, but to be learned by heart. For it is indeed the mark of a perverted mind and a bad disposition, to prefer being caught in

¹ "A fine Aufidii Bassi;" as Alexandre remarks, "Finis autem Aufidii Bassi intelligendus est non mors ejus, sed tempus ad quod suas ipse perduxerat historias. Quodnam illud ignoramus." Lem. i. 18. For an account of Aufidius Bassus we are referred to the catalogue of Hardouin, but his name does not appear there. Quintilian (x. 1) informs us, that he wrote an account of the Germanic war.

² "Jam pridem peracta sancitur."

³ This sentiment is not found in that portion of the treatise which has been lately published by Angelus Maius. Alexandre in Lemaire, i. 19.

⁴ The following is probably the passage in the Offices to which Pliny refers: "Panæcius igitur, qui sine controversia de officiis accuratissime disputavit, quemque nos, correctione quadam exhibita, potissimum secuti sumus . . ." (iii. 2.)

a theft to returning what we have borrowed, especially when we have acquired capital, by usurious interest¹.

The Greeks were wonderfully happy in their titles. One work they called *Κηρίον*, which means that it was as sweet as a honeycomb; another *Κέρασ' Ἀμαλθείας*, or Cornu copiæ, so that you might expect to get even a draught of pigeon's milk from it². Then they have their Flowers, their Muses, Magazines, Manuals, Gardens, Pictures, and Sketches³, all of them titles for which a man might be tempted even to forfeit his bail. But when you enter upon the works, O ye Gods and Goddesses! how full of emptiness! Our duller countrymen have merely their Antiquities, or their Examples, or their Arts. I think one of the most humorous of them has his Nocturnal Studies⁴, a term employed by Bibaculus; a name which he richly deserved⁵. Varro, indeed, is not much behind him, when he calls one of his satires A Trick and a Half, and another Turning the Tables⁶. Diodorus was the first among the Greeks who laid aside this trifling manner and named his history The Library⁷. Apion, the grammarian, indeed—he whom Tiberius Cæsar called the Trumpeter of the World, but would rather seem to be the Bell of the Town-crier⁸,—supposed that every one to whom he inscribed any work would thence acquire immortality. I do not regret not having given my work a more fanciful title.

That I may not, however, appear to inveigh so completely against the Greeks, I should wish to be considered under the same point of view with those inventors of the arts of

¹ "Cum præsertim sors fiat ex usura." The commentators and translators have differed respecting the interpretation of this passage; I have given what appears to me the obvious meaning of the words.

² "Lac gallinaceum;" "Proverbium de re singulari et admodum rara," according to Hardouin, who quotes a parallel passage from Petronius; Lemaire, i. 21.

³ The titles in the original are given in Greek; I have inserted in the text the words which most nearly resemble them, and which have been employed by modern authors.

⁴ "Lucubratio."

⁵ The pun in the original cannot be preserved in the translation; the English reader may conceive the name Bibaculus to correspond to our surname Jolly.

⁶ "Sesculysses" and "Flextabula;" literally, Ulysses and a Half, and Bend-table.

⁷ Βιβλιοθήκη.

⁸ "Cymbalum mundi" and "publicæ famæ tympanum."

painting and sculpture, of whom you will find an account in these volumes, whose works, although they are so perfect that we are never satisfied with admiring them, are inscribed with a temporary title¹, such as "Apelles, or Polycletus, was doing this;" implying that the work was only commenced and still imperfect, and that the artist might benefit by the criticisms that were made on it and alter any part that required it, if he had not been prevented by death. It is also a great mark of their modesty, that they inscribed their works as if they were the last which they had executed, and as still in hand at the time of their death. I think there are but three works of art which are inscribed positively with the words "such a one executed this;" of these I shall give an account in the proper place. In these cases it appears, that the artist felt the most perfect satisfaction with his work, and hence these pieces have excited the envy of every one.

