

come to agree with the account of the Church of *Rome* : and every Year, during this time of Forty Years, shall be as this present Year 1645. and as those of 1646. and 1647. will be in the usual and ordinary computation.

III. *A Calculation of the Credibility of Human Testimony.*

M*oral Certitude Absolute*, is that in which the Mind of Man entirely acquiesces, requiring no further Assurance : As if one in whom I absolutely confide, shall bring me word of 1200 *l* accruing to me by Gift, or a Ships Arrival ; and for which therefore I would not give the least valuable Consideration to be Ensured.

Moral Certitude Incomplete, has its several Degrees to be estimated by the Proportion it bears to the *Absolute*. As if one in whom I have that degree of Confidence, as that I would not give above One in Six to be ensured of the Truth of what he says, shall inform me, as above, concerning 1200 *l* : I may then reckon that I have as good as the Absolute Certainty of a 1000 *l*, or five sixths of Absolute Certainty for the whole Summ.

The *Credibility* of any Reporter is to be rated (1) by his *Integrity*, or Fidelity ; and (2) by his *Ability* : and a double *Ability* is to be considered ; both that of *Apprehending*, what is deliver'd ; and also of *Retaining* it afterwards, till it be transmitted.

“What follows concerning the Degrees of Credibility, is divided into *Four Propositions*. The *Two First*, “respect the *Reporters* of the Narrative, as they either “*Transmit Successively*, or *Attest Concurrently*: the *Third*, “the *Subject* of it ; as it may consist of several *Articles* : “and the *Fourth*, joins those three Considerations together, exemplifying them in *Oral* and in *Written* “*Tradition*.

PROPOS. I.

Concerning the Credibility of a Report, made by Single Successive Reporters, who are equally Credible.

LET their Reports have, each of them, Five Sixths of Certainty ; and let the first Reporter give me a Certainty of a 1000 *l*, in 1200 *l* : it is plain that the Second Reporter, who delivers that Report, will give me the Certainty but of $\frac{5}{6}$ ths, of that 1000 *l* or the $\frac{5}{6}$ th of $\frac{5}{6}$ ths of the full Certainty for the whole 1200 *l*. And so a Third Reporter, who has it from the second, will transmit to me but $\frac{5}{6}$ ths of that Degree of Certainty, the Second would have deliver'd me &c.

That is, if, *a*, be put for the Share of Assurance a single Reporter gives me ; and, *c*, for that which is wanting to make that Assurance compleat ; and I therefore suppos'd to have $\frac{a}{a+c}$ of Certainty from the First

Reporter ; I shall have from the Second, $\frac{a^2}{a^2+c^2}$; from the

Third, $\frac{a^3}{a^3+c^3}$.

And accordingly if, *a*, be = 100 ; and *c* = 6, (the number of Pounds that an 100*l*, put out to Interest brings at the Years end ,) and consequently my Share of Certainty from One Reporter, be = $\frac{100}{106}$; which is the present value of any Summ to be paid a Year hence : The Proportion of Certainty coming to me from a Second, will be $\frac{100}{106}$ multiplied by $\frac{100}{106}$, (which is the present Value of Money to be paid after two Years ,) and that from a Third-hand Reporter, = $\frac{100}{106}$, thrice multiplied into itself ; (the Value of Money payable at the end of Three Years,) &c.

Corollary.

And therefore , as at the Rate of 6 per. Cent In-

Interest the present Value of any Summ payable after Twelve Years, is but half the Summ: So if the Probability or Proportion of Certitude transmitted by each Reporter, be $\frac{100}{101}$; the Proportion of Certainty after Twelve such Transmissions, will be but as a half; and it will grow by that Time an equal Lay, whether the Report be true or no. In the same Manner, if the Proportion of Certainty be set at $\frac{100}{101}$, it will come to a half from the 70th Hand: And if at $\frac{100}{1001}$, from the 695th.

PROPOS. II.

Concerning Concurrent Testifications.

IF Two Concurrent Reporters have, each of them, as $\frac{1}{8}$ th of Certainty; they will both give me an Assurance of $\frac{35}{36}$ th, or of 35 to one: If Three; an Assurance of $\frac{215}{216}$, or of 215 to one.

