No 1

1. In the province of Xensi is a hill called
Taipe on which if a drum be beat it
immediately thunders and lightens
— Magistrates have forbidden all persons
from death to beat a drum on the summit
2. The River Tan has red fish with whose
blood if one anoints his feet he may
walk over the river without sinking
3. If the water of the Tan be stirred all
the fish rise to the surface — —
4. In the province of Xan-tung is a
Spring which confers long life —
5. In the province of Su-chuen near
the city of Chingtu is the extensive
mountain Ching-Ching, on which
the immortal men and women
6. In the province of Kiangnang are
mountains inhabited only by old
people
7. In the province of Quangtung near
the city Lianchang is the great hill
Ulhoan

Uthiang in which a fruit grows with this wonderful property that you may eat what you please but must carry none away for if you do you will miss your way and never be able to get down from the mountain

8. A great stone to be seen where the stroke of a sword pierced three feet into the stone

9. On the mountain Feng hoang in the province of Honan dyed the Phoenix Assembly of birds once a year to lament its death — many caught at night — ~~roast~~ —

10 Near the city Fuen chee is the mountain Vankee the highest in the world in this ten thousand people saved themselves at the general Deluge —

11. On the mountain Hon poo Hing chee are three pools which turn iron into copper immediately —

12. An Eclipse is occasioned by the great dragon in Heaven getting between and seizing on the luminary he finds — he holds between his teeth till he is caused to quit his hold by the beating of drums &c. made throughout China —

13. A handsome man consists in his being thirty — able to put an Elbow chair —

14. Women cannot possibly be handsome without small feet —

15. China is situated in the middle of the Earth — and the other countries or nations to the number of round it —

16. Chinese the only enlightened people all other nations barbarous —

17. Near Canton on the sea is to be seen a creature head like a bird —

tail like a fish and feathers shines on
its belly —

18. In Quang tong — a creature neither
fish nor flesh but between both. All
the summer it is a bird of a yellow
colour and keeps on the mountains
but in the winter it turns fish
again and takes to the water —
good eating —

19. Swift and will run 300 miles in
a day —

20. On the mountains listen are Tygers
who have left off their ferocity.
the nature of the soil is such
that Tygers and snakes brought
hither from other places, become
tame in a short time —

21. In the street ~~the~~ Cio near the city
Chang chu is a stone of 5 cubits
high and 18 thick which in bad
weather of itself rolls and moves up
and down —

22. A statue of a very beautiful
woman not made by art but grown
there —

23. A statue which changes colour
according to the weather —

24. Near to the city of Ceng on the
mountain of Logo stands the statue
of a great Idol out of whose mouth
water gushes continually —

25 — A great temple of Idols form
in the province of Manking
which cures diseases —

26. Nought that seven birds flying
with seven arrows one after another

27. Nine Idols called Vergin on the
hill Pinochai signifying [illegible]

28. In the province of Quangsi is a
hill in the shape of an Elephant

29. Mountain Ottering — shape of a man
with his head turning downwards

30. The hill called Chaisang before storm
or thunder roars so loudly as to be
heard at two miles distance —
The Mountain Cheing fung near to
31. Xaichen emits a great flame of fire
at night provided rain has fallen on
it the preceding day, but in dry weather
there is no such appearance —
32. Tsinsiel is one of [illegible] famous for a
remarkable echo
[illegible]
33. Wen Tong fung
On the top of the hill Fiungcao
34 in the Chinese nest, under which
is ~~a fine~~ found an extraordinary
precious stone
35. On the hill Xeyan are found after
rain several stones in the shape
of Swallows — also are other stones
which cure a great many diseases
such as agues, fevers &c
36 In the province of Quang se a yellow
earth [illegible] the form —

37. In the province of Xansi is a red
earth used as vermilion — On the
mountain Ninxao a whitish earth
used by the ladies as paint —
Mines of Coals —
38. On the hill Ganlo near to the city
Fungchang is a stone in form of a
mans nose, from the nostrils arise
two springs one hot the other cold
39. In Tinchiae the fifth city of Xang-
tong is the spring Manson which
bubbles forth both hot and cold water
at the same time, separate and divided
from others —
40. In the province of Quang se is a
spring one half clear the other
muddy — mix them they will sepa-
rate — in contrary ways —
41. In the province of Xensi in the city
of Lingchang is a fountain as clear as
Chrystal and near five foot deep, yet

the top is cold and the bottom so hot as
cannot be touched —

42 Near to Jaung pong is a ~~stream~~ spring
so hot as to boil an egg

43. Several warm bathes and hot spring
in the mountain Loutang near the
city Usiang

44 On the hill Gaito near Tsung ching
is a very deep well which by its rise
and fall shews a fruitfull or barren
year —

45. Persons of the same name must
not intermarry —

46 – Great wall was built 2000 years
ago and guarded by 1000000 Soldi

47. In the province of Suchuen near the
city of Chunking is a great hill on
the side of the river Fou on this is
an idol Fe so large that his eyes
ears nose and mouth can be seen
at two miles distance —

Ms 17

48. Chinese Government the only
ancient and perfect govern in earth
—

49. The city Seuo sunk – now a lake

50. Near the city Kiang is a salt Lake

51. Lake – great stone fish seen and fished
in the water for summer to paradise —
– In bad weather this fish a dreadfull
noise – assisted by an echo

– Emperor – Dream – precious ~~stone~~
pearls – grow dimmer and brighter with
the moon —

52 In the lake Tungting a floating
Island on which is a Chapel —

53. Water of the Lake near the city Hing-
chen is of a green colour – colour
good for washing Damson —

54. The water of the Lake yun continues
warm all the winter ——— goose

55. In the territory of Ning po fu in the lake
pool Yapoi – ~~clear~~ clear when the Governor
is just, but muddy when he is bad —

56. On the east side of the city Yunchun is a
small Lake called Yo in which King Pegao
fed ten tame Crocodiles with Criminals and
Malefactors —

57. On the N. W. side of the City Tinting is
the Lake Mooinas into which the leaves
of a certain tree falling are converted into bird
so black that the inhabitants look upon them
as little devils or spirits —

58. Hot sulphureous Springs in many
parts of China —

59. Near the city Singing in the province
of Quang tong on the mountain Tinta
is a spring or pool from which on the
throwing in of a stone a noise like thunder
proceeds ~~the~~ soon after the sky overcasts
and pours a deluge of rain — Dragon's
pool —

60. On the east side of the city Chunning
is a fountain exceeding cold tho'
the adjacent earth is heated by a fire
which burns continually under ground

61. If a nail could be driven any where
into the Chinese wall, the builder of that
part was punished with death —

62. The world was made of an egg
which spread it self in Breadth a man
ner that heaven was made of the
shell, sky water and fire of the ~~yolk~~
white and the earth of the yolk

63. The world is nothing but the
Giant Panco, his head is mountain
his two eyes are the sun and moon
his flesh is the earth legs is the
mountains hair is the herbs and
trees and his belly is the sea
That all the Chinese were formed
out of the brain of this Giant
and ~~the~~ all the other nations out of his
excrement —

64. The world at first consisted en-
tirely of water, in a violent concus-
a scum & froth was raised & lighter
... heavens, Demons — Earth —

66. Iron wood makes better Anchors
for ships than iron itself —
67. It is indecent for either man or
woman to appear in company
without a fan, in winter as well as
in summer —
68. Before setting out on a journey it
is necessary to salute the town
without the gate —
69. Mountains afford the best principles
to prognosticate from — Shape
&c —
70. More respect and worship is due
to large than to a small image,
one of 40 or 80 feet than one of 5
71. Two eyes painted on the bows
of the boat — If we can see
how can boats

72. When the Idol does not grant
an application, he ought to be
punished by being [illegible]
his instruments dragging him through
the dirt —
73 The left hand is in China and
ought to be the seat of honour —
Beheading a more dishonorable
74. punishment than strangling
— The head is the most valuable
part of the body — what is man
without his head —
75 No man is disgraced by the
bastinado, or correction from a
Mandarin is intended for his
good, and he ought to receive
it such and thank the Man-
darin for his fatherly care of
his morals —

An Examination of the 2d. Part of Mr. Hume's 12th. Essay.

You begin this Part of your Essay wh. shewing that "it may seem a very extravagant Attempt of the Sceptics to destroy Reason by Argument & Ratiocination." By destroying Reason I presume from the general Tenour of your Expressions you mean the bringing of it into Doubt or Dubiety. At least I see nothing in your Words, that can lead one to a different Interpretation of the Phrase. Can you allow that "the Demonstration of some Principles, wh. you ascribe to Geometry seem as unexceptionable, as that wh. proves the three Angles of a Triangle to be equal to two right ones." And you grant "that these absurd Opinions as you call them, because they startle & amaze you, as things wh. you cannot conceive of, "are supported by a Chain

of Reason the clearest & most natural, & that it is impossible for us to allow the Premises without admitting the Consequences". You likewise acknowledge that the Properties of Circles & Triangles are the Principles from which some of these Inferences are drawn, & that the Demonstrations of these Properties are so convincing & satisfactory that nothing can be more so. For in the following Words, "Nothing can be more convincing & satisfactory than all the Conclusions concerning the Properties of Circles & Triangles; & if these be received, how can we deny &c. Now if by Reason you understand the Faculty of reasoning or that Power by w^h the mind draws Conclusions or Inferences from Premises, w^h are either admitted as self evident Truths, or Consequences already deduced from such Truths, I apprehend you scarce speak intelligibly when you say, That the Faculties

make use of Argument & Ratiocination to destroy Reason or to bring its Existence into Doubt & Uncertainty. For what else is this but saying, that he exercises a Power, in order to shew that it is not. Now you certainly will grant, that you never can make use of any thing to prove that it is nothing. If the Exercise of a thing be real, it necessarily presupposes the Reality of the thing itself, since no use can be made of nothing. And if there be no reality in the Exercise, the Consequences flowing from it cannot be depended on.

But if you mean by Reason, what is commonly understood by Reasoning, and the Deductions w^h are come at by means of it, you cannot undoubtedly be supposed to assert in general, that the Scepticks great Aim & Design is to destroy these or even make them Doubtful by Argument & Ratio-

:ocination. My Reason for saying so is this. If any thing, whatever, inserted in a Chain of Reasoning w.ch carries with it the fullest Clearness & Conviction, can be rendered doubtful by another process of Reasoning clear & unexceptionable leading to an Inference directly opposite or at least different, this may without doubt become questionable from a similar Process, & the Result of this again uncertain & so on for ever. So that however far any one should advance even so far, all that he could possibly make out, would be this, that it was very doubtful whether he had rendered the thing he intended doubtful or not. If you mean the Results of reasoning taken in a general Sense, they will at last necessarily leave you here. However this is an Employment you can hardly ascribe to any Person. For there never was an Instance of a Conclusion drawn by perfectly unexceptionable Steps from premises equally unexceptionable, that was rendered uncertain by an opposite Conclusion satisfactory & convincing. No person ever demonstrated by steps w.ch as powerfully convey Satisfaction to the Mind of every Person that understands it, that the Angles at the Base of an Isosceles Triangle are not equal, as Euclid has proved that they are; or indeed ever imagined it to be possible. Were you to appoint him this Task, you would necessarily make him begin with this Supposition that no reasoning carries absolute Certainty along with it, & with this Design at the same time, to make use of it, in order to show that it does not. That is, you would first make him suppose all reasoning to be doubtful, & then employ it to show that it is not. But if you

only mean that he is to employ just Argument & Ratiocination to pull down the Fabricks & Superstructures w^ch. has been reared on false reasoning, thus assigning him a noble Office indeed. For next to the Discovery of Truth, the detection of Falsehood is most valuable