I, indeed, freely admit, that much may be added to my works; not only to this, but to all which I have published. By this admission I hope to escape from the carping critics², and I have the more reason to say this, because I hear that there are certain Stoics and Logicians³, and also Epicureans (from the Grammarians⁴ I expected as much), who are big with something against the little work I published on Grammar⁵; and that they have been carrying these abortions for ten years together—a longer pregnancy this than the elephant's⁶. But I well know, that even a woman once wrote against Theophrastus, a man so eminent for his eloquence that he obtained his name, which signifies the

¹ "Pendenti titulo;" as Hardouin explains it, "qui nondum absolutum opus significaret, verum adhuc pendere, velut imperfectum." Lemaire, i. 26.

² "Homeromastigæ."

³ "Dialectici." By this term our author probably meant to designate those critics who were disposed to dwell upon minute verbal distinctions; "dialecticarum captionum amantes," according to Hardouin; Lem. i. 28.

⁴ "Quod argutiarum amantissimi, et quod æmulatio inter illos acerbissima." Alexandre in Lemaire, i. 28.

⁵ Pliny the younger, in one of his letters (iii. 5), where he enumerates all his uncle's publications, informs us, that he wrote "a piece of criticism in eight books, concerning ambiguity of expression." Melmoth's Pliny, i. 136.

⁶ The ancients had very exaggerated notions respecting the period of the elephant's pregnancy; our author, in a subsequent part of his work (viii. 10), says, "Decem annis gestare vulgus existimat; Aristoteles biennio."

Divine speaker¹, and that from this circumstance originated the proverb of choosing a tree to hang oneself².

I cannot refrain from quoting the words of Cato the censor, which are so pertinent to this point. It appears from them, that even Cato, who wrote commentaries on military discipline³, and who had learned the military art under Africanus, or rather under Hannibal (for he could not endure Africanus⁴, who, when he was his general, had borne away the triumph from him), that Cato, I say, was open to the attacks of such as caught at reputation for themselves by detracting from the merits of others. And what does he say in his book? "I know, that when I shall publish what I have written, there will be many who will do all they can to depreciate it, and, especially, such as are themselves void of all merit; but I let their harangues glide by me." Nor was the remark of Plancus⁵ a bad one, when Asinius Pollio⁶ was said to be preparing an oration against him, which was to be published either by himself or his children, after the death of Plancus, in order that he might not be able to answer it: "It is only ghosts that fight with the dead." This gave such a blow to the oration, that in the opinion of

¹ His real name was Tyrtamus, but in consequence of the beauty of his style, he acquired the appellation by which he is generally known from the words *θεῖος φράσις*. Cicero on various occasions refers to him; Brutus, 121; Orator, 17, *et alibi*.

² "Suspendio jam quærere mortem oportere homines vitæque renunciare, cum tantum licentiæ, vel feminae, vel imperiti homines sumant, ut in doctissimos scribant;" Hardouin in Lemaire, i. 29. We learn from Cicero, De Nat. Deor. i. 33, that the name of this female was Leontium; "... sed meretricula etiam Leontium contra Theophrastum scribere ausa sit."

³ A. Gellius (vii. 4) refers to this work and gives an extract from it.

⁴ The hostility which Cato bore to Scipio Africanus is mentioned by Livy, xxxviii. 54, and by Corn. Nepos, Cato, i.

⁵ Lucius Munatius Plancus took a conspicuous part in the political intrigues of the times and was especially noted for his follies and extravagance.

⁶ Asinius Pollio is a name which stands high in Roman literature; according to the remark of Alexandre, "Vir magnus fuit, prono tamen ad obtrectandum ingenio, quod arguunt ejus cum Cicerone similitates," Lemaire, i. 30. This hostile feeling towards Cicero is supposed to have proceeded from envy and mortification, because he was unable to attain the same eminence in the art of oratory with his illustrious rival. See Hardouin's Index Auctorum, in Lemaire, i. 168.

the learned generally, nothing was ever thought more scandalous. Feeling myself, therefore, secure against these vile slanderers¹, a name elegantly composed by Cato, to express their slanderous and vile disposition (for what other object have they, but to wrangle and breed quarrels?), I will proceed with my projected work.