For if one of them gives a Certainty for 1200 *l*, as of $\frac{1}{8}$ th; there remains but an Assurance of $\frac{1}{8}$ th, or of 200 *l* wanting to me, for the whole. And towards that the Second Attester contributes, according to his Proportion of Credibility: That is to $\frac{1}{8}$ th of Certainty before had, he adds $\frac{1}{8}$ th of the $\frac{1}{8}$ th which was wanting: So that there is now wanting but $\frac{1}{8}$ th of a $\frac{1}{8}$ th, that is $\frac{1}{36}$ th; and consequently I have, from them both, $\frac{35}{36}$ th of Certainty. So from Three, $\frac{215}{216}$, &c.

That is, if the First Witness gives me $\frac{a}{a+c}$ of Certainty, and there is wanting of it $\frac{c}{a+c}$, the Second Attester will add $\frac{a}{a+c}$ of that $\frac{c}{a+c}$; and consequently leave nothing wanting but $\frac{c}{a+c}$ of that $\frac{a}{a+c}$, $\frac{c^2}{a+c}$. And in like manner the third Attester adds his $\frac{a}{a+c}$ of that $\frac{c^2}{a+c}$, and leaves wanting only $\frac{c^3}{a+c}$. &c.

Corollary.

Hence it follows, that if a single Witness should be only so far Credible, as to give me the Half of a full Certainty ; a Second of the same Credibility, would (joined with the first) give me $\frac{3}{4}$ ths ; a Third, $\frac{7}{8}$ ths ; &c : So that the Coattestation of a Tenth, would give me $\frac{1023}{1024}$ ths of Certainty ; and the Coattestation of a Twentieth, $\frac{2096999}{2097000}$ ths or above Two Millions to one. &c.

PROPOS. III.

Concerning the Credit of a Reporter for a Particular Article of that Narrative, for the whole of which he is Credible in a certain Degree.

LET there be Six Particulars of a Narrative equally remarkable : If he to whom the Report is given, has $\frac{1}{2}$ ths of Certainty for the whole, or Summ, of them ; he has 35 to one, against the Failure in any One certain Particular.

For he has Five to One, there will be no Failure at all : And if there be ; he has yet another Five to One, that it falls not upon that single Particular of the Six. That is, he has $\frac{1}{2}$ ths of Certainty for the whole : and of the $\frac{1}{2}$ th wanting he has likewise $\frac{1}{2}$ ths, or $\frac{1}{30}$ ths of the whole more ; and therefore that there will be no Failure in that single Particular, he has $\frac{1}{2}$ ths and $\frac{1}{30}$ ths of Certainty, or $\frac{16}{30}$ ths of it.

In General, if $\frac{a}{a+c}$ be the Proportion of Certainty for the whole ; and $\frac{m}{m+n}$ be the chance of the rest of the particular Articles m , against some one, or more of them n ; there will be nothing wanting to an absolute Certitude, against the not failing in Article, or Articles, n ,

but only $\frac{nc}{m+n \times a+c}$

PRO.

P R O P O S . IV.

Concerning the Truth of either Oral or Written Tradition, (in Whole, or in Part,) Successively transmitted, and also Coattested by several Successions of Transmittents.

(1) **S**upposing the Transmission of an *Oral* and *Narrative* to be so performed by a Succession of Single Men, or joined in Companies, as that each Transmission, after the Narrative has been kept for Twenty Years, impairs the Credit of it a *th* part; and that consequently at the Twelfth Hand, or at the end of 240 Years, its Certainty is reduced to a Half; and there grows then an even Lay (*by the Corollary of the second Proposition*) against the Truth of the Relation: Yet if we further suppose, that the same Relation is Coattested by Nine other several Successions, transmitting alike each of them; the Credibility of it when they are all found to agree, will (*by the Corollary of the first Proposition*) be as $\frac{1023}{1024}$ of Certainty, or above a Thousand to One; and if we suppose a Coattestation of Nineteen, the Credibility of it will be, as above Two Millions to One.