But if you only intend to affirm that by saying that the Sceptic destroys Reason by Argument and Ratiocination, that he makes use of Conclusions drawn [illegible] from Premises exceptionably [illegible] by Reason clear & unexceptionable, w^ch. he finds to be inconsistent with the Views as a discerning Faculty or with some other of its Inferences as a true one, in order to make it doubt both of its Maxims & Conclusions, you must confine your meaning to those Particulars, in w^ch. I find this Disagreement to take Place. This if I mistake not is your meaning. For after telling us, that the Demonstration of some of these Conclusions seems as unexceptionable as that by w^ch. it is proved that the three Angles of any Triangle are equal to two right ones you allege that notwithstanding this Reason views them as big with Contradiction & Absurdity, & is thereupon thrown into a kind of amazement and Suspence, w^ch. without the Suggestions of any Sceptic, gives her a Diffidence of herself & of the ground she treads on." Now I dare say you will allow that the Sceptic must confine this Distrust w^ch. he makes to Reason entertains of herself by such Reasonings as these alone, & ought never to imagine that it should be extended to all Conclusions attained by Reasoning, between w^ch. & the self evident Maxims of Reason & other Consequences derived from these

them he never discovered any such Opposition or Incongruity. For if the Discovery of this Inconsistency & Disagreement be the only Foundation upon w^ch he goes in attempting to bring Reason into a State of Doubt & Uncertainty & this as far as I am able to discover & I could wish to allow your Words their full force, is the only Ground you leave him to erect his Batteries on, it would be altogether absurd to suppose him capable of extending it to Cases on w^ch no such Disagreement appears. This would be supposing him to draw Consequences without premises, similar to those he has drawn from Premises. He would be making him think pretty near as wisely as an Engineer, ~~without the Aid of the Ground~~, that should give Directions for erecting a Battery without the Aid of the Ground or any other thing to support it or as a Mason who should propose to build a house without a foundation. Reason can not distrust herself with regard to any of those clear & unexceptionable Conclusions of Reason, my w^ch do not clash with or run directly in the Face of her other self evident Notions or Conclusions drawn from them by Steps of indubitable Evidence in the Opinion of one, who makes the observing of such Contrariety the sole foundation for such Distrust. But perhaps you will say you reason from Analogy & it were a parte ad totum. Point out the Analogy, & I shall allow your Argument founded thereon as much force as any Analogical reasoning can possibly carry with it. Now in all Analogical Reasonings, there must be some resemblance or Similitude in the Circumstances, upon w^ch the Analogy is founded. But the only Bottom you leave the Sceptic for making Reason rest her doubt of her own clear unexceptionable Conclusions on, is this, y^t

that they stand directly opposed to her other clear & undoubted maxims, or to Consequences coming with most convincing Evidence from them. I take it for granted you will allow there is no Resemblance to this Opposition discovered in those Cases in wch it is supposed no such Opposition appears. For if you do not you will be forced to conclude that it both is & is not, at the same time. If then the only Circumstance in wch the Difference is founded in the one Case is not discovered to hold in the other, or indeed so much as any other similar Circumstance, pray tell me, upon what Analogy do you ground the same or a similar Conclusion? If in such a Situation you draw Consequences, you must necessarily acknowledge, that you draw them, not because you see any Reason for doing so, but because you suppose there ought to be one. And if this be the Way in wch you suppose your Sceptic to draw Conclusions, I do not see, that you make him any thing else than one who does not profess Reason, & consequently is incapable of exercising it.

But this is not all. You grant the Premises from wch the Demonstrations you mention are deduced to be so convincing & satisfactory as I have already observed, that Nothing can be more so, being those wch are laid down & demonstrated by Euclid in his Elements of Geometry & to wch like the rest of mankind you offer no Objections. You likewise allow the said Demonstrations to be derived from these by a Chain of Reason the clearest & most rational & unexceptionable as that by wch it is proved that the three Angles of a Triangle are equal to two right ones. I dare say you will agree with me in thinking that I do you no injustice here in assuming, that this is neither more nor less than saying

that you begen w^th Principles to the truth of w^ch you cannot object, you gradually Draw Consequences from them, to the Truth of w^ch you likewise cannot start any objection, that you are fully & perfectly convinced of every Step you make, and at last come to a Conclusion w^ch you are perfectly satisfied is fairly drawn. Now I see no other meaning that this has, than that your Reason perceives it to be just. At the same time you affirm that these very Conclusions shock the clearest & most natural Principles of human Reason, & are big with Absurdity & Contradiction: But this I suppose you can mean nothing else than that these very Consequences w^ch your Reason perceives to be just, shock your Reason & appear to it absurd & contradictory. Now what is this but saying that Reason discovers them both to be & not to be just. For I imagine you understand by the Absurdity & Contradiction of any Conclusion, what is generally meant by the being unjust & contrary to some Maxim or Inference that is just. For no Consequence whatever can be contradictory to itself, since this would be saying expressly that it is different from & opposite to itself. Perhaps you will allege you do not see the Conclusion to be just, though you see it unexceptionably drawn from unexceptionable Principles. But this I apprehend is saying precisely the same thing in different Words. For you are not here in the same predicament with one, who objects to a Conclusion drawn by another, as exceptionable, because he does not thoroughly understand him, or has not perfectly clear & distinct Ideas of the reasonableness of the Steps he took to arrive at it. To him in this Situation it is no Conclusion. But your Case is different. Your Inferences are obtained

by means of Steps, wch are made by a Chain of reasoning the clearest & most natural; so that it is impossible to admit the Premises without admitting likewise the Consequences. And you affect the Premises to be so convincing & satisfactory that nothing can be more so, ~~& consequently they are unexceptionable~~ They are indeed the Propositions in Euclids Elements of Geometry, & these I believe yourself will allow have as good a Claim as any Conclusions to be called just. You likewise own that the Application of these Principles are as unexceptionable as they are themselves, by saying that they are as much so, as this Proposition, that the three Angles of a Triangle are equal to two right Angles. And if they are so, I scarce think any thing can be more so. For I know no Conclusion that has a better title to be called just than this proposition. Wherefore you must neces-

sarily conclude that you both see the Reasons of the Conclusions you take Notice of both to be & not to be just at the same time; a thing wch needs only to be mentioned to any Person possessed of Reason to be declared by him impossible. This Consequence you seem to have been afraid of, and I believe every Person will be sceptical in the most dogmatical & positive manner with Regard to its Possibility. You cannot allege that there is any Principle of Reason that has a better Claim to be called just than these Principles & Consequences, since you affirm that nothing can be more convincing & satisfactory than the one & that the other is equally unexceptionable, unless you show there is something else requisite to denominate any Proposition just besides that Clearness & Distinctness wch makes it convincing & satisfactory. From this Allegation you are evidently

excluded by your own Assertions.
But even grant that you are not
& that I should not insist from you
own Words on leaving you thus up
so close, it certainly was incum-
:bent upon you to have produced
the Principle & to have shown that
it really has a preferable Claim.
And neither, you know yourself
you have attempted to Do. However
when the Dispute turns upon the
Preeminence of one thing in any
particular above another, you will
unquestionably be so reasonable
as to allow that it is necessary
both to produce it, & to bring a Proof
of the Advantages w^ch lie on the Side,
For if it is not produced, there can be
no Comparison made between y^m
& consequently no Dispute, & if it
not produced in such a Way as to
show it possesses the superiority, the
whole amounts to nothing but a
mere Assumption. And you know
that when the Question is with regard
to the superior Degree of Clearness or Evi-
:dence w^ch one thing possesses above
another, it is not sufficient barely to
affirm that the one is more evident
than the other, particularly when
that other is so clear that you can-
:not according to your own acknow-
:ledgement refuse it. This would be
just asserting a thing to be so, & after-
:wards leaving nothing but the As-
:sertion itself as a Proof of the Assertion.
Yourself must acknowledge that you
have neither produced the principles
of Reason, w^ch you assert to be quite
inconsistent with the Demonstrati-
:ons you mention, nor shown y^t
they possess a greater Degree of Evi-
:dence. You indeed observe, that no
priestly Dogmas invented on Purpose
to tame & subdue the rebellious Reason
of Mankind, ever shocked common
Sense more, than the Doctrine of the
infinite Durability of Extension &

all its Consequences". As to the Dogmas of the Creeds, I confess I do not see how they are connected with this Subject, & therefore shall not at present enter into any Consideration of them. Besides as your Charge is general & you have not mentioned any particular Dogmas, you have not left these Gentlemen any room to give you a limited & determinate Answer; & it would appear that you did not mean they should give you any. However as I see no reason you had to go out of your way to attack & upbraid them, I shall not be at the trouble to go out of mine to defend them. I quoted the Observation with a quite different Design. You say that the Doctrine of the infinite Divisibility of Extension shocks common sense. Perhaps you may imagine that one may understand by what you mean by those principles of Reason are wch you say enables you to pronounce the Determinations you speak of absurd & contradictory. But I must confess to you, that common sense appears to me so vague an Expression, that I do not know what to make of it. I honestly acknowledge that I do not understand what is meant by it. It seems to imply something more than the principles of Reason; though I can easily guess that your Intention was to limit it to those in this Place, from your observing in the next Sentence that the same Doctrine "shocks the clearest & most natural Principles of human Reason". Here as you declare that that Doctrine shocks common Sense & in the next Sentence, that it shocks the clearest principles of Reason, I presume that you use them in considering this Subject as synonimous. And I cannot indeed discern what other meaning you could affix to it wch properly where you had professedly to do with the principles of Reason & their Con-

:sequences. Whence it appears that one must still be as much at a loss as ever to know what principles of Reason you mean; since common Sense here signifies nothing else but the principles of Reason. I doubt not however that you meant something definite & particular by by the cleared & most natural principles of human Reason, since I question not that you meant something, & cannot understand if you did not mean so, how you meant any thing directly to the Subject. How else is it to be known then what Principles you intended? Must one enumerate all those Principles, & apply them one by one to the Demonstrations relating to the infinite Divisibility of Extension? But how is he to set about this Enumeration, to search Limits or after the most painful & diligent search to be certain that it takes in all those Truths or Propositions we appear to

Reason clear & self evident, almost as soon as they are proposed to it in terms we make them be sufficiently understood. And these if I mistake not are what you mean by the Principles of human Reason. For Reason considered in itself can only be called one & the same Power, or principle, if you choose to give it that Name, we make use of these first distates or evident maxims, & exercises itself in a variety of ways in applying them for the purpose of investigating Truths that lie farther removed & at a greater Distance. Now we know there are many Truths & Propositions, we Reason admits as certain & self evident as soon as they are presented to it in intelligible Terms; tho' if left to itself it might never have thought of them. The Axioms of Euclid are universally allowed to have a Title to be ranked in this Class; & yet I may assume what

the least Hesitation, that more than three fourths of mankind never thought of one half of them, or can tell in their own Words what they are or what is their meaning. But if you will not allow this to be the Case with regard to so great a Proportion of mankind, I dare say you will however grant these Propositions as the following to be self-evident to every one who knows the things of wch they are assumed.

A Rhombus is not a Rhomboid, a Parabola is not an Ellipse, an Hyperbola is not a Cissoid, a Cyclo-id is not a Cissoid, a Cylinder is not a Tetraedron, a Dodecahedron is not an Octahedron, an Octahedron is not a Dodecahedron, a Dodecahedron is not an Icosahedron &c. &c.

These are distinct Propositions to every one who knows these Figures & Solids. And they will likewise be seperate & distinct Propositions to Persons who are informed that these Words denote quite different things, though they even should not know what those things are. And all these particular self-evident Propositions, are but illustrations of this general one, that one thing is not another thing. But if you deny that more than three fourths of Mankind never formed any Idea or thought of these Propositions, you must either assert, that they know the Figures & Solids to wch they relate, or that they could think of the Propositions, before they had any Idea or Conception of the things about wch they are announced; neither of wch I dare say you will venture to assert. In like manner each Property of a Triangle taken by itself may be declared different from the several Properties of a Parallelogram one after another, each of those of the Parallelogram different from each of those of the Circle, each of those of the Circle different from each of those of the Parabola, each of those of the Parabola from each of those of the Ellipse, each of those of the Hyperbola

from each of those of the Cycloid, each of those of the Cycloid from each of those of the Cissoid, each of those of the Cissoid from each of those of the Conchoid, each of those of the Conchoid from each of those of the Quadratrix, each of those of the Quadratrix from each of those of the Logarithmic Curve &c so on to Curves of all the different Orders.

There is a great Number of Ways in wch an endless or infinite Number of selfevident Propositions both of an affirmative & negative Nature may be be formed. I shall just mention one of these Ways to you, wch is taken from Numbers as follows.