And because the public good requires that you should be spared as much as possible from all trouble, I have subjoined to this epistle the contents of each of the following books², and have used my best endeavours to prevent your being obliged to read them all through. And this, which was done for your benefit, will also serve the same purpose for others, so that any one may search for what he wishes, and may know where to find it. This has been already done among us by Valerius Soranus, in his work which he entitled "On Mysteries³."

The 1st book is the Preface of the Work, dedicated to Titus Vespasian Cæsar.

The 2nd is on the World, the Elements, and the Heavenly Bodies⁴.

The 3rd, 4th, 5th and 6th books are on Geography, in which is contained an account of the situation of the different countries, the inhabitants, the seas, towns, harbours, mountains, rivers, and dimensions, and the various tribes, some of which still exist and others have disappeared.

The 7th is on Man, and the Inventions of Man.

The 8th on the various kinds of Land Animals.

The 9th on Aquatic Animals.

The 10th on the various kinds of Birds.

¹ "Vitiligatores."

² The table of contents, which occupies no less than 124 pages in Lemaire's edition, I have omitted, in consequence of its length; the object which the author proposed to effect by the table of contents will be gained more completely by an alphabetical index.

³ "Ἐποπτιδων." For an account of Valerius Soranus see Hardouin's Index Auctorum, in Lemaire, i. 217.

⁴ To the end of each book of the Natural History is appended, in the original, a copious list of references to the sources from which the author derived his information. These are very numerous; in the second book they amount to 45, in the third to 35, in the 4th to 53, in the fifth to 60, in the sixth to 54, and they are in the same proportion in the remaining books.

- The 11th on Insects.
 The 12th on Odoriferous Plants.
 The 13th on Exotic Trees.
 The 14th on Vines.
 The 15th on Fruit Trees.
 The 16th on Forest Trees.
 The 17th on Plants raised in nurseries or gardens.
 The 18th on the nature of Fruits and the Cerealia, and the pursuits of the Husbandman.
 The 19th on Flax, Broom¹, and Gardening.
 The 20th on the Cultivated Plants that are proper for food and for medicine.
 The 21st on Flowers and Plants that are used for making Garlands.
 The 22nd on Garlands, and Medicines made from Plants.
 The 23rd on Medicines made from Wine and from cultivated Trees.
 The 24th on Medicines made from Forest Trees.
 The 25th on Medicines made from Wild Plants.
 The 26th on New Diseases, and Medicines made, for certain Diseases, from Plants.
 The 27th on some other Plants and Medicines.
 The 28th on Medicines procured from Man and from large Animals.
 The 29th on Medical Authors, and on Medicines from other Animals.
 The 30th on Magic, and Medicines for certain parts of the Body.
 The 31st on Medicines from Aquatic Animals.
 The 32nd on the other properties of Aquatic Animals.
 The 33rd on Gold and Silver.
 The 34th on Copper and Lead, and the workers of Copper.
 The 35th on Painting, Colours, and Painters.
 The 36th on Marbles and Stones.
 The 37th on Gems.

¹ "Spartum;" this plant was used to make bands for the vines and cables for ships.

BOOK II.

AN ACCOUNT OF THE WORLD AND THE ELEMENTS.

[I have adopted the division of the chapters from Hardouin, as given in the editions of Valpy, Lemaire, Ajasson, and Sillig. ; the Roman figures, enclosed between brackets, are the numbers of the chapters in Dalechamps, De Laët, Gronovius, Holland, and Poinset. The titles of the chapters are nearly the same with those in Valpy, Lemaire, and Ajasson.]

CHAP. I. (1.)—WHETHER THE WORLD BE FINITE, AND WHETHER THERE BE MORE THAN ONE WORLD.

