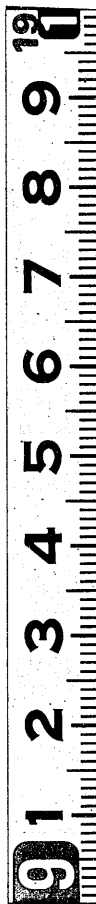


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L O N D O N:
Printed for B. WHITE, at Horace's Head, Fleet-Street.
M.DCC.LXXXIV.

P R E F A C E.

THE following sheets contain an Investigation of the Nature and Properties of Public Credit, and of the Natural Laws and Principles by which the comparative Value of *Money* and the Fluctuations in the Value of Annuity Stocks are governed; in which it is demonstrated, that a public debt is capable of producing either a great public saving and advantage, or an immense public loss, according to the different methods by which it may be conducted in the practice.

The investigation is of a mathematic nature, and the theorems are likewise illustrated and made plain, by argumentative deductions and numerical examples.

It may not be amiss to mention, that as the arguments are of a deductive kind, a greater degree of attention will naturally be required on the part of the reader, than is generally required for the perusal of a pamphlet or a piece of history.—I must also mention, that as I never applied myself to the study of elegance in style and language, the reader may very probably find a greater degree of labour necessary on his part, than

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might otherwise have been required:—this consideration led me *indeed* to hesitate within myself for a short time, whether I *would* or *would not* write; but on serious reflection, I considered it best that I should let the importance of the subject overcome my feelings on that head.—How far the *deficiencies* in the style and language may be atoned for by the soundness of the doctrines, is a point that must be left to the decision of the studious peruser.

I shall only request that the Reader will proceed *period* by *period*, with steady slowness and with strict attention; and I would willingly hope that such additional labour on his part, will overcome the difficulties that may flow from those deficiencies in manner of expression, which I must unhesitatingly confess myself to labour under.

S. GALE.

Charles-Town, South Carolina,
October 1782.

CON-

C O N T E N T S.

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ERRATA in the First Essay.

Page 8 Line 27, for simple read single

75 — 18, for £.4 : 5 : 0 or £.6, read £.4, £.5, or £.6,

106 — 1, for price read value

106 — 4, after depreciation read the underwritten note †.

138 — 32, for might be higher read might in that case be higher

139 — 14, for might be lower read might in that case be lower

156 — 3d from the bottom, for less read loss

177 — 10 from the bottom, for that there is read than that there is

207 — 3d from the bottom, for as read at

219 — 1, for colours read colonies

† It may here be excepted, that, if the periodical quantity of money appropriated to this channel of circulation, should be sufficient to prevent any depreciation in the value of the stocks, then, the nett profit would be equal to the apparent premium: Or, if the revenue so appropriated should be sufficient to cause a continual appreciation in the value of the stocks, the nett profit would, in that case, be greater than the apparent premium. But this cannot be the case, unless the stocks shall bear a higher interest than the ordinary rate of the market, and be subject to a limited tender for their redemption, whereby their market-value shall be above *par*.—These kind of stocks will be particularly explained in the Second Essay.

AN ESSAY, &c.

SECTION I.

Introductory observations on the different opinions that are entertained respecting the advantages and disadvantages of a Public Debt.

THE various opinions that are entertained respecting the advantages and disadvantages of a Public Debt, seem supported by so much strength of reasoning on each respective side, as must, according to appearance, not only leave each of the advocates equally confirmed in their first opinion, but must also render it exceedingly difficult, if not impossible, for the most unprejudiced person to draw a proper line between them, without the help of some farther considerations than those that are generally set forth in the arguments (strong as they may respectively appear) by which each doctrine has been hitherto maintained.

Some highly applaud the maxims of those nations of antiquity who always made it a rule to lay

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lay up treasures before-hand, as the instruments either of conquest, or of defence.—These, consider it as a matter of improvidence in the moderns, to have recourse to extraordinary taxes and impositions in time of actual hostility, and decry the method of raising money in time of war by mortgaging the public revenues and resources of a state, or by establishing any medium of circulation to be afterwards redeemed, as a system pregnant with the greatest and most dangerous evils.

Others again disapprove the ancient maxim, as a system altogether inconsistent with the well-being of modern nations.—These, consider the raising of money for the public service by incurring a public debt, as a method the most proper, and the most easy to be borne; and as a system productive of many and great advantages, as well commercial as political, exclusive even of those considerations of necessity, or conveniency, that might originally occasion its adoption.

Opinions more diametrically contrary to each other than these are, cannot possibly exist.

If we take a concise survey of the arguments that are made use of in support of these different opinions, we shall find A alledging on the one hand,—‘ That such quantity even of gold and silver *only*, as may be obtained purely from commerce and industry alone (the whole of it being permitted to circulate as a commercial medium) will become a real injury, not only to the nation at large, but also to that very commerce by which it shall have been obtained:— For in this case (says he), whenever the general balance of commerce shall be in favour of any nation, the quantity of *money* in such nation must necessarily increase; and, seeing *money* has no other

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‘ other than a *representative* value, this increase (being permitted to circulate) must produce an equal decrease in the *ratio* of its representation with respect to all other commodities; whereby provisions, materials, and the wages of the labourer, and (from thence) the manufactures, and other productions of the state, will become (in the same proportion) dearer, and other nations be thereby enabled to sell at cheaper rates in foreign markets; the natural consequences of which must be a decay of commerce and of industry, and of course a decrease of the national wealth.

‘ The institution, then, (continues A) of any circulating commercial medium that is not considered by other nations to be of intrinsic value, but dependent solely on *faith* for its support; such as *paper-money*, with which *public stocks* may (from their easy transfer) be in some degree included, must not only be productive of all the beforementioned inconveniencies, but must likewise prevent the influx (if not also cause the banishment) of gold and silver, which by consent of all the world are held in *valuable* estimation.’

Hence, this conclusion is naturally drawn by A,—‘ That the best and most profitable system for a nation, is to raise and lay up treasures for a war, during the peace preceding it.’

On the other hand, we shall find B alledging—‘ That although an increase in the quantity of circulating money will naturally produce a decrease in the *ratio* of its representation with respect to other commodities; yet, there will necessarily be an interval of time between the actual increase in the quantity of the current medium, and the consequent alteration in the prices;

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prices; during which interval, that natural desire of acquiring wealth, or, in other words, that love of money, which is, *as it were*, implanted in the human breast, will be so roused by this increase, that such an additional spur will thereby be given to every kind of industry, as will more than balance the inconveniencies with which (by increasing *afterwards* the prices of commodities) it will be attended: and, although those inconveniencies will naturally follow, their pursuit will only be like the hindmost wheels of a chariot, pursuing continually the foremost wheels, without being able to overtake them: whereas, on the contrary, was money to be locked up out of circulation, it must (for the same reasons) operate as a continual check to every industrious occupation; and, although the prices of commodities would thereby be lessened, yet this advantage, like the former disadvantage, must always be behind.

Moreover (continues B) when money is lent to government for the public service, seeing that the taxes, instead of being levied for the whole expences, are then levied only for the interest, the effects must be the same as would be produced by lending to the industrious individuals whatever their respective proportions would amount to; and the capitals employed in productive industry are thereby preserved from diminution.—The public debt also enables the industrious individuals to lay out, from time to time, in the public stocks, such monies as their business may not immediately require, whereby they will receive an interest for such sums as would otherwise, from time to time, lay unemployed and unproductive: by this means they will

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will be enabled to sell for smaller rates of profit than before, and still obtain on the whole an equal or a greater gain.—Wherefore, seeing that the establishment of a public debt leaves larger capitals in industrious hands, requiring only taxes for the interest; and, seeing also, that the profits flowing from an industrious application of the capital, are greater than the bare interest thereof; it must follow, that a public debt will be productive of advantage in all commercial states; and by howmuchsoever these profits shall exceed the interest, by so much the nation (in some or other of its members) must be enriched, and its resources must consequently be increased by the debt.

Farthermore (continues B) the good effects of a national debt do not end here; but, seeing that its security depends on the stability of the government, on the faith of which it is established, private interest, that strong director of almost every human action, will naturally lead the public creditors to exert themselves to the utmost of their abilities, in the support of government, and thereby form a check against that unhappy spirit of opposition and revolt, which, at times, prevails in almost every state: whereas, on the contrary, a hoarded treasure might operate as a *bait* for the ambition of pretended patriots, by the seizure of which, they might be able to overturn the government and fulfil their ends.

Hence B draws this conclusion,—‘ That on every consideration, whether commercial or political, it is better and more advantageous for a nation to raise the money for the expences of her wars, by incurring a public debt, than to

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'raise them in any other manner.'—And thus (if one may use the expression) the *issue* is joined.

A person altogether unprejudiced on either side, should he take only an ordinary view of the positions advanced by A, should he hear the arguments that might be furnished for their support by gentlemen of oratorical talents, he would be almost ready to conclude that very little could be urged in contradiction.

On the other hand, should he take a view of the positions B advances,—should he hear the arguments by which those positions might in their turn also be defended,—should he take a view of the nations where public debts do actually exist, and find those arguments verified by facts,—the same unprejudiced arbitrator would, it is presumed, be nearly ready to withdraw the opinion he might have formed before: his judgment would be at least suspended for a while, in hopes of being able to collect some further lights, that should be altogether independent of, and unconnected with, the flowers of language or the charms of style.

That *both* opinions cannot be true in *fact*, however well supported each may be by *eloquence*, must be a conclusion undeniably just; nor would it be unreasonable to suppose that the *TRUTH* might probably lay somewhere between the two extremes of these opinions: but *to find it*, is the question.

With respect to the arguments laid down by A, it must indeed be admitted, that an increase or decrease in the quantity of *money* in any nation (if we exclude *mines* and *paper-auxiliaries*), will depend on its external commerce.—But, although we may safely admit that an increase or decrease in the quantity

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quantity of circulating money will produce *some effect* on the *ratio* of its representation with respect to other commodities; yet, if we reflect seriously, it will not be found reasonable to admit as an *axiom*, 'that an increase or decrease in the quantity of circulating money, should produce an equal decrease or increase in the *ratio* of its representation.'—The velocity with which the money may circulate, and the manner in which the internal commerce may be carried on, seem necessary to be considered also.

If the *circulation* be brisk, it is evident that the same commerce will be carried on with a less quantity of money, than would be required for that purpose if the circulation was slow; or, in other words, the demands for money will be supplied with more ease when there is a *brisk*, than when there is a *slow circulation*, although the *quantity* should be the same.—The circulations of commerce might also be in some degree effected by exchanging commodities the *one* for the *other*: the more prevalent this shall be, the less, of course, will be the demands for *money*: and as the comparative value of money, or prices of commodities, must (according to the natural course and order of things) be governed by the *demands* that there may be, and by the ease or difficulty with which those *demands* may be supplied, it must necessarily follow, that the alteration in the prices of commodities cannot be in the same proportion as the alteration in the *quantity* of circulating money *taken simply*.

Neither can it, on reflection, be admitted as an *axiom*, 'that public stocks of transferrable annuities shall produce the same *effects* as would be produced by an increase in the quantity of circulating money.'—The former, is a com-

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modity to be bought and sold; the latter, is a commodity wherewith to buy and sell: it must therefore deserve a very serious consideration, whether the effects produced by public stocks may not be the very *reverse* of what is supposed in A's argument.

It is not the intention of this essay to enter into enquiries of an historic nature, but to trace out the *effects* that flow, according to the natural course and order of things, from *given causes*:—there are, however, two observations which here present themselves so very naturally, that it would be in some measure wrong to omit taking notice of them.

According to A's positions, the prices of commodities, in nations having a public debt, must necessarily increase, in a much greater proportion than the circulating quantity of gold and silver; but we find from history, that since the discovery of the *mines* of the Western World, the circulating quantity of gold and silver in Europe has increased in a much greater proportion than the prices of commodities.—If this be admitted to be true, A's principles must of course be erroneous.

Moreover, we also find from history, that a nation will sometimes expend almost as much in supporting a war for one simple year, as the whole amount of the *money* contained in such nation, exclusive of the expences of all its other members. If this be admitted as a fact, any preparation that nations could make for a war, by laying up money beforehand, must be of but very little moment.—It must also follow from this admission, that it can by no means be the *quantity* of money, but the *force of its circulation*, that enables any nation to support the expences of a war for any long continuance.

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With respect to the positions advanced by B, in favour of an increase in the quantity of circulating money, and in favour of a public debt, it must be acknowledged by all who will cast their eyes around those nations where public debts do actually exist, that the effects which he points out respecting the consequent increase of commerce and industry seem to be *in some degree* experimentally verified; and the effects he mentions in checking the designs of rebellious subjects, and pretended patriots, seems to be out of the reach even of doubt itself.—But it does not seem reasonable to admit so easily, *that a public debt shall add to the riches of a nation, and cause its resources to increase.*

It must always be remembered, that there ever was and ever will be a number of indolent and idle members in every state; and although it may be admitted that the establishment of a national debt gives an encouragement to commerce and industry, by leaving larger capitals in industrious hands, and by furnishing the industrious individuals with an opportunity of laying out their spare monies, from time to time, in the public stocks, whereby they may receive an interest for such sums as would otherwise, from time to time, lay unemployed, and unproductive; yet, such establishment furnishes, at the same time, additional means for the support of idleness, by affording an opportunity for the indolent to lay out their money in the stocks, and to live at ease; whereas, for want of such an opportunity, they might, perhaps, have betaken themselves to some industrious employment.—The profits, therefore, flowing from a public debt, can only be the quantity by which the former effects shall exceed the latter:—should the latter balance the former, the good

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good that might be expected would be defeated; and should the latter become the heaviest scale, the debt must consequently be *injurious* to the state.

Besides, although the inducements given to industry by a public debt, may have a voluntary operation on those who have a prospect of increasing, or of acquiring wealth for themselves; yet, it does not immediately follow, how far this consideration shall actually extend to the laborious part of the community, whose ambition can, in general, never be carried beyond the attainment of a tolerable subsistence from day to day: their increasing industry may therefore proceed in a great measure from the *necessity* which may be occasioned by the additional weight of standing taxes.—It is not indeed material whether the motives to industry shall be voluntary, or whether they shall be compulsive, while the same good consequences shall continue to be produced; but if the effects attendant on the weight of taxes shall render the daily labourer afraid of marriage, lest he should be unable to raise up a family on his hire, the national industry may then be well compared to the exertions of an individual beyond his natural abilities; and, as the latter will weaken the body-natural in its health and strength, so also will the former weaken the body-politic in that most important of all national resources,—POPULATION among the lower orders of the state*.

