A N
E S S A Y

Towards illuſtrating the

S C I E N C E
O F
I N S U R A N C E.

Wherein it is attempted

To fix, by preciſe Calculation, ſeveral impor-
tant Maxims upon this Subject;

To ſolve various Problems, and Caſes of
Conteſt;

And particularly

To balance, whether it be nationally advan-
tageous to inſure the Ships of our Foreign
Enemies.

Addreſſed to the
Right Hon. HENRY PELHAM, Eſq;

By the AUTHOR of
A LETTER *from a* BYSTANDER.

----- *Prodeſſe quam conſpici.*

L O N D O N:
Printed in the Year M DCC XLVII.

To the RIGHT HONORABLE

Henry Pelham, Efq;

S I R,

HAVE the Honor to lay this ESSAY at your Feet, in public Teftimony of my Gratitude, not only as a Subject in general of the *Britifh* Dominions, but as particularly indebted for diftinguifhing Acts of your Favor. Acknowledgments of this fort, I am fenfible, are ufually frefh Trefpaffes; And that, whilft I feem to be offering my Gratitude, I am ferving myfelf of new Advantages: ---- For if ever the prefixing of a *Great* and *Favorite* Name hath availed to a Work, This

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may juftly prefume on Succefs, under your Aufpices; And hath affured to itfelf *Dignity* from *your Patronage*, and *public Efteem* from *your Approbation*.

Your fuperior Skill in the Commerce of your Country, fixes every Effay of this fort under your Dominion.--- For though your *high Station* gives you a *Power*, you derive from your *Abilities* an *Authority* much greater, over thefe Subjects. A Work, therefore, which pretends to bring new Light upon *Objects* of *Trade*, and to rectify the *Courfe* of *Bufinefs*, is juftly to pay its Homage to You; And it is from your Decifion upon it, that the World will be inftructed to form their Sentiments. --- For fo juft is the public Deference, that it would unanimoufly have conftituted YOU the *Judge*, if you had not condefcended to be the *Patron*; --- And it is thus happy for me, in this Addrefs, that what my fondeft *Ambition* had vow'd, the ftricteft *Propriety* hath directed.

'Tis

'Tis yours, Sir, to direct the Finances of this Empire.----Nobility of Defcent, Influence in the Senate, fuperior Knowledge, and, what throws a *Luftre* upon all, the *Favor* of your PRINCE, have call'd You to this Station.---Thefe are fhining Advantages, and they have alfo been eminently poffefs'd by many of your Predeceffors.--- But what CHARM have You found to conciliate adverfe Parties, and reconcile the Claims of haughty Competitors! Hereditary Refentments, and long Expectations of fweet Revenge, have all been relinquifh'd by your Mediation; And the SENATE hath almoft forgotten the *Voice* of *Envy* and *Difcord*. --- The Great, of all Parties, have affented to your Power; And our inteftine Divifions have all fubfided upon your Direction of the Public. --- Our *Anceftors* labour'd under *Civil Diffentions*, and the Force of the State was rent by *perfonal Oppofitions*, and *rival Attacks:* They wanted ONE *Superior* amongft them, as the common *Center* of *Union*, whofe

whose *Decency* and *Dignity* attracted universal Esteem, and in whose Power they could all concur. ---- Happy for that Age, where this PERFECTION of CHARACTER shines; To whose Sentiments all have deferr'd their own, and unanimously confide in his clear *Probity* of *Heart*, and unbiass'd *Rectitude* of *Judgment*.

This hath not been more *glorious* for YOU, than serviceable to your PRINCE, and COUNTRY. The PROTESTANT SUCCESSION, our great PALLADIUM, hath acquired, from this general Attachment to You, the firmest Security. From your Influence, and upon a dutiful and upright Basis, MANY of the NOBLEST throughout the Kingdom engaged in the immediate Service of the Crown, jointly banishing their Disgusts, and despising all false and mean Imputations: In the *Hour* of *Danger* they were found faithful, and exerted their important Force for the HOUSE of HANOVER, and the *Liberties* of their *Country*.

But

But there is ONE, whose Merit in this *Junction* was the *Rival* of Yours: The *Benevolence* of his Nature, and his untainted *Integrity*, were of great Efficacy in cementing the *Union*. ---- It would be new, that in any Instance of Zeal for the HOUSE of HANOVER, the DUKE of NEWCASTLE should not be of the foremost: In the Time of Anxiety his *active Watch*, and *undaunted Courage*, stood forth, as our public *Guard:* His powerful Influence then eminently appeared throughout the Nation; And his *riper Years* well supported the Cause, which his *early Youth* had gloriously vindicated.

This powerful and new *Coalition* of the noblest Families in concert with YOUR HOUSE, gave a general Confidence to the Friends of *Liberty*.----REBELLION saw the Efficacy of it, to its Confusion; And where it falsly had flatter'd itself with Neutrality, found the warmest Friends to the HOUSE of BRUNSWIC: Hence despairing, it turn'd its Course, and

shrunk

shrunk abash'd to the darkest Corner of the Land. --- Your Merit in this Event will be ever recorded by your grateful Country: For the *Junction*, so important at this Crisis, which was cordially made with *You*, would not have been obtained by *other Ministers*. ---Thus, instead of being torn by *Civil Divisions*, our *Enemies*, to their Astonishment, found us an *united* People; Nor could the PUBLIC CREDIT of *Britain* be shaken, for YOU was at the Helm.---The *Rebels* then skulk'd in the *North*, till they obtain'd their Reward from the ILLUSTRIOUS YOUTH, sent forth for their *Scourge* by our ROYAL HERO; Who, as the *Soul* of the *State*, then animated his whole *People*.

Extensive *Authority* is now delegated to your Care, from the *Favor* of your *Prince*, and from the united *public Affection*; And it hath not been delegated, but for great Purposes: It would never have been committed, in such Plenitude, to the Direction of ONE, for common, or trivial Ends.---

I   Atchieve-

Atchievements are expected at your Hands, worthy of your Power. ---You have advanced far in ABOLISHING our PARTY DISTINCTIONS;--- If it be reserv'd for Mortal to accomplish, it belongs to You:---Pursue the important Task; --- Continue your *Benevolence* to All equitably, and proceed to *enlarge* the *Pale*. ---- You have the Body of the Great and the Good on your Side throughout the Nation: Their Wishes and Prayers attend your Progress; And You have already outstripp'd their fondest Hopes. --- It is an Object the nearest to your own Heart, and the most worthy of your Power; And will be the Completion of all your Glory.

There are other Atchievements also demand your *Sickle*, and wait to be gather'd to your full *Sheaf*:--- The REGULATION and ABRIDGEMENT of the BODY of our LAWS;---The DISCOVERY and JUST APPLICATION of the Revenues of CORPORATIONS, HOSPITALS, and SCHOOLS, throughout the Kingdom.--- These are great and important Objects;

a   And

And there is yet ONE left *exposed*, which demands your *Piety*, --- To vindicate the NURSERIES of LEARNING from their *illiberal Statutes*, and *narrow Exercises*; To open *Polite Education* to the *British* Youth, and to lead forth the SCIENCES and ARTS in an amiable Dress. It will be of public Ornament, and diffusive Benefit.----Our YOUTH shall then seek no Refinement *abroad*, but owe the highest to their own Colleges *at home*: Other Nations shall come to *draw* at *our* SPRINGS, and find the SEATS of POLITENESS in *Your* Britain.

S I R,

Your most obliged,

And most obedient,

Bury-Street,
St. James's, London,
Aug. 14, 1747.

Faithful Servant,

CORBYN MORRIS.

PREFACE.

*T*HE following Essay *appears in public with the utmost Deference;* ---- *It hath arisen from some accidental Remarks I made upon the Subject, which led me to perceive that it had a Fund the most extensive both of curious and useful Speculation. Upon this Light I sprung to the Work, though an absolute Stranger to the* Practical Part *of the Business.* --- *After I had set down the Points which my own Imagination suggested, a Conversation with a very ingenious and worthy* Merchant *opened to my View a new Variety of Topics, which I thought merited a clear Discussion and Solution.* ---- *Our Sentiments upon these,* I *must own, were not consonant; his Notions being established by a long Course of* Practice, *and mine perhaps too fondly attached to a Set of* new Principles. --- *It is therefore proper to advertise the Reader, that he is to expect no Information concerning what are the present Customs, or* Practice *in this Business; but some Remarks con-*

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cerning what ought to be, *according to my Apprehension: And throughout the whole, an Endeavour to establish the just Maxims, not upon old Custom or Prejudices, but upon a fair open Footing of Reason and Equity.*

It will be observed, I imagine, that the Rates of the Premia, *and the* Prices *of Goods, in the Instances I have mentioned, do not correspond with the real* Premia, *or* Prices, *which occur in Practice: But this is not of Concern; The* Method *of* Reasoning *being the Point to be ascertained; And it being easy, when this is fixed, to substitute any different* Premia, *or* Prices, *and to draw just Conclusions from them in any Instance.*

The defective Part *of the Cargoe, or the* Sea's Share, *which are Terms frequently occurring in the following Essay, are to be understood to include, not only what is due to* Shipwrecks, *but also to* Captors, *and to all other* Accidents *upon the* Sea.

It hath been constantly supposed in this Work, if 100l. *be insured, and the Ship be lost, that this whole* 100l. *will be repaid by the Insurer: Whereas it is said to be the Course of Practice to stop* 2 *per Cent, and to pay only* 98l. *to the Insured. --- This will raise the Amount of the Premium, but not alter the following Methods of Solution. --- Thus, if the Premium be* 10 *per Cent, and* 98l. *is to be recovered for every* 100l. *which is insured, This Premium is then in reality* 10l. *upon* 98l. *And how much per Cent, or how much upon* 100l. *it is equivalent to, will be*

be readily found by common Proportion: As 98 : 10 : : 100 : 10.2. *So that the Premium, in this Case, is really* 10.2 *per Cent; And substituting this new Value of the Premium instead of the former, the Question is easily solved by the Methods in this Essay.*

The Mathematical Solutions *which occur in this Work, however obvious they are, and easily attained, may be apt at first to appear formidable, and be imagined entirely unnecessary to the Subject. The same, I acknowledge, was my own Sentiment, when I entered upon this Work: But I soon found, that without the Aid of some higher Calculations, all must be left unsettled and loose, And bounded by general Guesses, instead of being accurately measured and limited. --- It is not therefore Affectation of Obscurity, but absolute Necessity, has introduced these Solutions, in order to demonstrate those perfect and clear Distinctions in the Subject, which justly raise it to the Dignity of a* Science. *--- But it hath been endeavoured to explain these Solutions by various Examples in common Life; And so much Pains hath been taken to render the whole intelligible, and to reduce it to the Level of* common Arithmetic, *that the Piece will have less Rank upon this Account, than it might otherwise pretend to: --- For I am very sensible, that the Condescension I have shewn to the* many, *will appear tedious to the* few. *--- But having the Public in general at heart, it has been my Ambition to be really* useful, *rather than be thought* skilful.

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As to the latter Part of this Work, it contains Reasons, which appear conclusive to me, against our Insurance of the Ships of our Enemies. --- I am sensible, at the same time, that many Gentlemen of the greatest Abilities, and the most disinterested Love to their Country, have been of a contrary Opinion, and have regarded this Commerce as profitable to the Nation. ---- It will be acceptable, I am sure, to these Gentlemen, to see the Point examined to the Bottom; And if I have contributed to set a Truth of so great Importance in a full Light, I shall have their Applause; At least I have to hope, that my Endeavours, tho' mistaken, upon this Subject, will be candidly regarded, for the sake of the Public Zeal, by which they are inspired.

There will be found, through the whole, some Remarks, *and* Distinctions, *which seem to have* Novelty *and* Use *to recommend them. --- Of this Sort are the* Distinctions *concerning* the clear Capital, the Premium, *and* the whole Capital; *The* Rules *for* Insurance *derived from them; And the Proof*, that, upon a Footing of Equity, no Person hath a Right to insure so, as to recover the Premium, over and above his Expences. --- *The Demonstrations, that* the same Sum, either staked upon one, or spread upon many Voyages, equally hazardous, will be exactly of the same Value; *And yet, that* the Extension of the Voyages will continually effect the Mitigation of the Hazard. The Approximation of the successful and unsuccessful Voyages, the oftner they are repeated, to the original

ginal Proportion between the Stakes, *with other various Remarks, which have not hitherto appeared, that I know, upon this Subject; And yet are Points of the most* general Importance *and* Utility *in the Science. ---- And lastly, the* Adjustment *of some curious and intricate* Cases *of* Contest *between* Merchants *themselves, and between* them *and* Insurers; *In which a* new general Method *of solving these Cases is invented, and submitted to* Gentlemen *of* Business.

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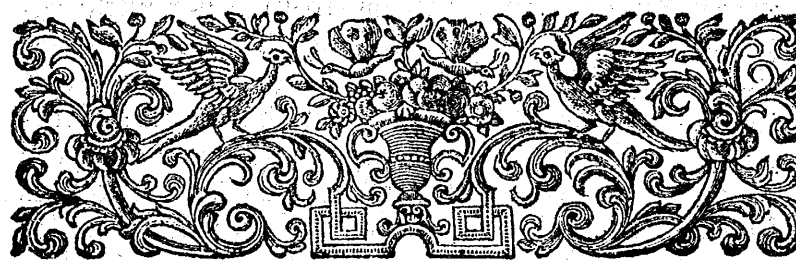
E S S A Y

Towards illuftrating the

SCIENCE of INSURANCE.

INSURANCE, which I am now to treat of, is that *Aid*, whereby the national Commerce is fupported, And the Cafualties and Misfortunes incident to the induftrious Merchant are mitigated. — It is by this Method of Security that any Perfon, having his Property ftanding out upon Hazard, is indemnified from all Lofs, upon Payment of a fair Compenfation; And the *Infurers*, in confideration thereof, take the whole Rifk upon themfelves, leaving the *Merchant* at liberty to urge his Commerce, with Quiet of Mind, with fteady Purfuit, and with folid Credit.