The world¹, and whatever that be which we otherwise

¹ "Mundus." In translating from one language into another, it is proper, as a general principle, always to render the same word in the original by the same word in the translation. But to this rule there are two exceptions; where the languages do not possess words which precisely correspond, and where the original author does not always use the same word in the same sense. Both these circumstances, I apprehend, apply to the case in question. The term *Mundus* is used by Pliny, sometimes to mean *the earth* and its immediate appendages, the visible solar system; and at other times *the universe*; while I think we may venture to assert, that in some instances it is used in rather a vague manner, without any distinct reference to either one or other of the above designations. I have, in almost all cases, translated it by the term *world*, as approaching nearest to the sense of the original. The word *mundus* is frequently employed by Lucretius, especially in his fifth book, and seems to be almost always used in the more extended sense of *universe*. There are, indeed, a few passages where either meaning would be equally appropriate, and in one line it would appear to be equivalent to *firmament* or *heavens*; "et mundi speciem violare serenam," iv. 138. Cicero, in his treatise *De Natura Deorum*, generally uses the term *mundus* in the sense of *universe*, as in ii. 22, 37, 58 and 154; while in one passage, ii. 132, it would appear to be employed in the more limited sense of *the earth*. It occasionally occurs in the *Fasti* of Ovid, but it is not easy to ascertain its precise import; as in the line "Post chaos, ut primum data sunt tria corpora mundo," v. 41, where from the connexion it may be taken either in the more confined or in the more general sense. Manilius employs the word very frequently, and his commentators remark, that he uses it in two distinct senses, *the visible firmament* and *the universe*; and I am induced to think that he attaches still more meaning to the term. It occurs three times in the first eleven lines of his poem. In the third line, "deducere mundo aggreddior," *mundus* may be considered as equiva-

call the heavens¹, by the vault of which all things are en-

lent to the celestial regions as opposed to the earth. In the ninth line, "concessumque patri mundo," we may consider it as signifying the celestial regions generally; and in the eleventh, "Jamque favet mundus," the whole of the earth, or rather its inhabitants. We meet with it again in the sixty-eighth line, "lumina mundi," where it seems more properly to signify the visible firmament; again in the 139th, "Et mundi struxere globum," it seems to refer especially to the earth, synonymous with the general sense of the English term *world*; while in the 153rd line, "per inania mundi," it must be supposed to mean the universe. Hyginus, in his *Poeticon Astronomicum*, lib. i. p. 55, defines the term as follows: "Mundus appellatur is qui constat in sole et luna et terra et omnibus stellis;" and again, p. 57, "Terra mundi media regione collocata." We may observe the different designations of the term *mundus* in Seneca; among other passages I may refer to his *Nat. Quæst.* vii. 27 & iii. 30; to his treatise *De Consol.* § 18 and *De Benef.* iv. 23, where I conceive the precise meanings are, respectively, the universe, the terrestrial globe, the firmament, and the heavenly bodies. The Greek term *κόσμος*, which corresponds to the Latin word *mundus*, was likewise employed to signify, either the visible firmament or the universe. In illustration of this, it will be sufficient to refer to the treatise of Aristotle *Περὶ Κόσμου*, cap. 2. p. 601. See also Stephens's *Thesaurus*, *in loco*. In Apuleius's treatise *De Mundo*, which is a free translation of Aristotle's *Περὶ Κόσμου*, the term may be considered as synonymous with universe. It is used in the same sense in various parts of Apuleius's writings: see *Metam.* ii. 23; *De Deo Soeratis*, 665, 667; *De Dogmate Platonis*, 574, 575, *et alibi*.