Neither

* As too great an exertion in the *body-natural* will generally first discover itself by weaknesses and pains, so also, it is not improbable but too great an exertion in the *body-politic* may first discover itself by an increase of *impotent* poor.

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Neither can it be admitted, *without exception*, that a national debt will actually give that encouragement to commerce and industry which may at first sight be supposed: if, for instance, the prices of the public stocks shall be subject to great and sudden fluctuations, an immense encouragement will evidently be thereby given to idle speculation; and useful commerce and industry must of course be thereby injured and discouraged.—The positions, therefore, that are advanced in each of the foregoing arguments are evidently exceptionable and inconclusive.

Ruminating on these considerations for and against a public debt, I was led to enquire seriously within myself, how far the subject might, or might not, be capable of a divesture from a rayment which alters the reflection of the rays of light at every motion, without affording any conclusive colour; and, (stripping it of its variative garment) how far it might, or might not, be able to undergo a THOROUGH SEARCH by that ONE only unerring PROBE which GOD has vouchsafed to MAN:—AN INVESTIGATION PURELY MATHEMATICAL.

In my first enquiries I was actuated only by a desire of keeping disagreeable reflections from my mind*, and by a desire of being satisfied within myself on a subject that seemed to be more and more mysterious, the more it had been viewed; but,

* The author had at this time been separated from his family and his little property near seven years, by the troubles in America.—This circumstance may, perhaps, have produced some *effect* with respect to his expressions; but it is hoped not to have had a greater effect than may be reasonably excused.

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but, in the course of my pursuit, sundry things appeared (particularly with respect to the principles of the fluctuation in the value of annuity stocks) that I never before had seen or heard of.—Every new circumstance also gave me more and more reason to believe that this important field had never been surveyed in the same direction heretofore. On this account I prevailed on myself to collect my scattered thoughts together; conceiving, that as it might by possibility happen, that an observation of a private sentinel, by being communicated to his general, might change the fortune of the martial day; so also, there might be a like possibility, that a person moving in my humble sphere might, perchance, stumble on a circumstance that might become of service to the general weal.

S E C T. II.

Of the Definitions or simple Properties of a Public Debt; the Principles or Axioms necessary for deducing the consequent Properties or Effects; and, a brief relation of the Theorems resulting from those premises, to be demonstrated in the following Sections.

I N order to enter regularly into the subject, it is necessary to lay down (preparatorily as it were) the *primary* or *simple properties* of those kinds of debts, the *consequent properties* or *effects* of which are intended to be investigated; together, also, with the *primary principles* or *axioms*, whereby those *consequent*

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sequent properties or *effects* are intended to be deduced.

The debts, then, intended for the present subject of enquiry, are such (by way of *definition*) that the CAPITAL or PRINCIPAL be not demandable by the creditor: but, that his demand (the which he shall also be at liberty to assign, or transfer, at any time, to any other person) shall consist of a certain *annuity* or *periodical payment*;—either,

1st, To continue in perpetuity; or, until it shall afterwards cease, in consequence of a valuable consideration to be in future agreed on:—OR,

2dly, To continue a certain definite term of time, and then to cease:—OR,

3dly, To continue (indefinitely as to time) until the *capital* or *principal* shall be repaid.

These annuities I shall denominate by the following terms, respectively; viz.

1st. *Perpetual annuities*;

2d. *Determinate annuities*;

3d. *Redeemable annuities*, or *annuity stocks*.

It may be observed here, that as the *annuity* only (and not the *capital* or *principal* of the debt) is demandable by the creditor, the *market value* thereof may, from time to time, be *higher* or *lower*, according as the competitions among the *buyers* and the *sellers* may vary.

It may also be observed, that although I distinguish these annuities into *three* different kinds, only *one* of which I call by the name of *Redeemable Annuities*; yet, either of the other *two* may nevertheless be *redeemed* (or rather *re-purchased*) by a future agreement with the annuitants: but the reason on which I form the distinction, is this:—In the cases of *perpetual*, and of *determinate annuities*, the

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the annuitant is not restricted, as to the *demand* that he shall make for the *price* of the redemption: whereas, in the case of *redeemable annuities*, or *annuity stocks*, he cannot require more than the *principal* or *capital stock*. And hence, (although *redeemable annuities*, or *annuity stocks*, may sometimes be called by the name or term of *Perpetual Annuities*; yet) it must be observed, that *annuity stocks* possess the properties of *perpetual annuities*, so far forth only as the *market value* of the *stock* shall be under *par*, and no farther: AND CONSEQUENTLY, whenever that term shall be so applied (whether in the present Essay, or in any other work or works) it must always be understood with that restriction.

In all enquiries of a mathematic nature, it is indispensibly necessary, that certain self-evident FIRST PRINCIPLES should be admitted, by way of *axioms* (or *foundations* as it were) from whence to proceed: and the matters requested to be granted in the present case, are the following

POSTULATA,

1st. That a time of war be always followed by a time of peace, and that a time of peace be always followed by a time of war.

2d. That the expences of a nation be greater in time of war than in time of peace.

3d. That for the conveniency of making payments and exchanges, there be one commodity, viz. MONEY, that shall, in exchange, *represent* and *be represented by* all others: and, that the VALUE of any other commodity be denominated by the quantity of money that might be obtained in exchange therefor as an equivalent.

4th. That

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4th. That the comparative value of commodities of all kinds, for the time being, whether considered with respect to exchange, purchase, or rent, be dependent on, and governed by, the DEMAND that there shall be for such commodities respectively, and the *ease* or *difficulty* with which such demand may be supplied.

5th. That there be a quality in MONEY whereby it is productive of a RENT, OR INTEREST; and, that (from postulata 2d and 4th) there being a greater demand for money in time of war than in time of peace, the rate of interest be higher in the former than in the latter time.

These are the only principles that are required as *data*, and it is presumed that they are all so perfectly obvious, as to be admitted without the remotest hesitation.

It must be acknowledged, that there was once a time when the 5th postulatam would not have been granted, because *interest* was forbidden by a positive law; and although this may still continue to be the case in some countries, where *little commerce* and *much superstition* prevails; yet, nothing under heaven can be more unnatural than such a law.—Money was at all times, and in all places, admitted to be an equivalent for houses and lands; and houses and lands were always admitted to possess the quality of producing a rent.—Now, if houses and lands do (of natural right) actually possess this quality of producing a rent, and money be actually an equivalent for houses and lands, it must necessarily follow, that money must (by the same natural right) possess the quality of producing a rent also.—It is evidently impossible that it could actually be an equivalent with-

This mode of reasoning would prove out that even leather or any other commodity admitted a rent

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out possessing that quality.—Hence, the admission of the postulata cannot be doubted.

Having thus *premised* the *simple properties* (by way of *definitions* as it were) of my intended subject, as also the *principles* (by way of *axioms*) from whence I shall endeavour to proceed in the investigation of the *consequent properties* or *effects*, it may not be amiss to mention (for the reader's consideration and contemplation) that I shall endeavour, from the foregoing *premises*, to demonstrate the following *theorems* or *propositions*; viz.

Proposition 1st.—If public credit be exercised, by a simple borrowing of money in time of war, or rather by establishing *annuity stocks* redeemable at pleasure, bearing such natural rate of interest as the demand shall occasion, whatever it may be; and, when the war be ended, the interest be reduced to the natural rate current in the time of peace, whatever it may be; and, during the said time of peace the whole of such debt be paid off;—A nation in such case (abstracted from matters of conveniency) will be neither *richer* nor *poorer* on account of having incurred and paid off such debt; but the damages or burthens sustained by the members of the state will be exactly the same as if they had paid the whole of the expences of the war by taxes or contributions during the time of its continuance.

But if, instead of compleating the redemption, any sum of money be appropriated as a *periodical sinking fund* during the time of peace, and the whole debt be not thereby cleared off; such exercise of public credit will produce a clear public *SAVING* OR *GAIN*, whereby such nation will be enabled, with the self-same *revenue*, or *burthen* to the members of the state, to carry on a war of a
greater

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greater periodical expence than if it had no debt; by a periodical sum, equal to the *interest* on the aforesaid periodical *sinking fund* as it shall have become increased by the interest of the debt paid off thereby during the peace, computed at a *rate per cent.* equal to the *difference* between the rate of interest in time of peace, and the rate of interest occasioned by the extraordinary demand for money in time of war.

Moreover, if the periodical *sinking fund* shall consist *only* of the *difference* between the *extraordinary interest* necessarily required in time of war, and the *ordinary interest* in time of peace; however great or small such difference may be, the perpetual application of it to the redemption of the debt in time of peace, and to the prevention of its growth in time of war, will not only fix a boundary or limit to the increase of the debt, but will also overtake it in its growth, and finally complete its redemption*.

Proposition 2d.—If (through legal restraints on the rate of interest for money, or through any desire of making the rate of interest appear to be less than the *real* rate actually occasioned by the demand for money for the time being) money be raised in time of war, on redeemable *annuity stocks* bearing an *adopted* rate of interest on the nominal capital thereof, less than the *real* or *actual* rate at the time of borrowing; such exercise of public credit will be attended with a *public loss*, which
loss

* The demonstration of this first proposition will be found in the third section: it will also be shewn in the 7th and 9th sections, that money may be raised by a method still more advantageous.

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lofs will bear the same proportion to the nominal capital of such annuity-stock, as the *difference* between the *adopted* and the *real* rate of interest at the time of borrowing, shall bear to the said *real* or *actual* rate.—And moreover, the *real* rate of interest will nevertheless be paid on all the money so raised; and, when the war shall be ended, and the rate of interest for money *decrease* according to the natural course and order of things, the interest for the *lofs* *also* will for ever continue to be paid, until the debt be redeemed*.

Proposition 3d.—If money be raised in time of war on determinate annuities;—such exercise of public credit will be attended with a public *lofs*, equal to the *difference* between the *VALUE* of the unexpired part of such determinate annuity (at the end of the war), computed according to the extraordinary rate of interest at the time of borrowing;

* The demonstration of the second, third, and fourth propositions, will be found in the fourth section.—It may be excepted from this second proposition, that if the *adopted* rate of interest be less than the *ordinary* rate in time of peace, the stocks will become redeemable under *par*, whereby the *lofs* will be the same *only* as if such *adopted* rate had been equal to the *ordinary* rate in time of peace: but, it will be shewn in the ninth section, that this circumstance of the stocks being redeemable under *par*, can be no way advantageous, but must, on the contrary, be *ruinous* to a state; and, consequently, this exception is only an *apparent*, not a *real* exception.—It is unnecessary to say any thing by way of *proposition*, with respect to what I denominate *Perpetual Annuities*, because, the annuity being *unexpirable*, and the *price* to be demanded for the redemption *unlimited*, there cannot be any *precise* limit for the *lofs*.

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ing; and the *VALUE* thereof computed according to the ordinary rate of interest in time of peace.

Proposition 4th.—If money be raised in time of war, on mixed or compound annuities, whereof part be *redeemable* and other part or parts *determinate*, in order that the whole of the money raised on such compound annuity shall be equal to the nominal capital of the redeemable stock; such exercise of public credit will be attended with a public *lofs*, viz. the *lofs* on such part of the money so raised, as shall be proportionate to (or in equivalence for) the redeemable part, will be the same as was mentioned in the *second* of the foregoing propositions; and the *lofs* on such part of the money so raised, as shall be proportionate to (or in equivalence for) the *determinate* part of such compound annuity, will be the same as was mentioned in the foregoing *third* proposition: and these put together, will be the *whole lofs* with which the raising of money on compound annuities will be attended*.

Pro-

* It may be observed, that the method of raising money, mentioned in this *fourth proposition*, is precisely the same as giving a certain rate of interest thereon for a certain number of years, and after that, a *lower* rate of interest until redeemed.—When viewed in this light, it must appear almost impossible, at the first sight, that it could be attended with any *lofs*. The *PRINCIPLE* from whence this *lofs* flows, seems to have been but little (if at all) considered: it is this, an *equilibrium* cannot in this case be preserved between the *demand* for money, and the *force of the circulation* by which that *demand* is supplied; and a depreciation must consequently take place in the prices of the stocks, from the want of appropriating the proper proportion of money to that channel of circulation: this depreciation will necessarily govern

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Proposition 5th.—If it be objected,—*That the beforementioned losses are unavoidable consequences of the encouragement or profit necessary to be given (on account of the extraordinary demand for money) to those who subscribe to the new loans; and that the subscribers would demand the terms mentioned in the foregoing second, third, and fourth propositions, or other terms equally profitable to themselves and expensive to the public;*—Although such objection appears to have much weight, and is thereby entitled to an attentive consideration and strict examination; yet, such attentive consideration and strict examination being had, the objection will be found to vanish, and to possess no real existence*.—Moreover the methods mentioned in the *second, third, and fourth propositions*, will be disadvantageous to the subscribers as well as to the public†.

Proposition 6th.—If the additional interest, profit, or encouragement, necessary to be given *per centum* for a new loan (on account of the extraordinary demand for money) be denominated a *Premium*;—the depreciations that will take place in the prices of the public stocks in consequence of the extraordinary demand for money (by which depreciations the losses are governed) will depend principally on the *manner* of giving those *premiums*; whereby the proportion

the terms on which future loans will become obtainable, and will thereby cause the beforementioned loss.—A full explanation of this remark will be found in the seventh section.

* The demonstration of this fifth proposition will be found in the fifth section.

† A proof of this additional observation will be found in the seventh section, and again in the ninth section.

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proportion of money thrown into that channel of circulation shall be in a greater or lesser degree increased: inasmuch, that either one or other of the following depreciations in the prices of the stocks will take place in the course of a war, from the *manner* (in itself considered) of giving the self-same *premiums* for the self-same loans; admitting no other cause whatever to intervene; viz.