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It is deferving of the higheſt Attention, as a *Source* the moſt fruitful of *private Speculation*, and *public Benefit*; And is ſo far from being juſtly reproachable as a *Plan* of *Gaming*, that it removes the *Buſineſs* of the *Merchant* from that State, and greatly reduces the *Riſk* upon the whole; Diſſipating it in ſuch a manner, as to leave even the *Inſurer* himſelf liable to little Hazard. — And it is ſo far from being open to any Objection under right Conduct, that, in true Policy, the *whole Body* of every People ſhould inſure the induſtrious and uſeful *Undertakings* of *all* their *Members*; And wherever no Recourſe is to be had to ſuch *Inſurances*, it is a great Defect of their *State-Policy.*

However, therefore, from the Narrowneſs of any particular Perſons, who have been Inſurers, the Profeſſion itſelf may have been regarded as mean, and void of all Dignity, I cannot but eſteem it highly meritorious, and honorable; For it can never juſtly be deemed a mean Profeſſion to intercept the Calamities of the induſtrious Merchant, and to give Security to all his worthy Purſuits.

It may perhaps be thought, that in theſe Encomia upon *Inſurances*, I am running into the Error of moſt *Biographers*, who are remarkable for extolling the *Perſon* whoſe *Life* they treat of, beyond all other *Heroes.*—But it is evident, that Inſurances give Tranquility and Chearfulneſs to the extenſive Trader: Theſe only make it juſtifiable for him to venture in many Branches of Commerce, which are of great Benefit to the Nation: Theſe enable him to lay a ſteady Foundation of Credit, To procure Money upon eaſy Terms, And to bring his Goods cheap to foreign Markets. — It is indeed from theſe only that he can often be ſaid to be worth any thing with Certainty, or can at ſome times

times juſtly pretend to borrow at all; — And to theſe the Nation is indebted, that many uſeful Articles of Trade are rendered either reaſonable, or practicable, to be carried on by its Subjects.

It may perhaps ſeem a *Paradox* here, how *Inſurances* can occaſion leſs Riſk and Diſtreſs upon the whole, ſince they only ſeem to transfer the Evil from one Hand to another, And inſtead of the *Merchant* to place the *Inſurer.*

And indeed if *one Inſurer* alone took upon himſelf the whole Riſk of *one Merchant's* Property, there would be no leſs Diſtreſs upon the whole, except in that Portion of it, which would be mitigated by the *Premium* paid to the Inſurer, And whereby he would be enabled to diſcharge ſome Part of the Loſs. — But, as the Caſe generally is, *ten* or *twenty* Inſurers join together in inſuring *one* Cargoe; Whereby each Inſurer ſpreads the Property he riſks upon *ten* or *twenty* different Events, and is not tied to be a Loſer of *all*, by the Reſult of *one* unfortunate Voyage.

This *mitigates* the Hazard in favour of the Inſurer: — For though, in each Voyage, the Odds may be 2 to 1 on his Side, it would be very imprudent for him to riſk the *whole*, or the greateſt Part of his Property, upon the Event of *one* Voyage; It being no more than 2 to 1 that he loſes not *all*: — Whereas, by extending the ſame Sum to *ten* different Voyages, it will be prodigious Odds, no leſs than 59048 to 1, that he does not loſe *all*, or that he wins *one*, or *more*, of the Voyages.———— It is hence evident, that by the Junction of a Body of Inſurers together, and the Extenſion of their Riſk to many Voyages, there is leſs Hazard incurred by each, and conſequently leſs Diſtreſs. — And thus the *Merchant* is ſecured, and the *Inſurer* not equally liable to be cruſhed in his

ſtead;

ſtead; Which demonſtrates the general public Benefit derived from Inſurance.

But, to explain more particularly the Conſequences of the Extenſion of the Riſk to ſeveral Voyages, it will be neceſſary to advance the following Propoſitions.

PROPOSITION I.

If A riſks 1000 l. *upon the Event of* one *Voyage, where the Odds in his Favour are in any Proportion, as* 9 *to* 1; *And B riſks* 100 l. *upon each of* ten *ſeveral Voyages, or* 1000 l. *likewiſe upon the whole, the Odds in each Voyage being alſo in the ſame Proportion as in A's Adventure, Then will the Value of A's and of B's Expectations, upon the whole, be exactly the* ſame; *Notwithſtanding the Property of A depends upon* one *Contingency, and the Property of B depends upon* ten *ſeveral Contingencies.*

DEMONSTRATION.

Imagine the Chances for A and for B are *nine* to *one* in their Favour, in each Voyage.

1. There being then *nine* Chances for A's winning, to *one* Chance for his loſing, it follows that A is entitled to $\frac{9}{10}$ of the whole Sum adventured, upon a fair Compoſition; But the Sum adventured is 1000 l. therefore the juſt Value of A's Expectation, upon his Adventure, is $\frac{9}{10}$ thereof, or 900 l.

2. There being *nine* Chances for B's winning, to *one* Chance for his loſing, in each Adventure, it follows that B is entitled to $\frac{9}{10}$ of each reſpective Sum, which is adventured, upon a fair Compoſition;

poſition; But the Sum adventured upon each Voyage is 100 l. therefore the juſt Value of B's Expectation, upon each Adventure, is $\frac{9}{10}$ thereof, or 90 l. And there being *ten* ſuch Adventures, the Value of B's Expectation, upon the whole, is *ten* times 90, or 900 l. which is exactly the ſame with the Value of A's Expectation. Q. E. D.

Another DEMONSTRATION.

Imagine *eleven* Perſons, A, B, C, D, &c. to have each adventured 1000 l. upon *eleven* different Ships, where the Odds for each Voyage to be proſperous are *nine* to *one*, being all exactly the *ſame*; It is then evident, that the Values of A's and B's Expectations, and of all the reſt of the Adventurers, are exactly equal.

Imagine now, that the *ten* laſt Perſons, B, C, D, E, &c. all ſell their entire Expectations to *one* Purchaſer, L; It is then evident, that the total Value of L's Expectation is equivalent to all their Expectations together, and decuple the Value of A's Expectation.

Imagine again, that L ſells out his whole Expectation in *ten* Lots, to *ten* Perſons, Q, R, S, T, &c. each Purchaſer to be entitled to $\frac{1}{10}$ Part of the Reſult of each of the *ten* Events; It is evident then, that in lieu of the former *ten* Perſons, B, C, D, E, &c. each of whom ſtood the Riſk of *one* whole Voyage himſelf, here are now ſubſtituted *ten* other Perſons, Q, R, S, T, &c. each of whom ſtands the Event of $\frac{1}{10}$ Part of each of the *ten* Voyages. But the Value of the Expectations of each of theſe laſt, is equal to the Value of the Expectations of each of the former; For if Q's Expectation be leſs valuable than B's, then the total Value of the Expectations of Q, R, S, T,

T, &c. is alfo lefs valuable than the total Value of the Expectations of B, C, D, E, &c. But that cannot be, becaufe then the Value of the Expectation of L would be lefs alfo. Neither can the Value of Q's Expectations be greater than the Value of B's ; For then the total Value of the Expectations of Q, R, S, T, &c. would be greater than the Value of L's Expectation.———— Therefore the Values of B's and Q's Expectations are exactly equal, being both equal to $\frac{1}{10}$ of the Expectation of L. Therefore if B be fubftituted in the Place of Q, that is, if B's Adventure be extended to *ten* different Voyages, the Value of A's and B's Expectations will be ftill equal. Q. E. D.

PROPOSITION II.

If A has wagered 1000l. *againft* 1000l. *of his Adverfary's, upon the Event of* one *Voyage, where the Odds are* 9 to 1 *in A's Favour ; And B has wagered* 100l. *in the fame manner, upon each of the feveral Events of* ten *different Voyages, amounting in the whole to* 1000l. *alfo, the Odds in each Voyage being likewife* 9 to 1 *in his Favour ; Then are the* Values *of A's and of B's Expectations exactly* equal *by the foregoing Propofition.* — *And yet, the Probability that A is a Winner, is evidently no more than* 9 to 1 ; *whereas the Probability that B is a Winner, is above* 610 to 1. — *Again, it is no more than* 9 to 1, *that A does not lofe the* whole ; *whereas it is* 9,999,999,999 *to* 1, *or near* 10,000,000,000 *to* 1, *that B does not lofe the* whole.

DEMONSTRATION.

The Probability of A's being a Winner, is laid down to be $\frac{9}{10}$ in the Propofition, and his Adventure depending upon one fingle Event, without further Expanfion or Complication, the Chances are not altered.

To determine next the Probability of B's being a Winner, it is to be confidered, that his Adventure is extended to *ten* different Voyages, from whence the following *eleven* Varieties of Events are liable to happen, oppofite to each of which the Number of Chances for its happening are here fubjoined.

Varieties of Events.	*Number of Chances for each Variety to happen.*
1 — to win all ten	3,486,784,901
2 — win nine and lofe one	3,874,204,890
3 — win eight and lofe two	1,937,102,445
4 — win feven and lofe three	573,956,280
5 — win fix and lofe four	111,602,610
6 — win five and lofe five	14,880,348
7 — win four and lofe fix	1,377,810
8 — win three and lofe feven	87,480
9 — win two and lofe eight	3,645
10 — win one and lofe nine	90
11 — lofe all ten	1
Total Number of Chances for all the Varieties	10,000,000,000

Thefe Varieties, and the Number of Chances for each, are readily obtained, by putting *a* for the Number of Chances for B's winning each Voyage, and *b* for the Number of Chances for his lofing each

each Voyage; Then as there are ten Voyages to be determined, raise the Binomial $a + b$ to the tenth Power, $viz.$ $a^{10} + 10a^9b^1 + 45a^8b^2 + 120a^7b^3 + 210a^6b^4 + 252a^5b^5 + 210a^4b^6 + 120a^3b^7 + 45a^2b^8 + 10a^1b^9 + b^{10} = \overline{a + b}|^{10}$. — In which the refpective Varieties, and the Number of Chances for each, are diftinctly exhibited.

It is here evident, that if B wins fix or more of the ten Voyages, he becomes a Winner upon the whole; And it appears from the foregoing Table of the feveral Varieties of Events, that the Number of Chances for B to win fix Voyages at leaft, is 9,983,650,626; For it includes, befides the Chances for winning fix Voyages exactly, all the Chances for winning any greater Number of Voyages than fix, and confequently all the Chances for the firft $five$ Varieties to happen. — On the other hand, all the Chances for B's gaining lefs than fix of the Voyages, which are the whole Number of Chances for the fix laft Varieties, or for B's not winning upon the whole, are 16,349,374. — But 9,983,650,626 is to 16,349,374 as 610$\frac{1}{7}$ nearly to 1; Which are the Odds for B's winning upon the whole, agreeably to what is afferted in the Propofition. Q. E. D.

If, inftead of B's being a Winner upon the whole, it be demanded, what are the Odds of his not being a Lofer upon the whole, they will then ftill be greater in his Favour; For he will be in ftill be greater in his Favour; For he will be in the Circumftance of no Lofer, if he wins at leaft $five$ of the Voyages, wherefore the Number of Chances for the $fixth$ Variety are to be added to the Chances favourable to B in the preceding Inftance, Which will make the Odds 9,998,530,974 to 1,469,026, or nearly 6806 to 1, that B is not a Lofer.

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As there is only 1 Chance for the laft Variety, it is 9,999,999,999 to 1, or near ten $thoufand$ $Millions$ to one, that B does not lofe all the ten Voyages.

If B wins no more than $four$ Voyages upon the whole, he will be a Lofer; But the Number of Chances for his winning $four$ Voyages at leaft, is the Sum of the Chances for the $feven$ firft Varieties, which Sum is 9,999,908,784. And the Number of Chances for his winning lefs than $four$ Voyages, is the Sum of the Chances for the four laft Varieties, which is 91,216. So that the Odds are 9,999,908,784, to 91,216, or nearly as 109,628 to 1, that B lofes not more than $four$ Voyages.—Although even in this Circumftance of lofing fix Voyages and winning $four$, againft which the Odds are fo prodigious, he will be only a Lofer of 200l, or of $\frac{1}{5}$ of his Stake; an equal Sum to his own, being fuppofed to be ftaked by his Adverfary againft him upon each Voyage.

It might appear incredible, was it not fupported by precife Calculation, that B, from this Expanfion of his Adventure, to only ten feparate Voyages, fhould be fo much more liable than A, to be a Winner, and fo prodigioufly lefs fubject, than A, to be a Lofer; And yet, that the Values of their Expectations fhould ftill be exactly equal.

But the Reafon of this will immediately appear, by examining the Advantages which B has relinquifhed, by this Expanfion of his Adventure, and which Advantages ftill continue to A. Thefe principally confift in B's having relinquifhed the great Probability, which A retains, of winning the whole; For it is 9 to 1 that A wins the whole; Whereas the Odds, inftead of being in Favour of B's winning the whole, are againft it; It being 6,513,215,599 to 3,486,784,401, or almoft 2 to 1, that B does not win the whole. And the

C   Chances,

Chances, which B thus lofes, for gaining all, being the moſt valuable Chances, are compenſated by a much larger Number for winning various Parts of the whole; In order to preſerve the Value of both their Expectations ſtill equal.——

But it will be proper, that this *Compenſation* ſhould preciſely appear.——Recurring then to the foregoing Table of the ſeveral Varieties, and the Number of Chances for each Variety, it appears, 1. That B has a certain Number of Chances for winning all the *ten* Voyages, which are 3,486,784,401 Chances.

2. B has 3,874,204,890 Chances for winning *nine* Voyages, or for winning 900 *l*; Each of which Chances is only equal to $\frac{9}{10}$ of a Chance for winning 1000 *l*, or for winning the whole *ten* Voyages.——Therefore theſe 3,874,204,890 Chances for *nine* Voyages, are equivalent only to $\frac{9}{10}$ of their Number, or to 3,486,784,401 Chances for winning the whole *ten* Voyages; And $\frac{3874204890}{10000000000}$ of *nine* Voyages, is only equal to $\frac{3486784491}{10000000000}$ of *ten* Voyages.

3. B has 1,937,102,445 Chances for winning *eight* Voyages, which are only equivalent to $\frac{8}{10}$, or $\frac{4}{5}$ of the ſame Number of Chances, that is to 1,541,681,956 for winning the whole *ten* Voyages.