(2) In Oral Tradition as a Single Man is subject to much Casualty, so a Company of Men cannot be so easily suppos'd to join; and therefore the Credibility of $\frac{1023}{1024}$ ths, or about $\frac{9}{10}$ ths, may possibly be judged too high a Degree for an Oral Conveyance, to the Distance of twenty Years. But in *written Tradition*. the Chances against the Truth or Conservation of a single Writing are far less; and several Copies may also be easily suppos'd to concur; and those since the Invention of Printing exactly the same: several also distinct Successions of such Copies may be

be as well suppos'd, taken by different Hands, and, preserv'd in different Places or Languages.

And therefore if Oral Tradition by any one Man or Company of Men might be suppos'd to be Credible, after Twenty Years, at $\frac{10}{100}$ ths of Certainty ; or but $\frac{2}{10}$ ths ; or $\frac{1}{10}$ ths : a Written Tradition may be well imagin'd to continue, by the Joint Copies that may be taken of it for one Place, (like the several Copies of the same Impression) during the space of a 100, if not 200 Years ; and to be then Credible at $\frac{100}{101}$ ths of Certainty, or at the Proportion of a Hundred to One. And then, seeing that the Successive Transmissions of this $\frac{100}{101}$ of certainty, will not diminish it to a Hal until it passes the Sixty ninth Hand ; (for it will be near Seventy Years, before the Rebate of Money, at that Interest, will sink it to half :) It is plain, that written Tradition, if preserv'd but by a single Succession of Copies, will not lose half of its full Certainty, until Seventy times a Hundred (if not two Hundred) Years are past ; that is, Seven Thousand, if not Fourteen Thousand Years ; and further, that, if it be likewise preserv'd by Concurrent Successions of such Copies, its Credibility at that Distance may be even increas'd, and grow far more certain from the several agreeing Deliveries at the end of Seventy Successions, than it would be at the very first from either of the Single Hands.

(3) Lastly in stating the Proportions of Credibility for any Part or Parts of a Copy, it may be observ'd ; that in an Original not very long, good Odds may be laid by a careful Hand, that the Copy shall not have so much as a Literal Fault : But in one of greater Length, that there may be greater Odds against any Material Error, and such as shall alter the Sense ; greater yet, that the Sense shall not be alter'd in any considerable Point ; and still

still greater, if there be many of these Points, that the Error lights not upon such a single Article; *as in the Third Proposition.*

IV. *Part of a Letter from Dr. Hotton to Dr. Tancred Robinson, Concerning the late Swammerdams Treatise de Apibus; the Ahmella Ceylonensibus, and the Faba Sti. Ignatii.*

IT A est, damnabat sua studia δ μαναις Swammerdamius noster; erat enim Sectæ *Antonia Bourignon* addictus: id verò doleo non produisse Amici hujus nostri *Commentarium de Apibus*, omnium quæ unquam elaboravit Castigatissimum; hoc opus vernaculo Sermone scriptum cum Iconibus quamplurimis eò spectantibus plus semel apud eum vidisse me satis memini; at ubi jam latitat ignoro prorsus.

Nuperis Annis magnam celebritatem nacta est ob vim Lithontripticam quæ ipsi ascribitur, Herba quædam à *Ceylonensibus Ahmella* dicta. An jam uspiam exstet nescio; sed eam colui, cum versarer in Præfecturâ *Horti Amstelod.* Flores fundit in summis caulibus per similes *Chrysanthemo Curassav. alato caule flo. Aurantiis Par. Bat.* Semen ei bidens, caules quadrati, fol. Lamii vel Urticæ (quæ subacria sunt) conjugatis amicti; undè manifestè liquet ad Cannabinæ Genus, quod bidens vocat *Cæ/alpinus*, eumque sequutus *Tournefortius*, spectare; neque fortè inconcinne nuncupari posse *Cannabinam* aut *bidentem Urticæfoliam Indicam Lithontripticam.*

Novissimè quoque increbuit usus *Faba*, quam vocant, *di Sto. Ignatio*; dicitur & *Higosur* & *Faba di St. Nicolas* & *de Cava longa.* Semen est amarissimum, quod nullam
Fabæ