First, A depreciation *per cent.* the *maximum* of which will be equal to the greatest *premium* that shall be required for any one loan.

Secondly, A depreciation *per cent.* the *maximum* of which will be equal to the amount of all the *premiums* that shall be required for every loan.

Thirdly, A depreciation *per cent.* the *maximum* of which will be equal to any quantity (at pleasure) between the greatest *premium*, and the amount of all the *premiums**.

Proposition 7th.—The grand principle on which the good or evil attendant on a public debt will depend, consists PRACTICALLY in keeping and applying such a proportion between the revenue and the loans, as shall preserve a just *equilibrium* between

* The sixth section is preparatory to the demonstration of this sixth proposition: the final demonstration will be found in the seventh section; in which it will also be found, that if the *premiums* be so given as to admit either of the two last mentioned depreciations, there will be an opening also for *collateral causes* of still farther depreciations; whereby the *actual* depreciations will be carried even beyond the abovementioned *maximums*, unless those *collateral causes* should be counteracted by other *collateral causes*. The doctrines contained in the sixth and seventh sections will also be farther supported in the eighth section.

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between the *demand* for money and the *force of the circulation* by which that demand is supplied.—The revenue that will be required is also within the ability of any nation that can support a war for any long continuance: inasmuch, that if this *equilibrium* be not preserved, the consequent depreciation in the prices of the stocks (which governs the terms on which future loans shall be obtainable) will be such, that should the war be of any long continuance (as seven or eight years for instance) a greater revenue will be required for the payment of the bare *interest* of the loans, than would be required both for the preservation of the *equilibrium*, and for the payment of the interest of the self-same loans*.

It may also be mentioned, that such is the nature of public credit, that, if any errors shall at any time happen in the methods practised by any nation, (although a continuance of those errors must infallibly terminate in a public bankruptcy; yet,) all the attendant evils will always remain curable, as long as the public credit itself shall remain unexhausted: neither will the application of the necessary remedy be burthensome, nor injurious, either to the public or to any individual whomsoever.—But as this part of the subject is intended for a second Essay, we will leave it for the present, and proceed from the beforementioned premises, to demonstrate and explain the doctrines above proposed.

S E C T.

* The demonstration of this *seventh proposition* will be found in the ninth section.

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S E C T. III.

Of the damages or burthens sustained by the members of a state in supporting the expences of a war:—That incurring a Public Debt is not only the most convenient method of raising the money, but (if properly conducted) must also be productive of an actual saving.

THE first reflection that presents itself to the mind from a consideration of the beforementioned postulata (in page 14 and 15) is this,—that although the monies for the expences of a war, should be *actually* raised by taxes or contributions during the time of its continuance; yet nevertheless, the actual *damages* or *burthens* sustained by the members of the state, on account of their contributions to those expences, will be, *not only* the monies by them so paid or contributed, but also the interest thereon; because, they would (at any given period of time) have been by so much the *RICHER*, if such payments or contributions had not been required of them, and they had pursued the same industry and œconomy.

* For example,—Let it be supposed that out of a term of twenty years, a nation shall have a war during

SYMBOLIC DEMONSTRATIONS.

* 1st.—If during any time, or number of half years T , in which the rate of the increase of money by interest be R , a nation shall carry on a war at any half-yearly expence S , which said sum S shall be paid into the treasury at the beginning

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during the first eight years, at an expence of *ten millions* per year, or rather *five millions* per half year; which sum (let it again be supposed) the service shall require to be paid into the treasury at the beginning of each half year:—Let it also be supposed, that the rate of interest for money in such nation (taking it on the average) during the time of war, be *five per cent. per annum*; and, (seeing from the 5th postulatam that the rate of interest will naturally be higher in time of war than in time of peace) let it be supposed also, for example sake, that in time of peace it be *three and an half per cent. per annum*; and that the interest be payable *half-yearly*.

Now the sum to be expended in this case will be £.80,000,000; but the amount thereof, together with the damages or interest thereon, will, at the end of the said *eight* years of war be £.99,324,050; which, together with the interest thereon during the remaining *twelve* years of the said twenty, will amount to £.150,619,000; which

ginning of each half year,—Then, it is evident that the expences, with the interest or damages thereon, will, at the end of each respective half year, be as follows, viz.

Half years - - 1, 2, 3, 4, &c. to T
Expences or damages $RS, R^2S, R^3S, R^4S, \&c.$ to R^TS
the sum of which is $RS + R^2S + R^3S + R^4S + \&c.$ to $+ R^TS$
Which (per progressionis naturam) is $\frac{R^{T+1}R}{R-1} \times S$
equal to - - - - -

2d.—And the said expences, with the interest or damages thereon, at the end of any farther time t (of peace), in which the rate of increase by interest be r , will of course be - - - - - $\frac{R^{T+1}R}{R-1} \times r^t S$

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which of course will be the quantity of the damages or burthens sustained at the end of the twenty years, in case the whole of the expences should be so paid by taxes or contributions during the continuance of the war: because (as said before) the members of the state will (at the end of the said term) be so much *poorer* than they would have been, if they had pursued the same industry and oeconomy, and those taxes or contributions had not been required of them.

I must request that the reader would not be discomposed at the *apparent* extravagance of the abovementioned amount; because, on reflection, he will find, that in case a state shall consist of *ten millions* of people, this immense burthen will be less than *ten shillings and three pence a year* for each, both for the payment of the interest and the principal.

It could not indeed be pretended, that if the war did not happen, or if the expences thereof should be otherwise provided, the whole of this £.5,000,000 per half year would be actually lent on interest by its proprietors, or otherwise accumulated into a CAPITAL:—It is however perfectly evident, from that natural desire which is implanted in the breasts of men for bettering their condition, that a considerable part thereof would actually be accumulated into a capital:—A part of it would, it is perfectly clear, be *actually* lent on interest:—Another part would be employed by its proprietor in the still more profitable road of commerce and industry:—so far the capitals of the members of the state would evidently be increased:—And, although a remaining part would be expended or *consumed* by its owners, in the enjoyment of a more comfortable way of living; yet,

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yet, such is the natural and unalterable connection between *causes* and *effects*, that even this part would not be unworthy of the consideration of its rent or interest.—It is evident, on the slightest reflection, that this last-mentioned part will pertain chiefly to the lower orders of the state; and these, by being deprived of it, will naturally cause an increase in the number of impotent poor, whereby the *private* taxes for their support must necessarily be increased; so that the burthens of the other members will be increased, and the accumulation of the capitals of the members of the state at large will consequently be checked or diminished, by so much the more, as the lower orders of the state shall be unable to support their proportionate parts.

The state, considered as a body politic, must evidently be so much the poorer also, on account of the war; because, the capital, the wealth, or the resources, of a state at large, can certainly be no other than the capital, the wealth, or the resources, of the several members *conjointly* that compose such state.—But the view in which the losses sustained by the state, considered as a body politic, will perhaps appear most striking, is, the *loss* of the industry of those members who are carried forth to war; the entire loss of all those members who fall by the sword; and the *consequent loss* of that progeny which in the natural course and order of things would have proceeded from them; by whom the AGRICULTURE, the MANUFACTURES, and the COMMERCE of the state, would be extended, if the direful scourge of war did not unhappily intervene.

Each of these reflections equally support the principle of extending the consideration, not only to

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to the actual *expences* of a war, but also, to the rent or interest thereof: and the more these reflections shall be contemplated, the more will that principle be supported by them.—It is not necessary however to dwell farther on the reasonableness of it; because, it is presumed that no one (*at least* no one in a commercial country) will hesitate a moment at the admission of the *postulata* in page 14 and 15; and these being admitted, the consideration of the *interest* as well as the actual *expences* must necessarily follow.

Hence then, if instead of raising the whole of the money by taxes during the continuance of the war, the same money should be raised by incurring a public debt for any part thereof, such method of raising the money will be attended with *advantage* or *disadvantage* compared with the former method, (exclusive of matters of conveniency) according as the amount of *such expences*, with the *interest* thereon, at the end of the same term of time, computed at the same rates of interest, shall be *lesser* or *greater* than the amount beforementioned.

In order to determine whether the raising of the money by incurring a public debt for a part thereof, would be *advantageous* or *disadvantageous*, compared with the former method of raising the whole by taxes during the continuance of the war, if we ascertain the periodical quantity of a standing revenue to be raised during the whole of the aforesaid term of twenty years, which, in its damages or burthens to be sustained by the members of the state computed according to the above-mentioned rates of interest, shall be equal to the burthens or damages beforementioned; then, such method of raising the money will of course be *advantageous*

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advantageous or *disadvantageous*, compared with the former method, according as such standing revenue shall be more or less than sufficient *actually* to defray the beforementioned expences and the interest thereon.

† Now, if a standing *war-revenue* should be established (payable half-yearly) during the whole of the aforefaid term of twenty years, which, together with the interest thereon during the said term, computed at the same rates as before, shall be equal to the beforementioned damages or burthens (viz. £.150,619,000—see page 24) such standing

SYMBOLIC DEMONSTRATIONS continued from p. 24.

† 3d.—Now, if instead of raising the whole expences S per half year by taxes during the aforefaid time T , a certain revenue or half-yearly sum s should be raised during the whole time $T+t$; then, the damages or burthens sustained by the members of the state during the part T (of the time $T+t$) in which the rate of increase by interest be R , will be as follows, half-yearly, viz.

Half years - - 1, 2, 3, 4, &c. to T
 Damages or burthens s, Rs, R^2s, R^3s , &c. to $R^{T-1} \times s$
 the sum of which is $s + Rs + R^2s + R^3s + \&c.$ to $+ R^{T-1} \times s$
 Which (per progressionis naturam) is equal to $\frac{R^T - 1}{R - 1} \times s$

4th.—Which said damages or burthens, at the end of the farther part t of the said time $T+t$, in which the rate of increase by interest be r , will become - $\frac{R^T - 1}{R - 1} \times r^t s$

5th.—And the damages or burthens sustained by the members of the state from the continuance of the said revenue s during the said farther part t of the time $T+t$

will (by the same progressional series as N° 3) be $\frac{r^t - 1}{r - 1} \times s$
 6th.

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standing war-revenue will be the half-yearly sum of £.2,557,200.

In this case it is evident that a debt must be incurred during the war:—And seeing that this revenue comes into the treasury at the *end* of each half year, whereas it is necessary that the money for the service of the war should (according to the former supposition) be lodged in the treasury at the *beginning* of each half year, the debt must consequently grow from the beginning, by an half-yearly quantity equal to the difference between the

6th.—Wherefore the damages or burthens sustained from the said revenue s during the whole time $T+t$

will be - - - - - $\frac{R^T - 1}{R - 1} \times r^t s + \frac{r^t - 1}{r - 1} \times s$

OR (which is all the same) - - - - - $\frac{R^T - 1}{R - 1} \times r^t + \frac{r^t - 1}{r - 1} \times s$

7th.—Hence then, it being required that the revenue s shall be such, as that the damages or burthens thereof during the whole time $T+t$, shall be equal to the damages or burthens sustained during the same time $T+t$ by raising the half-yearly sum S during the time T , we shall have (per N° 2. $\frac{R^T - 1}{R - 1} \times r^t + \frac{r^t - 1}{r - 1} \times s = \frac{R^{T+1} - R}{R - 1} \times r^t S$ p. 24) - - - - -

8th.—And hence - - - - - $s = \frac{R^{T+1} - R}{R - 1} \times r^t S$
 $\frac{R^T - 1}{R - 1} \times r^t + \frac{r^t - 1}{r - 1}$

9th.—And, seeing that the revenue s does not come into the treasury till the end of the half year, whereas it is necessary (according to N° 1, page 23) that S should be brought into the treasury at the beginning of the half year,

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the half-yearly expences of the war, and the present worth of the half-yearly war-revenue.

If therefore, from the half-yearly expences of the war - - - - £. 5,000,000
we subtract the present worth of (£. 2,557,200) the revenue payable at the end of the half-year, viz. - - 2,494,830

The remainder will be the half-yearly quantity by which (including the interest thereon) the debt will grow during the war - - - - 2,505,170

The amount of which at the end of the eight years of war, will be the quantity of debt incurred, viz. £. 49,764,700.

OR

year, a debt (which let be called D) must consequently be incurred, growing from the beginning, by the half yearly quantity $S - \frac{s}{R} = \frac{SR - s}{R}$; wherefore, the debt incurred at the end of each respective half year, will be as follows; viz.

Half years - 1, 2, 3, &c. to T
Increase of the debt $SR - s$, $SR - s \times R$, $SR - s \times R^2$, &c. to $SR - s \times R^{T-1}$
The sum of which at the end of the time T, (by the

same series as N° 3, in p. 28) will be $D = \frac{R^T - 1}{R - 1} \times SR - s$

10th.—OR (by reduction) - $D = \frac{R^{T+1}R}{R-1} \times S - \frac{s}{R}$

11th.—OR (by reduction again; which also agrees with the difference between N° 1, in page 24, and N° 3, in page 28, and thereby forms a proof or check on the

work, viz.) - - - - $D = \frac{R^{T+1}R}{R-1} \times S - \frac{R^T - 1}{R-1} \times s$

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12th.

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OR otherwise—Seeing that the whole amount of the expences, with the interest thereon computed to the end of the war (in page 24) is - - £. 99,324,050

Whereas, the standing *war-revenue* (viz. £. 2,557,200 per half year) with the interest thereon, computed to the end of the war, will amount only to - - - - 49,559,350

Their difference will of course be the quantity of debt outstanding at the end of the war, viz. - - - £. 49,764,700

* The war being now ended, and the rate of interest for money falling (according to the foregoing admission) to $3\frac{1}{2}$ per cent. per annum; this debt may be converted into redeemable annuity-stocks bearing the said rate of $3\frac{1}{2}$ per cent. because, if any of the former lenders should refuse to comply with the decrease that shall naturally take place in the rate of interest when the extraordinary demand for money ceases, other lenders will

12th.—* The war being ended, and the rate of increase by interest falling, according to the natural course and order of things, to any lower rate r , and the said debt D being accordingly converted into a redeemable stock of annuities bearing the said rate r , the half-yearly interest thereon will become - - - $D \times r - 1$

13th.—And the remaining part of the half-yearly revenue s will then become an half-yearly *sinking fund*, whereby the said Debt D (and of course the interest thereon) will be periodically reduced during the time t of peace; viz. - - - $s - D \times r - 1$

14th.—Which (for contraction sake) let be put equal to - - - - s

15th.