4. The Number of Chances for B's winning *ſeven* Voyages, are 573,956,280, which are equivalent only to $\frac{7}{10}$ of the ſame Number of Chances, or to 401,769,396 Chances, for winning the whole *ten* Voyages.

5. The Number of Chances, which B has for winning *ſix* Voyages, are 111,602,610, which are equivalent to only $\frac{6}{10}$ or $\frac{3}{5}$ of the ſame Number of Chances, that is to 66,961,566 Chances for winning the whole *ten* Voyages.

6. The Number of Chances for B's winning *five* Voyages, is 14,880,348, which are equivalent to only $\frac{5}{10}$ or $\frac{1}{2}$ of the ſame Number of Chances, that is

is to 7,440,174 Chances, for winning the whole *ten* Voyages.

7. The Number of Chances for B's winning *four* Voyages, which are 1,377,810, are equivalent to $\frac{4}{10}$ or $\frac{2}{5}$ of the ſame Number of Chances, that is to 551,124 Chances for winning all the *ten* Voyages.

8. The Number of Chances for B's winning *three* Voyages, are 87,480, of which $\frac{3}{10}$ are 26,244 Chances.

9. The Number of Chances for B's winning *two* Voyages, are 3,645, of which $\frac{2}{10}$ or $\frac{1}{5}$ are 729 Chances.

10. The Number of Chances for B's winning *one* Voyage, are 90, from whence it appears, that the Probability of his gaining *one* Voyage preciſely, and no more, is $\frac{90}{10000000000}$, to which $\frac{1}{10}$ of the ſame Probability, or $\frac{9}{10000000000}$, for gaining the whole *ten* Voyages, is equivalent.

Therefore all the Chances belonging to B, through the ſeveral Varieties into which his Adventure has been ſpread, appear to be exactly equivalent to the following reſpective Chances for winning the *ten* Voyages.

			Number of Chances for winning *ten* Voyages.
1	— Variety	— as before	3,486,784,401
2	— Variety	— equivalent to	3,486,784,410
3	— Variety	— equivalent to	1,549,681,956
4	— Variety	— equivalent to	401,769,396
5	— Variety	— equivalent to	66,961,566
6	— Variety	— equivalent to	7,440,174
7	— Variety	— equivalent to	551,124
8	— Variety	— equivalent to	26,244
9	— Variety	— equivalent to	729
10	— Variety	— equivalent to	9
	Total Number of Chances		9,000,000,000

There-

Therefore the whole Value of B's Expectation from all the Varieties, being contracted to the Circumstance of winning, or losing all the *ten* Voyages, As A's is, appears to be $\frac{9000000000}{10000000000}$, or $\frac{9}{10}$, which is exactly equivalent to the Value of A's Expectation.

This Extension of B's Adventure to *ten* different Voyages, though it evidently alters not the *Value* of his Expectation, yet it greatly diminishes his *Risk* of either winning, or losing all; And removes his Property out of that desperate Hazard in which it was involved, whilst it rested only upon *one* Event.—Indeed A has the greater Probability of winning all, but B has immensely the greater Probability of being a Winner. A ventures at all, or none, and he hazards prodigiously the most.—Whereas B hazards excessively little; And the Extension of his Adventure has all the Effect of the highest Prudence, in resigning a great Part of his Chances for gaining all, and obtaining, in Return, a prodigiously larger Number for gaining more than he loses; Whereby he preserves to himself, upon the whole, almost a sure moderate Advantage.

The Extension of B's Adventure, and the additional Security he derives from it, affords a Demonstration of the Prudence of that common Maxim, *not to venture all upon one Bottom*. And if B, instead of engaging upon an equality of Stake, only in *ten* different Voyages, had extended himself to *twenty* Voyages, wagering upon each 50 *l*, And having the same Odds upon each in his Favour, The Probability of his winning, upon the whole, would have been still further immensely increased; Though the Likelihood of his winning all, or of his being so great a Winner, would have been diminished.

It

It is here always to be remembered, that this Reasoning proceeds upon the Supposition that the Odds in each Voyage are in Favour of B.—For if B has the Odds against him in each Voyage, then, by extending his Adventure to a great Number of Voyages, instead of resting it upon *one*, the Probability of his losing *all* will indeed be much lessened. In lieu of which, the Probability of his losing *upon the whole*, will be prodigiously augmented; so that, though he will not play so deep as before, yet he will more absolutely relinquish all Hopes of Gain, and tie himself almost to a Certainty, of being upon the whole, a Loser; which in this Respect is playing more desperately, though not more deeply, than he would do by adventuring upon *one* Voyage.

But it is duly to be observed, that the foregoing Propositions and Remarks are all founded upon the Supposition, that the two Adventurers A and B each stake an equal Sum upon every Voyage or Game; in which Case the Superiority of Chances on the Side of A, in each Voyage or Game, would give him, upon the Extension of his Risk to several Voyages, that superior Probability of winning upon the whole, which hath been already delivered: Whereas, in Cases of *Insurance*, the *Insurer*, who has generally the greater Number of Chances in his Favour, lays down in return a proportionably greater *Stake*, in order to compensate the Advantages he draws from the superior Number of Chances.

Thus, since in every Voyage it may be conceived that the Contention for the Cargoe lies between the Sea and the Merchant; Or, if the Cargoe is insured, between the Sea and the Insurer, the latter taking upon himself the Risk of the Merchant, suppose the Premium upon a Voyage to be 10 *per Cent.* it appears then that the Merchant allows

lows his own Share of the Cargoe, upon a fair Compofition, to be only 90 *per Cent.* and that the Sea's Share of the Cargoe is 10 *per Cent.* The Infurer therefore, who receives the 10 *l.* for the Premium, and is refponfible for the whole 100 *l,* evidently ftakes 90 *l,* and the Sea 10 *l,* in this Contention. But the Number of Chances for the Voyage to fucceed are allowed to be 90, and for the Voyage to fail are 10; fo that the Odds in the Chances are 9 to 1 in favour of the Infurer, and in the Stakes are 9 to 1 in his Disfavour.

The Values of the Expectations of the Infurer and the Sea appear thus to be exactly equal to their refpective Stakes.——For, fince in each Voyage, out of every 100 *l.* ftaked the Infurer is refponfible for 90 *l,* And 10 *l.* only of the Stake belongs to the Sea, and there being 9 Chances to 1 in favour of the Infurer, it follows, that the Value of his Expectation is $\frac{9}{10}$ of the whole Stake, or $\frac{9}{10}$ of 100 *l.* which is 90 *l.* And the Value of the Expectation of the Sea is $\frac{1}{10}$ of the whole Stake, or 10 *l;* Which demonftrates, that the Stakes of each are exactly equal to the Value of their refpective Expectations; and that each has the fame fair Equivalent for his Stake, in proportion to the Sum which he adventures.

Upon the Expanfion of the Rifk to *ten* Voyages, the Chances for the feveral Varieties to happen have been accurately determined under the foregoing Propofitions; but whereas there A would be a Winner upon the whole, if he won more Voyages than he loft, the *Infurer* will not be a Winner unlefs he wins all the *ten* Voyages; and he will be no more than a *Saver* by winning *nine* of thefe Voyages, that is $\frac{9}{10}$ of the whole Number of Voyages, proportionably to his Share of the Stake, which is $\frac{9}{10}$ of the whole.——For the Infurer has ftaked upon the *ten* Voyages ten times 90 *l.* or 900 *l.* and if he wins *nine* Voyages, he will recover 900 *l.*

900 *l.* which will leave him a *Saver:* On the other hand, if the Sea wins $\frac{1}{10}$ of the whole Number of Voyages, or 1 Voyage, he will recover 100 *l;* Being alfo the whole which the Sea has ftaked upon the ten Voyages.

And univerfally in all Cafes, whatever be the Infurer's Proportion of the whole Stake, the fame Proportion of Voyages out of the whole muft fucceed, in order to conftitute him a *Saver.*

Imagine that there are *two* Infurers, the firft of which rifks the Sum of 800 *l.* upon *one* Voyage, where the Odds are $66\frac{2}{3}$ to $33\frac{1}{3}$, or 2 to 1, in his Favour; and confequently the whole Value infured is 1200 *l.* of which he receives 400 *l.* for the Premium.

The 2d Infurer rifks the fame Sum of 800 *l.* upon *twelve* fuch different Voyages, or $66\frac{2}{3}$ *l.* upon each Voyage, the Odds being alfo 2 to 1, as before, that each Voyage fucceeds; and this 2d Infurer, upon the whole 12 Voyages, having received twelve times $33\frac{1}{3}$ *l.* or 400 *l.* for the Premia, the whole Stake being alfo, as before, 1200 *l.* of which his own clear Share is 800 *l.*

'Tis demanded here, what are the refpective Expectations of the 1ft and the 2d Infurer?

It is firft certain, that the *Values* of their refpective Expectations are both equal, and that each amounts to 800 *l.* exactly.

In regard to the 1ft Infurer, as he has ventured all upon *one* Voyage, he is abfolutely certain to win, or to lofe all, without any Mitigation. The Probability of his winning all is $\frac{2}{3}$, and that he lofes all the Probability is no greater than $\frac{1}{3}$.

To determine the Value of the feveral Expectations of the 2d Infurer, upon the Extenfion of his Rifk to *twelve* Voyages, the Binomial $a+b$ is to be raifed to the 12th Power, a, or 2, being the Number of Chances for his winning each Voyage, and

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and b, or 1, the Number of Chances for his losing each Voyage.

Varieties of Event.		Number of Chances for the respective Varieties.
1 — To win all 12 Voyages —	a^{12}	4,096
2 — To win 11 and lose 1 —	$12a^{11}b^1$	24,576
3 — To win 10 and lose 2 —	$66a^{10}b^2$	67,584
4 — To win 9 and lose 3 —	$220a^9b^3$	112,640
5 — To win 8 and lose 4 —	$495a^8b^4$	126,720
6 — To win 7 and lose 5 —	$792a^7b^5$	101,376
7 — To win 6 and lose 6 —	$924a^6b^6$	59,136
8 — To win 5 and lose 7 —	$792a^5b^7$	25,344
9 — To win 4 and lose 8 —	$495a^4b^8$	7,920
10 — To win 3 and lose 9 —	$220a^3b^9$	1,760
11 — To win 2 and lose 10 —	$66a^2b^{10}$	264
12 — To win 1 and lose 11 —	$12a^1b^{11}$	24
13 — To lose all 12 Voyages —	b^{12}	1

$$\overline{a+b}\,|^{12} = \text{Total } 531,441$$

It is firſt to be obſerved, that as the Stake of the 2d Inſurer is $\frac{2}{3}$ of the whole Stake, the Number of Voyages he is to win muſt be $\frac{2}{3}$ of the whole Number, or eight Voyages, in order to conſtitute him a Saver.

If he wins exactly *eight* Voyages, and loſes four, he will neither be a Winner nor Loſer; and it appears, that there are 126,720 Chances out of 531,441, or in the Proportion of almoſt 24 Chances out of 100, for this Event.

The Number of Chances for his winning more than *eight* Voyages, are to the Number of Chances for his loſing more than *eight* Voyages, as 208,896 to 195,825: So that, rejecting the Chances for his being barely a *Saver*, the Odds are, that he is a Winner rather than a Loſer; and it is 335,616 to 195,825, or about 8 to 5, that he is either a Winner, or at leaſt a Saver.

If

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If he is a Loſer upon the whole, it is evident, that he may loſe 5, 6, 7, 8, 9, 10, 11, or all the 12 Voyages: But it is 436,992 to 94,449, or above 9 to 2, that he does not loſe more than *five* Voyages; in which Caſe he will only be deficient by *one* Voyage of his juſt Proportion. And it is 496,128 to 35,313, or above 14 to 1, that he does not loſe more than *ſix* Voyages; In which Caſe he will be deficient of his juſt Proportion of ſucceſsful Voyages by no more than *two*; ſo that it will be above 14 to 1 that he does not loſe 200*l*, or $\frac{1}{4}$ of his Stake.

It is alſo evidently 531,440 to 1 that he does not loſe all; And the Odds for his winning, at leaſt *three* or *four* Voyages, are alſo prodigiouſly great; Whereas it is no more than 2 to 1 that the 1ſt Inſurer does not loſe all.

It appears therefore, from preciſe Calculation applied to the Caſe of Inſurance, that by the *Expanſion* of the Riſk to *twelve* Voyages, the 2d Inſurer relinquiſhes a great Part of the Probability, which remains to the 1ſt, of winning the whole. In lieu of which, the Hazard of his loſing all, or near all the Voyages, to which the 1ſt Inſurer is liable, is almoſt entirely cancelled. The 2d Inſurer alſo preſerves all the while Odds in his Favour, that he is a Winner, rather than a Loſer; And that if he happens to be a Loſer, his Loſs ſhall be very moderate. Whence it is evident, that he hazards much leſs than the 1ſt Inſurer; And that upon the whole he runs very little Riſk of his Property by this wide-bottomed Inſurance.

If the Proportion of the Chances for the winning and loſing of each Voyage be greater in favour of the Inſurer, and if his Riſk be expanded to any large Number of Voyages, he will always preſerve Odds on his Side, that he is a Winner, rather than a Loſer. Though the *greater* the Number of Voyages, the *greater* the Probability will be, that he

D ſhall

shall be *less* a Winner; and if a Loser, that he shall be *less* a Loser. And, after an *infinite* Number of Voyages, the Proportion of successful ones, to those which are unsuccessful, will approach to the original Proportion of the Odds for winning and losing in each Voyage, or to the respective Stakes, so as to reduce the *Insurer* and the *Sea* to the Terms of being both *Savers*.

Thus, as in the *Contraction* of the Adventure to *one* Voyage or Trial, the Hazard is the *greatest* it can be on either Side, being confined to the winning or losing of *all*, without Mitigation; so, in the *Expansion* of the Adventure to an *infinite* Number of Voyages, the Hazard is the *least*, as it then utterly vanishes; The Insurer and the Sea both acceding to the Terms of being Savers by the Distribution of the Voyages between them, in proportion to their respective Stakes upon each Voyage.