¹ Cicero, in his *Timæus*, uses the same phraseology; "Omne igitur cælum, sive mundus, sive quovis alio vocabulo gaudet, hoc a nobis nuncupatum est," § 2. Pomponius Mela's work commences with a similar expression; "Omne igitur hoc, quidquid est, cui mundi cælique nomen indideris, unum id est." They were probably taken from a passage in Plato's *Timæus*, "Universum igitur hoc, Cælum, sive Mundum, sive quo alio vocabulo gaudet, cognominemus," according to the translation of Ficinus; *Platonis Op.* ix. p. 302. The word *cælum*, which is employed in the original, in its ordinary acceptation, signifies *the heavens*; the visible firmament; as in Ovid, *Met.* i. 5, "quod tegit omnia, cælum." It is, in most cases, employed in this sense by Lucretius and by Manilius, as in i. 2. of the former and in i. 14. of the latter. Occasionally, however, it is employed by both of these writers in the more general sense of *celestial regions*, in opposition to the earth, as by Lucretius, i. 65, and by Manilius, i. 352. In the line quoted by Cicero from Pacuvius, it would seem to mean the place in which the planets are situated; *De Nat. Deor.* ii. 91. The Greek word *οὐρανός* may be regarded as exactly corresponding to the Latin word *cælum*, and employed with the same modifications; see Aristotle, *De Mundo* and *De Cælo*, and Ptolemy, *Mag. Const.* lib. i. *passim*; see also Stephens's *Thesaurus*, *in loco*. Aratus generally uses it to designate the visible firmament, as in l. 10, while in l. 32 it means the heavenly regions. Gesner defines *cælum*, "Mundus

closed, we must conceive to be a Deity¹, to be eternal, without bounds, neither created, nor subject, at any time, to destruction². To inquire what is beyond it is no concern of man, nor can the human mind form any conjecture respecting it. It is sacred, eternal, and without bounds, all in all; indeed including everything in itself; finite, yet like what is infinite; the most certain of all things, yet like what is uncertain, externally and internally embracing all things in itself; it is the work of nature, and itself constitutes nature³.

It is madness to harass the mind, as some have done, with attempts to measure the world, and to publish these attempts; or, like others, to argue from what they have made out, that there are innumerable other worlds, and that we must believe there to be so many other natures, or that, if only one nature produced the whole, there will be so many suns and so many moons, and that each of them will have immense trains of other heavenly bodies. As if the same question would not recur at every step of our inquiry, anxious as we must be to arrive at some termination; or, as if this infinity, which we ascribe to nature, the former of all things, cannot be more easily comprehended by one single formation,

exclusa terra," and *mundus*, "Cælum et quidquid cæli ambitu continetur." In the passage from Plato, referred to above, the words which are translated by Ficinus *cælum* and *mundus*, are in the original *οὐρανὸς* and *κόσμος*; Ficinus, however, in various parts of the *Timæus*, translates *οὐρανὸς* by the word *mundus*: see t. ix. p. 306, 311, *et alibi*.

¹ The following passage from Cicero may serve to illustrate the doctrine of Pliny: "Novem tibi orbibus, vel potius globis, connexa sunt omnia: quorum unus est cælestis, extimus, qui reliquos omnes complectitur, summus ipse Deus, arcens et continens cælum;" Som. Scip. § 4. I may remark, however, that the term here employed by our author is not *Deus* but *Numen*.

² We have an interesting account of the opinions of Aristotle on this subject, in a note in M. Ajasson's translation, ii. 234 *et seq.*, which, as well as the greater part of the notes attached to the second book of the *Natural History*, were written by himself in conjunction with M. Marcus.

³ The philosophers of antiquity were divided in their opinions respecting the great question, whether the active properties of material bodies, which produce the phænomena of nature, are inherent in them, and necessarily attached to them, or whether they are bestowed upon them by some superior power or being. The Academics and Peripatetics generally adopted the latter opinion, the Stoics the former: Pliny adopts the doctrine of the Stoics; see Enfield's *Hist. of Phil.* i. 229, 283, 331.

especially when that is so extensive. It is madness, perfect madness, to go out of this world and to search for what is beyond it, as if one who is ignorant of his own dimensions could ascertain the measure of any thing else, or as if the human mind could see what the world itself cannot contain.

CHAP. 2. (2.)—OF THE FORM OF THE WORLD¹.