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will naturally be found, whereby the former ones may be paid off.

Hence then, the half-yearly interest of the debt will become - - £. 870,880

Which, being subtracted from the half-yearly standing war-revenue - 2,557,200

The remainder will become an half-yearly *sinking fund*, by which the debt (and of course the interest thereon) will be reduced; viz. - £. 1,686,320

* Now this sinking fund will, at the end of the aforefaid

15th.—* Now the periodical quantity by which this sinking fund s will redeem the debt D during the time t of peace, will be half-yearly, as follows; viz.

Half years - 1, 2, 3, 4, &c. to t

Redemptions - $s, rs, r^2s, r^3s, \&c.$ to $r^{t-1} \times s$

The sum of which (by the same progression series as

N^o 3, in page 28) will be - - - - $\frac{r^t - 1}{r - 1} \times s$

16th.—Hence, the debt at the end of the said time t of peace will be - - - - $D - \frac{r^t - 1}{r - 1} \times s$

Which (per N^o 13 and 14, in page 31) is - - - - $= D - \frac{r^t - 1}{r - 1} \times s - D \times r - 1$

Which (per N^o 9, in page 30) is

$$= \frac{R^t - 1}{R - 1} \times SR - s - \frac{r^t - 1}{r - 1} \times s - \frac{R^t - 1}{R - 1} \times SR - s \times r - 1$$

Which (by reduction) is - - - - $= \frac{R^t + 1}{R - 1} \times R - \frac{R^t - 1}{R - 1} \times r^t + \frac{r^t - 1}{r - 1} \times s$

Which (per N^o 7, in page 29) is = 0.

Wherefore, in this case, there can be neither profit nor loss on account of the debt.

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aforefaid twelve years (or rather twenty-four half years) of peace, amount to £. 49,764,700 the same as the debt.—Wherefore, if this sinking fund be actually applied to the redemption of the debt, the debt will be entirely paid off; and consequently, the members of the state will be neither richer nor poorer, than they would have been, had the whole expences of the war been raised by taxes during the time of its continuance; admitting the same industry and œconomy to prevail in the *one* case as in the *other*.

It will hereafter be shewn (in the sixth section) that the burthens or damages sustained by the members of the state, in consequence of taxes, (admitting them always to be judiciously laid and applied) will be much mitigated by the effects of the additional vigour, which the proper application of them will give to the circulation of money; by which (as will hereafter appear) the rate of interest will be in a great measure governed. But, as the rate of interest will (according to the fifth postulum, page 15) naturally be higher in time of war than in time of peace; and as we are at present *only* comparing the damages or burthens that result from the *one* and from the *other* method of raising the money, on a supposition that the rate of interest be pre-given; the effects of the CIRCULATION do not immediately appertain to our present comparison; and therefore need not at present be brought under consideration.—It must however be perfectly obvious, on the least serious reflection, that the more equal the taxes shall be in *war* and in *peace*, the more regular, uniform, and steady, will be the circulation of money; and from thence, the value of other property will be the more regular, uniform, and steady also; which is certainly a
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very great argument in favour of a public debt, even if there were no other arguments in its favour: but there are still many other arguments in favour of a public debt.

* It must be observed, in the foregoing case, that the whole of the beforementioned standing *war-revenue*, viz. £.2,557,200 will be on hand at the end of the twenty-fourth half year of peace; a part of which, viz. £.2,513,220 would clear off the debt; and the other part, viz. £.43,980 pays the

17th.—* But, it must be observed, that (per definition, page 13) the capital not being demandable, the last half-year's produce of the sinking-fund, viz. $r^{t-1} \times s$ may be applied to the service of the new war, and the interest to be paid thereon, will, in such case, be only according to the rate r , as in time of peace; viz. the half-yearly sum of $- - - - - r^{t-1} \times s \times r - 1$

18th.—Whereas, if there had been no debt, this sum must have been attended with the increased rate R , occasioned by the extraordinary demand for money, which would be the half-yearly sum of $- - - - - r^{t-1} \times s \times R - 1$

19th.—Wherefore, the debt will be productive of an actual half-yearly saving of $- - - - - r^{t-1} \times s \times R - r$

20th.—The present worth of which at the beginning of the half year, (at which time the money S for the service of the war, is pre-supposed to be required in the treasury, per N^o 1, page 24) is $- - - - - \frac{r^{t-1} \times s \times R - r}{R}$

21st.—Hence then, the self-same revenue s which will be equal *only* to the burthens sustained by supporting a war for any time T out of $T+t$, at any expence S per half year, where there is no public debt; will be sufficient, where there is a public debt, to support a war for the self-same time, at an half-yearly expence of $- - - - - S + \frac{r^{t-1} \times s \times R - r}{R}$

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the half-year's interest thereof:—It must also be observed, that as the CAPITAL of *annuity-stocks* (per definitions in page 13) is not demandable by the creditors, government can retain the aforesaid sum of £.2,513,220, and apply it to the service of the new war, now (by the supposition) commencing; in which case, the interest to be paid thereon will be only at the rate of $3\frac{1}{2}$ per cent. per annum, viz. the beforementioned half-yearly sum of $- - - - -$ £.43,980

Whereas, if there had been no debt, it must have been attended with the increased rate of interest occasioned by the extraordinary demand for money, which (admitting it as before to be 5 per cent. per annum) would be the half-yearly sum of $- - - - -$ 62,830

Wherefore, the debt will be productive of an actual half-yearly saving of $-$ £.18,850

The present worth of which at the beginning of the half year (at which time the money is pre-supposed to be required to be lodged in the treasury), is £.18,390.

Hence then, the self-same revenue (or burthen) that must be sustained by the members of the state, in supporting a war of the beforementioned time, at an expence of £.5,000,000 per half year, or £.10,000,000 per year, where there is no public debt; will support a war for the same time, at an expence of £.5,018,390 per half year, or £.10,036,780 per year, where there is a public debt.

It may perhaps be objected here, that there cannot be in reality any actual profit, advantage, or saving,
D 2 on

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on account of the debt; but that whatever appears to be gained by the public, must be lost by some or other of the members.

This objection is *in reality* no other than part and parcel of an opinion which is held by some, *that a nation, by being in debt to its own members, cannot (on that account) be either richer or poorer, however large or small such debt may be.* But although there appears at first sight to be much plausibility in such opinion, it will nevertheless be found to be altogether erroneous in every part.

It must always be observed, that the *interest for money* is not entirely a *pure rent for the use thereof*; but, part of what is called the *interest*, is, properly speaking, a continual premium of insurance for the safety of the *PRINCIPAL*: and hence, this premium of insurance (and consequently the rate of *interest*, of which it is a *part*), will be higher or lower to different persons at the same time and place, according to the respective degrees of safety, or security, that may be given by the borrowers:—This remark may indeed be daily observed in almost all places.—A man who has money to lend would certainly rather lend it to one who can give him *land-security*, than to one who can only give him a security in *houses*; because houses are subject to many accidents that lands are not liable to: some kinds of security again are liable to infinitely more accidents than houses; and the premium of insurance will naturally be higher according as the danger shall be greater.

Hence then, where the security is best, this rate of insurance, and consequently the *rate of interest*, of which the said rate of insurance is a part, will naturally be lowest; so that there will be an *actual saving*

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saving flowing purely from the goodness of the security; abstracted from all other considerations:—Wherefore, if it be admitted that *PUBLIC SECURITY* is superior to that of an individual, (which must certainly be the case if the public credit be properly conducted) a public debt must consequently be capable of producing a *public saving* or *profit*, without any loss to any person whomsoever.

In the foregoing case, the saving is evidently a consequence of the creditors giving up the right of demanding the *PRINCIPAL*; and, unless they are the losers, it is perfectly evident that there can be no losers at all:—But they are fully (and according to their own agreement) compensated by the superior goodness of the security.—There cannot, therefore, be any losers: and the *saving* resulting to the public must consequently be a *nett* one.

It may also be observed, that by howmuchsoever the rate of interest on the *public security*, shall be lower than the rate at which *individuals* might borrow, for the payment of their respective shares or proportions; by so much there will also be an additional saving, over and above the quantity beforementioned. • But, as the quantity of this *additional saving* (although very considerable) cannot be ascertained for want of *data*, the sum determined by the foregoing method of deduction *only* is mentioned; leaving the rest to atone for the expences with which the management of a public debt may be attended.

It may perhaps also be farther objected, *that the uncertainty in the expences, and in the time of continuance of war and peace, would render it impossible to ascertain and to preserve a proper ratio or proportion between*

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between the debt, the revenue, and the sinking fund; and that therefore a saving or profit could not be produced in actual practice.

But, here it must be observed, that although, from the uncertainty of human things, it will be impossible to proportion the respective component parts *each* to the *other*, so as to bring the whole of what might be established for a standing *war-revenue* into action just at the commencement of a new war; yet, there must necessarily be the beforementioned *saving* on such part thereof as shall actually be so brought into action; viz. on the *sinking fund* as it shall become increased by the interest of the debt paid off during the peace.—And moreover, if it should be admitted that the same industry and œconomy shall prevail, as if there was no debt, there must necessarily be the beforementioned *saving* on the whole of the debt that shall remain unredeemed:—because, had the members of the state borrowed the money in their individual capacities, for the payment of their respective shares or proportions, they must have been liable to a demand for the PRINCIPAL, and (consequently) to the payment of the increased rate of interest thereon during the war; which (per definition in page 13) a public debt is not subject to.

Neither is the uncertainty in the expences, or in the continuance of war, and of peace, any the least obstacle; nor productive of any the least degree of difficulty in the practical exercise of public credit.

It will hereafter be shewn (in the seventh section) that the additional profit or interest, necessarily required (per postulatam 5) on account of the extraordinary demand for money in time of war,

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war, may be given, by a method much more advantageous both for the public and for the lenders, than that of giving it in an additional interest to continue during the war: but, as I have made use of this method, by way of example, to shew that a public debt is capable of producing an actual public saving; I shall continue it so far as will be necessary to prove *also*,—That if the *war-revenue* that shall be established from time to time, shall consist *only* of the *interest* of the money from time to time borrowed during the war, according to such *rate* as the extraordinary demand for the time being shall occasion; such revenue alone will be a sufficient support and security for any debt that may be so incurred: and after this shall be proved, it must certainly be impossible that the previous uncertainty in the expences, and in the time of contingence of war and of peace, can create any kind of difficulty with respect to the proportions necessary to be kept between the *debt*, the *revenue*, and the *sinking fund*.

* It is perfectly evident, that if the standing WAR-REVENUE shall consist of the *interest* of the money borrowed, according to such *rate*, as the extraordinary demand shall occasion; then, the difference between the *extraordinary interest* of

of

SYMBOLIC DEMONSTRATIONS *continued from p. 34.*

22d.—* And, although the uncertainty in human affairs is such, that the times T and t , the expences S , and the rates R and r , cannot be previously given in *actual quantity*; yet, this uncertainty as to *actual quantity* is no obstacle, nor productive of any difficulty.—For, if the revenue s from time to time, should be only the bare interest $S \times \overline{R-1}$ of the money S from time to time borrowed

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rowed

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of the money so borrowed in time of war, and the *ordinary interest* thereof in time of peace, will become a sinking fund:—It is also perfectly evident, that if this sinking fund be perpetually applied to the redemption of the debt in times of peace, and to the *prevention* of the growth of the debt in times of war; it must be increased from time to time, NOT ONLY by the difference between the *extraordinary* and the *ordinary interest* of the money borrowed in future wars, BUT ALSO by the *interest* of such parts of the debt as shall be paid off thereby in the times of peace:—Hence then, the sinking fund must consequently increase, both in time of peace, and also in time of war; whereas the debt will increase in time of war *only*, and will decrease in time of peace: wherefore, the sinking fund must consequently increase in a greater proportion than

rowed during any time of war T , then, it is evident, that the debt at the end of the first war will be TS and the revenue will be $TS \times R - I$ and the interest of the debt after the expiration of the war $TS \times r - I$

23d.—Wherefore, there will consequently be a sinking fund $TS \times R - r$

24th.—Which, at the end of any farther time t of peace will have redeemed of the debt (per N° 15, page 32) $\frac{r^t - 1}{r - 1} \times TS \times R - r$

25th.—And, (per the series in N° 15, page 32) the said sinking fund *itself* will become increased to the quantity $r^{t-1} \times TS \times R - r$

26th.—Now, if this sinking fund be applied to the public service during any future time T of war, the debt will

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than the debt can grow; and must therefore, not only fix a *boundary* or *limit* to the increase of the debt, but must also *infallibly* overtake it in its progress, and finally complete its redemption.

To

will be increased (in proportion to the expence TS) by the

proportionate quantity *only* of $T \times S - r^{t-1} \times TS \times R - r$

27th.—And the revenue will be increased (in order to pay the interest thereof) by the proportionate

quantity $T \times S - r^{t-1} \times TS \times R - r \times R - r$

28th.—And, seeing that after this second time T of war expires, the interest on the proportionate quantity by which the debt is so increased will be only

$$T \times S - r^{t-1} \times TS \times R - r \times r - r$$

The sinking fund must of course become farther increased by the proportionate quantity

$$T \times S - r^{t-1} \times TS \times R - r \times R - r$$

29th.—Hence then, the SINKING FUND will be increased, both by the *augmentation* of the debt in the times T of war (per N° 28), and also by the *redemption* of the debt in the times t of peace (per N° 25); whereas, on the other hand, the DEBT will not only be continually diminished by the application of the sinking fund during the times t of peace (per N° 24), but will also (per N° 26), be thereby continually checked in its growth during the times T of war:—Wherefore, the sinking fund will be for ever *increasing*; and the *proportion* in which the debt will grow, will be for ever *decreasing*:—Moreover, the *progression* of the sinking fund in time of peace will be *geometric*; and the *progression* of the debt in time of war will be *arithmetic only*:—Wherefore, in this case, the sinking fund must consequently overgrow the debt, and finally redeem it; however *long* or *short* the times T and t , or however *great* or *small* the periodical expences S , or however *high* or *low* the rates of interest R and r may be,

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To make this plain,—Let us (by way of example) take a series of the foregoing wars of eight years out of twenty, at an expence of £.10,000,000 per year, or rather £.5,000,000 per half year, and at the same rates of interest as before.