'Tis here obvious to remark, that in all Cases, from the Contraction of the Adventure into one Voyage, to the Expansion of it into any Number of Voyages, the *Values* of the Expectations of the Insurer and of the Sea are not altered, but are each constantly equivalent to the respective Sums they have staked; And that, even in an infinite Expansion of the Adventure, this continues to hold true, where the Voyages, and consequently the Stakes, fall to each of the Adventurers exactly in this Proportion.

The Insurer thus demonstratively incurring very little or no Hazard, who extends his Adventure to a great Number of Voyages, it now evidently appears, that the general Anxiety and Distress is much diminished by *Insurance*; and that the *Merchant* is thereby relieved, and the *Insurer* not liable to be crushed in his stead.—It now also appears in a full Light, that *Societies* of Men, who have acquired

quired competent Estates, and are retired from Trade, may safely and prudently engage in insuring the Properties of others, which are standing out upon Risk, without drawing thereby their own Estates into Hazard: And therefore they are not justly liable to be ranked upon the footing of *Gamesters*, whose Properties stand upon a precarious Foundation.—From the joint Engagement of such *Societies* in *Insurances*, the Public derives very great Advantages; And the Estates of these Persons, although they have retired from Trade themselves, are still employed in supporting the national Commerce.

It may possibly be urged in this place, that since the Insurer and the Sea, in a large Number of Voyages, will approach nearer and nearer to the Proportion of being both Savers, nothing is to be gained by a long Course of Insurance; and that a Person who has followed this Business during his Life, may, at the End of all his Accounts, find himself neither a Winner nor Loser.

To which it is to be answered, 1. That though, in a great Number of Voyages, the Proportion of successful ones for the Insurer, to those which are unsuccessful, will approach nearer and nearer to the original Proportion between the two Stakes; yet the Difference between the Number of successful and unsuccessful Voyages will be still greater and greater unto an infinite Number of Voyages: In which Case this Difference will vanish, or be nothing, in respect to the whole Number of Voyages.

Thus, suppose there be at first the Proportion of 3 to 1, which is continually to accede nearer to 2 to 1; Upon the first Expansion of the Terms let this Proportion become 25 to 10; Upon a larger Expansion, 220 to 100; And upon a still larger Expansion, 2100 to 1000.—It is here evident, that the Proportion continually accedes nearer and

nearer

nearer to 2 to 1 ; And the Difference between the two Terms of the Proportion, is ftill a leffer and leffer *Part* of the whole, though its *Sum* be greater. And in a large Number of Voyages, though the Proportion between the fuccefsful and unfuccefsful ones will ftill accede nearer and nearer to the Proportion between the two Stakes, yet the Odds will be vaft, that there fhall be a confiderable Difference, or Deviation, from this exact Proportion.

This Difference will prevent the Infurer and the Sea from being exact Savers, and therefore obviates in fome Meafure the foregoing Objection to the Bufinefs of Infurance : For the Difference will ftill fubfift, and be a greater and greater Sum, though a lefs Share of the whole, unto an infinite Number of Voyages ; When its Share of the whole will be infinitely diminifhed, or become nothing ; The Voyages then falling to the Infurer and the Sea, in proportion to their refpective original Stakes, which will conftitute them both Savers.

But it may now ftill be urged, upon what is admitted, that though there will be a Difference in mitted, that though there will be a Difference in the Proportion of the Voyages from the Proportion of the Stakes, And confequently a Gain on one Side or other, and not an exact Saving to both Sides ; Yet that this Gain will be a very fmall Part of the whole Stake which is adventured ; And confequently that an Infurer, after a long Courfe of Bufinefs, will find himfelf very little a Gainer, or Lofer, in refpect to the total Amount of all his Stakes ; And the longer he follows the Bufinefs, the leffer Share will his Dividend of Profit or Lofs be upon the whole Sum he has adventured.

This would certainly be true, if the *Premium* was *entirely* the *Sea's Share* of the Cargoe ; And it would then be the Cafe at the long Run, that the whole Body of Iufurers would find their Dividend of Profit or Lofs to be extremely little, upon the whole

whole Amount of their Bufinefs ; Which naturally refults from the continual *Mitigation* of the *Hazard*, by the *Expanfion* of the *Voyages*. This, however, would elevate the Merit of *Infurance*, as a fafe difinterefted Scheme for the Public Utility ; And remove from it the injurious Reproach of being a precarious Syftem of *Gaming*.

But, 2. As the Infurer hath a *Profit* in the Premium, over and above what he is refponfible for to the Sea, this Profit, in its continual Operation upon a great Number of Voyages, becomes confiderable ; And removes all Fear from thofe who purfue the Bufinefs, that upon the Balance of their Accounts they fhall only be Savers.

If the Number of Chances for a Voyage to fucceed, and to fail, are feverally given, the *defective Part* of the Cargoe, or the *Sea's Share*, is confequently affigned.—Thus, if 9 Voyages out of 100 are found by Experience to fail upon a Medium, then the Part which muft be efteemed to be *defective*, or be allowed to be *loft*, upon a Medium, out of every Cargoe, is $\frac{9}{100}$, or 9 *per Cent*.

And reciprocally, if 9 *per Cent*. be known to be the *defective* Part, or the Part which, upon a Medium, muft be allowed to be *loft* out of every Cargoe, it is evident, that 9 Voyages out of 100 are found to fail by Experience. If then 9 *per Cent*. be the *defective* Part of a Cargoe, there muft be fomething more, as fuppofe 1 *per Cent* allowed to the Infurer for his Profit, in which Cafe the *Premium* will be 10 *per Cent*. And in all Cafes, the *Premium* is to be underftood to confift of the *defective* Part, and of the *Infurer's Profit*, together ; The Remainder is the *clear Capital*.

It is evident, from the foregoing Inftance, that if the Infurer was only to receive the *defective* Part of the Cargoe, it would be no Advantage to him to purfue the Bufinefs : The 9 *per Cent*, or the *defective*

fective Part, being only a bare equivalent to him, for the Lofs which he becomes engaged to repair. Therefore fome Profit over and above the defective Part, is juftly to be allowed to the Infurer for his Trouble; And the *defective* Part, and this *Profit*, together, conftitute the *Premium*; And the Remainder of the Cargoe is the *clear Capital*.

It is evident, although there have been no fufficient Experiments collected of the Succefs or Failure of a particular Voyage, that if the *Premium* be fettled and agreed to between the Infurer and Infured, the Chances for the happening and the failing of that Voyage, including the Infurers Profit, are fixed and allowed between the two Parties.—Thus if the Premium be 10 *per Cent*, out of this is to be deducted the Infurer's Profit, which fuppofe to be 1 *per Cent*; The Remainder, or 9 *per Cent*, is the *defective* Part; which fhews that there are efteemed to be 91 Chances for the Succefs of the Voyage, to 9 Chances for its Failure.

There are many Debates concerning the Manner in which Infurances ought juftly to be made, particularly whether the *Premium* ought to be included in the Infurance.—To affign therefore one general Rule for all Circumftances, *The* INSURANCE, *in all Cafes, ought juftly to be fo made, As that the* INSURED, *upon the Balance of the Account, may only obtain his* clear CAPITAL.

This is the equitable Rule in all Cafes.—For thus the Infurer will recover his whole Right, And fall under no Temptation to fraudulent Practices.—Thus, fuppofe I have a Cargoe coming from the *Weft-Indies*, which, if it arrives fafe, will be worth 100 *l.* here, And that the *Premium* for Infurance upon the Ship is 10 *per Cent*; It is then plain, that my *clear Capital* is 90 *l.*; And that I fhall act juftly in infuring my

my *whole Capital*, that is, the *clear Capital* and the *Premium* together, or the whole 100 *l.*;—For if the Voyage fucceeds, I receive 100 *l.* from the Cargoe, and have paid 10 *l.* for the *Premium*, which leaves me my *clear Capital* of 90 *l.*—If the Voyage fails, I receive 100 *l.* from the Infurer, And have paid 10 *l.* for the *Premium*,—So that in either Cafe of the Succefs, or Failure of the Voyage, by infuring my *whole Capital*, I exactly recover my *clear Capital*, And have no Advantage from the Lofs of the Veffel.

But there are fome, particularly *French* Merchants, who, if they have a Cargoe coming from the *Weft-Indies*, which, upon its fafe Arrival, will be worth 100 *l.* And where the Premium is, fuppofe, 10 *per Cent*, infure fo, as to obtain their *whole Capital*, or the whole 100 *l*, upon the Balance of the Account. — Thus the Sum they would infure in this Inftance, would be $111 l.\frac{1}{9}$; For the Premium upon this Sum of $111 l.\frac{1}{9}$, after the Rate of 10 *per Cent*, is $11\frac{1}{9}$; fo that upon the Lofs of the Ship, they would recover 100 *l.* clear, over and above repaying to themfelves the *Premium*.

In which Inftance it is eafy to obferve, that it will be better for the infured Merchant, that the Ship be loft; For in that Cafe he will recover from the Infurers the whole 100 *l*, clear of all Expences, or not only his *clear Capital*, but the *Premium* alfo.—Whereas if the Ship arrives fafe, he obtains only his Cargoe of 100 *l*, and lofes the *Premium*; that is, he recovers no more than 90 *l*, or only his *clear Capital*.

And from hence arifes a very reafonable Objection to the Admiffion of fuch Infurances, In that the Adventurer ought not to have his Advantage lie in the Lofs of the Voyage, which may be an Inducement to very bad Practices.

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There are, however, many Perfons, who will argue, that if they have any Capital, as 1000 *l.* rifked upon a Voyage, it is juft for them to infure fuch a Sum, as that they may recover the whole 1000 *l,* befides all the Expences of the *Premium.*—And as this is a Point which continues in Debate, it will be of ufe to demonftrate ftrictly, that no Perfon, in fuch Cafe, has a Right to infure fo, as to recover the whole 1000 *l.* upon the Balance of the Account, that is, to recover both the *clear Capital* and the *Premium.*

DEMONSTRATION.

Imagine, that the *whole Cargoe* ftanding out upon Adventure, will be worth 1000 *l,* if it arrives fafe at Home ; and that there are *ten* fuch Voyages out of 100 fail upon a Medium ; Now in every Adventure of this Sort, it may be juftly conceived, that there is a Contention between the *Merchant* and the *Sea* for the Cargoe ; And that the Odds for the *Merchant* to win are 90 to 10, or 9 to 1; Then it is evident, that upon a fair *Compofition* between them, the *Merchant* is entitled to $\frac{9}{10}$, And the *Sea* to $\frac{1}{10}$, of the Cargoe. Therefore, upon a fair Compofition, the *Merchant* has a Right to be fecured in $\frac{9}{10}$ of the Cargoe, or in 900 *l,* as his *clear Capital* ; And the *Sea* has a Right to be fecured in 100 *l,* upon a fair Compofition, as his *clear Capital.* But by *Infurance* the Merchant actually enters into fuch a *Compofition,* though not with the *Sea* directly, yet with the *Infurer,* who undertakes to be refponfible for the *Sea,* and engages to fecure the whole Cargoe, or the Value of it, to the *Merchant,* at all Adventures, upon the *Merchant's* firft paying to him the 10 *per Cent,* or the *Sea's* Share out of it, as the fair *Premium* for the Compofition.—This is evidently juft and

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and equitable.——But if the Merchant, inftead of being content with this fair Diftribution, infures fo as to recover, clear to himfelf, the *whole Cargoe,* that is, not only his only *clear Capital,* but the *Premium* alfo, It is evident, that he is upon a Plan of fecuring to himfelf, in cafe of Failure of the Voyage, not only his *own Share* of the Cargoe, but alfo the *Sea's Share,*—To which he has no Right : And he may as juftly take upon himfelf to infure any *other Merchant's* Cargoe in the fame Ship, as he may to infure fo as to recover this *Premium,* which is the *Sea's Cargoe.* Therefore, fince the Arguments for the Right of infuring, fo as to recover the Premium, have arifen from a falfe Notion of the Merchant's Right to the *whole Cargoe,* as it now appears that the Merchant has no Right to the *whole Cargoe,* he has confequently no Right to infure fo as to recover the *Premium.* Q. E. D.

This Demonftration fuppofes the *Premium* to be exactly the *Sea's Share* of the Cargoe, and no more; And it is probable, from the great Number of Infurers, that the Rate of Infurance, or the Premium, is reduced very low, fo as that the Infurer has no more than a fmall Profit over and above what he is refponfible for to the Sea. However, this Profit in the Premium, whatever it be, over and above the Sea's Share, it may feem that the Merchant has a Right to infure ; But, from the Terms of Infurance, and the *Compofition* thereby entered into, it appears, that the Merchant allows, though not to the Sea folely, yet to the Sea and to the Infurer together, the *whole Premium* ; And accepts the *Remainder* as his *clear Capital,* or as all which belongs to himfelf ; thereby abfolutely relinquifhing all Right to any Part of the *Premium.*

It is eafy to demonftrate from hence, that when a Trade will not bear the *Charge* of *Infurance,* it

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is not worth while to purfue it.— For the *Premium*
for Infurance as juftly belongs to the Sea and to
the Infurer, or to the Infurer only, who takes
upon himfelf to fatisfy the Sea, As the reft of the
Cargoe does to the Merchant; And whatever
Trade will not bear the Charge of Infurance, will
evidently not bear the Payment of the juft Ex-
pences and Demands to which it is fubject.

PROBLEM I.

*To infure fo, as that the Infured, upon the Failure
of the Voyage, may recover the Sum A clear, over
and above the Charges of the Premium.*

Let the Premium for the Infurance be $\frac{1}{m}$ of the
Sum infured.

Put x for the Sum to be infured in this Inftance.

Then this Sum, deducting from it the Charges
of the Premium, is to amount to A.

That is, $x - \frac{x}{m} = A$

$$x = \frac{mA}{m-1}, \text{ or } A + \frac{A}{m-1}.$$

1. EXAMPLE.

A Merchant fhips for the Weft-Indies *a Cargoe
which has coft him* 100 l. *here; What Sum is he to
infure, fo as to recover* 100 l. *clear of all the Ex-
pences of the Premium, which is* 10 per Cent. *for
this Voyage?*

Here $A = 100$

$m = 10$

And the Sum to be infured is $A + \frac{A}{m-1}$

That is, $100 + \frac{100}{9}$

or $100 + 11\frac{1}{9}$, or $111\frac{1}{9}$.