That it has the form of a perfect globe we learn from the name which has been uniformly given to it, as well as from numerous natural arguments. For not only does a figure of this kind return everywhere into itself² and sustain itself, also including itself, requiring no adjustments, not sensible of either end or beginning in any of its parts, and is best fitted for that motion, with which, as will appear hereafter, it is continually turning round; but still more, because we perceive it, by the evidence of the sight, to be, in every part, convex and central, which could not be the case were it of any other figure.

CHAP. 3. (3.)—OF ITS NATURE; WHENCE THE NAME IS DERIVED.

The rising and the setting of the sun clearly prove, that this globe is carried round in the space of twenty-four hours, in an eternal and never-ceasing circuit, and with in-

¹ I may remark, that the astronomy of our author is, for the most part, derived from Aristotle; the few points in which they differ will be stated in the appropriate places.

² This doctrine was maintained by Plato in his *Timæus*, p. 310, and adopted by Aristotle, *De Cælo*, lib. ii. cap. 14, and by Cicero, *De Nat. Deor.* ii. 47. The spherical form of the world, *οὐρανός*, and its circular motion are insisted upon by Ptolemy, in the commencement of his astronomical treatise *Μεγάλη Σύνταξις*, *Magna Constructio*, frequently referred to by its Arabic title *Almagestum*, cap. 2. He is supposed to have made his observations at Alexandria, between the years 125 and 140 A.D. His great astronomical work was translated into Arabic in the year 827; the original Greek text was first printed in 1538 by Grynæus, with a commentary by Theon. George of Trebisond published a Latin version of it in 1541, and a second was published by Camerarius in 1551, along with Ptolemy's other works. John Muller, usually called Regiomontanus, and Purback published an abridgement of the *Almagest* in 1541. For an account of Ptolemy I may refer to the article in the *Biog. Univ.* xxxv. 263 *et seq.*, by Delambre, also to Hutton's *Math. Dict.*, *in loco*, and to the high character of him by Whewell, *Hist. of the Inductive Sciences*, p. 214.

credible swiftness¹. I am not able to say, whether the sound caused by the whirling about of so great a mass be excessive, and, therefore, far beyond what our ears can perceive, nor, indeed, whether the resounding of so many stars, all carried along at the same time and revolving in their orbits, may not produce a kind of delightful harmony of incredible sweetness². To us, who are in the interior, the world appears to glide silently along, both by day and by night.

Various circumstances in nature prove to us, that there are impressed on the heavens innumerable figures of animals and of all kinds of objects, and that its surface is not perfectly polished like the eggs of birds, as some celebrated authors assert³. For we find that the seeds of all bodies fall down from it, principally into the ocean, and, being mixed together, that a variety of monstrous forms are in this way frequently produced. And, indeed, this is evident to the eye; for, in one part, we have the figure of a wain, in another of a bear, of a bull, and of a letter⁴; while, in the middle of them, over our heads, there is a white circle⁵.

(4.) With respect to the name, I am influenced by the unanimous opinions of all nations. For what the Greeks, from its being ornamented, have termed *κόσμος*, we, from its perfect and complete elegance, have termed *mundus*. The name *cælum*, no doubt, refers to its being engraven, as it

¹ See Ptolemy, *ubi supra*.

² This opinion, which was maintained by Pythagoras, is noticed and derided by Aristotle, *De Cœlo*, lib. ii. cap. 9. p. 462-3. A brief account of Pythagoras's doctrine on this subject is contained in Enfield's *Philosophy*, i. 386.

³ Pliny probably here refers to the opinion which Cicero puts into the mouth of one of the interlocutors in his treatise *De Nat. Deor.* ii. 47, "Quid enim pulchrius ea figura, quæ sola omnes alias figuras complexa continet, quæque nihil asperitatis habere, nihil offensionis potest, nihil incisum angulis, nihil anfractibus, nihil eminens, nihil lacunosum?"

⁴ The letter Δ, in the constellation of the triangle; it is named Δελτωτόν by Aratus, l. 235; also by Manilius, i. 360. We may remark, that, except in this one case, the constellations have no visible resemblance to the objects of which they bear the name.