Now, seeing that the whole of the money for the expences of the war is in this case supposed to be borrowed, and only the interest thereof raised by taxes; the debt at the end of the first war will be - £.80,000,000

The half-yearly *interest* of which at the aforesaid rate of *five per cent. per annum*, will be the half-yearly *war-revenue*, viz. - £.2,000,000

And the half-yearly interest of the debt in time of peace, at $3\frac{1}{2}$ *per cent. per annum*, will be - - - - - 1,400,000

Hence, there will be an half-yearly sinking fund at the commencement of the first peace - - - - - £.600,000

Which at the end of eleven years and an half of peace, will have redeemed of the debt - - - - - 16,812,300

Wherefore, the debt remaining unredeemed at the end of the first peace, or the commencement of the second war, will be - - - - - £.63,187,700

And the half-yearly *sinking fund*, as it now stands increased by the in-

terest

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terest of the debt discharged, will be - - - - - £.894,215

Which, being applied to the service of the war now commencing, must be deducted from the half-yearly expence - - - 5,000,000

And the remainder will be the half-yearly sum to be borrowed during the second war, viz. - - - - £.4,105,785

Which being repeated during eight years, or sixteen half years, will make - - - - - 65,692,560

Wherefore, the debt at the beginning of the last half year of the second war, will be - - - - - £.128,880,260

But, seeing that the beforementioned half-yearly sinking fund comes again to be applied to the redemption of the debt, at the end of the half year, there will then be paid off - - - - - 894,215

And the debt at the end of the second war, will be - - - - - £.127,986,045

Now, the addition made to the *war-revenue* will be the interest of the beforementioned sum of £.65,692,560 borrowed during the second war, at

five

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five per cent. per annum, viz. the half-yearly sum of - - £.1,642,314
Which added to the former - - - - 2,000,000

Gives the half-yearly *war-revenue* at the end of the second war, or the commencement of the second peace - £.3,642,314

And the interest of the whole debt (being now reduced to $3\frac{1}{2}$ per cent. per annum) will be half-yearly - - 2,239,756

Wherefore, the half-yearly sinking fund, at the commencement of the second peace, will be - - - - £.1,402,558

Which, at the end of eleven years and an half of the peace, will have redeemed of the debt - - - - 39,300,375

Wherefore, the debt remaining unredeemed at the end of the second peace, or the commencement of the third war, will be - - - £.88,685,670

And the half-yearly sinking fund as it will now stand increased by the interest of the debt discharged will be - - - - £.2,090,315

Which being subtracted from the half-

yearly

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yearly expence of the war - - - - 5,000,000

The remainder will be the half-yearly sum to be borrowed during the third war - £.2,909,685

Which being repeated during eight years, or sixteen half years, will make - - - - 46,554,960

And the debt at the beginning of the last half year of the third war, will be - - - - £.135,240,630

At the end of which last half year, the beforementioned sinking fund will pay off - - - - 2,090,315

Wherefore, the debt at the end of the third war, or commencement of the third peace, will be - £.133,150,315

The addition made to the war-revenue during the third war, will be the interest of the beforementioned sum of £.46,554,960 borrowed at 5 per cent. per annum, viz. the half-yearly sum of - - - - £.1,163,874
Which added to the former - - - - 3,642,314

Gives the half-yearly war-revenue at the end of the third war, or the

commencement

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commencement of the
third peace, viz. - £.4,806,188

And the interest of
the debt (the whole
being now reduced to
 $3\frac{1}{2}$ per cent. per an-
num) will be half-
yearly - - - - 2,330,130

Wherefore, the half-
yearly sinking fund
at the commencement
of the third peace,
will be - - - - £.2,476,058

Which, at the end of eleven years
and an half of the peace, will have
redeemed of the debt - - - - 69,380,385

Wherefore, the debt remaining
unredeemed at the end of the third
peace, or the commencement of the
fourth war, will be - - - - £.63,769,930

And the half-yearly sinking fund,
as it will now stand increased by
the interest of the debt discharged,
will be - - - - £.3,690,215

Which being sub-
tracted from the half-
yearly expences of the
war - - - - 5,000,000

The remainder will
be the half-yearly sum
to be borrowed du-
ring the fourth war;
viz. - - - - £.1,309,785

Which

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Which being repeated during
eight years, or sixteen half years,
will make - - - - 20,956,560

And the debt at the beginning
of the last half year of the fourth
war, will be - - - - £.84,726,490

At the end of which half year,
the beforementioned sinking fund
will pay off - - - - 3,690,215

Wherefore, the debt at the end
of the fourth war, will be - - - £.81,036,275

There is no need to mention the
addition that would be made to the
sinking fund, at the commencement
of the fourth peace, by the decrease
of the rate of interest on the money
borrowed during the fourth war;
because the beforementioned sink-
ing fund of £.3,690,215, during
the next eleven years and an half of
peace; would pay off - - - - 103,401,670

Which exceeds the debt, by - £.22,365,395

* It is also worthy of remark, that if a nation
shall at any time be obliged to exert herself with
respect

SYMBOLIC DEMONSTRATIONS *continued from p. 41.*

30th.—* And moreover, seeing that the greater the
expences S shall be, the greater will be the extraordinary
demand for money; and from thence (per postulatam 4.)
the greater the rate R will be, and (of course) the greater
the

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respect to expences, beyond what might be considered as her natural abilities; such exertion, will, in its own nature, always furnish a remedy proportionate to the evil; provided only, that such nation be able to raise a revenue equal to the *extraordinary* interest, and that the rate of interest be permitted to flow according to the natural course and order of things, *undisguised* and *unrestrained* by legal provisions.

This observation will appear perfectly plain, by considering, that the greater the exertion shall be with respect to expences, the greater will be the *extraordinary* demand for money, for the time being; and (per postulatam 4th) the greater will be the *additional* interest, which composes the sinking fund; and from thence, the future growth of the debt will (of course) be checked in a greater degree; and its redemption will consequently be effected in a shorter time.

For example,—Let it be supposed that the ordinary rate of interest in time of peace, as also the expences and the continuance of a war, be as before;—and let it also be supposed that this *extraordinary* demand for money should cause the rate of interest to become 7 per cent. per annum, on the average, during the war.

In

the quantity $R-r$ will become; it must necessarily follow, that if the rate R be permitted to flow in its natural order undisguised, any extraordinary exertion will always (in the common course and order of things) produce a remedy proportionate to it: and hence, if the money be thus raised, the *ability* or *inability* to raise the revenue $S \times R - I$ from time to time, without actual grievance, will shew the measure of the national strength.

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In this case, the debt at the end of the first war will be - - - - £.80,000,000

The half-yearly interest of which, at 7 per cent. per annum, will be the half-yearly standing *war-revenue* at the end of the first war; viz. £.2,800,000

And the half-yearly interest of the debt in time of peace, will be - 1,400,000

Wherefore, there will be an half-yearly sinking fund at the commencement of the first peace - - - - £.1,400,000

Which, at the end of eleven years and an half of the peace, will have redeemed of the debt - - - - 39,228,700

Wherefore, the debt remaining unredeemed at the end of the first peace, or the commencement of the second war, will be - - - - £.40,771,300

And the half-yearly sinking fund, as it will now stand increased by the interest of the debt discharged, will be - £.2,086,500

Which being subtracted from the half-yearly expences of the war - - - - 5,000,000

The remainder will be the half-yearly sum to be borrowed during the second war £.2,913,500

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Which

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Which being repeated during
eight years, or sixteen half years,
will make - - - - - 46,616,000

And the debt, at the beginning
of the last half year of the second
war, will be - - - - - £.87,387,300

At the end of which half year,
the beforementioned sinking fund
will pay off - - - - - 2,086,500

Wherefore, the debt at the end
of the second war, or the com-
mencement of the second peace,
will be - - - - - £.85,300,800

The addition made to the war-
revenue during the second war, will
be the interest of the money bor-
rowed (viz. £.46,616,000) at 7 per
cent. per annum; viz. the half-
yearly sum of - - - £.1,631,560

Which added to
the former - - - 2,800,000

Gives the war-reve-
nue at the end of the
second war, viz. the
half-yearly sum of - £.4,431,560

And the half-yearly
interest of the debt
in time of peace be-
ing subtracted - - - 1,492,765

The remainder will
be the half-yearly
sinking fund at the

commencement

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commencement of the
second peace, viz. - £.2,938,795

Which at the end of eleven years
and an half of the peace, will have
redeemed of the debt - - - 82,346,500

Wherefore, the debt remaining
unredeemed at the commencement
of the third war, will be only - * £.2,954,300

It must also be observed, that the greater the
difference between the *ordinary* and *extraordinary*
rates of interest shall be, the greater will be the
public saving (explained in page 34 and 35) re-
sulting from the debt.

It is also evident, that if the foregoing method
of raising money, should be pursued in any na-
tion, the *ability* or *inability* of such nation to raise a
revenue (without grievance to the subjects) equal
to the *interest* of the money required, according to
such *rate* as the demand for money shall occasion,
will shew the *measure* of her natural strength: be-
cause, (as has just now been proved) the sinking
fund thereby produced will be sufficient to redeem
any

* It is necessary to mention, that the factors for these
computations having been wrought to only five decimal
places, the *units* in the foregoing sums will not be
exact:—The half-yearly parts will however be within
£.10, and the capitals within £.100, of the truth;
which is near enough for these large computations; par-
ticularly, as the foregoing method of making the loans is
made use of *only* by way of example, on account of its
being the most simple to common conception; but is
not the most advantageous method, as will be shewn in
the seventh section.

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any debt that shall be so incurred :—And although (as mentioned in page 39) the money may be raised by a method preferable to the beforementioned method; yet, it cannot but be pleasing in the highest degree, to observe the foregoing admirable connection which the great Author of Nature has implanted between *causes* and *effects*, whereby a remedy proportionate to the *malady* is produced *naturally* from the *malady* itself. —To explore and to improve this admirable connection is man's duty: but, should he endeavour to disguise, restrain, or divert things, from that general course and order which nature has laid down, his attempts will not only be vain, but himself also will be swept away and destroyed by the current.

SECTION IV.

Of the losses that are attendant on endeavouring to disguise or conceal the real Rate of Interest for Money.

THE evils attendant on attempts to divert or disguise the course and order of nature, are, in many things, obvious on the first reflection; but there is no instance wherein those evils would be more fatal, than in public credit.

If the rate of interest for money should be restrained by legal provisions, or apparently disguised, so as to appear (at the first sight) to be less than the *real rate* naturally occasioned by the *demand* for the time being, such disguise will be attended with the loss of a *principal* proportionate

to the degree in which the rate of interest shall be so disguised.

* For example,—If in a time of war, when the rate of interest shall be *5 per cent. per annum*, a stock of redeemable annuities shall be established, bearing *4½ per cent. per annum* on the nominal capital; and so much of such nominal capital be given for a new loan, as that the lenders shall receive *5 per cent.* interest on the money actually advanced; then, for every £.100 in money so actually raised, the nominal capital to be given must be £.111½; and if, after the war shall be over, the rate of interest shall decrease so as to become either the said *4½ per cent.* or any *lesser rate* whatever, such capital will not be redeemable without paying £.111½ for every £.100 so raised; and consequently, there must be a loss of £.11½ per cent. on all the money so raised.

If the redeemable annuity stock shall bear only *£.4 per cent. per annum* interest on the nominal capital, then £.125 of such nominal capital must be given

SYMBOLIC DEMONSTRATIONS continued from p. 48.

31st.—* But, if the rate of interest be disguised in such manner as that during any time *T* of war in which the rate of increase by interest shall be *R*, any capital sum *C* be raised on redeemable annuity stocks bearing a certain lesser rate *r*, on the nominal capital thereof *N*, so as that the periodical interest shall be the same, viz.

$$N \times r - i = C \times R - i$$

32d.—Then the nominal capital of such annuity stock must be - - - - - $N = C \times \frac{R-i}{r-i}$

33d.—And, if after the expiration of the said time *T* of war, the rate of increase by interest shall fall to any rate

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given for every £.100 in money to be advanced; and, if in time of peace the rate of interest shall fall to 4 per cent. per annum, or any lesser rate, such capital will not be redeemable under £.125 for every £.100 so raised; wherefore there must be a loss of £.25 per cent. on all the money so raised.

If the redeemable annuity stock shall bear only $3\frac{1}{2}$ per cent. per annum interest on the nominal capital, then £.142 $\frac{6}{7}$ of such nominal capital must be given for every £.100 in money to be advanced; and, if the rate of interest in time of peace shall fall to $3\frac{1}{2}$ per cent. or any less rate, such capital will not be redeemable under £.142 $\frac{6}{7}$ for each £.100 so raised; and consequently there must be a loss of £.42 $\frac{6}{7}$ per cent. on all the money so raised.

If the redeemable annuity stock shall bear only 3 per cent. per annum interest on the nominal capital, then £.166 $\frac{2}{3}$ of such nominal capital must be given for every £.100 in money to be advanced; and if in time of peace the rate of interest shall fall to 3 per cent. per annum, or to any less rate, such capital will not be redeemable under £.166 $\frac{2}{3}$ for every

rate r , either equal to or lesser than the aforesaid adopted rate r , such nominal capital N must of course become a real one; or (in other words) the redemption thereof must cost N , although no more than C was received therefor; and consequently, there must be a loss

$$L = N - C = C \times \frac{R-1}{r-1} - C = \frac{R-1}{r-1} - 1 \times C = \frac{R-r}{r-1} \times C.$$

34th.—Which bears the same proportion to $(N=)$ $C \times \frac{R-1}{r-1}$, as $R-r$ bears to $R-1$.

35th.

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every £.100 so received; wherefore there must be a loss of £.66 $\frac{2}{3}$ per cent. on all the money so raised.