Thus

Thus $111\frac{1}{9}l.$ is to be infured, fo as to recover
the Sum of 100 l. clear of all Charges of Premium.
For the Premium of 10 *per Cent.* for infuring
$111\frac{1}{9}l.$ is $11\frac{1}{9}l.$ which, deducted from $111\frac{1}{9}$, leaves
100 l. clear of all Charges.

2. EXAMPLE.

A French *Merchant has a Cargoe coming home from
the* Weft-Indies, *which, if it arrives fafe, will
be worth* 100 l. *what Sum is he to infure, fo as to
recover this* 100 l. *clear of the Charge of the Pre-
mium, which is after the rate of* 7 per Cent. ?

Here $A = 100$

$$\frac{1}{m} = \frac{7}{100} = \frac{1}{14.286}$$

And confequently $m = 14.286$

$$A + \frac{A}{m-1} = 100 + \frac{100}{13.286}$$

Or 107.527, which is the Sum to be infured.
For, deducting 7 *per Cent.* from this Sum, the
Remainder is 100 l. exactly.

This *Problem* may be otherwife folved, in the
following Manner:

It is to be confidered, that there is to be infured,

1. $\begin{cases} \text{The Capital} \underline{\hspace{2cm}} \\ \text{in order to recover the Capital} \underline{\hspace{1cm}} \end{cases} A$

2. $\begin{cases} \text{And fince, for the Infurance of the Capi-} \\ \text{tal, there muft be paid the Premium} \\ \frac{A}{m}. \text{ Therefore, in order to recover} \\ \text{this Premium, there muft be infured} \\ \text{alfo} \underline{\hspace{2cm}} \end{cases} \frac{A}{m}$

3. $\begin{cases} \text{And fince, for the Infurance of } \frac{A}{m}, \text{ there} \\ \text{muft be paid the Premium } \frac{A}{mm}; \text{ In} \\ \text{order to recover this Premium, there} \\ \text{muft alfo be infured} \underline{\hspace{1.5cm}} \end{cases} \frac{A}{mm}$

E 2   4. And

4. $\left\{\begin{array}{l}\text{And fince, for the Infurance of } \frac{A}{mm}, \text{ there} \\ \text{muft be paid the Premium } \frac{A}{m3}; \text{ In} \\ \text{order to recover this Premium, there} \\ \text{muft alfo be infured}\end{array}\right\}\left.\begin{array}{l}\frac{A}{m3}\end{array}\right.$

And fo on, in a continued Series, *in infinitum*. But the Series $A + \frac{A}{m} + \frac{A}{m2} + \frac{A}{m3} + \frac{A}{m4}$, *&c.* *in infinitum*, is a Series of Terms in Geometrical Progreffion, decreafing *in infinitum*, whofe Sum is $\frac{mA}{m-1}$, or $A + \frac{A}{m-1}$, as was before difcovered.

The Coincidence of which two very different Methods, in the *fame Solution*, will not appear void of Entertainment to the *Curious*.

The following Method, which is an Abbreviation of the firft, feems beft adapted to common Practice.

Let the Sum to be recovered, clear of all Charges, be A.

The Premium m *per Cent.* or $\frac{m}{100}$, which in Decimals will be $0.m$.

Then putting x for the Sum to be infured, fo as to recover A, the Equation will be

$$x - mx = A$$
$$x = \frac{A}{1-m}.$$

I. EXAMPLE.

Let the Sum to be recovered, clear of all Charges, be 100 *l.*

And 10 *per Cent.* or 0.1, be the Rate of Infurance.

Then the Sum to be infured, fo as to recover 100, is $\frac{100}{1-0.1}$, or $\frac{100}{0.9}$, or $\frac{1000}{9}$, which is equal to $111\frac{1}{9}$, as before appeared.

2. Exa

2. EXAMPLE.

Let the Sum to be recovered, clear of all Charges, be 100 *l.*

The Premium be 7 *per Cent.* or 0.07.

Then the Sum to be infured is $\frac{100}{1-0.07}$, or $\frac{100}{0.93}$, or $\frac{10000}{93}$, which is 107.527 *l.* nearly, as before appeared.

PROBLEM II.

To infure fo, as that the Infured, upon the Lofs of his Ship, may recover the Sum A clear, over and above the Premium, and the Intereft alfo of the Premium for one Year.

Let the Premium be m *per Cent.* or $0.m$.

And let 1 *l.* added to its Intereft for 1 Year, be r.

Put x for the Sum to be infured.

Then the Premium upon it is mx; And the Premium, together with the Intereft upon this Premium for one Year, is mrx.

Therefore $x - mrx = A$

$$x = \frac{A}{1-mr}.$$

EXAMPLE.

A Merchant here having fhipped a Cargoe for the Weft-Indies, *which has coft him* 100 l. *in London, is defirous to infure fuch a Sum as that he may recover his prime Coft of* 100 l. *clear, over and above the Premium after the Rate of* 5 *per Cent. and the Intereft upon that Premium after the Rate of* 5 *per Cent. for one Year.*

Thus: Suppofe $A = 100$ *l.*

The Premium 5 *per Cent.* or $0.05 = m$.

The

The Rate of Intereſt, or 1 l. added to its Intereſt for one Year, 1.05 = r.

Then $\frac{A}{1-mr} = \frac{100}{1-0.05} \times 1.05$

$= \frac{100}{1-0.0525} = \frac{100}{0.9475}$

$= \frac{100,0000}{9475} = 105.54 l$. which is the Sum to be inſured, ſo as to anſwer the Condition of the Pro-blem.

To prove which, take 5 *per Cent.* of 105.54, or the Premium upon it, and the Intereſt alſo of the ſaid 5 *per Cent.* Now 5 *per Cent.* of 105.54 l. is 5.277 ; And 5.277, together with the Intereſt thereof for one Year, is 5.54 ; Which deducted from 105.54 l. the Sum inſured, leaves 100 l, which is the clear Sum to be recovered.

PROBLEM III.

To inſure ſo, as that the Inſured, upon the Loſs of his Ship, may recover the Sum A clear, over and above the Premium, and the Intereſt alſo upon the Premium for two Years.

Let the Premium be m *per Cent.* or 0. m.
And let 1 l. added to its Intereſt for 1 Year, be r.
Put x for the Sum to be inſured.
Then $x - mrrx = A$
$x = \frac{A}{1-mrr}$.

EXAMPLE.

A French *Merchant*, upon the Balance of an Ac-count, has 100 l. paid to his Order at Vera-Cruz *in the* Weſt-Indies, *which Sum will be re-turned home to him in the* Flota *two Years hence, What Sum is he to inſure, ſo as to recover this principal Sum of* 100 l. *clear, over and above the Premium after the Rate of* 5 per Cent, *and alſo the Intereſt upon the Premium for two Years?*

Then $A = 100$.
The Premium $m = 5$ *per Cent.* or 0.05.
And the Rate of Intereſt, or 1 l. added to its In-tereſt for one Year, = 1.05.

Then $\frac{A}{1-mrr} = \frac{100}{1-0.05} \times 1.05 \times 1.05 = \frac{100}{1-0.055125}$

$= \frac{100}{.944875} = \frac{100,000,000}{944875}$, or 105.82 l. nearly.

To prove which, take 5 *per Cent.* of 105.82, or the Premium upon it, which is 5.291 : Take alſo this laſt Sum, added to its Intereſt, after the Rate of 5 *per Cent.* for two Years, which is 5.82 ; And deducting this from 105.82, the Remainder is the clear Capital of 100 l.

PROBLEM IV.

To infure fo, as to recover the Sum P, and its Intereft for one Year, clear, over and above the Premium upon both, and the Intereft alfo upon that Premium for one Year.

The Premium let be m *per Cent.* or $o. m$; And let $1l.$ added to its Intereft for one Year, be r; Then P, added to its Intereft for one Year, will become Pr: Call Pr, A; Then this *Problem* is reduced to the Cafe of the fecond *Problem*; And x, or the Sum to be infured, $= \frac{A}{1-mr}$, or $\frac{Pr}{1-mr}$.

EXAMPLE.

A Merchant at Cadiz *has* 1000l. *now due, and paid to his Account at* La-Vera-Cruz, *which Sum he expects home by the* Flota *a Year hence; What he expects home by the* Flota *a Year hence; What be now to infure, fo as to recover his* 100l. *Sum is he now to infure, fo as to recover his* 100l. *with the Intereft upon it for one Year, over and above the Premium, and the Intereft upon that Premium for one Year?*

Let the Premium be 5 *per Cent.* And the Rate of Intereft alfo 5 *per Cent.*

Then $\frac{Pr}{1-mr} = \frac{105}{1-0.5} \times 1.05 = \frac{105}{1-0.0525} = \frac{105}{0.9475}$ $= 110.818 l.$ which is the Sum to be infured.

To prove which, take 5 *per Cent.* of 110.818l. which is 5.5409l. and is the Premium: Take alfo the Intereft of 5.5409l. for one Year, which Intereft is 0.277l; And the Premium, together with its Intereft, amounts to 5.8179l, or 5.818l; Which being deducted from 110.818l, the whole Sum infured, leaves 105l. But this 105l. will repay

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to the Merchant his 100l, together with its Intereft alfo for one Year; Therefore the Conditions required in the foregoing Example appear to be exactly anfwered.

PROBLEM V.

To infure fo, as to recover the Sum P, and its Intereft for two Years, clear, over and above the Premium upon both, and the Intereft upon that Premium for two Years.

The Premium let be m *per Cent*, or $o. m$; And let $1 l$, added to its Intereft for one Year, be r: Then confequently $1 l$, added to its Intereft for two Years, will be rr; And P, added to its Intereft for two Years, will become Prr. Then put x for the Sum to be infured; The Premium upon which is mx; And this Premium, added to its Intereft for two Years, is $mrrx$. But x is to be fuch a Sum, as, after the Deduction of the Premium upon it, together with the Intereft of the Premium for two Years, may ftill amount to Prr; That is, to the original Sum of P, including its Intereft for two Years.

Therefore, $x - mrrx = Prr$.

$x = \frac{Prr}{1-mrr}$, which is the Sum to be infured.

If Prr be called A, this Problem will be reduced exactly to the Cafe of the *third* Problem.

EXAMPLE.

Take the antecedent Example, fubftituting *two Years* in the place of *one Year*, wherever it occurs.

Then $\frac{Prr}{1-mrr} = \frac{110.25}{1-0.055125} = \frac{110.25}{0.944875} = 116.682 l.$ which is the Sum to be infured.

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To prove which, take 5 *per Cent.* being the Premium upon 116.682, which is 5.8341; And this Premium, added to its Intereſt for two Years at 5 *per Cent*, amounts to 6.432 *l*; Which, deducted from 116.682 *l*, leaves 110.25 *l*, being exactly 100 *l*. added to its Intereſt for two Years; Whereby the Condition of the Problem is anſwered.

PROBLEM VI.

To inſure ſo, as to recover the Sum P clear, and its Intereſt for two Years, together with what ſhall be paid for the Premium, and alſo the Intereſt upon that Premium for two Years, over and above all Charges.

The Premium being *m per Cent*, or o. *m*; And 1 *l*, added to its Intereſt for one Year, amounting to *r*, It follows, that *P*, added to its Intereſt for two Years, will become *Prr*. Let the Sum to be inſured be *x*, Then the Premium upon this Sum is *m x*; And this Premium, added to its Intereſt for two Years, becomes *mrrx*; Which laſt Sum is to be recovered clear, as well as *Prr*. Therefore *x* is to be ſuch, that, after the Deduction of the Charge of the Premium from it, there may remain *Prr + mrrx*.

That is, $x - mx = Prr + mrrx$.

$x = \dfrac{Prr}{1 - m - mrr}$, which is the Sum to be inſured.

EXAM-

EXAMPLE.

A French *Merchant having a Cargoe in the* Eaſt-Indies, *which has coſt him* 100 l. *there, and which he expects home in two Years, deſires to inſure ſo, as, in caſe of Failure of the Voyage, to recover clear into his Pocket this* 100 l, *and its Intereſt for two Years, together with what ſhall be paid for the Premium, and alſo the Intereſt upon that Premium for two Years, over and above all Charges.*

The Premium let be 10 *per Cent*, and the Rate of Intereſt 5 *per Cent*.

Then $\dfrac{Prr}{1 - m - mrr} = \dfrac{100 \times 1.1025}{1 - .1 - .1 \times 1.1025} = \dfrac{110.25}{.9 - .11025}$
$= \dfrac{110.25}{.78975} = 139.6\,l$. which is the Sum to be inſured.

To prove which, according to the Conditions of the Problem, after the Premium of 10 *per Cent*. is deducted from 139.6 *l*, there is ſtill to remain clear, the Amount of this Premium added to its Intereſt for two Years, and alſo the principal Sum of 100 *l*. added to its Intereſt for two Years. But 10 *per Cent*, or the Premium upon 139.6 *l*, is 13.96 *l*, which being deducted from 139.6 *l*, leaves 125.64 *l*. This Premium alſo of 13.96 *l*, added to its Intereſt after the rate of 5 *per Cent*. for two Years, amounts to 15.39 *l*; Which being deducted from 125.64, leaves 110.25 clear, And is the exact Amount of 100 *l*. added to its Intereſt after the rate of 5 *per Cent*. for two Years; Which anſwers all the Conditions required.

It would be eaſy to multiply Problems and Examples of this ſort without Number.——But in every

Queſtion

Queſtion of this kind in the Science of Infurance, if the Ideas of the *clear Capital*, and of the *clear Capital* and *Premium*, which laſt together conſtitute the *whole Capital*, be diſtinctly retained in the Mind, all Difficulties will eaſily vaniſh, both in regard to Equity and Computation.