2 is greater than 1, 3 is greater than 1, 3 is greater than 2, 4 is greater than 1, than 2, than 3, 5 is greater than 1, than 2, than 3, than 4, 6 is greater than 1, than 2, than 3, than 4, than 5; 7 is greater than 1, than 2, than 3, than 4, than 5, than 6; &c &c. Now these are all affirmative & it is plain they may be continued without End, since neither Unite nor any other Number can be supposed to be so often added together, but still more may be added.

Precisely in the same Way we get an endless or infinite Number of negative selfevident Propositions.

Thus 2 is not 1, 3 is not 1, is not 2, 4 is not 1, is not 2, is not 3; 5 is not 1, is not 2, is not 3, is not 4; 6 is not 1, is not 2, is not 3, is not 4, is not 5; 7 is not 1, is not 2, is not 3, is not 4, is not 5, is not 6; and so on for ever.

The same Truth, that selfevident Propositions or Maxims of the Understanding both of an affirmative and negative Nature are capable of being shown in a great Variety of other Ways.

But I am persuaded, you will allow it to be sufficiently clear from what I have already observed. If by the clear & natural principles of human Reason you mean such Truths as the Understanding at once takes to be selfevident as soon as it attends to them, & I see nothing else that you can mean

by them, you must have that to enumerate them would be an endless Undertaking. If then your Reason suggested you with Truths so clear as to enable you to pronounce Conclusions to be absurd, as you yourself acknowledge by them of Reasoning as unexceptionable as that by wch the three Angles of a Triangle are equal to two right Angles, from Principles contained in the Elements of Euclid, it was certainly your Business to have produced these Truths, that the world might have judged of the reasonableness of your Assertion with regard to a matter wch you was professedly making use of to destroy the Certainty of Reason. But this you have not done. Perhaps you will tell me that your Reason made you pronounce them absurd, by means of something you could not conceive, & in a Way you cannot describe. But this Manner of speaking seems to me very exceptionable & almost unintelligible. For how are you to know that it was a Principle of Reason wch made you draw the Conclusion unless you can condescend upon it or show what it was. Might it not in this Case have been something else than Principles of Reason, that made you declare the Consequences of the Demonstrations you mention to be absurd. How are you certain that it was not some vulgar Prejudice with regard to the Nature of Extension acquired by your Senses, somewhat like that wch makes the ignorant & illiterate imagine the Sun & Stars to move round the Earth once in 24 hours, & pronounce the opposite Opinion of the Earth's Motion absurd? You may allege it is true, that from common Life People very frequently without any Sensible effort such & such Propositions to be nonsense, & others to be true & unquestionably certain, before they attend to the Principles

from w^ch they deriue these Assertions to see whether they are founded in Reason & Prejudice or partly in both. No doubt they do, & for that very Reason judge often rashly & draw many foolish & ridiculous Conclusions. But unless they examine themselves that those are really maxims of Reason w^ch they go upon, & take Care to seperate them from the Prejudices & prepossessions w^ch spring from Custom, Education & other the like Causes, instead of amounting to more than common Evidence to truths w^ch Reason looks upon as selfevident or Consequences deriued from them by Steps the most satisfactory & convincing, they may come short of a Presumption in prejudice to their Certainty. Evidence. I endeavoured to show by taking your Words in more strict a Sense than they may be taken in without doing you any Injustice, that your very Assertions imply an Impossibily. You confess yourself that they seem to contain an Absurdity, w^ch makes you doubt even of your doubts. After attempting to demonstrate that what you affirm is impossible I allowed you a wider field, & have examined every Supposition I could think of, from w^ch you could receive any Aid, & upon examining them have been unable to find that any Advantage can accrue to your Opinion from them. Thus much may suffice for the Nature of your Attempt. Attack. I shall now examine the particulars upon w^ch you ground it.

The first then you take notice of is this. "A real Quantity infinitely less than any finite Quantity, containing Quantities infinitely less than itself & so on in infinitum." I would fain ask you where you met with a Demonstration of this, or what Genuine

either asserts or demonstrates it. I have examined the Demonstrations with regard to the infinite Divisibility of Extension w^ch are given by those who are reputed the best Geometers who treat of this Subject, & I cannot safely say that I never discerned any thing in them, that gives the least Countenance to such a Conclusion. I have likewise considered the Observations of some Metaphysicians in relation to the same Doctrine, & have not been able to discover any thing asserted by them similar to this Consequence w^ch you charge them as well as the Geometers with. I shou[ld] fully suspect that there is some mistake with regard to it. I do not imagine that you would have imputed such a Conclusion to them, if you had not been persuaded that they had actually drawn it, taking it for granted that you are more of a Gentleman than to ~~have done~~ so. But I cannot help entertaining strong Suspicions, that you have been imposed on with regard to this matter in some Shape or other, & taken it upon Trust. However if you will be so good as to mention one Geometer or Metaphysician, that so much as asserts it, I think I can show you in a Way quite satisfactory that the very first Step of the Conclusion is so far from being unexceptionable, that it contains a plausible absurdity & flat Contradiction. And to convince you that I do not pretend to more than I can effect, I beg your attention to what I am now going to say. You will readily allow I dare say that a Quantity or Magnitude must either be finite or infinite You will I am persuaded as readily acknowledge that an infinite Magnitude is greater than any finite Magnitude of the same Kind, & if it is possible for any Magnitude to be infinitely less than the least it is

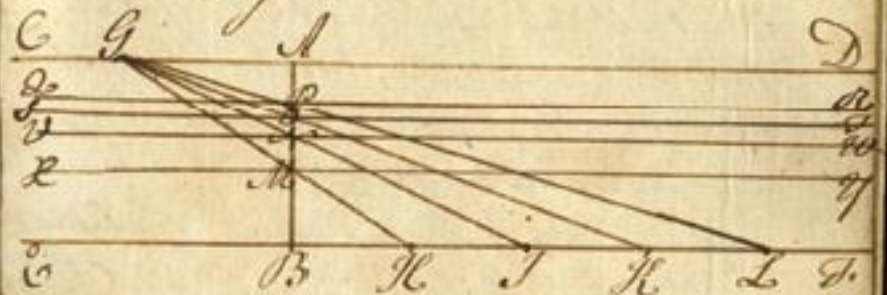
likewise a portion impossible for it to be infinitely less than the first.
In the first place then Let the real Quantity or Magnitude you speak of be a finite Magnitude or Quantity. Then a real Quantity infinitely less than any finite Quantity, comes to this a Quantity infinitely less than itself, viz. is impossible.
Next Let it be an infinite Quantity or Magnitude. Then since an infinite Quantity is greater than any finite Quantity of the same kind, a quantity infinitely less than any finite Quantity, must be infinitely less a fortiori than an infinite Quantity of the same kind, that is, must be infinitely less than itself, viz. is impossible. Perhaps you will allege that I am not dealing fairly by you here, & that this viz. I have just now shown to be impossible, is a part of that very Conclusion your Reason tells you is absurd. You must grant then your Conclusion to be endless or infinite, since it says that this said imaginary Quantity viz. I. I. shown cannot exist in Nature, contains Quantities infinitely less than itself & so on in infinitum. Here then I've evidently made a Step upon viz. an infinite Number of others in the scale hang. Besides you may be very justly called upon here to produce the Demonstration upon viz. this Step depended. I positively deny the Existence of any such Demonstration. But granting it even to exist, we must certainly conclude that it's incumbent upon you to produce it for Examination; and if it can be shown you in so satisfactory a manner that it's fault as to convince you, that part of your attack upon the Certainty of Reason founded thereon must undoubtedly fall to the ground. Be so kind then as to produce your Authority for it if you can find any

that it may be examined. I am almost confident that you cannot & that you have been generally mistaken with regard to the fact.

I shall now endeavour to show you all that is generally allowed by Mathematicians to be understood by the infinite Divisibility of Extension, & to convince you that it does not run counter to any one Principle of Reason.

Let A B represent any Part of linear Extension however small, & through the Extremities A, B of this lineal Extension let two parallel right Lines C D, E F be conceived to be drawn. Let any point G be taken at pleasure in C D one of these Lines on one Side of A B, & let equal parts be set off on the other of these Lines & on the opposite Sides of A B. Then since parallel Lines are such as though produced ever so far will not meet, it is evident that though the equal Parts B H, H I, I K, K L &c. be continued on ever so far they will not meet with the right Line C D produced. Now let the right Lines G H, G I, G K, G L &c. be drawn.

Fig. 1.



Then it is evident, since none of the Points H, I, K, L &c. though B K should be set off on E F produced in continued Succession without End, can ever meet with C D, that none of these right Lines can ever coincide with C D. But since the Angles G H I, G H B taken together make two right Angles (12. E. 1) or will come to the same thing since the right Line G H falls upon the right Line E F, G H I are not in the same straight Line. Con-

:sequently G H I is a Triangle, &
G I intersects A B in some point
N nearer to A than the Point M,
in w^h G H intersects it.

In like manner it is shown that
G K intersects it in a Point O near-
:er to A than the Point N, G L in
a Point P nearer to A than the Point
O &c so on. That is each succeeding
Line cuts A B in a Point nearer
the Extreme A than that in w^h the
immediately preceding one cuts it.

But as the Number of the Points
H, I, K, L &c. may be encreased
without End, so may likewise the
Number of the intersecting Lines
G H, G I, G K, G L &c. w^h is always
equal to the number of the said
Points; and of necessity the Num-
:ber of the Points of intersection
M, N, O, P &c. may be encreased
ever so far without our ever ar-
:riving at the Extreme A.

After the same manner, if through
the Points of Intersection M, N, O,
P &c. though ever so great in number
right Lines X Y, V W, S T, Z R &c.
be drawn, it may be demonstrated
by a similar Process, that though
we should make ever so many
Intersections of A M, A N, A O, A P &c.
respectively by means of Points
taken on X Y, V W, S T, Z R &c.
respectively, we could never reach
the extreme A.

Whence it is evident that after ever
so many Intersections of the Linear
Extention A B, or of the Parts A M,
A N, A O, A P &c. there shall still
remain a Part adjacent to the Ex-
:treme A w^h is real & finite

This Demonstration contains the Sub-
:stance of what is generally advanced
by Geometers with regard to the Divis-
:ibility of Linear Extension, tho' expressed
in a somewhat different manner, and

indeed comprehends the Substance or agreed measure of what has been or can be advanced concerning this Matter from Principles purely geometrical. For the various Methods of demonstrating it, when properly conducted and cautiously expressed, ultimately leave one in the same Conclusion.

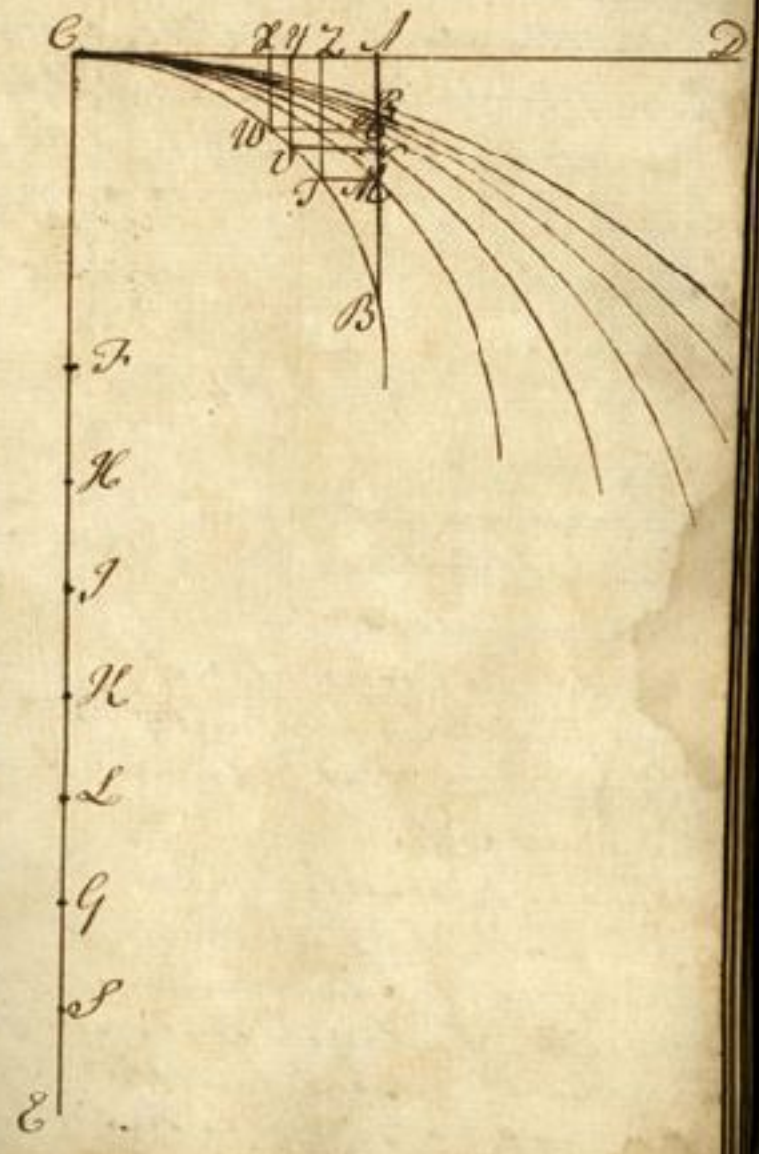
I have here supposed the Lines R V, V W, S T, Z R &c. to be drawn parallel to C D, E F, tho' Mathematicians seldom draw them thinking the Matter plain enough without them; in order to show you, that the Line A B be intersected ever so often, yet each even the smallest of the Parts lying between the Extreme A & the Points of Intersection, though intersected themselves in like manner ever so often, will still leave a real finite part adjacent to the said Extreme A.