⁵ "Locum hunc Plinii de Galaxia, sive Lactea via, interpretantur omnes docti." Alexandre, in Lemaire, i. 227. It may be remarked, that the word *vertex* is here used in the sense of the astronomical term *zenith*, not to signify the pole.

were, with the stars, as Varro suggests¹. In confirmation of this idea we may adduce the Zodiac², in which are twelve figures of animals; through them it is that the sun has continued its course for so many ages.

CHAP. 4. (5.)—OF THE ELEMENTS³ AND THE PLANETS⁴.

I do not find that any one has doubted that there are four elements. The highest of these is supposed to be fire, and hence proceed the eyes of so many glittering stars. The next is that spirit, which both the Greeks and ourselves call by the same name, air⁵. It is by the force of this vital principle, pervading all things and mingling with all, that the earth, together with the fourth element, water, is balanced in

¹ De Ling. Lat. lib. iv. p. 7, 8. See also the remarks on the derivation of the word in Gesner, *Thes.*, *in loco*.

² "Signifer." The English term is taken from the Greek word Ζωδιακός, derived from Ζῶον; see Aristotle, De Mundo, cap. 2. p. 602. The word *Zodiacus* does not occur in Pliny, nor is it employed by Ptolemy; he names it λοξὸς κύκλος, *obliquus circulus*; Magn. Const. i. 7, 13, *et alibi*. It is used by Cicero, but professedly as a Greek term; Divin. ii. 89, and Arati Phænomen. l. 317. It occurs in Hyginus, p. 57 *et alibi*, and in A. Gellius, 13. 9. Neither *signifer* taken substantively, nor *zodiacus* occur in Lucretius or in Manilius.

³ The account of the elements, of their nature, difference, and, more especially, the necessity of their being four, are fully discussed by Aristotle in various parts of his works, more particularly in his treatise De Cælo, lib. iii. cap. 3, 4 and 5, lib. iv. cap. 5, and De Gener. et Cor. lib. ii. cap. 2, 3, 4 and 5. For a judicious summary of the opinions of Aristotle on this subject, I may refer to Stanley's History of Philosophy; Aristotle, doctrines of, p. 2. l. 7, and to Enfield, i. 764 *et seq.* For the Epicurean doctrine, see Lucretius, i. 764 *et seq.*

⁴ Although the word *planeta*, as taken from the Greek πλανήτης, is inserted in the title of this chapter, it does not occur in any part of the text. It is not found either in Lucretius, Manilius, or Seneca, nor, I believe, was it used by any of their contemporaries, except Hyginus, p. 76. The planets were generally styled *stellæ erraticæ*, *errantes*, or *vagæ*, *sidera palantia*, as in Lucretius, ii. 1030, or simply the *five stars*, as in Cicero, De Nat. Deor. ii. 51, and in Seneca, Nat. Quæst. vii. 24. Pliny, by including the sun and moon, makes the number seven. Aratus calls them πένρ' ἄστρες, l. 454.

⁵ "Ær." "Circumfusa undique est (terra) hac animabili spirabilique natura, cui nomen est ær; Græcum illud quidem, sed perceptum jam tamen usu a nobis;" Cicero, De Nat. Deor. ii. 91.

the middle of space. These are mutually bound together, the lighter being restrained by the heavier, so that they cannot fly off; while, on the contrary, from the lighter tending upwards, the heavier are so suspended, that they cannot fall down. Thus, by an equal tendency in an opposite direction, each of them remains in its appropriate place, bound together by the never-ceasing revolution of the world, which always turning on itself, the earth falls to the lowest part and is in the middle of the whole, while it remains suspended in the centre¹, and, as it were, balancing this centre, in which it is suspended. So that it alone remains immoveable, whilst all things revolve round it, being connected with every other part, whilst they all rest upon it.