If indeed the rate of interest in time of peace should not fall so low as 3 per cent. the three per cent. stocks would of course be redeemable under par:—For example,—If the rate of interest in time of peace should fall only to $3\frac{1}{2}$ per cent. the three per cent. stocks would be redeemable at £.85 $\frac{1}{2}$ cash for a £.100 of nominal stock, in which case the abovementioned £.166 $\frac{2}{3}$ of three per cent. stock would be redeemable for £.142 $\frac{6}{7}$ in money; so that the loss on the redemption would in this case be £.42 $\frac{6}{7}$ per cent. the same only as if the annuity stock had carried $3\frac{1}{2}$ per cent. interest on its nominal capital.

But, although this circumstance of the stocks being redeemable under par, causes the loss on the redemption to be less than it would otherwise be; yet, the effects therefrom accruing (so far from being favourable) will be altogether prejudicial and destructive: because, the lower the price of the redemption shall be, the higher must be the rate of interest; and consequently, the greater must be the taxes required for the payment of the interest of future loans: so that when the effects are also considered, the loss will be found to be increased instead of being lessened by having the stocks redeemable at a discount.—This will be more fully explained in the ninth section.

* It must also be observed here, that as the value of

35th.—* And, seeing (per N^o 31) that the interest $N \times \frac{R-1}{r-1}$ (= per N^o 32 $C \times \frac{R-1}{r-1} \times \frac{R-1}{r-1}$) is paid on

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the

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of each of the beforementioned annuity stocks in time of peace, is composed *partly* of money borrowed, and partly of a public loss;—and, as the interest (whether it *be* or *be not* reduced to a lower rate than that originally adopted on the annuity stock) must be paid on the whole of the *annuity capital*;—the current interest must consequently be continually paid for the *quantity of the loss*, as well as for the *quantity of money borrowed*, until it be *actually* redeemed.

It is unnecessary, after what has been said, to enter into any particulars, with respect to the loss that may attend the raising of money on what I define (page 13) to be *perpetual annuities*: because, as there is no limit prefixed, neither as to *time* nor *price*, beyond which the redemption may not proceed;—so, consequently, there can be no *absolute* or *positive* limit for the *loss*.

If the rate of interest on money (occasioned by any extraordinary demand for the time being) should be *apparently* disguised, or concealed, by raising money on determinate annuities; such method will be attended with a greater or lesser loss, according as the said determinate annuity shall continue a longer or a shorter time.

It

the nominal capital $N = C \times \frac{R-1}{r-1}$; although the rate r should afterwards be reduced to any lower rate r , yet, even then, the interest must be $N \times r - 1 = C \times \frac{R-1}{r-1} \times r - 1$. Wherefore, the interest at the said rate r must consequently be paid for the loss $L = \frac{R-r}{r-1} \times C$ as well as for C the quantity of money actually borrowed.

36th.

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It is necessary to be observed, that a determinate annuity is composed of two parts; viz. one part of the annuity is the periodical *interest* of the money advanced therefor; and the other part is (as it were) an appropriated *sinking fund*, whereby the PRINCIPAL so advanced, is periodically discharged.

* For example,—If in a time of war, the rate of interest be *5 per cent. per annum*, and any sum of money be raised on an annuity to continue twenty years, and then to cease;—then, the quantity of the annuity in proportion to every £.100 so to be raised, will be £.7 : 19 : 4 $\frac{1}{10}$; or rather, (the payments being made half-yearly) £.3 : 19 : 8 $\frac{7}{10}$ per half year.

In this case £.5 out of the beforementioned £.7 : 19 : 4 $\frac{1}{10}$ is the interest of the £.100 so advanced, and the remaining £.2 : 19 : 4 $\frac{1}{10}$ per annum (or rather £.1 : 9 : 8 $\frac{7}{10}$ per half year is a *sinking fund* whereby the said £.100 is periodically discharged,

36th.—* If during any time T in which the rate of increase by interest be R , any capital sum C be raised on any determinate annuity A to continue any time T , whereby the said annuity shall be such quantity A , as that the amount thereof, with its interest during the said time T , be equal to the amount of the said capital C with its interest during the said time T , (as per N° 3,

page 28) viz. $\frac{R^T-1}{R-1} \times A = C \times R^T$

37th.—Then $A = \frac{C \times R^T}{\frac{R^T-1}{R-1}}$

38th.

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discharged, during the said twenty years, or forty half years.

Now, if a part of this term of twenty years should be a time of peace, in which the rate of interest should be only $3\frac{1}{2}$ per cent. per annum, the members of the state must necessarily be poorer at the end of the said twenty years, than they would have been, if they had borrowed the money themselves, for the payment of their respective proportions; because, were they to have borrowed the money themselves, they would only pay the current rate of interest for the time being; whereas, in the present case the extraordinary rate of 5 per cent. is continued to be paid during the whole time of the continuance of the annuity; notwithstanding the decrease in the rate of interest, which, according to the natural course and order of things, must take place, when the extraordinary demand for money ceases.—And hence, this method of raising money must be attended with a loss, equal

38th.—Or, if A be the given quantity, we shall have

$$C = \frac{\frac{R^T - I}{R - I} \times A}{R^T}$$

39th.—And, seeing that the quantity by which the annuity A exceeds the interest $C \times R - I$ of the money C advanced, is a periodical discharge of the principal; the part remaining undischarged of the said principal at the

expiration of any part T of the time T will be $\frac{\frac{R^T - I}{R - I} \times A}{R^T - I}$

40th.

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equal to the AMOUNT of the difference between the ordinary and the extraordinary interest, during such time as the current rate shall be less than 5 per cent.

But the best method of determining the quantity of the loss, will be, to ascertain how much of the PRINCIPAL shall have been discharged, by the periodical excess of the annuity above the interest, during the war; and, how much would be required to re-purchase or redeem the remaining part of the term, at the commencement of the peace.

Now if we suppose 5 per cent. per annum to be the average of the rate of interest during the war, we may consider it to be the actual rate about the middle of the war; and if we suppose the war to continue four years after the raising of the money, the beforementioned $\text{£} .2 : 19 : 4\frac{1}{100}$ per annum, or rather $\text{£} .1 : 9 : 8\frac{1}{100}$ per half year, will (at the end of those four years) have discharged $\text{£} .12 : 19 : 2\frac{1}{2}$ of the principal $\text{£} .100$ so raised; so that

40th.—But if, at the expiration of the said part T of the time T , the rate of increase by interest shall fall to r ;

the part remaining unexpired will become $\frac{\frac{r^T - I}{r - I} \times A}{r^T - I}$

41st.—And consequently, there must be a loss of

equal to $\frac{\frac{r^T - I}{r - I} \times A}{r^T - I} - \frac{\frac{R^T - I}{R - I} \times A}{R^T - I}$

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that there will then remain undischarged of the said £.100 the sum of - - - £.87 0 9½

But the extraordinary demand for money now ceasing, and the rate of interest thereupon falling to 3½ per cent. per annum; the remaining sixteen years of the said annuity could not be re-purchased or redeemed under - - - 96 19 6½

And consequently, on every £.100 so raised, there must be a loss of - - - £.9 18 9

If the determinate annuity shall continue thirty years, the annual quantity thereof, in proportion to every £.100 so to be raised, must be £.6 : 9 : 5; of which, £.5 will be the annual interest, and the remaining £.1 : 9 : 5 will be an appropriated sinking fund, by which the *principal* will be periodically discharged:—And, admitting the war to continue (as before) four years after the money be thus raised, this £.1 : 9 : 5 per annum, or rather £.0 : 14 : 8½ per half year, will then have discharged £.6 : 8 : 6 of the said £.100 principal; so that there will remain undischarged thereof, the sum of - - - £.93 11 6

But the extraordinary demand for money ceasing, and the rate of interest falling to 3½ per cent. the remaining 26 years of the said annuity could not be re-purchased or redeemed under - - - 109 17 5

Wherefore, on every £.100 so raised, there must be a loss of - - - £.16 5 11

If

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If the determinate annuity shall continue 99 years, the annual quantity thereof, in proportion to every £.100 so to be raised, will be £.5 : 0 : 9½; of which, £.5 will be the annual interest, and the remaining 9 d. 1½ per annum (or rather 4 d. 1½ per half year) will be a *sinking fund* whereby the principal is periodically discharged:—And, admitting (as before) that the war continues four years after the money be thus raised, this 4 d. 1½ per half year will then have discharged £.0 : 3 : 3½ of the said £.100 principal, so that the part thereof then remaining undischarged will be - - - £.99 16 8½

But the extraordinary demand for money ceasing, and the rate of interest falling to 3½ per cent. the remaining 95 years of the said annuity could not be re-purchased or redeemed under - - - 138 18 7½

Wherefore, on every £.100 thus raised, there must be a loss of - - - £.39 11 11

And, as these are, respectively, the *present* or *immediate* losses at the commencement of the peace, they must of course be attended with the current rate of interest, during the remaining term of the continuance of the annuity.

These losses may at first sight, perhaps, appear astonishing: but, when it is considered that the rate of interest for money must necessarily be *higher* or *lower* from time to time, according as the demand therefor shall be *greater* or *lesser*;—it must necessarily follow, that if money be borrowed when the rate of interest is high, and such high interest be so fixed as not to be reducible when the extraordinary demand for money ceases, the *natural* decrease

decrease of the rate of interest must consequently be lost; and such loss must of course be greater or lesser, according as such high rate of interest shall be fixed for a longer or a shorter time. And, although the loss on *perpetual* annuities, (or on *annuity stocks* not having the interest reducible) will be greatest; yet, the loss on very long determinate annuities, must be very near as great.

* Hence then, if any of the beforementioned redeemable and determinate annuities shall be compounded together, so as that the money raised on the whole compound, be equal to the nominal capital of the redeemable stock, the loss on the money so raised will be as follows; viz.

If the redeemable annuity stock bearing $4\frac{1}{2}$ per cent. *per annum* on its nominal capital, be compounded with the determinate annuity to continue 20 years, the sum raised on every £100 of such nominal capital will be £90; and the loss thereon will be at the rate of $\frac{1}{11}$ per cent. (as in page 53) viz. - - - - - £10 0 0

And the loss on the remaining £10 will be at the rate of $\frac{9}{1829}$ per cent. (as in page 60) viz. - - - - - 0 19 10 $\frac{1}{2}$

Wherefore, the loss on every £100 raised on such compound annuities, will be - - - - - £10 19 10 $\frac{1}{2}$

If

SYMBOLIC DEMONSTRATIONS continued from p. 59.

42d.—* Hence then, if any capital sum $C = C + C$ be raised on compound annuities, whereof the part C be redeemable,

If the determinate annuity to continue 30 years should be compounded with the redeemable annuity stock bearing $4\frac{1}{2}$ per cent. the loss on the £90 obtained for the redeemable stock will be as before - - - - - £10 0 0

And the loss on the remaining £10 will be at the rate of $\frac{16}{511}$ per cent. (as in page 60) viz. - - - - - 1 12 7 $\frac{1}{2}$

Wherefore, the loss on every £100 so raised, will be - - - - - £11 12 7 $\frac{1}{2}$

If the determinate annuity to continue 99 years, and the $4\frac{1}{2}$ per cent. redeemable annuity stock be compounded together, the loss on the £90 obtained for the redeemable stock will be as before - - - - - £10 0 0

And the loss on the remaining £10 will be at the rate of $\frac{39}{11}$ per cent. (as in page 61) viz. - - - - - 3 18 2 $\frac{1}{2}$

Wherefore, the loss on every £100 so raised, will be - - - - - £13 18 2 $\frac{1}{2}$

Again,

redeemable, and the other part C determinate, in order that the said capital sum $C = C + C$ be equal to N , the nominal capital of the redeemable stock, there must consequently (per No 33, page 53, and No 41, page 59) be a

$$\text{loss } L + l \text{ equal to } \frac{R-1}{1-1} \times C + \frac{r^{T-T_1}}{r-1} \times A - \frac{R^{T-T_1}}{R-1} \times A$$

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Again,—If the 4 per cent. redeemable stock and the determinate annuity to continue 20 years should be compounded together, £.80 will be the proportion obtained for the redeemable stock, and the loss thereon will be at the rate of £.25 per cent. (as explained in page 54) viz. £.20 0 0

And the loss on the remaining £.20 raised on the determinate annuity, will be at the rate of £.9 : 18 : 9 per cent. (as in page 60) viz. - - - 1 19 9

Wherefore, the loss on every £.100 so raised, will be - - - £.21 19 9

If the 4 per cent. redeemable stock and the determinate annuity of 30 years be compounded together, the loss on the £.80 obtained on the redeemable stock, will be as before £.20 0 0

And the loss on the remaining £.20 will be at the rate of £.16 : 5 : 11 per cent. (as in page 60) viz. - - - 3 5 2½

Wherefore, the loss on every £.100 so raised, will be - - - £.23 5 2½

If the 4 per cent. redeemable stock, and the determinate annuity of 99 years be compounded together, the loss on the £.80 obtained on the redeemable stock, will be as before £.20 0 0

And the loss on the remaining £.20 will be at the rate of £.39 : 1 : 11 per cent. (as in page 61) viz. - - - 7 16 4½

Wherefore, the loss on every £.100 so raised, will be - - - £.27 16 4½

Again,

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Again,—If the 3½ per cent. redeemable annuity stock, and the determinate annuity to continue 20 years, be compounded together, £.70 will be the proportion obtained for the redeemable stock, and the loss thereon will be at the rate of £.42½ per cent. (as explained in page 55) viz. £.30 0 0

And the loss on the remaining £.30 raised on the said determinate annuity, will be at the rate of £.9 : 18 : 9 per cent. (as explained in page 60) viz. - - - 2 19 7½

Wherefore, the loss on every £.100 so raised, will be - - - £.32 19 7½

If the 3½ per cent. redeemable stock, and the determinate annuity of 30 years, be compounded together, the loss on the £.70 obtained for the redeemable stock, will be as before £.30 0 0

And the loss on the remaining £.30 will be at the rate of £.16 : 5 : 11 per cent. (as in page 60) viz. - - - 4 17 9½

Wherefore, the loss on every £.100 so raised, will be - - - £.34 17 9½

If the 3½ per cent. redeemable stock, and the determinate annuity of 99 years, be compounded together, the loss on the £.70 obtained for the redeemable stock, will be as before £.30 0 0

And the loss on the remaining £.30 obtained for the determinate annuity will be at the rate of £.39 : 1 : 11 per cent. (as explained in page 61) viz. - - - 11 14 7

Wherefore, the loss on every £.100 so raised, will be - - - £.41 14 7

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It

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It may also be observed, that if the rate of interest be *higher* than $3\frac{1}{2}$ per cent. per annum in time of peace, or *lower* than 5 per cent. per annum in time of war (on the average), the losses will be *less* than those abovementioned: and, on the other hand, if the rate of interest should be *lower* than $3\frac{1}{2}$ per cent. per annum in time of peace, or *higher* than 5 per cent. per annum in time of war (on the average), the losses will be *greater* than those abovementioned.