Let us now take the well known Method of illustrating it by means of Circles, & push the Illustration a little farther than is usually done, for the Sake of Perspicuity.

Let A B be the linear Extension as before. From any Point F without it as a Centre with the Distance F B describe an Arc of a Circle. Through the Point F draw an indefinite right Line C E parallel to A B & meeting the Arc described in some Point C. From the Point C draw an indefinite right Line C D at right Angles to C E. Take on C E from the Point F any number of equal Distances F H, H I, I K, K L, L G, G &c. & from the Points H, I, K, L, G, &c. as Centres with the Distances H C, I C, K C, L C, G C, &c. respectively describe Arcs intersecting A B respectively in Points M, N, O, P, Q, R &c. Now it is evi-

:dent that the further any one of the Points in the Line C E is removed from C, the nearer will the Arc described from it as a Centre cut A B to the Extreme A. And since C D is a Common Tangent at the Point C to all the Arcs that can be described from the Points H, I, K, L, G, S &c. with the Radii H C, I C, K C, L C, G C, S C &c. if the number of these Points be increased ever so far, just so far will the Intersections M, N, O, P, Q, R &c. of A B be increased. But though the number of the intersecting Arcs should be increased ever so much, they must still fall below their common Tangent C D, in every Point but C where they meet it. Whence it is evident, that if we should suppose the Number of the Intersections to be increased ever so far, there still would remain a real & finite Part of Lineal Extension adjacent to the Extreme A.

Fig. 2.



From the Points of Intersection M, N, O &c. draw M I, N V, O W &c. parallel to C D & meeting the Arc C B in the Points I, V, W &c. and from these points draw I Z, V Y, W X &c. parallel respectively to A B & meeting C D in the Points Z, Y, X &c.

Then it may be shown precisely in the same Way, that each of the Lines Z I, Y V, X W &c. is equal respectively to the Parts lying between the Extreme A & the several Points of Intersection M, N, O &c. may be intersected a number of Times ever so great, & shall leave a real finite linear part of Extension adjacent to that Extreme in the Line C D.

This is precisely the same Conclusion with the preceding one drawn from Fig. 1. and no geometrical Process whatever can carry one beyond A in treating of the Divisibility of Linear Extension. In short this is all that is meant by Geometricians when they speak of the infinite Divisibility of Extension.

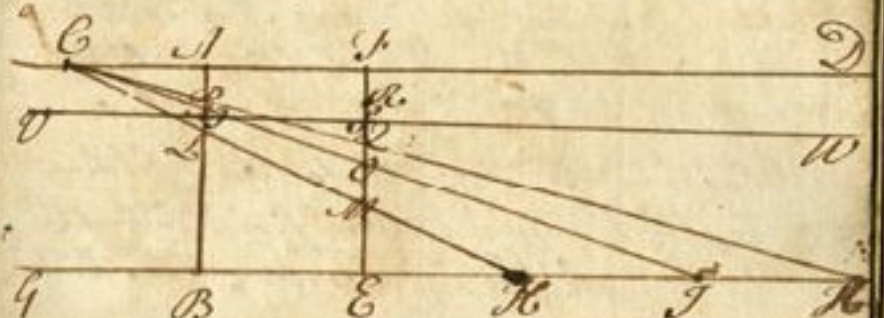
I shall now show you how the same Reasoning may be applied to Superficial & solid Extension.

Let A B E D represent in general any one of the four Species of Parallelograms, to wit the Square, Rectangle, Rhombus & Rhomboid. Take any Point C without it in the Line C D and on C K from the Point E set off equal Parts E H, H I, I K &c. Then it is evident that, if C H, C I, C K &c. be drawn, their Intersections L M, N O P Q &c. with the Parallelogram will cut off Trapezia B E M L, L M O N, N O P Q &c. But the Number of the equal Parts E H, H I, I K &c. should be increased ever so far, Some of their Extreme Points H, I, K &c. would meet with the Line C D produced. Therefore the right Lines intersecting

the Parallelogram, though their Number should be ever so much increased would ever coincide with the Line CD. Consequently there always will remain Trapezia ALMF, MNOF, NP2O &c. between the Linear Extremes AF of the Parallelogram & the Intersections LM, NO, P2 &c. with the said right Lines, tho' their Number be increased ever so much.

In like manner it may be demonstrated, that if the Trapezia MK2P &c. be reduced to Parallelograms MF, KF &c. by bisecting the Differences 2R &c. of the Sides K2, MP &c. of the Trapezia, and drawing Lines thro' the Points of Bisection &c. each of these Parallelograms tho' intended ever so often, will still leave a real ever so small Trapezium adjacent to the Extreme AF

Also if the Points A, E had been joined, & right Lines drawn from the Point A, to the several Points K, I, H &c. there would successively Triangles be cut off from the Triangular Space AKE & tho' their Number should be increased ever so much, there still would remain



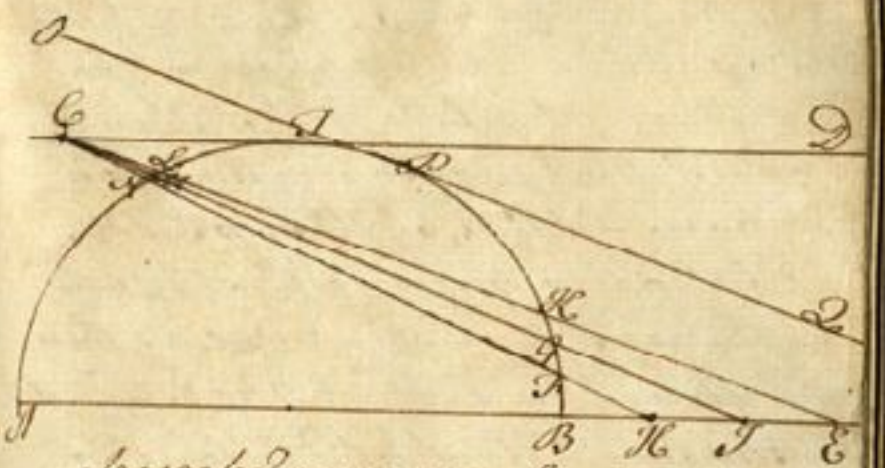
a Triangle adjacent to the Side AF.

The same Conclusion must be drawn with regard to all rectilinear Figures, either by reducing them to Parallelograms by (hS. E. I.), or without doing so.

Now let AIBA represent the Space contained by a Segment of any Curve whatever, let the Base AB be produced indefinitely, & let CD be a Tangent to the Curve & parallel to AB. Let there be any

Point C taken in the Line CD on one side of the Point of Contact I, and let equal linear Parts BH, HI, IE &c. be set off in an opposite Direction from D on AB produced. Then it is evident that just so many Area or Spaces AB GK, KI GM, MG KL &c. will be cut off from the Segment, as there are Points H, I, E &c. to wit, right Lines are respectively drawn from the Point C. But though the Number of the Points H, I, E &c. should be increased ever so much, none of them would ever meet with the Line CD. Whence it clearly follows, that though the Number of the Area cut off from the Segment should be increased ever so much, there still would remain a segment adjacent to the Point of Contact I.

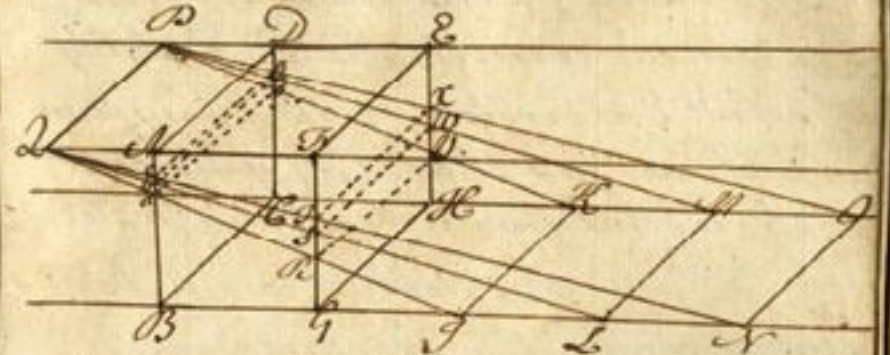
And if right Lines O2 &c. were drawn parallel to the Base LK &c. of the Segments, & touching them in Points P &c. it might be demonstrated in the same Way, that each of them though



intersected in a similar manner ever so often would still leave a real finite segment adjacent to its corresponding Point of Contact.

Lastly let ABCDEIGH represent in general any one of the four different Species of Parallelopipeds, comprehended respectively by Parallel Planes, viz. are Squares, Rectangles, Rhombuses & Rhomboids, and let the Planes ADEI, BCHG be produced indefinitely. In the Plane ADEI produced draw O2 parallel to AD, & at equal Distances GI, IL, LN &c. taken in an opposite

Direction from the other Side of the Parallelopiped, drawn IK, LM, NO &c. in the Plane BCKG produced, & parallel respectively to GK. Then it evident that just so many Intersections ad VR, bh WS, cp XT &c. with Planes passing thro' P2 and the Lines IK, LM, NO &c. as there are Lines IK, LM, NO &c. and just so many Parts of solid Extension aBCdVKGR, badhWVRS, cbhpXWST &c. will be cut off by these Intersections. But tho' plain these parallel Planes tho' produced ever so far will not meet, & plain that though the Number of the Lines IK, LM, NO &c. be increased ever so much, none of these Lines will be in the Plane ADEF produced. Wherefore tho' the Number of the Intersections ad VR, bh WS, cp XT &c. should be increased ever so much, they all would lie betwixt the Planes ADEF, BCKG, & consequently



there would still remain a part of the solid Extension adjacent to the Plane ADEF.

And if the Differences betwixt EV, Dd &c. be bisected, and Planes be drawn through the Points of Bisection parallel to ADEF, it may be demonstrated in like Manner that each of the Parallelopipeds formed thereby wch will be respectively equal to the Solids AadDEVRF, MhDEWSF, NcpDEXTF &c. though unbisected ever so often in a similar Manner, will still leave a part of solid Extension adjacent to the Plane ADEF.

The same Conclusion may be drawn concerning the Divisibility of solid Extension under any form whatever, as that of a Cylinder, a Sphere, a Pyramid, a Cone, a Sections, a Hexahedron, an Octahedron, a Dodecahedron, An Icosahedron, a Spheroid, a Conoid &c.

These Conclusions contain the substance of all that has been advanced by Geometricians or indeed can be advanced by them from Principles purely Geometrical with regard to what is usually called the infinite Divisibility of Extension. It might perhaps be as proper to call it the indefinite or unlimited Divisibility of Extension. But to dwell long on this Topic would be to quibble & dispute about Names. And if we examine attentively our Notions or Conceptions with regard to Infinitude, we shall find that we have really no Idea of such a thing as it is in itself, but that being conscious that we can conceive of Processes carried on Step by Step indefinitely, we come to get this Idea that there is such a thing as we never can reach by any Process of Operation however far continued, viz. as it were the Locus & Comprehender of all things.