It is evident that the *French* Method of Infurance, ſo as to recover, upon the Balance of the Account, the *whole Capital*, inſtead of the *clear Capital*, is founded upon a Miſtake, in conceiving that the *whole Capital* belongs to the Merchant, without any Conſideration of the *defective* Part which belongs to the *Sea*. — Yet, though this be contrary to Equity, it will introduce no Difficulty in the Computation : For the *French* Merchant regards the *whole Capital* as the *clear Capital*; And the Queſtion is to be ſolved accordingly.—And in all Caſes this is the conſtant Rule, and the Sum of the Myſtery, *That the* WHOLE CAPITAL *is to be infured, in order to recover the* CLEAR CAPITAL, *upon the Balance of the Account*; That is, *after Repayment of the Premium.*

If the *Premium* upon any *whole Capital* be $\frac{1}{m}$ thereof, it is then evident that the *clear Capital* is $\frac{m-1}{m}$ thereof; For theſe two together, that is, the *clear Capital* and the *Premium*, or $\frac{m-1}{m} + \frac{1}{m}$, conſtitute $\frac{m}{m}$, or the *whole Capital.*

If the *whole Capital* be given, there is no Difficulty in regard to the Sum which ought to be fairly infured, which is to be the *whole Capital*.— And therefore, if the *clear Capital* only be given, all the Difficulty is to find the *whole Capital.*

But to find the *whole Capital*, when the *clear Capital A*, and the *Premium* are both given, and no *Intereſt* is to be computed upon either, hath been

been ſhewn under the firſt Problem, where the *whole Capital*, in ſuch Caſe, hath been found to be

$$A + \frac{A}{m-1}.$$

The *whole Capital* may now alſo be found, when the *clear Capital* is given, by a *new general Method*, with peculiar Elegance and Simplicity.

Thus, ſince $\frac{1}{m}$ of the Cargoe is the *Premium*, then conſequently $\frac{m-1}{m}$ of the Cargoe is the *clear Capital.*

And theſe two added together, or $\frac{m-1}{m} + \frac{1}{m}$, or $\frac{m}{m}$, is the *whole Capital.*

Wherefore $\frac{m-1}{m}$ is to $\frac{m}{m}$, or $m-1$ is to m, as the *clear Capital* to the *whole Capital.*

But the *clear Capital* here is A,

Therefore $m-1 : m :: A : \frac{mA}{m-1} = A + \frac{A}{m-1}$, as hath been already diſcovered by *two* different Methods.

This Solution is in reality purely *Arithmetical*, and applicable to any Queſtions of this ſort with the greateſt Eaſe and Perſpicuity.

Thus, ſuppoſe, 1. the *clear Capital*, in any Caſe, be 100*l*; And the *Premium* 10 *per Cent*. — Then, in order to find the *whole Capital*, it is to be conſidered, ſince the *Premium* is $\frac{10}{100}$, that the *clear Capital* is $\frac{90}{100}$ of the whole Cargoe; that is, is 90 Parts out of 100, of which the whole conſiſts.

Therefore, as 90 : to 100 :: ſo is the *clear Capital* to the *whole Capital.*

That is, in this Inſtance,

As 90 : 100 :: 100 : $111\frac{1}{9}$, the *whole Capital.*

2. EXAMPLE.

The clear Capital *let be* 100 l, *and the* Premium 7 per Cent, *what is the* whole Capital ?

Since the Premium is $\frac{7}{100}$ of the Cargoe, it follows, that the *clear Capital* is $\frac{93}{100}$ of the whole Cargoe.

Therefore, as 93 : 100 : : fo is the *clear Capital* to the *whole Capital.*

That is, in this Inftance,

As 93 : 100 : : 100 : 107.527 l. the *whole Capital,* which is to be infured in order to recover the *clear Capital,* over and above the Re-payment of the *Premium.*

It is not difficult to extend the fame Method of Reafoning to any of the other foregoing Problems, and to folve them in the fame Manner, by the Affiftance only of common *Arithmetic:* The *grand Principle* in all Cafes of this fort, and the Foundation of every Solution, being this, *That the* WHOLE CAPITAL *is to be infured, in order to recover the* CLEAR CAPITAL. — For, fince the *Premium* is to be paid before-hand by the Merchant, he ought to infure fo, as to recover this *Premium* again, as well as the *clear Capital;* whereby, upon the Balance of the Account, he will obtain, as he ought, the *clear Capital* only, over and above all his Expences.

If the *whole Capital* be given, the *clear Capital* is found by deducting the *Premium* from it. The Reafonablenefs has been fufficiently inculcated already in this Work, of acquiefcing in the *clear Capital,* and of infuring upon the juft Principle of recovering *that* only, clear of all Charges. Greedinefs and Ignorance have hitherto, in fome Inftances, too much encroached upon this equita-
ble

ble Rule; And formed Pretenfions, without Right, to the recovering and retaining of additional Sums, which have not really been difburfed by the Merchant. —— But whatever Deviations, by Miftake or by Avarice, may be made from *Equity,* the *grand Principle* ftill continues to be true, *That the* WHOLE CAPITAL *is to be infured, in order to recover,* however it may be ftated, *the* CLEAR CAPITAL.

This will be very ftrongly illuftrated in a complicate Inftance, by folving the Example under the *fixth* Problem, according to the laft *new* Method of Proportion, upon this Principle, and by the Aid only of common *Arithmetic.*

Referring then to this Example, it appears, that the Merchant defires to infure fo, as to recover, clear into his Pocket, 100 l, and the Intereft of it for two Years; together with whatever fhall be paid for the Premium, and alfo the Intereft upon that Premium for two Years, over and above all Charges.

Therefore, fince the Premium is 10 *per Cent,* or $\frac{10}{100}$, And the Rate of Intereft 5 *per Cent,* it follows, that the Premium, added to its Intereft for two Years, amounts to $\frac{11.025}{100}$; And 100 l, added to its Intereft for two Years, becomes 110.25 l; This laft being the total Sum which will have been really difburfed by the Merchant, is the *clear Capital.* —— But the Merchant, in this Inftance, is determined to recover not only the *Premium,* which he has paid to the Infurer, but alfo further to recover a *Premium extraordinary,* added to its *Intereft* for *two Years,* which he will retain in his own Pocket. Therefore *both thefe* are to be included in the *whole Capital,* and to conftitute together the total Amount of the *Premium,* which
there-

therefore becomes $\frac{10}{100}$ + $\frac{11.025}{100}$, or $\frac{21.025}{100}$; And consequently the clear Capital remaining is $\frac{78.975}{100}$.

Wherefore 78.975 : 100 :: as the *clear Capital* to the *whole Capital*.

Or 78.975 : 100 :: 110.25 : 139.6, the *whole Capital* to be infured, as before appeared.

Of which *whole Capital*, it is to be obferved, that the real *clear Capital* is no more than 110.25 *l*; The *Premium* to be *juftly* recovered, which has been paid to the Infurer, is 13.96 *l*; And the *Premium extraordinary*, with the *Intereft* upon it for *two Years*, is 15.39 *l*; Which laft Sum appears to belong to the *whole Capital*.

This Solution depends upon the *grand Principle*; —And is formed according to the laft new Method of finding, from the *clear Capital* given, the *whole Capital* to be infured; Since they bear to each other the fame Proportion, which the *clear Part* of every 100 *l*. of the Cargoe upon the Deduction of the *Premium*, bears to the *whole* 100 *l*. And by this Method is fhewn, with peculiar Perfpicuity, that the *extraordinary Premium*, together with its *Intereft*, which the Merchant retains in this Inftance, is no Part of his *clear Capital*; And therefore, that he has no *Right* to retain it, upon an equitable Plan of Infurance; Although fuch kind of Infurances may be propofed as Objects of *Speculation*, or perhaps fometimes be really admitted in *Practice*.

Imagine I have 100 *l*. at *Lifbon*, which I can have remitted from thence hither in Bills of Exchange at *Par*; — It is then evident, that as there is no Sea-Rifk, there is no Premium due in this Courfe of Conveyance. — If therefore I was to infure in this Cafe, it muft be upon the *whole Capital*; But fince the *whole Capital* is the *clear Capital*

tal added to the *Premium*, and the *Premium* in this Circumftance is *nothing*, it follows, that the *whole Capital* and the *clear Capital* here are the fame; Which is right; And vindicates, even in this Inftance, the Truth of the general Rule, *That the* WHOLE CAPITAL *is to be infured, in order to recover the* CLEAR CAPITAL.

But fuppofe I order this 100 *l*. in Specie to be fhipped in a Veffel from *Lifbon* hither, and that the *Premium* upon the Voyage is 5 *per Cent*; It is then evident, that my *clear Capital* is only 95 *l*, And that I am to infure the *whole Capital* of 100 *l*. in order to recover my *clear Capital*. — Since by this Method of Conveyance I have fubjected my Property to Hazard, and now the *clear Part* of it only remains to myfelf.

Imagine again, that I have 100 *l*. now due to me, and paid to my Order at *Panama*, which is to be returned to me to *Europe* by the Galleons; That the *Indulto*, or the Tax upon it to the King of *Spain*, is 5 *per Cent*; That the Premium from *Panama* to *Cadiz* is 10 *per Cent*; What ought I to infure, fo as to be reimburfed at *Cadiz* in my *clear Capital*, upon the Balance of the Account?

The *Indulto* to the King of *Spain* being 5 *per Cent*, the Remainder, or 95 *l*, is my *whole Capital*, which is to be infured; Of which 10 *per Cent*, or 9.5, being the *Premium*, the Remainder, which is 85.5 *l*, is my *clear Capital*.

Thefe Problems being difpatched, it may next be remarked, that from various Accidents to Veffels at Sea, or from their being ftranded on Shore, it frequently happens that fome Part of their Cargoes are loft, and the reft faved; Whence arife many Queftions and Difficulties, of much Nicety, in regard to *Average* and *Salvage*, between the Infured and the Infurers: — Some of which, I

G   appre-

apprehend, muſt have an Affinity with the following Caſes.

C A S E   I.

A Merchant inſures 500 *Hogſheads of Sugar, coming from* Jamaica *to* London, *at* 10l. *per Hogſhead, or* 5000l. *for the whole Cargoe: In the Voyage the Ship ſprings a leak, and half of the Hogſheads are thrown over-board, to ſave the reſt; But the remaining half, which arrived ſafe in Port, being worth* 20l. *each Hogſhead, or* 5000l. *in the whole, the Inſurers inſiſted with the Merchant, that, ſince he recovered the whole Value he had inſured, they were not liable to any Demand: — How ought this juſtly to be determined?*

S O L U T I O N.

Imagine the *inſured Part* of the Cargoe to be *I*, and the *Part not inſured* to be *M*; Then theſe two Parts added together, or $I + M$, conſtitute the whole Cargoe. But in this Inſtance there is loſt one half of the whole Cargoe, or $\frac{1}{2} I + \frac{1}{2} M$. But $\frac{1}{2} I$, which is loſt, is one half of the inſured Value; And it belongs to the Inſurers to repair the Loſs of the inſured Value. And $\frac{1}{2} M$ is one half of the Value not inſured, which falls to the Merchant's own Loſs. — Therefore, in this Caſe, the Inſurers ought juſtly to pay one half of the Value inſured upon the whole Cargoe.

This will be further evident, by ſuppoſing, for the preſent, the *non-inſured Part* of the Cargoe to be *nothing*; In which Caſe it is plain, that the whole Loſs falls upon the Inſurer.—Let there be now a *non-inſured* Value put into every Hogſhead, equal to the Amount of the *inſured* Value. If then

then half of the Hogſheads be loſt, the inſured Value therein, and the non-inſured Value, are both loſt. But it would be very unreaſonable to inſiſt, that the Loſs upon the inſured Value is all to be repaid out of the non-inſured Value in the Hogſheads which are ſaved;—Which is the ſame as to inſiſt, that one Merchant's Property, which is ſaved, ſhall pay the Loſs upon another Merchant's Property, which has been damaged: —Yet this is, in effect, what is urged by the Inſurers, who inſiſt, that the *non-inſured* Part, which is ſaved, ought to make up the Loſs upon the Part *inſured*.

Again, it may be further conſidered, that the Merchant hath as good a Right to inſiſt that the whole 5000l. ſhall be paid by the Inſurer, ſince there hath been ſo much Value loſt, as the Inſurer hath to inſiſt upon paying nothing, ſince there hath been ſo much Value ſaved.— But the true Deciſion depends upon this, That there is an *inſured* and a *non-inſured* Part in each Hogſhead, which being ſeparated, all the Loſs upon the *inſured* Part, and no more, is undeniably to be repaired by the Inſurer.

And if the Sugar had come to a *fallen Market*, inſtead of a *riſen* one, the juſt Demand upon the Inſurers would have ſtill been the ſame, or half of the whole Value inſured. For in that Caſe, putting *I* for the inſured Value of the Cargoe, and *M* for the Value not inſured; Then the whole Value of the Cargoe, as before, is $I + M$. And if half of the Cargoe be loſt, the Loſs will ſtill be $\frac{1}{2} I + \frac{1}{2} M$; That is, one half the *inſured* Value, together with one half of the Value *not inſured*. —— But the *non-inſured* Value is here *nothing*; Therefore the whole Loſs falls upon the Value *inſured*, And is conſequently to be repaired by the Inſurers.

　　　　C A S E

C A S E II.

A Merchant infures 500 *Hogſheads of Sugar, coming from* Jamaica *to* London, *at* 10 l. *per Hogſhead, or* 5000 l. *upon the whole Cargoe: The Ship in her Voyage runs a-ground upon the Coaſt of* Portugal, *and is ſtranded ; but all her Cargoe of Sugar is ſaved, and comes to a riſen Market in* Portugal, *of* 20 l. *for each Hogſhead, or* 10,000 l. *for the whole Cargoe. —— But the Charge of Salvage is* 1000 l, *which is thereupon demanded by the Merchant from the Inſurer ; The Queſtion is in this Caſe, What ought to be paid by the Inſurer ?*

S o l u t i o n.

Putting I for the infured Value of the Cargoe, and M for the Value not infured, it follows, that the whole Value of the Cargoe is $I + M$, or 10,000 l, in this Inſtance ; And the Charge of *Salvage* is to be eſteemed as a Damage ſpread upon the whole Cargoe : But the Amount of this Charge, or Damage, is 1000 l, or $\frac{1}{10}$ Part of the whole Value of the Cargoe ; That is, $\frac{1}{10} I + \frac{1}{10} M$; That is, $\frac{1}{10}$ Part of the *infured* Value, together with $\frac{1}{10}$ Part of the Value *not infured*. —— Therefore the Inſurer ought to pay no more than $\frac{1}{10}$ Part of the Value infured, or 500 l.