It may not be amiss to mention a circumstance here, that may perhaps occur to but very few, except those who may be immediately concerned in annuity stocks and loans;—those also to whom it may occur, may (not improbably) be led to draw conclusions too hastily, as well for as against its being obtainable in actual practice.

The circumstance to which I here allude, is the difference between the *effects* of mentioning at once the sum to be advanced for two annuities, the one redeemable, and the other determinate; and the *effects* that would be produced by mentioning *separately* the respective sums to be advanced for each.

It may perhaps appear very odd to some, that there should be any difference, whether an hundred pounds should be given and received for any *two* commodities; or whether a part thereof, as £. 70, should be given and received for the one of those commodities, and £. 30 for the other; seeing, that in each case, the self-same sum would be *apparently* given and received for the self-same commodities.—But in the case of *mixed* or *compound annuities* this *appearance* is delusive, and not real:—the commodities (i. e. the annuities) are not the same in their *properties* when mentioned *separately*,

as

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as they are when mentioned *together**: inasmuch, that there will be an actual difference of £. 30 per cent. between the *effects* produced from mentioning the whole sum to be advanced for the *two* together, and the *effects* that would be produced by mentioning the two sums separately.

To illustrate this observation,—Let it be supposed that the rates of interest in *war* and in *peace* be the same as mentioned before, and that the terms of a loan should be thus expressed; viz. *That for the sum required to be advanced, the lenders should receive an annuity or interest of $3\frac{1}{2}$ per cent. to be afterwards redeemed, together also with a farther annuity of £. 2 : 7 : 9 $\frac{4}{100}$ to continue 20 years, and then to cease.*

In this case the proportion for the *redeemable annuity* will be £. 70, and the proportion for the *determinate annuity* will be £. 30, making together the £. 100 so received; but, when the extraordinary demand for money shall cease, and the rate of interest become $3\frac{1}{2}$ per cent. (according to the foregoing admission), the redeemable annuity *itself* will require £. 100 for its redemption (as has been already explained), instead of the £. 70 actually received therefor.

But

* The reader will be pleased to recollect the *definitions* in the beginning of the second section: particularly, the distinction between *perpetual annuities* and *redeemable annuities*; and how far forth the latter partake of the properties of the former.—This important distinction is totally unattended to, in every piece that I have seen written on this subject; and in consequence thereof, the writers have been led into such prodigious mistakes, that every of their most important conclusions are totally and entirely erroneous.

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But, if the terms of the loan should be thus expressed,—*That for £.70 in part of every £.100 to be advanced, the lenders should receive an annuity of £.5 per cent. viz. £.3 : 10 : 0 to be thereafter redeemed; and for the remaining £.30 of every £.100 they should receive an annuity of £.2 : 7 : 9 $\frac{1}{8}$ to continue 20 years, and then to cease;—the annuity of £.3 : 10 : 0 would then be redeemable by the re-payment of the £.70 which was received therefor; and the loss sustained on every £.100 so raised, would be the loss only on the part received for the determinate annuity; viz. £.2 : 19 : 7 $\frac{1}{2}$, as in page 65.—This loss also would be avoided, if the whole of the loan should be made, on condition of being redeemable at pleasure, or at the end of the war; and an actual saving to the public would in that case be produced also, as has been already shewn in the third section.*

But, it is not improbable (as said before) that some to whom the foregoing circumstance may occur, may survey it only in part, and may thereby be led to draw conclusions too hastily, as well for as against its being obtainable in actual practice.

SECT.

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S E C T. V.

Of the objections that may appear, with respect to the CAUSES from whence the beforementioned Losses may originate; and the practicability or impracticability of actually avoiding them.

IT may be objected to what has been said in the foregoing section, *that the prices of the public stocks for the time being, will always govern the terms on which new loans will be obtainable; and, as the fluctuation in their prices between war and peace, will be a profit to the party so laying out his money, over and above the extraordinary interest in the intermediate time; the lenders will of course require terms for the new loans that shall not only be equally advantageous, but such as shall be productive also of an additional profit or premium; whether the money should be raised on annuities redeemable, determinate, or mixed, or in any other way or manner whatsoever.*

This objection appears at first sight to be conclusive; and it would indeed be perfectly conclusive, if there was no other connection between the prices of the stocks, and the terms of obtaining new loans, than that of the latter being governed by the former. But it will hereafter demonstrably appear, that the prices of the stocks, and the terms of obtaining new loans, will alternately govern and be governed by each other.—This alternate governance is not, however, to be taken for granted, until it be hereafter proved; and it therefore becomes necessary, in the intermediate

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time,

time, to give the objection a thorough examination.

* In order to examine the objection with strictness, it is necessary to *postulate*,—*That government (in commercial nations) be able to borrow money for the support of a war, at some rate of interest or other; conditioned, that the same be redeemable at the pleasure of government, by the re-payment of the principal.*

In this case (it may be observed) the *extraordinary* interest will become reducible to the ordinary rate (whatever it may be) at the end of the war: because if any of the lenders would rather receive their *principal*, than submit to the decrease in the rate of interest, which must naturally take place (per postulata 4 and 5) when the extraordinary demand for money ceases; other lenders will be found, whereby the former ones may be paid off.

This *postulatum* being for a moment admitted, (I say *admitted for a moment*, because it will be necessary to enquire *farther* whether it ought or ought not to stand admitted) and it being supposed, according to the objection, that the lenders would in that case demand such a rate of interest for the new loans, as should be equivalent on the whole,

SYMBOLIC DEMONSTRATIONS *continued from p. 63.*

43d.—* If it be objected,—that in case of making the loans redeemable at pleasure, or at the end of the war, by the re-payment of the sum borrowed; a rate of increase by interest R would be demanded by the lenders, whereby the expences to the public should be equal to those occasioned by the fluctuation in the value of the *stock* or *capital*, in consequence of the fluctuation of the rate of interest from R to r :—Then, seeing that the amount of any capital sum C so advanced, together with the interest thereon at the end of any time (of war) T will be $R^T \times C$.

44th.

whole, to the interest produced by the stocks during the war, and the probable rise in their price when the war should be over;—they must consider, in order to ascertain such their demand,

1st. What the rate of interest will probably be after the war shall be over?—because, by such *rate* the rise in the price of the old stocks will of course be governed.

2dly. How long the war will probably continue?—because, according to the objection, the temporary rate of interest to be demanded by the lenders, must be so much *higher* than the rate produced by the stocks, as that the amount of the *difference* during the continuance of the war, may be equal to the probable rise in the price of stocks, when the war shall cease.

The first enquiry;—What may probably be the rate of interest after the war shall be over, might indeed be judged of, by considering what it was before the war began, and what alterations might reasonably be expected from new circumstances. But any opinion that could be formed with respect to the second enquiry,—*how long the war might continue*, must be exceeding doubtful and

44th.—And, seeing also, that by the decrease of the rate from R to r at the expiration of the said time T , the said capital sum C will become increased (per N° 33, page 53, r and r being in this case equal) by the farther quantity — — — — — $\frac{R-r}{r-1} \times C$

45th.—The amount of the said capital sum C together with the interest thereon during the time T , and the farther increase thereof occasioned by the decrease of the rate from R to r , must consequently be — $R^T + \frac{R-r}{r-1} \times C$

F 4

46th.

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and uncertain, however intelligent or judicious the person forming such opinion might be.

Now if the ordinary rate of interest in time of peace should be $3\frac{1}{2}$ per cent. per annum, and at any period in a war the prices of the old stock should be so decreased as to yield an interest of 5 per cent. per annum on their market value,—Then, it is evident that the fluctuation in the prices of the stocks between war and peace would be as $3\frac{1}{2}$ to 5, or as 100 to $142\frac{6}{7}$; and the temporary rate of interest (payable half-yearly) to be demanded by the lenders, for money redeemable at pleasure, or at the end of the war, in order to be equivalent to such fluctuation in the value of the stocks, must be as follows; viz.

If the war should be supposed to continue after the time of the loan

1 year, the temporary rate of	
interest must be	- $43\frac{24}{100}$ per cent. per ann.
2 years	- - - $22\frac{52}{100}$
3 years	- - - $16\frac{03}{100}$
4 years	- - - $12\frac{87}{100}$
5 years	- - - 11
6 years	- - - $9\frac{78}{100}$
7 years	- - - $8\frac{92}{100}$
8 years	- - - $8\frac{28}{100}$

The

46th.—Wherefore, the temporary rate R to be demanded by the lenders during the time T must (according

to the objection) be such, as that $R^T \times C = R^T + \frac{R-r}{r-1} \times C$

47th.—Whence - - - - $R^T = R^T + \frac{R-r}{r-1}$

48th.—And thence - - - $R = \sqrt[T]{R^T + \frac{R-r}{r-1}}$

49th:

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The preposterous extravagance of these rates of interest, and the impossibility of forming a judgment of the continuance of a war, on which the temporary rate of interest must in this case depend; would, even were there no other considerations, be sufficient to convince us, that there must be some farther connection between the prices of the stocks, and the terms of obtaining new loans, besides that of the latter being governed by the former.—But this is not all:—It must also be observed, that was this particular governance the only connection, the longer the (war or the) extraordinary demand for money should be supposed to continue, the lower must be the rate of interest required by the lenders; which is perfectly absurd:—and consequently, these fluctuations in the prices of the stocks, and the raising of money according to the *postulatum*, cannot possibly exist together.

But it remains to be determined whether the *postulatum* must stand or fall, with respect to the actual practicability of so raising the money.

It may be again objected,—that, although in a commercial nation in which there is no previous debt, money

49th.—Now, the index T of the powers of R and R being one and the same, and the quantity $\frac{R-r}{r-1}$ being a given one; the root R must consequently be greater or lesser respectively, as the index T shall be lesser or greater:—That is, the longer the extraordinary demand for money shall be supposed to continue, the less must be the rate of interest to be demanded by the lenders; which is absurd:—And therefore, such fluctuation cannot possibly happen if the additional interest required on account of the extraordinary demand for money be given only during the war.

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money may be borrowed for the public service in manner mentioned in the *postulatum*;—yet, when there is previously a large stock of transferable annuities, in which any person may lay out his money, and receive all the advantages attendant on the rise in the prices of the stocks when the war shall be over;—the prices of those transferable stocks for the time being, and the probable rise in their prices afterwards, must necessarily be the guide of all persons who would subscribe to any new loan.—Much may be said of the advantages resulting to the public from giving a redeemable annuity of £.3 : 10 : 0 for £.70, and a determinate annuity for the remaining £.30 of every £.100 (as was mentioned at the latter end of the 4th section), rather than giving the same redeemable and determinate annuities for every £.100:—But who would advance £.70 for an annuity of £.3 : 10 : 0 that would be redeemable by the re-payment of such £.70; when, by laying out his money in the old stocks, he could buy at nearly the same price, an annuity that would not be redeemable without his own consent for less than £.100; and which sum it might probably be worth in the course of a year or two?—Hence then, it would be absurd to suppose, that subscriptions for any new loan would ever be filled, on any other principle than that of offering terms that would produce the same profits as could be obtained by purchasing in the old stocks, together also with an additional profit or premium, by way of an inducement for monied men to give the new loan the preference.

This appears at first sight to be a very hardy objection against the practical exercise of public credit; and, hardy as it is, it must certainly be admitted.

When a $3\frac{1}{2}$ per cent. redeemable annuity stock, (or, in other words,—when an annuity of £.3 : 10 : 0 redeemable at pleasure by the pay-

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ment of £.100, but not redeemable for a less sum without the consent of the annuitant) shall currently sell for £.70; and it shall be supposed that in the course of a year or two, more or less, it might rise in value, and probably become worth par; it must certainly be admitted, that no man would in such case advance £.70 for an annuity of £.3 : 10 : 0 that should be redeemable at pleasure by the re-payment of such £.70:—or, in other words,—no man would in that case advance £.100 for a five per cent. annuity stock.

But, when the aforesaid $3\frac{1}{2}$ per cent. annuity stock, which is always redeemable at pleasure by the payment of £.100, shall currently sell at the price of £.100, which must be the case if the ordinary rate of interest be $3\frac{1}{2}$ per cent.—if an annuity stock redeemable at pleasure also, bearing an interest of £.4 : 5 : 0 or £.6, more or less, per cent. per annum, should be offered for a new loan, every of the advantages that could be obtained by purchasing in the old stocks, would be obtained here also, together with an additional profit or premium; and the new loan would evidently be preferable to the old stocks in this case, as well as in any other case whatever.

It is perfectly evident that the substance of the foregoing *postulatum*, and the substance of the foregoing objections, flow from one and the same general and universal principle:—viz. That when there is an extraordinary demand for any commodity, (whether money or any thing else) extraordinary terms must be given to obtain it:—But the indefinite expression, *extraordinary terms*, is as perfectly comprehended in an *additional interest*, as it is in an *additional principal*:—And moreover, if the extraordinary terms were required to be definite,

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nite, instead of *indefinite*, they might be comprehended in a *determinate* additional interest, of so short a continuance, as to be absolutely incapable of exceeding the time of the continuance of the extraordinary demand for money; in which case, the loan must necessarily become redeemable at pleasure, agreeable to the *postulatum*, as soon as the extraordinary demand for money ceases.

Hence then, whether the extraordinary terms required shall be *definite*, or *indefinite*, the *postulatum* (as well as the objections) must stand admitted:—and consequently, any fluctuation in the prices of the public stocks that shall be *inconsistent* therewith, cannot have any immediate connection with the GOVERNING CAUSE; but must be a secondary *effect*, which cannot possibly be produced, without the previous intervention of some error, in the manner of giving the extraordinary terms for the new loans.