Thus for Example, if the supposed Parallelopiped in the last Figure to be a Cube, we can easily conceive that by a continued Addition the three linear Dimensions of it may be gradually increased indefinitely, and thence come to form this Idea, that there is such a thing as the possible or an infinite solid Extension, viz. must be the Locus of the said Cubic solidity increased to a Degree ever so great, & viz. it can never fill. We

thereby get this Idea, that it is; but we get no Idea of itself or of what it is.

In like manner by conceiving the two linear Dimensions of a plain Surface to be continually or indefinitely increased on all Directions we get this Idea, that there must be infinite Superficial Space, in wch this increased superficial Space is comprehended, & which it can never fill. And in the same Way by conceiving a line to be continually or indefinitely increased or produced, we obtain this Idea, that there must be infinite linear Extension, in wch this Line must always be, & wch it can never equal. Methods somewhat similar to these must any Person make use of to come by these Ideas, if he wishes to have them. Let any man who has formed these Ideas examine his own mind, & say whether he did not acquire them by some Way or other similar to what I have mentioned. I dare say he will not assert that he has any distinct Idea of infinite Space itself or of what it is, tho' he has this Idea that it is. And I am fully persuaded that the Bulk of mankind never so much as any such Idea, & that their notions wh regard to Space seldom reach far beyond the Information of their Senses. Pray what else do people mean by saying that Number in its own Nature is infinite, than this, that no Number can be so great, that still more may not be added to it? Thus by adding 1 to 1 for 2, 1 to 2 for 3, 1 to 3 for 4, 1 to 4 for 5, 1 to 5 for 6, 1 to 6 for 7 &c & finding that this Operation may be continued indefinitely, we get the

Idea of Numbers being infinite.

In like manner we come at this Idea that Number is infinitely Divisible, by finding it to be divisible indefinitely. Thus the Terms of the following arithmetical or geometrical decreasing Series may be continued indefinitely.

$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}$ &c.

$\frac{1}{7}, \frac{1}{9}, \frac{1}{11}, \frac{1}{13}, \frac{1}{15}, \frac{1}{17}, \frac{1}{19}, \frac{1}{21}, \frac{1}{23}$ &c.

$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}, \frac{1}{128}, \frac{1}{256}, \frac{1}{512}$ &c.

$\frac{1}{7}, \frac{1}{14}, \frac{1}{28}, \frac{1}{56}, \frac{1}{112}, \frac{1}{224}, \frac{1}{448}, \frac{1}{896}, \frac{1}{1024}$ &c.

Now if we suppose (w^c^ may denominate Unity of any thing, to represent a Mile, a Yard, a foot, an Inch &c. & Expression) the Numbers 2, 3, 4, 5, 6, 7, 8, 9, 10 &c. the Denominators of the Terms in the first arithmetical Series, to express respectively the Part of any one of them, w^ch^ remains after each successive intersection or Division, it is evident that though the Series should be continued indefinitely & the Number of the Terms become ever so great, there still would remain ~~Part~~ a real Part of the Extension, w^ch^ part though divided in a similar manner ever so often would likewise still leave a real part of Extension, & so on continually. And all this is perfectly reconcileable to every Principle of right Reason. For none of these Operations however far continued is infinite, but the infinite Divisibility is that w^ch^ comprehends them all, & w^ch^ they never can reach or equal, though ever so often repeated.

In the first Case we supposed Unity to be continually added to itself, tho' any other Number or Numbers might have been used as well. In this there is likewise an Addition tho' of a different kind, Unity being successively added to the Denominators of the Terms of the Series.

In the one the Number however great always expresses the Multiple of a Mile, a Yard, a foot an Inch &c. of linear, superficial or solid Extension in the other, the part.

In the same Way the number 2 is successively added to the Denominators of the terms of the second Arithmetical Series. And in the two Geometrical Series the Denominator of each Term is added to itself to form that of the immediately succeeding one. To illustrate the general Idea I might make use of an endless Variety of different Series both Arithmetical & geometrical. However I imagine these few, will be sufficient to let you understand my meaning, & to convince you that what is generally called the infinite Divisibility of Extension is not repugnant to any one Principle of Reason, when properly understood & examined.

~~Before I proceed any farther I shall consider the~~

However I still cannot help observing that I could wish you had not spoken in a manner quite so vague & undetermined, and I apprehend to yourself if you have not done so, in mentioning the clearest & most natural Principles of human Reason, by which I presume you meant some Axioms or self evident Truths, which you assumed enabled you to pronounce the Doctrine of what is usually called the infinite Divisibility of Extension to be inconsistent & contradictory & which you have not been so good as to specify or mention.

Before I proceed to examine the second part of your Charge upon Geometry I shall consider the Note you annex to the first part of it. Your Words are these. "Whatever Disputes there may

be about Mathematical Points, we must allow, that there are physical Points; that is parts of Extension, &c. can, ~~neither be perceived or~~ be perceived either by the Eye or Imagination. These Images then w^ch are present to the Fancy or Senses, are absolutely indivisible, & consequently must be allowed by Mathematicians to be infinitely less than any real Part of Extension; & yet nothing appears more certain to Reason, than that an infinite Number of them compose an infinite Extension. How much more an infinite Number of these infinitely small Parts of Extension, w^ch are still supposed infinitely divisible?"

Here you in the first Place make a Distinction betwixt mathematical & physical Points; and since the former of these have from their Definition no Parts of Extension, & the latter are expressly declared by you to be Parts of Extension, the only distinction betwixt a mathematical & physical Point evidently consists in this, that the one is void, & the other is a Part of Extension. I can easily discern that in this Note you exclude the Existence of Matter by your calling these Parts of Extension Images, a method of speaking w^ch you know yourself you have borrowed from others. I fancy you think yourself sufficiently authorized to do so by one Objection to it, w^ch you have added in the first Part of your Essay, to those w^ch were formerly started by D^r Berkely & others. However I shall not dispute with you in this Place the Propriety of your doing so, since the Existence of Matter does not in the smallest Degree affect the reasoning I am now engaged in. I shall even grant you what you assert, & surely you cannot ask more. You positively assert, that Real Physical Points as you call them are absolutely indivisible. And though I should not allege that they cannot be

infinite both because if they were so they never could make up a finite Extension of the same kind, & because we cannot conceive it to be possible for infinite indivisible Extension to exist, I say that although I should not even have recourse to these Arguments, your own words excude you from the Privilege of asserting them to be so, since you say that it takes an infinite Number of them to compose an infinite Extension. They must of Necessity then be finite Parts of Extension, & since they are Points, you seem confined to linear Extension. But the Extremes of any finite Linear Extension are mathematical Points; and as you have offered no argument to show that the Use of such Points is not perfectly consistent I am certainly at full Liberty for any thing that you have advanced to use them. Now it is evident that between any two mathematical

Points however near ~~each other~~ each other, there must necessarily be other such Points, wch as necessarily divide the Part of Extension betwixt them into smaller Parts of Extension. For if you deny this you must hold that their compenetration, & consequently no part of Extension to be between them, wch is fundamentally & essentially contrary to your Supposition. For since mathematical Points have no Magnitude nor Parts of any kind & of Course can be no parts of Extention, they cannot touch one another & at the same time remain distinct & seperate, nor do they admit of partial Compenetration. But even supposing that to be possible, wch is own Nature is altogether impossible, to wit, that they could either touch or partially compenetrate each other, we should find that the Supposition would not make one single whit more for your Opinion!! I have made more Concessions

on your favour in the Course of this Examination, than I was under any Necessity of doing, & I will still make more.

" Here then you are unavoidably under the Necessity of asserting these Points you speak of to be Invisible in their own Nature, since if you do not, you necessarily hold them both to be & not to be Parts of Extension at the same time. I shall even allow that you meant by these ~~Physical~~ Points superficial Parts of extension. Then since the Extremes of such Parts of Extension are mathematical Lines w^ch are mere Length or linear Extension without Breadth, it is plain that between them there must necessarily be other such Lines, w^ch as necessarily divide each of these Parts of superficial Extension into other such Parts. For if this be denied it manifestly follows, that these mathematical Lines or Extremes totally compenetrate each other, & consequently admit no such Extension between them, w^ch is diametrically opposite to the Supposition.

Lastly I shall suppose that you meant by these Points, solid Parts of Extension, & see what you can make of this Supposition. Then since the Bounds or Extremes of a Solid are Superficies w^ch are mere Length & Breadth without thickness, it is evident that between any two of them, however near to each other, there are necessarily others, w^ch as necessarily divide this Solid Part of Extension into other such Parts. For if you refuse to admit this Conclusion, you must necessarily admit the total Compenetration of these superficies, & of Course allow that there is no Part of solid Extension between them, w^ch is perfectly destructive of the Supposition. So

that, take, you must necessarily grant that the Supposition of indivisible Parts of Extension, take it what way you will unavoidably leaves you in a manifest Absurdity. And I would ask yourself if in drawing these Conclusions, I have attempted to cut off any of your Resources, or once endeavoured to rob you of any thing that could make for your Opinion. What I have now said amounts to a Demonstration drawn from self-evident & most unexceptionable Principles of Geometry, & w^h. you have not once endeavoured to attack, that the measure of Extension, to our Eye & Imagination, upon w^h. your ground your Assertion is ~~perfectly~~ altogether false. I need not indeed have taken the trouble to demonstrate it to be so. For as you barely assert that the Eye & Imagination, are the measures of the Divisibility of Extension without bringing one Argument to support your Position, I might have answered it by merely asserting the Contrary, & could both as much Justice have demanded Audience to my negative as you could to your affirmative Assertion. For one Assertion may very justly be placed in Opposition to another. But I chose to take a more demonstrative Method of going to work, though I was under no necessity of doing so.

Besides proving however from certain & unexceptionable Principles the Absurdity of the Opinion w^h. you have taken up with regard to this Subject, I think I can point out the Mistake upon w^h. your Observations in this Note are founded. You first assume there that the Eye & Imagination are the ultimate measures of the Divisibility of Extension

sion saying first that there are parts of it w^ch can neither be divided or lessened by them, & then concluding that these Parts are absolutely indivisible. By observing that there are Parts of Extension w^ch the Imagination can ~~not~~ neither divide or lessen, I presume, you mean that the mind cannot form distinct Ideas of Parts or Divisions beyond these. I also take it for granted that you make the Imagination keep Pace with the Eye in this respect. Nay if you are consistent with yourself you must do so. For if you allow that the imagination can furnish us w^th distinct Ideas of Parts & Divisions beyond the Images got by the Eye (to adopt your own Language, since neither we use it or not, it can make no Difference in the Reasoning) you must certainly grant that the Eye is not an ultimate measure of these things, w^ch is contrary to your Supposition. Or if you will not acknowledge this, you must confess that the Information given by the Imagination is false. Whence then, since you are under the necessity of acknowledging either that these Measures are of the same Extent or that one or the other is false, w^ch acknowledgement would surely render the other very doubtful, it is plain that they must stand or fall together. You seem to me then in this Particular to have confounded the distinct Idea of a thing ~~as to its Nature~~, with the Ideas of the Possibility & Necessity of the thing. For finding your Eye & Imagination as far as they go to agree perfectly with Reason in declaring Extension to be divisible, when these stop short you conclude that it is no farther divisible. But you will certainly allow that tho' you cannot have a clear Idea of a particular thing, as to its Nature or Shape it is

that you can form such Ideas as these, that it may be or that it is necessarily.