This is further evident, becauſe the Value *not infured* is ſaved, as well as the *infured* Value, and is equally liable to the Charge of *Salvage*. —— And it is unreaſonable to demand from the Inſurer the Charge of Salvage, for a Part of the Cargoe in which he is no way concerned, which is the Part *not infured*.

CASE

C A S E III.

A Merchant infures 500 *Hogſheads of Sugar, coming from* Jamaica *to* London, *at* 10 l. *per Hogſhead, or* 5000 l. *upon the whole Cargoe: The Ship in her Voyage runs a-ground upon the Coaſt of* Portugal, *and is ſtranded, whereby* 250 *Hogſheads, or one half of her Cargoe is loſt, the other half ſaved ; And the Charges of Salvage amount to* 1000 l : *At the ſame time the Sugar comes to a fallen Market, ſo as to be worth no more than* 5 l. *for each Hogſhead ; What is to be paid by the Inſurer ?*

S o l u t i o n.

Putting every thing as before, 1. Since $\frac{1}{2} I + \frac{1}{2} M$, or one half of the whole Cargoe, is loſt, the Inſurer is to pay to the Merchant, on this Account, one half of the Value infured, or 2500 l.

2. The Charges of Salvage for the other half of the Cargoe, which is ſaved, and brought to a fallen Market, ought *all* to be paid by the Inſurer, As he cannot pretend that any Part of theſe Charges are incurred upon account of a Value *not infured*. Theſe Charges, amounting to 1000 l, being therefore all incurred by the *infured* Part of the Cargoe, and to be eſteemed as ſo much Damage upon *that Part* only, ought all to fall upon the Inſurer.

CASE

CASE IV.

Three Merchants insure with three different Insurers their respective Shares of the Cargoe of a Ship coming from the West-Indies; *the Property of the first Merchant being Indigo; of the second Merchant, Sugar; of the third, Tobacco: In the Voyage, upon the Vessel's springing a leak, the Goods of the third Merchant are thrown over-board by the Consent of the Ship's Crew, as necessary to their common Safety: Upon the Arrival of the Ship at home, how are the respective Demands to be adjusted between the Merchants themselves, and between them and the Insurers? Supposing each Merchant to have insured* 1200 l. *upon his respective Cargoe; and that the Indigo, upon its Arrival, is worth double the insured Value; the Sugar no more than half its insured Value; and the Tobacco, if it had arrived, would have been worth only two-thirds of its insured Value.*

SOLUTION.

Since the Market Value of the Indigo, upon its Arrival, is 2400 *l*; The Market Value of the Sugar, 600 *l*; And the Market Value of the Tobacco, if it had arrived, 800 *l*. The total Market Value of the Cargoe was 3800 *l*; which would have been the Amount of the whole Benefit received by the three Merchants, if all had arrived safe; And in proportion to the three several Parts of this whole Value, would have been the Benefit respectively received by these three Merchants; And in this Proportion ought also their respective Contributions to be towards the Charge of the Salvage.— But out of this total Value of 3800 *l*, the Sum of 800 *l*. has been contributed in effect, or paid by the third Merchant for the general Salvage.—Therefore the first and

and second Merchants are each to pay to the third Merchant $\frac{800}{3800}$, or $\frac{8}{38}$, or $\frac{4}{19}$ Parts of the Values of their respective Cargoes of Indigo and Sugar; That is, $\frac{4}{19}$ of both 2400 *l*. and of 600 *l*; Which are $505.\frac{5}{19}$ *l*, and $126.\frac{6}{19}$ *l*, respectively, as their several Shares of the Charge of Salvage. And the third Merchant will then also suffer himself, or contribute $\frac{4}{19}$ Parts of his Cargoe, or of 800 *l*, which amounts to $168.\frac{8}{19}$ *l*. The three Contributions of $505.\frac{5}{19}$, $126.\frac{6}{19}$, and $168.\frac{8}{19}$, amounting exactly to 800 *l*, or to the whole Charges of Salvage. — Thus every thing is justly settled between the *Merchants*, the Loss being fairly divided amongst them, in proportion to the real Values of their several Cargoes, and the Benefits respectively obtained from the Salvage.

The Point next is, To settle the *Merchants* Demands upon the *Insurers*. The *insured Values* of the Indigo, Sugar, and Tobacco, having been 1200 *l*, respectively; Their *Market Values* being 2400 *l*, 600 *l*, and 800 *l*, respectively; And their several *Damages* being $505.\frac{5}{19}$ *l*, $126.\frac{6}{19}$ *l*, and $168.\frac{8}{19}$ *l*; — It is then evident, that the third Merchant, whose Loss by the Sea is $168.\frac{8}{19}$ out of his Cargoe, has a just Demand for this whole Loss upon the Insurer: For the *Market Value* of his Cargoe being less than the *insured Value*, it cannot be pretended that any Part of this Loss has been incurred by an *extra* Value, which is *not insured*. — The third Insurer, therefore, ought justly to pay $168.\frac{8}{19}$ to the third Merchant. —— By the same Rule, the second Insurer ought to pay $126.\frac{6}{19}$ *l*. to the second Merchant. — But the first Insurer may justly say to the first Merchant, that there was in the Cargoe of Indigo an *extra Part* not insured, of equal Value to what was insured: And therefore, that the *insured* Part sustained only *half* of the Damage, the other half

half of the Damage being juftly to be allotted to the *non-infured* Part; And therefore the firft Infurer, inftead of 505.$\frac{5}{19}$, ought only to pay 252.$\frac{12}{19}$ *l.* to the firft Merchant.

It will probably appear extraordinary, that the three Infurers fhould be liable to pay 168.$\frac{8}{19}$ *l*, 126.$\frac{6}{19}$ *l*, and 252.$\frac{12}{19}$ *l*, refpectively, when they were each refponfible for the *fame Sum* of 1200 *l.* upon the *fame Voyage.* — But the fhort Anfwer is, That thefe Sums are the refpective Damages fuftained by the feveral Cargoes which they infured. ——— If thefe Cargoes infured had been in *different Ships*, there would be no Difficulty in the Admiffion of *different Damages*; And it is equally certain, that in the *fame Ship*, *different* Parts of the Cargoe may be *differently* damaged.

But waving further Speculations of this fort, which are out of my Province, however curious, and which I have here undefignedly fallen into, I advance to examine a political Point of the higheft Importance, which is, *Whether our Infurance of the Ships of our Enemies be a national Advantage?*

It is eafy to fee, that by this Practice, in time of War, we are rendered fubject to continual Frauds : For as our Enemies may infure upon having *Intereft or no Intereft* in their Ships, how practicable is it for them to infure a great Sum upon Ships, wherein they have little or no Cargoe, And to order thefe Ships to cruize in fuch a manner, in the Courfe of their pretended Voyage, that they may be almoft fure of being captured by our Men of War, or Privateers ! — In which Cafe, for the Payment perhaps of every 20 or 25 *l.* in *Premia*, there are fure to recover 100 *l.* from our Infurers.—And this is what is faid to have been lately practifed upon Ships fitted out at *Bayonne.*

Infurances upon *Intereft or no Intereft* in the Cargoe, have for Plea, I prefume, the avoiding of Trouble

Trouble and Difputes in afcertaining the Right to the Property; Upon the fame Foundation as *Goldfmiths* and *Bank Bills* are made payable to the Bearer, without further Enquiry.—This, I apprehend, is the ftrongeft Argument in their Favour: But there is evidently this Difference, that in regard to fuch Bills, there is an indifputable Property belonging to the *Drawer* of the *Bill*, though how the *Bearer* obtains the Poffeffion of it, is uncertain ; Whereas, in Infurances of *Intereft or no Intereft*, there may be no Property belonging to any Perfon.—Befides, in the Cafe of the Bills, the original Intention is obtained and preferved, which is *the eafy Circulation of Property.* —— But Infurances having been originally calculated, and in their Integrity ftill directed, for the Support of Navigation and Commerce, may by this Application of them be directed to the Deftruction of Shipping; And deviate entirely from being an Encouragement of Induftry and Trade, into a Temptation to Frauds and Commercial Abufes.—This fort of Infurance further, having no Foundation in Property, carries with it an *Abfurdity*, in engaging to fecure what is not ftanding out upon Hazard, nor really exifts ; And confequently falls into a downright Scheme of *Gaming*, where the Infurer and Infured wager together a particular Sum refpectively, upon the Succefs of a Voyage. It is therefore, in reality, liable to the fame Objections as *Gaming*, which is generally prohibited under wife Governments. ——— And upon the whole, this Practice, though it may have its Conveniencies upon fome Occafions, appears to open a Door to fo much Mifchief, without being abfolutely neceffary to upright Commerce in general, that in my Apprehenfion it ought not to be admitted.

But to return to the general Point of *infuring the Ships of our Foreign Enemies.* Let it be admitted, that

that the Premium for infuring the *French* Ships from *Martinico* and *St. Domingo* is $33\frac{1}{3}$ *per Cent*; And that out of this $32\frac{1}{3}$ *per Cent.* is the real Probability of the Lofs of each Ship, and 1 *per Cent.* the *Profit* given to our *Infurers* for their Trouble. This Premium of $33\frac{1}{3}$ *per Cent.* is here particularly mentioned, as it is the *higheft* which in general has been given for the Infurance of thefe Veffels.

The firft Argument I have heard in favour of thefe Infurances is, That *we draw to ourfelves hereby the certain prodigious Benefit of $\frac{1}{3}$ of the Value of the whole* French *Commerce.*

In anfwer to which, it appears from the foregoing Diftribution of the two Parts of the Premium, that the *Infurers Profit* upon thefe Ships is no more than 1 *per Cent.* or $\frac{1}{100}$ Part of the Value of their Cargoes. The other $32\frac{1}{2}$ *per Cent.* being *otherwife due* to our Men of War and Privateers, and which would be due to them upon a fair Compofition with the Enemy, if there was no Infurance.—All that it can then be pretended we gain, is the *Infurer's Profit*, over and above what is otherwife due to our Captors. And this Profit being reduced very low by the Multitude of rival Infurers, may perhaps not have exceeded 1 *per Cent*, if their Gains be fairly computed.—Thus it evidently appears from this Inftance, that all the Gain which we draw from thefe Infurances, inftead of being *one third* Part, is only *one hundredth* Part, of the *French* Commerce.

It may however ftill be urged, that *if our Gain from infuring thefe* French *Ships be no greater than 1* per Cent. *of their Value, yet ftill this being a confiderable public Advantage upon the whole, ought not to be rejected.*

To which it is to be anfwered, that if the whole Balance was to be fettled between us and the *French*, upon the foot of this fingle Account, we fhould be

Gainers

Gainers thereby of 1 *per Cent* upon the Value infured; And upon a *Million* of Property infured, our Gain would be 10,000*l*, which is no prodigious national Acquifition.—But if we confider the Gain of our Enemies from our Infurance of their Ships, and place their Gain oppofite to ours, it will then truly appear, upon the whole, on which Side the Balance lies, from this new Commerce of Infurance.

To begin with the *Englifh* Side of the Account, As our Gain will be moft eafily fumm'd; It appears, that the whole which we acquire hereby is only about 10,000*l. per Annum*, without any Augmentation of our Shipping or Commerce.

On the *French* Side of the Account, the firft Article of their Advantage from thefe Infurances is, *Tranquility* and *Peace of Mind* to numerous Families of their beft Subjects, in *Europe* and *America*; An Article of no fmall Importance to the Welfare of a People, and is therefore by them fo earneftly follicited.—It is eafy for every one to be informed, from his own Breaft, of the Difadvantage it is to any bufied Perfon to labour under continual Anxiety; And that Peace of Mind is of great Importance to his Abilities, to his fteady Purfuit, and Succefs in his Affairs.

To this is to be added another Article of high Advantage to the *French*, which is *Security* from a large Quantity of *Diftrefs* and *Ruin*, they would otherwife incur.—For if, out of every *three* Merchants, *one* is abfolutely ruined, and *two* efcape with confiderable Gains, there will be a much greater Quantity of Diftrefs, upon the whole, than if all *three* are *fined* according to their Abilities.—In one Cafe, you fee abfolute *Ruin* to *many*, and *Terror* to the *whole*; In the other Cafe, neither Ruin nor Terror, but a *general frugal Security.*

Befides, our Infurers in many Inftances *transfer* the *Anxiety* and *Terror* from the *French* to themfelves:

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felves: For though it hath already been proved, that a large Body of Infurers, joining together in a great many Voyages, are not fubject to much Hazard upon the whole, if the Chances in each Voyage are in their Favour; And therefore, that they need not fuffer Anxiety. Yet, as it often happens that fome of them will adventure through Greedinefs, or particular Accidents, to be deeply engaged upon *one* Ship, Inftances are too frequent of the Diftrefs of our Infurers; And the conftant Uneafinefs of many of them is very obvious. — Whence it evidently appears, that by this Practice of Infurance we not only relieve our Enemies from their Miferies, but fubftitute ourfelves in a great Part thereof in their ftead; —— Which is a Folly approaching to abfolute Madnefs.

It is further to be remarked, that the *French* generally infure fo as to recover, upon the Balance of the Account, not only their *clear Capital*, but the *Premium* alfo; So that they are Gainers by the Lofs of their Ships, and may juftly fmile at the Efforts of our Captors.

There is a further Evil arifing from this Practice of infuring the Ships of our Enemies, which is, That our Infurers are rendered thereby *bad Subjects* to their Country: For as *Self-prefervation* will be apt to prevail over all other Motives, they cannot but repine at the Capture of the Enemy's Ships, and rejoice in their Efcape. And thus it is the melancholy Effect of this Practice, to render many of the moft active and vigilant money'd Perfons amongft us, averfe to the Succefs of the Arms of their Country, and anxioufly wifhing for the Deliverance of its Enemies.