(6.) Between this body and the heavens there are suspended, in this aërial spirit, seven stars², separated by determinate spaces, which, on account of their motion, we call wander-

¹ "universi cardine." "Revolutionis, ut aiunt, centro. Idem Plinius, hoc ipso libro, cap. 64, terram cœli cardinem esse dicit;" Alexandre, in Lem. i. 228. On this subject I may refer to Ptolemy, Magn. Const. lib. i. cap. 3, 4, 6. See also Apuleius, near the commencement of his treatise *De Mundo*.

² "Sidera." The word *sidus* is used, in most cases, for one of the heavenly bodies generally, sometimes for what we term a constellation, a particular assemblage of them, and sometimes specially for an individual star. Manilius employs the word in all these senses, as will appear by the three following passages respectively; the first taken from the opening of his poem,

"Carminè divinas artes, et conscia fati
Sidera"

The second, "Hæc igitur texunt æquali sidera tractu
Ignibus in varias cœlum laqueantia formas." i. 275, 276.

The third ". . . . pectus, fulgenti sidere clarius;" i. 356.

In the *Fasti* of Ovid, we have examples of the two latter of these significations:—

"Ex Ariadnæo sidere nosse potes;" v. 346.

"Et canis (Iearium dicunt) quo sidere noto
Tosta sitit tellus;" iv. 939, 940.

Lucretius appears always to employ the term in the general sense. *J. Obsequens* applies the word *sidus* to a meteor; "*sidus ingens cœlo demissum*," cap. 16. In a subsequent part of this book, chap. 18 *et seq.*, our author more particularly restricts the term *sidus* to the planets.

ing, although, in reality, none are less so¹. The sun is carried along in the midst of these, a body of great size and power, the ruler, not only of the seasons and of the different climates, but also of the stars themselves and of the heavens². When we consider his operations, we must regard him as the life, or rather the mind of the universe, the chief regulator and the God of nature; he also lends his light to the other stars³. He is most illustrious and excellent, beholding all things and hearing all things, which, I perceive, is ascribed to him exclusively by the prince of poets, Homer⁴.

CHAP. 5. (7.)—OF GOD⁵.

I consider it, therefore, an indication of human weakness to inquire into the figure and form of God. For whatever God be, if there be any other God⁶, and wherever he exists, he is all sense, all sight, all hearing, all life, all mind⁷, and all within himself. To believe that there are a number of Gods, derived from the virtues and vices of man⁸, as Chastity, Concord, Understanding, Hope, Honour, Clemency,

¹ Cicero remarks concerning them; "quæ (stellæ) falso vocantur errantes;" De Nat. Deor. ii. 51.

² ". . . vices dierum alternat et noctium, quum sidera præsens occultat, illustrat absens;" Hard. in Lem. i. 230.

³ "ceteris sideribus." According to Hardouin, *ubi supra*, "nimium stellis errantibus." There is, however, nothing in the expression of our author which sanctions this limitation.

⁴ See Iliad, iii. 277, and Od. xii. 323.

⁵ It is remarked by Enfield, Hist. of Phil. ii. 131, that "with respect to philosophical opinions, Pliny did not rigidly adhere to any sect. . . . He reprobates the Epicurean tenet of an infinity of worlds; favours the Pythagorean notion of the harmony of the spheres; speaks of the universe as God, after the manner of the Stoics, and sometimes seems to pass over into the field of the Sceptics. For the most part, however, he leans to the doctrine of Epicurus."

⁶ "Sialius est Deus quam sol," Alexandre in Lem. i. 230. Or rather, if there be any God distinct from the world; for the latter part of the sentence can scarcely apply to the sun. Poinset and Ajasson, however, adopt the same opinion with M. Alexandre; they translate the passage, "s'il en est autre que le soleil," i. 17 and ii. 11.

⁷ "totus animæ, totus animi;" "Anima est qua vivimus, animus quo sapimus." Hard. in Lem. i. 230, 231. The distinction between these two words is accurately pointed out by Lucretius, iii. 137 *et seq.*

⁸ "fecerunt (Athenienses) Contumeliæ fanum et Impudentiæ." Cicero, De Leg. ii. 28. See also Bossuet, Discours sur l'Histoire univ. i. 250.