The Idea of a thing is totally distinct from the Idea of the Nature of the thing and of the manner in wch it is, and these again are perfectly different from the Idea of the Possibility of the thing or from the Idea of its Necessity. The first of these however you have confounded with these two last, as is plain from your concluding, both that the Divisibility of Extension is not, & is not possible beyond the Limits of your Eye & Imagination, because you have no distinct Idea of it beyond the Information wch they give us of it. I dare say you would not take it well were I to allege that you sometimes draw Conclusions without Evidence or Premisses. But I leave it to yourself to determine in the present Case, whether it was incumbent on you to have shown that there is no Difference between those Ideas, & that they are entirely the same on each other, before you argued from the Existence of the one to that of the other. It was certainly necessarily for you to have attempted & not only attempted but accomplished this Proof before you ventured upon your Conclusion, wch however you have not once offered to do. Indeed were you to attempt such a Proof I should not hesitate to say to you Age cum navigas, since I think the Contrary may be shown to be true from a great Variety of Instances. Take the following one, wch I hope will convince you of the Truth of what I now say. Suppose then that you take a Boy, who simply understands what is meant by a Circle & right angled Triangle, & knows nothing about the Properties of those Figures. Tell him that it is possible for the two Circles described on the Sides comprehending the right Angle to be equal to the Circle described on the Hypothenuse or the Side opposite to the right Angle, & he will easily understand your Assertion, though he himself does not discern the Possibility. Again tell him that it is possible to demonstrate

this Equality, & he will easily under-
:stand you, though he does not himself
see the Possibility of the Demonstration.
In like manner inform him that this
Equality necessarily takes Place for that
it is impossible it should be otherwise,
and he will readily conceive your
meaning, though he does not see
the necessary Equality itself. Tell
him again that it has been demon-
:strated & proved, & in Effect by Euclid
himself, as appears from 12. & 12. 18. & 8.
& 47. & 1. whose Demonstrations you
positively affirm in the Beginning
of your 4th Essay are not only true,
but will remain for ever so inde-
:pendent on whatever is existent in
the Universe; I say tell him this, &
he will immediately understand
you, though he has no Conception
of the Demonstration or Proof of this
necessary Equality. I might multi-
:ply Examples to this Purpose, but
it is needless to do so, since from the
one I have now made use of it is suf-
:ficiently evident, that we can both
conceive that a thing is possible &
is necessarily, without having a
distinct Idea of the thing itself of
what it is, or of how it is. The Contrary
of all this however I lay upon you
to demonstrate before you have Re-
:course to an Assertion, in Support of
wch you have not produced the least
Shadow of Proof. You cannot here
fly to Reason & say that it Authorizes
you to call your Eye & Imagination
the ultimate Measure of Extension,
since Reason on all Hands declares
against you. I just proved from Rea-
:son itself wch you yourself as I have already
observed acknowledge not only to be
true, but to be in their own Nature
eternally so, that your Position of in-
:divisible Parts of Extension implies
an Impossibility, & of Course that the
Measure from wch you take it is false
& absurd. I have now shown that

the Idea upon w^ch you graft your measure itself goes upon a Confusion of distinct & separate Ideas, & is direct:ly opposite to ~~all~~ the Knowledge we have of many of our Ideas. Besides Reason furnishes us with Axioms w^ch instantaneously almost declare ~~against~~ against the whole of your position. For whatever is absolutely indivisible can have no Parts of any [magnitude] kind; and whatever has no parts of any kind [any magnitude], can be no part of Extension. Before we have done with this Sub:ject, I think it may not be amiss to apply this measure of yours to increased Extension; & surely you can have no Objection to the Appli:cation, since it is the only one you condescend upon or leave to be applied. Now since you affirm that no Exten:sion can be less than what this measu:re extends to, & since it is the only measure you have fixed on, there must likewise be no Extension greater than what it takes in. For if it bound one Extreme

it ought certainly to bound likewise the other. For if it does not, you must allow that your measure of Extension is imperfect & incompleat; & if it does not hold for one Extreme, how are you sure that it holds for the other. This supposi:tion would undoubtedly furnish a strong Presumption against its doing so, particularly since you have ad:vanced Nothing to show that it is more adapted to the one than the other, w^ch in this Case it was indisputably your Business to have done. Besides as the Application of this measure is the only ground you go upon in drawing this Conclusion, that it limits one Extreme, confounding as I have already shown the Idea of a thing with the Idea of the Possibility of the thing or with that of its necessity Existence you have left yourself no Bottom to rest upon in drawing any other Consequence w^t regard to the other Extreme. What then must be the Re:

:sult of the Application I propose? Plainly this; That no Extension can exist but that w:ch the Eye takes in or reaches. For you must make the Imagination keep Pace w:th the Eye in your Portion for the Reasons I have mentioned above, if you want to avoid the Imputation of Absurdity & Contradiction in making it. That I may give you all Manner of fair Play I shall adopt your own Expressions. I dare say you will not maintain then, that those Images w:ch the Eye supplies us with extend beyond what is usually called the Heavens, or what commonly goes by the Name of the Region of the fixed Stars. No longer or greater Extension then does or can possibly exist. A fairer Conclusion than this cannot possibly be drawn from your Principle, & I am conscious I have done you no sort of Injustice in drawing it. This Extension then I suppose you hold to be infinite; since if you do not, you must deny the Existence of infinite Extension. And I do not see how you can well deny this, after saying That nothing appears more certain to reason, than that an infinite Number of those indivisible Points you mention, compose an infinite Extension." Whence then you are necessarily forced into this Conclusion, viz:t That the Extent between you & what is generally called the Region of the fixed Stars is infinite, or at least there is so much thing as infinite Extension & I shall allow yourself to judge of the Propriety of it. I have made some Concessions to you in managing this Dispute w:ch I was not obliged to do; & yet after all you see, that every Chain of Argument however short & inevitable drawn from raised on your own Principles leads directly either to an Absurdity or Contradiction.

I shall conclude my Examination of this Note with taking Notice of one other Circumstance, w:ch tho' it does not indeed fall immediately under my

Consideration at present, yet as you make it the Base of your Objections to the Existence of Matter in the first Part of this 12th Essay, I shall briefly consider, & point out some Contrariness flowing from it, wch strike equally at your Principles & D.r Berkeley's, wch seem, I must own to me, sedulously different. You assume in the first part of your Essay that the mind perceives things external, but that there are only Images present to it, without bringing any Proof soever in Support of your Assumation; & in this Note you call the Parts of Extension you speak of as indivisible Images & say that they are present to the sense & senses, that is, to the mind, wch alone perceives & imagines. These Images, tho' you deny that they are divisible or have parts, you allow to form larger Images wch have parts. Then you positively declare that an infinite number of them composes an infinite Image or infinite Extension wch you must of Course acknowledge contains an infinite Number of Parts. (And the number of Parts wch any Image, or what we call Extension consists of must likewise be equal to the Number of those component indivisible Images, wch go to make it up. Every one of those Images then wch we call parts of Extension except these indivisible Images, must according to your own Declaration consist of Parts. All these Images then, wch have Parts are present to & in the Mind as you every where assert, when you speak of them, you must certainly confess that the mind wch contains them also consists of Parts. For if you do not you must assume that things wch have Parts can be contained in a thing wch has no Parts. Now as such Images according to your own Principles & Language may be Linear superficial or solid Extension, the mind must possess linear superficial & solid Ex-

:tension: Also since every Figure has Extension, those Images w: we call Figures must have ex:
:tension, & the mind must possess extended Figurability. Wherefor il follows from your Principles that the Mind is extended, consists of Parts, & possesses Figurability under great Variety or the Capacity of being figured in a great Variety of Ways. I do not see how you can possibly ward off this Blow. But this is not all. You allow the Ex:
:istence of that infinite Image w: you call infinite Extension, & that it is made up of an infinite Number of those indivisible Parts of Extension & indivisible Images w: you make mention of. I formerly showed that according to your Principles there can be no such thing as infinite Exten:
:sion, unless you hold the Extent be:
:tween your self & those Images w: you called the fixed Stars to be so. Now whe:
:ther I take your Principles as laid down by your self or best by this Conclusion, I can most easily obtain this Consequence of the Mind as containing this Image consists of an infinite Number of Parts. And if I confine myself to your own Principles solely, I can draw this Con:
:clusion most unexceptionably, that the Mind is infinitely extended, since it contains an infinitely extend:
:ed Image. I am not sensible of hav:
:ing taken any wide Step in order to arrive at these Conclusions, nor of having traveled in the smallest De:
:gree your Words & Expressions. For you expressly call Parts of Extension Images, & you suppose that these Im:
:ages may be combined or encreased by Addition, & consequently that Im:
:ages composed of these may be opened by Division. They must therefore pos:
:sess Extension according to all the Ideas

we have of it. The Mind then is ex-
:tended & not only extended but extended
infinitely, consists of an infinite Numb-
:ber of Parts w^ch^ are capable of an endless
Variety of Figurability; that is, it possesses
all those Qualities of what is called Bo-
:dy, w^ch^ are usually denominated primary.
Besides you allow it to posess all the
secondary Qualities of Body, such as
hard soft, hot, cold, white, black &c. since
following D^r^ Berkeley you affirm y^t^
these are Qualities in the Mind not
in the Object. You plainly acknow-
:ledge then that the Mind is the Sub-
:stratum of all those Qualities w^ch^
are usually ascribed to matter, or
is that thing in w^ch^ these are inhere.
Now what is this but making it
Matter? For all that M^r^ Locke meant
or indeed any other Person could reason-
:ably mean by Matter was this, that
it is the substratum of these Qualities,
knowing nothing further about it.
But this Conclusion throws new light
upon the Nature of it, since it informs
us that it not only professes those Quali-
:ties w^ch^ mankind generally ascribe
to it, but likewise those Qualities of think-
:ing, willing, perceiving &c. Qualities
w^ch^ they formerly very foolishly refer
to something they call Spirit different
from Body or the substratum of those
other Qualities. However we now learn
that Body is the substratum of these
as well as of the other. Your mind
then is Matter w^ch^ thinks, wills, per-
:ceives its own Qualities, & not only
is Matter, but is Matter infinitely
Extended & of Course fills the Universe.
Also there is nothing but Matter in
the Universe, since those very Qual-
:ities by w^ch^ alone we were led to think
there was something different from Body
w^ch^ we called Spirit, are found to have
been misapplied, & really to belong to
Body. You must therefore either draw
necessarily this Conclusion that you may

are Matter & Matter too infinitely extended, & of course filling the Universe, capable of having your Parts variously figured & coloured, some of them hard, others soft, some cold, others hot, &c. or you must give us those very Principles, w^ch you had Recourse to in order to prove that Matter does not Exist, & by means of w^ch you seem to have thought you had accomplished your Proof. And since you fill the Universe with Matter, there can no Matter exist without you, unless you allege that some of your Parts are external to the rest of your Parts. Nor can you possibly hold any other Matter to exist at all, since if it does it must exist in yourself, & two things of the same kind exist at the same time in the same Place. Neither have you the smallest Reason to conclude the Existence of Spirit or anything different from Matter in the Universe, since those very Qualities by w^ch alone you could draw the Conclusion of thinking, willing, perceiving &c. are found to belong to Matter. Thus it appears then that the Principles you made use of to prove that Matter does not exist, when pushed to their proper Consequences necessarily leave you in this Conclusion that nothing else but Matter exists in the Universe, w^ch is full of it, & that you yourself are this infinite Matter w^ch fills it.