Another Article of Gain to the *French* from our infuring their Ships, is a *folid Credit*, and *Ability* they acquire thereby to maintain their Commerce, which would otherwife be loft; It being evident, that

that if the Properties of the *French* Merchants ftood out upon Adventure, without being infured, they have no certain Foundation of Credit; And would be unable to borrow Money to furnifh out new Cargoes, until the Event of thofe which were outftanding fhould be determined.—For they can give no *folid Security* to any Lender, and of courfe a great Part of the Money which is now intrufted in their Hands by cautious and prudent Perfons, would be immediately withdrawn.

The Confequence of which would be, that their *Manufactures*, and *Shipping* at home, and *Plantations* abroad, would all inftantly languifh and die, the Merchant being no more able to fet them at work: — So that it appears from hence, that by the Infurance of the *French* Ships, not only their particular Cargoes are infured, but alfo the Manufactures, and Shipping of *France*, and her *American* Plantations, to an immenfe Amount. ————View then the prodigious Diminution which would happen to the *French* Commerce for want of Infurance!

Thus the *French* draw amazingly greater Advantages from this Practice than may at firft be perceived; And if *we* annually acquire 10,000*l.* by thefe Infurances, *they* preferve many Millions, which would otherwife be loft to them: So that, upon the *Balance* of the Account, as it now difcovers itfelf, it is evident, that by this Commerce of Infurance between the two Nations, they are immenfe Gainers.

But the Account is not yet clofed; — For it is further to be confidered, that as the *French* and We are *Competitors* in Trade, almoft all which is preferved to *Them* is intercepted from *Us*. — This is evidently true in regard to their Woollen Manufactures, and to their Sugars, Fifhery, and the greateft Part of the Produce of their *American* Plantations.————It fully appeared in the Year 1719, when

when the *Plague of Marseilles* had ftopped the Vent of the *French* Woollen Manufactures, that the foreign Demand and Confumption of *Ours* was thereby vaftly increafed ; And it is plain, that before the prodigious Increafe of the *French* Sugar Colonies, we vended large Quantities of Sugar in the *Baltic, Holland, Germany,* and the *Mediterranean* ; Which Markets have been fince fupplied by the *French* ; And that now, if their Sugar Colonies were ruined, our own would be almoft proportionably increafed.

How furprizing an Effect *their Lofs,* and *our Gain* at the fame time, will have upon the Proportion of Trade and Wealth between the two Nations, is fit to be particularly explained. —— For fuppofe the whole Value of the *Britifh* Trade, be to the whole Value of the *French* Trade, as 3 to 2,—— Let now the *French* lofe *half* of theirs, and let us gain it ; Then will the Proportion become no lefs than 4 to 1 in our Favour.———— Again, Suppofe the whole Value of the *Britifh* Trade to the whole Value of the *French* Trade as 2 to 1,—And let the *French* lofe *half* of their Trade, and let us gain it ; Then will the Proportion be as $2\frac{1}{2}$ to $\frac{1}{2}$, or no lefs than 5 to 1. ———— How pernicious then is that Commerce, which has prevented fuch great Effects in our Favour !

But there is, as I conceive, a third Argument, which will probably be ufed in favour of Infurances, which is, *That it is the Bufinefs of every Commercial People to deal in all Articles of Trade, and to keep their Country the great Magazine of all Sorts of Commodities* ; In the fame Manner, as judicious private Traders keep many Commodities, by which they are likely to gain little, in order to preferve the general Refort to their Warehoufes.

To this it is to be anfwered, that it is not a fimilar Cafe. — For confidering *Britain* as one Trader,

Holland

Holland as another, and *France* as a third Trader; It may be right indeed for either of them to have in their Storehoufes not only the Commodities which are in general Demand, but fome of thofe which are little required, provided thefe laft exhauft not too much Property : — But will it be prudent in any private Trader to *infure* the *bad Debts* of a Rival Trader, and to fupport the Credit of his Competitor, from whofe Failure he fhould draw the whole Bufinefs to himfelf ? —— This laft is the Cafe of our infuring the *French* Commerce.

Another Argument is, *That if we don't infure the* French *Ships, they will be infured by the* Dutch, *or the* French *will become their own Infurers.*

The Anfwer to this is, that if the *Dutch* fhall infure the *French* Ships, they will act very injudicioufly.—If the *French* fhall enter into Societies for infuring their own Ships, they will act wifely. — But whatever other Nations do, which we cannot prevent, it is our Bufinefs to order our own Policy aright, and to give no Advantage by our own Fault to our Competitors.

There are fome Gentlemen, upon this Occafion, who fall into a Courfe of declaiming againft all *Commercial Prohibitions* and *Reftraints* ; And have a Creed, which they repeat by heart, That the *Current of Trade* fhould be *free,* and not interrupted by any Obftacles. — Such Gentlemen have no Idea of the *Act of Navigation,* without which the *Dutch* would fupply the Wants, and receive the Produce, of all our *American* Colonies: They have no Notion of our checquing the *French Linen* and *Silk Manufactures* imported amongft us, with exceffive Duties ; without which our own *Linen* and *Silk Manufactures* would be immediately ruined. — The Prohibition of the *Exportation* of our *Wool* is founded upon folid Reafons, too obvious

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to want Explanation. — It is indeed true, that the *Current* of *Trade* ought not to be *stopped*; but it ought to be prevented from flowing into *wrong Channels*, and to be directed into such as are *right*. Restraints and Prohibitions in Commerce are therefore neither new, nor dangerous Expedients; And any Argument against our prohibiting the Insurance of *French* Ships, from the general Topic, that all Prohibitions are bad, appears to be quite invalid.

There is another Argument, said to have been used in favour of these Insurances, which is, *That they must have been found by Experience to be advantageous, because if it was a losing Commerce, the Insurers in a Course of Years must be sensible of it, and would relinquish the Business; Instead of which, the Number of Insurers has been continually increasing, and many new-ones are daily crouding into the Business.*

To this is to be answered, that it is readily allowed that the Insurers themselves are Gainers by their Business. — It has been expresly supposed, and admitted, that they have, and ought to have, a *Profit* in the *Premium*; But does it therefore follow, that a Business is profitable to the Public in general, because it is advantageous to particular Dealers? — The *Owlers*, or *Exporters* of our *Wooll* to *France*, find their Business advantageous, And may urge, that they draw Money thereby into the Nation; But it is evident, that the Public receives from thence prodigiously less, than the *French* gain by this Commerce; And much less than the Public would otherwise receive, if the *French* had not our Wooll in support of their own Manufactures. — The Case has already been shewn to be exactly the same in our Insurances of *French* Ships, by which is drawn into the Pockets of our Insurers a small Sum, over and above what they repay; And thereby Advantages immensely greater are given

given to the *French*, and lost to ourselves, which we should otherwise gain by the Interruption and Ruin of the *French* Commerce. — It seems then to be very short Reasoning to infer, because a Commerce is advantageous to particular Dealers, who grow more numerous, that it is therefore nationally advantageous.

It deserves solemn Attention, that our Insurers, in reality, oppose all the *Efforts* of the *State* to destroy our Enemies: — For whilst our *Admiralty* is designing the total Capture of the *French* Ships, and exerting the Maritime Force of the Nation to ruin the *French* Commerce, our *Insurers* step forth, and agree with the *French* Merchants to guaranty their Commerce; And that their Loss shall not exceed 15, 20, or $33\frac{1}{2}$ *per Cent*, or whatever is paid for the Premium, from both the Sea and our Captors. — So that they actually intercept the Blow meditated by the Government against our Enemies; And, upon a certain Bribe being paid to themselves, place the *French* Commerce in a State of Security.

Put the Case, that the *French* have entirely insured any of their outward or homeward-bound Fleets, as their late *St. Domingo* Fleet is supposed to have been, at any Premium, as suppose 20 *per Cent.* upon a Medium. — Imagine now, that the *British* Ministry, or Admiralty, by the Interception of a *French* Pacquet, or by any other Intelligence, are informed, that the Rendezvous of the whole *French* Fleet is to be in a certain Latitude; And that a Squadron of *British* Men of War may be so stationed, as to be morally certain of *destroying* or *taking* the whole *French* Fleet. — An Event of this sort will shine in the *Gazette*, and be celebrated with public Illuminations. — But what will be the Consequence? —— It is evident, that if the *French* Fleet be *destroyed*, our *Insurers* are responsible

fponfible for it to the *French*: — Therefore, in the Cafe of the *Deſtruction* of their Fleet, even upon a fair Infurance, we ſhall have the Value of all this Fleet to pay to the *French*, towards which our Infurers have only received $\frac{1}{5}$ Part, for the *Premia*: —— Whence it appears, that there will be a clear Loſs to the *Britiſh* Nation of $\frac{4}{5}$ of the Value of the whole *French* Fleet, from this Event.

But ſuppoſe that the *French* Fleet, inſtead of being *deſtroyed*, is all *captured*; — Our *Captors* then gain the whole from the *French*, And the *French* recover again $\frac{4}{5}$ thereof clear from our *Infurers*: — So that, upon the whole, we acquire only $\frac{1}{5}$ Part of the Value of this Fleet, or the *Premia*, which we ſhould have acquired, if this Capture had not happened.———Thus, upon the Suppoſition that the whole *French* Fleet is *infured*, we ſhall neither gain nor loſe by the *Capture*: — Therefore the Deſtination of our Squadron to this Expedition, *at the beſt*, will be abſolutely uſeleſs; And the public Treaſure and Strength, in Money, and Ships, and Men, to the Amount of perhaps 2 or 300,000 *l*, will have been all waſted and ſquandered away, to no Purpoſe, upon this Event.

It is therefore high time for ſerious Enquiry, whether, under the preſent *Practice* of *infuring* the *French* Ships, the greateſt Part of our public naval Expence, ſo ſolemnly provided, and appropriated by the Legiſlative Body of the Nation, may not, upon many Occaſions, be fruitleſly directed: For, *after* French *Ships are infured here*, it is ridiculous to employ our Maritime Strength in *taking* them, ſince then *all* the *Loſs* will fall upon *our own Infurers*.—It is indeed certain, that the *more* of our Enemy's Ships we take, the *higher* the *Premia* will be raiſed upon them in *future* Voyages ; And, conſequently, the greater Deduction will be made out of their *future* Profits. But in regard to a

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preſent Voyage which is *infured*, the *Premia*, having been fixed and paid, are not at all affected by the Capture. — And after any Fleet of *French* Ships have been here *infured*, the Succeſs of our naval Force in *deſtroying* that Fleet will be our national Loſs, to the Amount of the whole *clear Capital*, And our *Capture* of that Fleet, though accompliſhed with great Expence, will be entirely inſignificant to Us, upon the Balance of the Accounts of our Infurers.

It is not to be ſuppreſſed, that *Suſpicions* have been held, of *Intelligence* being given to the *French* of the Stations of our Men of War, by *our own Infurers*; And it is certain they have ſtrong Temptations to contribute to the *Eſcape* of the Ships they have *infured*, if our Enemies ſhall *then* deſire to eſcape. — It is not to be expected, that *Intelligence* will be given to our own *Admiralty* by our Infurers, which would be to bring upon themſelves their own Ruin. It is more eaſy to conceive that they will chuſe to give Intelligence to our *Enemies* how to eſcape, and that our Enemies may accept it, when their Ships happen not to be infured to their full Value. — That Informations and Agreements of ſuch kind have been made, is by no means incredible: For *Intelligence* is continually paſſing between our *Infurers* and the *French*, from the Nature of this Dealing ; It being evident, that in order to ſhew the Hazard of a Capture, our Infurers muſt point out the Squadrons, and detach'd Veſſels of ours, which will be liable to intercept the Enemy's Ships in their Paſſage. This will be expected as reaſonable and fair, that the *Premium* may thereby be equitably aſcertained. — It appears thus, that there is ſome kind of *Neceſſity* under this Dealing, that the *French* ſhould be informed of the Force, and Number, and Stations of our Men of War, by our Infurers ; And

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that such Information will be applied by the *French*, and redound, to the Security of their Trade, is not to be doubted; Any more than it is, that a Commerce, which furnishes such Informations to our Enemies, is a Mischief to the Public.

If, after the *Premia* were raised to a great Height, and the *French* at this Rate had insured a large Fleet, it could be so managed, that no Part of our naval Force should be employed in intercepting this Fleet, but to other Purposes, The whole *Premia*, excepting so much as was due for the Hazard of Shipwrecks, would be gained to the Nation, without our incurring any naval Expence. — May it therefore be proposed, that our *Insurers* should signify to the *Admiralty*, from time to time, what Fleets of our Enemies they have thought fit to *insure*, in order to prevent the Direction of our Maritime Force to useless Expeditions. — However *ludicrous* this may seem, if the Commerce of insuring our Enemies is to be suffered to continue, it would be no improper *Intelligence* to our Admiralty.

The *French* on their Part draw Benefit from this Commerce in numberless Shapes; — They are more wise than to employ the chief Part of their naval Force in *convoying* their Trade, since the *British* Insurers will undertake to convoy it safe, for a much less Expence than the Cost of a Squadron. — It will be more prudent in the *French* to employ their Maritime Force in other important Attempts, such as attacking the Province of *Nova-Scotia*, or our valuable Settlements in the *East-Indies*.

It is thus that the *French*, with *three* Men of War, shall engage in Attempts of as great Importance, as we shall with *ten*; Which will be, if *seven* of our *ten* Men of War are employed in the Capture of *French* Ships, which are guaranty'd by our own Insurers. — And if it be said, that *France*

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at the same time bears the Burthen of high *Premia* upon her Trade, it must be remembered also, that she saves the Expence both of Men and of Treasure in *Squadrons* for *Convoy*.

It has been seen, and appeared to our Astonishment, in the Course of this War, how great the Amount is of the *French West-India* Commerce; — And it may deserve to be seriously considered, that if their Merchants can *now*, during the War, support their Plantation Trade under such heavy *Premia*, how prodigious will their Increase be, upon a Peace, when they are relieved from this Burthen! Especially if it be remarked, that their Merchants in general, and particularly their *Planters*, by *insuring* their Ships at present, not only preserve their Trade, but, from the large *Premia* they bear, are led into a Course of *Frugality* and *Œconomy*; — A *public Habit*, which cannot fail of procuring to them the widest Advantages; Instead of having some of their *Planters* ruined, and some elated by Success into great *Extravagance*, as would have been the Event without our *Insurances*.

F I N I S.