I now proceed to examine the next part of your Charge, w^ch is expressed in the following Words. "Nothing can be more common & satisfactory than all the Conclusions concerning the Properties of Circles & Triangles; & yet when these are once granted, how can we deny, that the Angle of Contact between a Circle & its Tangent is infinitely less than any rectilineal Angle, that as you may increase the Diameter of the Circle in infinitum, this Angle of Contact becomes still less even in infinitum, & that the Angle of Contact be-

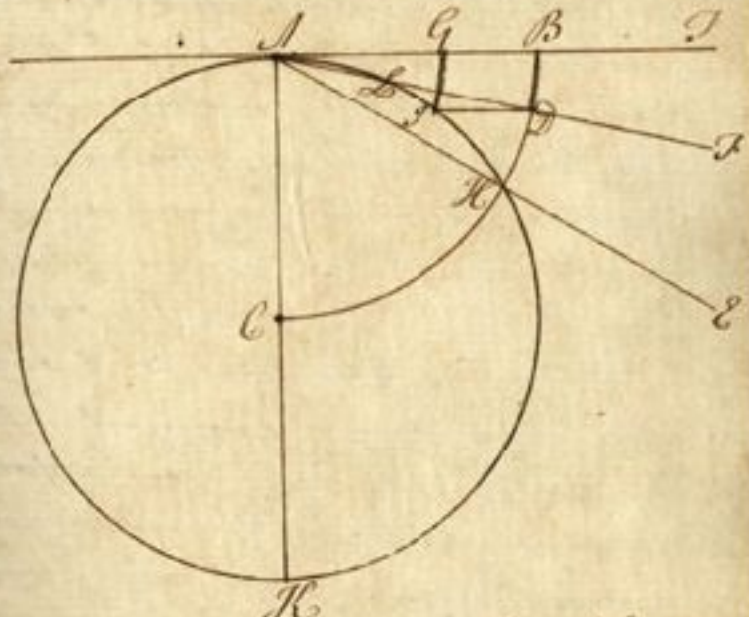
:twixt other Curves & their Tangents may be infinitely less than those betwixt any Circle & its Tangent, & so on in infinitum." &c

I am sorry that I am again under the Necessity of refusing the Fact. For I deny that any Mathematician ever demonstrated that the Angle formed by a Circle & its Tangent is infinitely less than any rectilineal Angle, or even strictly speaking, that it is less than any rectilineal angle, instead of being infinitely less. It is true indeed that Euclid concludes the Demonstration of the 16th Prop. of his third Book with saying that the Angle of a Semicircle is greater than any acute rectilineal Angle, & the remaining Angle or Angle of Contact less than any rectilineal Angle. But by this Expression w.ch is undoubtedly loose & unguarded, tho' at the same time it falls infinitely short of your Assertion, he can only be understood to mean, that no straight Line can be drawn from the Point where a right Line touches a Circle between the Tangent and the Diameter passing thro' the Point of Contact, so as not to cut the Circumference; or w.ch amounts to the same thing, that however small an Angle any straight Line drawn from the Point of Contact makes with the Tangent, or however great an acute Angle it makes with the Diameter passing thro' that Point, some part of the Circumference will always be betwixt this right Line & the Tangent. This is all that Euclid has demonstrated, & indeed that he could have demonstrated with regard to this Matter. And this is therefore all that he can be supposed to have meant by the foregoing Expression. Indeed it is an Expression w.ch has appeared to some very judicious Geometers, so unguarded & exceptionable, that they have I think with a good Deal of Reason looked on that Part of the Proposition as spurious or adulterated. But whether it be Euclid's or not it must have its Sense & meaning limited by what he has demonstrated, & there is not one Word in all his Performance from Beginning to End, that gives the least Countenance to this Assertion, that the Angle of Contact is infinitely less than

any rectilineal Angle. Besides as mixtilineal Angles are intirely of a different Kind from rectilineal ones, & as it were heterogeneous, he could not with any Propriety compare them together in respect of Magnitude, till he had found out some common Measure of Magnitude to wch they might both be referred. But from all that Mathematicians have been yet able to discover, it does not appear, that he could from all the Propositions in his Elements have investigated such a Standard measure. For tho' great Improvements have been made in the exact Sciences in modern Times, wch Euclid knew nothing of, particularly by Sir Isaac Newton that Sun beam of the human Race, yet no such measure has been found. We know that the Magnitudes of rectilineal Angles ~~are measured~~ contained by right lines of the same length, are measured by arcs of a Circle described from the common angular Point as a Center with one of those Lines as a Radius, & may be compared together by means of these Arcs. But this measure is not applicable to mixtilineal Angles, nor is there any common measure known to Mathematicians that can be equally applied to both the Sorts of Angles. And it cannot be questioned, that till some such thing be found out, it is absurd to compare them together in respect of Magnitude. Euclid's Demonstration with regard to the Angle of Contact, tho' it comprehend the Substance of what his Principles enabled him to conclude concerning it, could not have furnished him with the smallest Ground for such a Comparison. That this Angle properly speaking is less than any rectilineal Angle is what no man can prove, since Geometry as far as is yet known, does not afford Data for comparing their Magnitudes; & that it is infinitely less than any rectilineal Angle, is what no Person, who is in the smallest Degree acquainted with the Principles of this Science of Geometry, would dare

take in hand to attempt to demonstrate
In Proof of what I said in relation to the
Magnitudes of these two Sorts of Angles,
that the same measure is not applicable
to both, take the following illustration.
From any Point C as a Centre with
any Radius CA describe a Circle AHK,
Draw the Diameter ACK, & from one
of its Extremities A a Tangent AI.
Also from the Centre A with any of the
same Radius AC describe an Arc DHC
wch is a Quadrant. Through the Point
H where this Arc meets the Circle AHK
from the Point of Contact A draw a
right Line AE; from the same Point
any other right Line between AE &
the Tangent AI, wch will intersect
the Arc BH in some Point D. Draw
DI parallel to AB & IG to BD, & through
the Points G, I let an Arc be described
with a Radius equal to AB.
Then it is evident that since the Chords
BD, GI are equal & parallel, the Arcs
BD, GI are equal ~~& similar~~. But
BD, GI are also equal to the Magnitude of the Angle EAI or to

the Magnitude of the Angle DAI as the
Arc BH, to the Arc BD. Now the Arc BH
subtends the rectilineal Angle DAH
at the Distance AB, and the Arc BD or GI at the



Distance AG. But neither of these arcs
has any Title in preference to the other
to become the measure of this Angle; &
as they both cannot, neither of them is.
In like manner it may be shown
that no Arc whatever subtending the
rectilineal Angle DAH & described at
any Distance from the Point A can be-
come the measure of this Angle, so as to

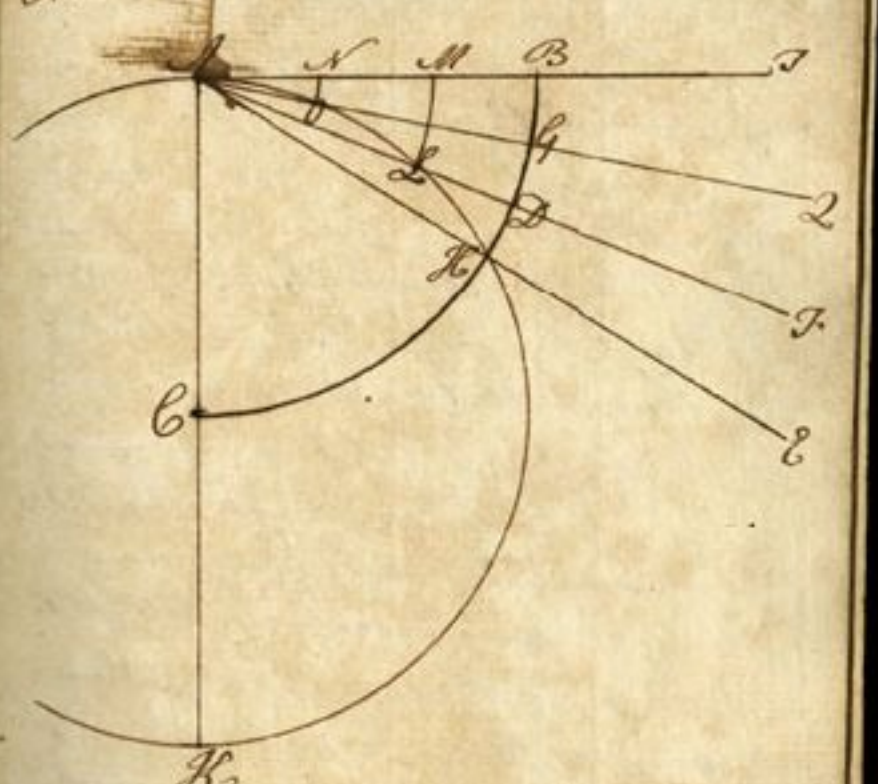
enable us to compare its magnitude with that of a rectilineal Angle. An indefinite Number of Arcs may be described at different Distances from the Point of Contact A; and whether any one of these Arcs measures it or not, is the difficulty, has not yet been shown by any Geometer or Philosopher whatever. Nay if any one of them can be the measure of it, it is plain that there is some rectilineal Angle equal to it; since however small the Arc be, there is always a right lined Angle so small as to be measured by it. Whence I assume that we are not authorized by any common measure w^ch Geometry affords us for comparing together the magnitudes of rectilineal & right lined Angles, to draw this Consequence that the Angle of Contact between a Circle & its Tangent is either greater or less than any right-lined Angle. And All that we can conclude with regard to it is what Euclid himself has demonstrated, w^ch is, that there is no rectilineal Angle so small formed by the Tangent & a right Line drawn from the Point of Contact on the same side of the Tangent with the Curve, as not to include some Part of the Circumference intersected or cut off by the right Line so drawn. And more than this he has not demonstrated in Reference to the Angle of Contact.

Much less then have we any ground to go upon in drawing this Inference that the said Angle is infinitely less than any rectilineal Angle, w^ch as a Conclusion, I am persuaded, that was never attempted to be drawn by any Geometrician whatever, &c. I am ready to show, he never could have deduced from unexceptionable geometrical Principles, having already demonstrated that he has no Data on w^ch he can ground his reasoning. If you will grant me out any such Conclusion, I shall undertake to show it indisputably to be false.

Otherwise

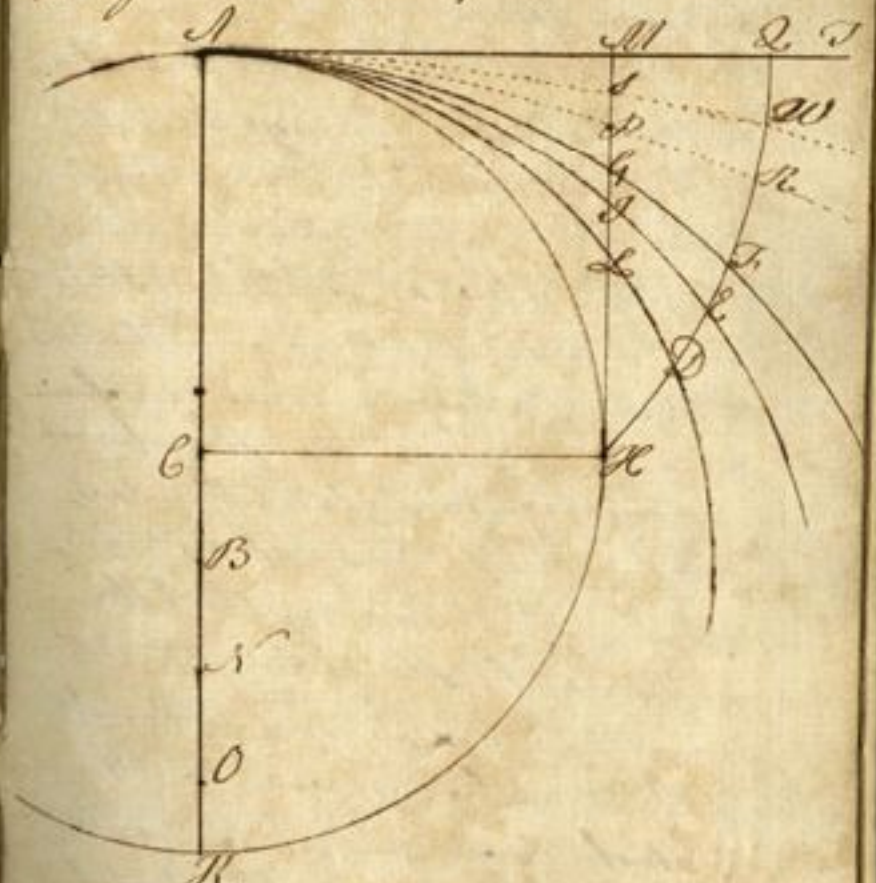
The Magnitudes of the Angles EAI, FAI, GAI, have to one another respectively the Ratios of the Arcs BK, BD, BG. But the Magnitudes of the Angles EAI, FAI, GAI, at the Distances AM, AN respectively are measured by the Arcs ML, ND. Now it is evident that if the Magnitude of the mixtilineal Angle HAI at the Distance AB, AM, AN &c. from the Point of Contact A be expressed by the Arcs BK, ML, ND &c. joining the several Points of the Tangent with the Circumference AK, it cannot be supposed subject to the same Law of Connexion with rectilinear Angles, & of Course be compared with their Magnitudes. For let it be so. Then since BD, BG &c. are fourth Proportionals to AL, AD and ML; MD, MG & ND &c. the Areas of the same mixtilinear Angle HAI at the same Distance AB will be represented by each of the Arcs BK,

BD, BG &c. w.ch is absurd. The Arcs BK, BD, BG &c. may be indefinite in Number.



We would arrive at the same Conclusion, by taking M.r Cotes Measure of an Angle, that mixtilineal & rectilineal Angles cannot be compared together by any Method yet known.

Let M K touch the Circle A K K, & with A K as Radius describe K 2. Also let there be any Number of Distances C B, B N, N O &c. be set off from the Centre C in A C produced. Then it is plain that all that is meant by any Mathematician when he has occasion to say that the Angle K A T of Contact is Diminished infinitely, is nothing more than what is demonstrated in Prop. 2. viz. that however great the Number of Circles A D, A E, A F, were described from the Centres B, N, O &c. & intersecting M K, 2 K in Points L, I, G &c. D, E, F &c. there shall may be described more Circles intersecting them in Points nearer to M & 2. Now if A P R be such a Curve that M P is always as M, P, R will be points to wit the Intersections L, I, G &c. D, E, F &c. approach nearer & nearer, but however great their Number do not reach. And what is this but saying that K P, K R may be drawn & intersected indefinitely which I have already shown to be possible wt regard to all Orders of Extension.



Now as this will be the Case at whatever Distance the Point K be from the Point of Contact A, it is unquestionable that nothing can be understood by the Expression but this, that any Radius

Extension may be cut indefinitely
that an indefinite Number of Circles
having the same Tangent may pass
thro' a given Space
In like manner if A S W be such a
Curve that M S is always as M W,
there may an indefinite Number
of Curves of the same Order & kind as
A P R pass between A P R & A S W.
Whence it is sometimes said that the
Angle R A T is diminished indefinite-
ly, w: only means that these Curves
fall nearer & nearer to the Point S,
W, when they intersect S P, W R.
And thus is just saying that the
linear Parts of Extension S P, W R
between the corresponding Points
S, W; P, R of the Curves A S W,
A P R at their lower Distance they be
taken from the Point of Contact, may
may be cut indefinitely. And so on
may proceed on indefinitely. Now
this is perfectly consistent wd. what is
formerly demonstrated in relation
to the indefinite Divisibility of any

of Extension, & showed to be agreeable to
every self-evident Maxim & Principle
of Reason. I might extend the same
Observations to Solids generated by
these Curves by supposing A R R
to be any Section whatever of a Hemi-
sphere thro' its Center, & A D a
right Line drawn on a Tangent
Plane to the Sphere in the Point A.
But any Person can make the Appli-
cation who is in the least acquainted
with Geometry.
When Mathematicians assign
one rectilineal Angle to be less than
another, they only mean this, that
the Curve forming the one lies
nearer to the Common Tangent at
any certain Distances from the
Point of Contact, than that w: forms
the other. Thus is the only Way they
have of denoting their Magnitudes.
For they have no common Measure
for them & right lined Angles, & I
am persuaded never will. In Con-
firmation of what I say I might

bring the concurring Testimony of all Geometers & Mathematicians who treat of this Subject. I shall satisfy myself with mentioning the Authority of one of the greatest Mathematicians that the World can boast of, & who, if any Person, was of such a Genius & Such Studies, as would have enabled him to find out such abstruse Measure, viz. however he nowhere takes notice of. And the only Method, viz. he employs to compare the Magnitudes of mathematical Angles is what I have just now described, as appears from his Solution to his Doctrine of prime & ultimate Ratios.

Note To suppose one to have an Idea of Infinitude, is to affirm that he has already finished & compleated the Process of adding his Ideas of what is finite, viz. is infinite & never can end; viz. is absurd. For to maintain that what never can end, is already ended.

Genesis Chapter 4th.

In this Chapter there are enumerated 7 Generations from Adam before the Flood in the Line of Cain, viz. and thus Adam, Cain, Enoch, Irad, Mehujael, Methusael, Lamech,

and {Jabal / Jubal} Lamech's Sons by Adah,

{Jubal-Cain / Naamah} his Son & Daughter by Zillah

Chapter 5th.

In this Chapter there are reckoned 9 Generations from Adam to the Flood in the Line of Seth, viz. follow with the Years from the Creation to the Flood

		Ages
Adam	Created	930
Seth	130 years	912
Enos	105	905
Cainan	90	910
Mahalaleel	70	895

		Ages
Jared	65	962
Enoch	162	365 translated
Methuselah	65	969
Lamech	187	777
Noah	182	950 Ch. 9. V. 29.

Noah's Age at the Flood Ch. 7. Verse 11. 600
From the Creation 1656 to the Flood

Chapters 7th & 8th.

From these Chapters it appears that Noah made use of the Lunisolar Year consisting of 360 Days, or of 12 months of 30 Days each. For Ch. 7. Verse 11. we are told that Noah entered into the Ark on the 17th Day of the 2d. month, & in Ch. 8. Verse 3 & 4th. that at the End of 150 Days it rested on the the Mountains of Ararat on the 17th Day of the 7th month, that is, at the End of 5 months, viz. at 30 Days a piece make 150 Days. This year was originally used by all Ancient Nations, that we have any true Account of.

The Arithmetick of Infinites or Method of Indivisibles is only the Method of Extractions made use of by the Ancients a little disguised & altered.

You declare the "Absurdity of the Determination of the abstract Sciences to be all managed by Demonstration with regard to Time than Extension"

"An infinite Number of real Parts of Time, you say, passing in Succession, & exhausted one after another, is so manifest a Contradiction, that no Man, one should think, whose Judgement is not corrupted instead of being improved by the Sciences would ever be able to admit of it."

By an infinite Number of real Parts of Time passing in Succession & exhausted one after another, you must either mean, that after the Part in the Succession w^ch is infinite in Number is ended, we exhausted another begins to

be exhausted & soon; or that all the Parts are actually exhausted. If you mean the first I confess I cannot discover the Contradiction you speak of, since it seems to me to signify nothing more than this, that Parts of Duration differing from & succeeding one another so on without ever coming to an End or Conclusion. But if you mean the second, I dare say there is no Person capable of understanding the Terms of the Proposition who will not immediately reject it. For if the Parts can ever be all exhausted they are not infinite. And if you understand the Proposition in this Light, I will venture to affirm that no Person ever embraced it, at least I am certain that I never met with any Mathematician & Metaphysician that asserted it. Any Rate I am positive that no one ever demonstrated it, since it is in itself demonstratively absurd from the very Principles of the abstract Sciences, & that these consequently cannot be charged with it. As to the first however I must acknowledge I do not discern the Contradiction in the Terms of it; since though the Parts of Duration are exhausting successively one after another, yet as their numbers is infinite, they never can be exhausted. An infinite Number does not appear to me to be a very proper Expression. For tho' Number in itself is endless or infinite, yet there is no such thing as an infinite Number. Thus let a number be ever so great or what Retrench from Unity you will, Unity or other Numbers may still be added to it without End. And whatever may be increased, is not surely infinite. The Addibility of Numbers is endless or infinite & consequently leaves no room, in such

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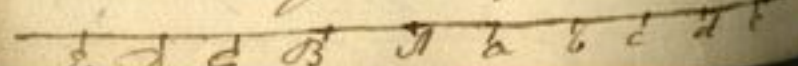
: forming a Number that cannot
be increased. By adding any parti-
: cular Measure of time backwards &
forwards from the present Instant, &
finding this Portion of time to be di-
: visible to itself without End in the same
Way with Numbers, we necessarily
conclude that there is infinite Dura-
: tion or Eternity, wch can never be
filled or exhausted by the Increase of time
any Measure of time however far
continued. And this is all that is
meant by Metaphysicians, when
they speak of Eternity or infinite Du-
: ration; & in this I think there is not
the smallest Contradiction or Absur-
: dity. I have already observed the
same thing wt regard to Extension, a
Space or Expansion if you choose
to give it these Names.
Infinite Duration may likewise
be illustrated by means of linear Extension.



Observation on the Idea of Power

As every one of our Perceptions either of external Objects or of our own Thoughts furnishes us with the Idea of Unity, being that by wch any thing is called one, so every thing wch we consider as produced, every Change or Alteration observable in any thing or Idea, every Motion of the Body, every Act of the Mind, gives us the Idea of Power. Every Person must therefore have the Idea of Power almost as soon as he is capable from the Exercise of his Senses to form a distinct Idea of any thing. For there is scarce any one that does not very early form a Sort of Necessity between sudden Motions Changes & Alterations beginning to be or exist, each of wch unavoidably affords him the Idea of Power or of something producing it. The Idea of any Production of what kind necessarily infers the Idea of Power since the Mind cannot avoid receiving

by seeing it to be impossible for any thing produced to produce itself; for it would be the same thing as supposing it to be, before it began to be or exist.

There is only however the Idea of the Existence of Power somewhere, that properly speaking, since we know nothing about the real Nature of any Power. In like manner we borrow

Mr. Locke mentions the Idea of Power Book 2d. Ch. 7. Sect. 8. Book 2d. Ch. 21. Book 2. Ch. 23. from Sect. 7th to the End. I think that Mr. Locke might with more Propriety have called the Power w. produces any Effect the Cause, than the Subject in w. it originates or is conveyed.

The Idea of every Effect, by w. I mean any thing whatever produced, dependency upon some Power for its Production, w. Power I call the Cause, is different from this Idea that the same or an equal Power operating precisely in the same Circumstances would always have produced, & always will produce the same or an equal Effect. The first refers to the necessary Dependence of the one for its Existence on the other; the last to the necessary Production of the one in consequence of, & connected with the Power in general past or present, or to come. The single Effect informs us as effectually as ten thousand of the necessary Existence of some Power at the time of its Production.

And if this Relation is necessary, it must have been so, & must always be so, cæteris paribus.

Mr. Hume does not treat Mr. Locke fully in saying that he derives the Idea of Power in particular Substances, as the Power Mr. Hume has to produce Reality from reasoning, & then calling it an original simple Idea. For he derives such Ideas from Sensation

ken Sect. 7. Chap. 23. Book 2. he ex-
:pressly affirms that these Ideas are
actually complex ones, & asks Par-
:don of his Readers for using them
as one original simple Ideas en-
:tering into the complex ones of
Substances. His Words are.

"Therefore it is that I have reckoned
"these Powers amongst the simple
"Ideas, wch make the complex ones
"of the sorts of Substances; though
"these Powers consisted in the Re-
"are truly complex Ideas. And in
"this looser Sense, I crave leave to be
"understood, when I name any of
"these Potentialities, among the
"simple Ideas, wch we recollect in our
"Minds, when we think of particular
"Substances."

And Mr. Locke indeed in this Chap-
ter & in the Beginning of Ch. 26. has
said all that Mr. Hume has ad-
:vanced concerning the Connexion

betwixt certain Effects & particular
Substances, imagening that he at
the same time was saying something
new & contrary to Mr. Locke's Obser-
:vations.

Mr. Locke evidently makes a dis-
:tinction betwixt the Idea of the ne-
:cessary Dependence of any Effect
upon some Cause, & that of any
particular Effect depending upon
some Power in a certain Substance.

Towards the End of Sect. 2. Ch. 26.
he says that "to have the Idea of
"Cause & Effect, it suffices to consider
"any simple Idea or Substance, as
"beginning to exist by the Operation
"of some other, without knowing
"the Manner of that Operation."
That is one Instance as well as a
thousand suffices to give us the Idea
of necessary connexion betwixt an
Effect & some Cause.

And in Sect. 1 of the same Chapter
he says that it is by repeated Obser-

sations we come to connect
strongly particular Effects to certa
Subjects. "Thus says he finding
that in that Substance w^ch we call
Wax, Fluidity, w^ch is a simple Idea
"that was not in it before, is con-
"stantly produced by the Application
"of a certain Degree of heat, we call
"the simple Idea of heat in Relation
"to fluidity in Wax the Cause of it,
"& fluidity, the Effect; & so on"

Definitions

Cause is that Power by w^ch any
thing of whatever kind or nature
(substance motion thought, Change &c
is produced or begins to be or exist
And the thing so produced is called
the Effect.