These reflections naturally lead us to an enquiry into the principles, by which the rate of interest, and the fluctuations in the value of annuity stocks, are governed.

S E C T.

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S E C T. VI.

Of the nature of the rate of interest, and the general principles by which the comparative value of Money, and the fluctuations in the value of Annuity Stocks are governed: With a digression concerning the effects of Taxes.

IN considering the nature of the rate of interest for money, it is necessary to distinguish between the quantity of money to be lent, and the quantity in circulation.

The quantity of money in circulation determines its comparative value with respect to other commodities, according to the *circulating force*; as will be more fully explained in the eighth section:—but when we are investigating the nature of the rate of interest, the comparative value between money and other commodities, need not of necessity be brought within the consideration; because, both the *principal* and the *interest*, which are the only things to be compared, are composed *solely* of money.

To make this plain,—let it be supposed that there should be *double* the present quantity of money in circulation; and only the same quantity of other commodities that there now is:—as also, that every man *individually* should have double the quantity of money that he now has, and the same quantity of other commodities that he now possesses.—In this case, money would bear only *half* the representative value that it now bears with respect to other commodities:—but this could produce

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duce no effect whatever on the comparison of *money* with *money*.—Lenders would indeed have double the quantity to lend, that they now have; but borrowers would have occasion for double the quantity that is now necessary, to answer the same purpose.—The quantity therefore in circulation, would, in this case, make no difference in the proportion between the *quantity to be lent*, and the *demand* that there would be for it: and, of course, the *rate of interest*, (or in other words) the proportion between the *interest* and the *principal* would be the same as at present.

The rate of interest then (or the greater or lesser proportion that the *interest* shall bear to the *principal*) cannot be governed by the *quantity* of circulating money; but must depend on the *CIRCULATION* thereof, whereby the *quantity to be lent* shall bear a lesser or a greater proportion to the *quantity circulating*.

If the circulation be *brisk*, it is perfectly evident that a much less quantity of money will be sufficient to carry on the ordinary commercial intercourse between man and man, than would be required for that purpose, if the circulation was slow: and hence, the more brisk the circulation shall be, the greater will be the proportion to be lent; and of course, the lower will be the rate of interest.

The briskness of the circulation of money, (or of commodities, which will hereafter be found to produce the same effects) in any nation, must evidently go hand in hand with the commercial prosperity of the state, and the general industry of its members: and hence, it may be considered as a *general rule*, that wherever industry and commerce

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merce shall most prevail, the rate of interest for money will be lowest.

But, it is necessary to distinguish between the *mediate* and the *immediate causes* that govern the rate of interest;—for, although industry may be considered as the *GRAND* and *ONLY FOUNTAIN* from whence all *REAL GOOD* must flow; yet, it is not the *immediate* or sole cause:—it does not produce any *immediate effect* on the rate of interest:—it only furnishes the *means* or *capitals* which are afterwards to be brought into action: so that the degree of *effect* must depend on the *application* of those means, after they are actually furnished*.

If the *demands* for any commodity be considered as a *stationary* or *given quantity*, it is perfectly evident from the fourth postulum, that the *terms* on which such commodity shall be obtainable must be *higher* or *lower* according as the quantity of such commodity in the market for disposal shall be *lesser* or *greater*:—Hence then, the rate of interest for money must be *higher* or *lower*, according as a *lesser* or *greater* proportion of money, shall flow into the hands of lenders.—And hence, it must necessarily follow, that in a nation where there is

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* When men first emerge from a state of nature, nothing but industry and frugality can enable them to provide any thing wherewith to traffic for the mutual supplying of each others wants: but after capitals shall be so provided, the commerce and industry will naturally increase, in proportion to the ease with which those capitals shall be brought into action: and we shall hereafter find (in the second section of the postscript) that although a *low rate of interest* and a *flourishing commerce*, naturally go hand in hand with each other; yet, the former is the *cause* not the *effect* of the latter.

a public debt, (although the industry and commerce of the state should be in all other respects the same) the rate of interest will be either *stationary*, or will *increase*, or *decrease*, according to the method by which the public debt shall be conducted; whereby a *lesser* or *greater* proportion of money shall be thrown periodically on the hands of the lenders, by the *CIRCULATION* that shall be established in that particular channel.—And the value of annuity stocks (and other property bearing a *fixed* rent) will, of course, be governed accordingly.

There cannot be a more important consideration in the science of public finance, than that of preserving (as far forth as the nature of times and circumstances will admit) a steady and regular value in fixed property.—This consideration will also be of still more importance to the public weal, in commercial nations where there is a public debt, than in other countries.

In a commercial nation, having a public debt, there will always, from the very nature of things, be numbers of commercial people, who having from time to time a greater quantity of money on hand than is necessary to answer their demands, will lay it out in the public stocks for a time, and turn it into money again as their occasions shall require; whereby, to receive an interest therefor in the intermediate time: and in this view, a public debt may (with great propriety) be considered as a channel of circulation, through which, commercial persons are enabled to obtain money from one another, for their mutual convenience; on the shortest notice, and on the most unquestionable security that can be given.

By this means, commerce and industry will be continually encouraged;—the rate of interest for money decreased;—and any annual revenue will thereby be enabled to procure a larger capital for public exertions: which must evidently be a matter of the utmost importance and advantage to a state, exclusive of the *saving* to the public, that has been already explained in the third section.

But, if the prices of the stocks should become subject to sudden and great fluctuations, the industrious proprietor, who may have occasion for his money when the stocks are low (as in time of war), must sustain a great loss; and commerce and industry must necessarily be injured thereby.

Moreover, should the fluctuation be very great, a person by laying out his money in the stocks, when at a low price, would not only receive an additional interest thereon for the time being, but would also, on the rise of the prices of the stocks, make a large profit on the capital so laid out; to the great encouragement of an idle and useless life.

Should the fluctuations be so great, as that the prices of the stocks should be actually affected by a mere *apprehension* of a war, or of an extraordinary demand for money, so as to make it more profitable for a man to lock up his money on speculation, than to lay it out in the stocks and receive the interest thereon; it might very probably be a means of introducing a species of gambling among persons of idle dispositions, by wagering on their speculative opinions with respect to the prices of the stocks at a future time: and such idle persons would then naturally employ themselves in the propagation of false and groundless rumours, to

answer their pernicious purposes: whereby the upright and industrious would be farther injured and imposed on.

To avoid the risk of losing by these fluctuations, the industrious members of the community, who have often occasion for their capital, would naturally be led to shun the stocks, and to keep their money in their coffers till their occupations might require it:—This would be most particularly the case in time of war; because the depreciation in the value of the stocks would then be greatest, in consequence of the then extraordinary demand for money:—by this means the circulation of money would be retarded, at the very time when a brisk circulation would be most necessary; and thereby the rate of interest for money must consequently become the more increased:—the prices of the stocks the more depreciated:—and new loans the more expensive to the public.

The industrious members being intimidated by the fluctuation from resorting to the stocks, must also cause the stock-holders to form a separate and distinct class of men, whose interests would then become contrary to the interests of the other orders of the state:—and in this case, a public debt, instead of being an important and substantial axle for beneficial circulation, would become a market only of gambling and idle speculation.

It is also evident from the 5th section, that the losses to the public pointed out in the 4th section, must be inseparable companions of these fluctuations in the prices of the stocks.

Hence, the good or evil with which a public debt will *in reality* be attended, must depend entirely

tirely on the *fluctuations* to which the prices of the public stocks shall, or shall not, become subject.—And hence, the NATURE, CAUSES, and PRINCIPLES, of such fluctuations, must be worthy of the most attentive consideration, and strict investigation.

The nature and principles of the fluctuations in the value of property, of whatever sort or kind, may be considered under one general head, as laid down in the fourth *postulatum*, page 15, viz. *The comparative value of commodities of all kinds, for the time being, whether considered with respect to exchange, purchase, or rent, will be dependent on and governed by the demand that there shall be for such commodities respectively; and the ease or difficulty with which such demand may be supplied.*

This *postulatum* being taken as an *axiom*, it must necessarily follow, that if the *demand* for any commodity should increase or decrease in the same proportion as the *quantity* to be disposed of; the value of such commodity must always remain at a *par*:—If the *demand* should be increased in a greater proportion than the *quantity* for disposal, the commodity must rise in value:—and if, on the contrary, the *quantity* for disposal should be increased in a greater proportion than the demand, the value of such commodity (whatever it may be) must thereby be decreased.—Hence then, the preservation of a *par*, or *equality* in the value of any commodity, must depend on the preservation of the *proportion* between the *quantity* of such commodity for disposal, and the *demand* that there shall be for it.

Now it is evident that the *demand* which there shall be for any particular commodity, will be

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measured by the quantity of money * that shall be thrown into that particular channel of circulation.—For instance, the quantity of money * that shall be appropriated to the *wheat-market*, the *wine-market*, the *stock-market*, or the like, will be the measure of the demand that there shall be in the market for *wheat*, or for *wine*, or for *stock*, or the like, respectively: and hence, money may be considered as a commodity *representing* and *measuring the value* of all other commodities.—Wherefore, if we survey the principles of the fluctuation in the value of *money*, compared with other kinds of property; we shall, in so doing, survey also the principles of the fluctuation in the value of other kinds of property, compared with money.

Agreeable to the foregoing fundamental principle, if there should be a large increase of circulating money in any nation, and the demands therefor should only remain as before, the value thereof, compared with other kinds of property, must necessarily be decreased: or, in other words, the other kinds of property (compared with money) must thereby become dearer:—But, if the quantity of other property should be increased also, in the same proportion as the money, this inconveniency would be prevented: because, the increase in the articles to be bought and sold, would cause an increase in the *demands* for money, proportionate to its increased *quantity*.—It is also evident, that so far as the increase of the articles to be bought and sold, shall be *internally* produced,

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* Any and every of the representatives of money, that shall be applied as an instrument wherewith to *buy*, is necessarily included in the term *Money*,—see postulatam 3d.

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so far the *efflux* of the money will also be provided against.

Here it may be observed, that as the establishment of public stocks of transferable annuities, creates a new internal article to be bought and sold; such establishment must necessarily contribute to lessen the natural inconveniencies that would be attendant on an increase in the quantity of circulating money; and must also operate towards preventing its efflux; and thereby, consequently, increase the wealth of the state.—And hence, the supposition contained in the argument of A, (as mentioned in the first section of this Essay) viz.—*that the establishment of transferable annuity stocks would increase those inconveniencies that naturally attend an increase in the quantity of circulating money*, must be erroneous.

These good effects produced by a public debt, in lessening that increase in the prices of commodities, which would be occasioned by an increase in the quantity of circulating money, must not however be considered as unlimited; because, the payment of the interest gives an additional velocity to the *CIRCULATION* of the money, (as will be more particularly explained in the course of this section) whereby the *demands* for money will become the more easily supplied; which will contribute to lessen its comparative value, and thereby *consequently* increase the prices of commodities.—This, therefore, naturally forms a *limit* or *boundary*, beyond which, these good effects must cease to be produced, and contrary effects must then of *course* take place, 'till they again shall meet a counter-action.

Again, agreeable to the foregoing fundamental principle, when there is an extraordinary demand
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for money (as in time of war) the comparative value thereof must thereby become increased, and (if there be no intervention of other causes) the value of other property, compared with money, must thereby, of course, become decreased.—But, if the *quantity* of money in the respective channels of circulation, should be increased also, in the same proportion as the *demand*,—or, if the demand for any other commodity or commodities, should be increased in the same proportion as the demand for money,—then the value of such commodity or commodities, would, of course, remain at the usual *par*.

If the circulating quantity of gold and silver should be increased, in proportion to the increased demand in time of war, by locking it up for that purpose during the preceding peace; it would be attended with more loss than benefit; because, the public must in that case lose the interest of it, during the time that it was so locked up; which would be avoided, if, instead of being locked up, it should be applied to the redemption of a debt, that had been previously contracted for the public service.

But, if the quantity of circulating money should be increased in the same proportion as the *demand*, by the establishment of a *paper-auxiliary*, as a legal tender in all payments that should be required to be made into the public treasury or exchequer, the inconveniencies that would be occasioned by such extraordinary demand for money, would be as effectually prevented, as if the circulating quantity of gold and silver should be increased in proportion to such demand.

If this effect of a paper-auxiliary should be denied, let it be required to know, in what the value

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value of gold and silver consists?—or, why they should be deemed more precious than iron, or other metals?—In point of general utility, as a *mere metal*, iron must be acknowledged to have the preference beyond all power of comparison.—The preciousness of gold and silver, must therefore depend *principally* on the conveniency, with which (according to the general consent of mankind), it may be exchanged, as a common *measure* or *medium*, for other commodities.

The necessary commerce between man and man, in all stages of society, in which there shall be a division of employments, renders some common *measure* or *medium* of this kind indispensably necessary:—but can it possibly be implied from thence, that it ought NECESSARILY to be composed of any particular material or materials?

The continual DUTY OF SERVICE (if one may so term it) of the common *measure* or *medium*, renders it CONVENIENT indeed that it should be composed of some *durable* material; and the smallness of the quantity of *gold and silver*, compared with that of other durable materials which may be capable of the requisite divisions, renders *them*, perhaps, the most convenient for the purpose, even should every thing else be brought under a general consideration. But it can by no means be implied, that such general rule should be subject to no exceptions.

It is always necessary to distinguish how far a thing is governed by *physical causes*, and how far it may depend on conveniency.—So far as it shall be governed by physical causes, it can be subject to no exceptions:—but where it depends on *conveniency*, it may be subject to many exceptions, both with respect to times and places.—Common

decency renders it indispensably necessary, that man's body should be clothed with a garment; but it by no means follows, that such garment should be made of any particular kind of materials:—those materials that would be most convenient for that purpose in the winter of a frigid zone, would by no means be the most convenient in the summer of a torrid zone: but whether the garment be thick and warm, or whether it be thin and cool, the same *required effect* of cloathing man's body for common decency, will be equally produced.

In like manner, there is no physical reason, why the *common measure* or *representative medium* should be composed of gold and silver, or of any other particular material or materials:—And therefore, what has been said of *money* must hold equally true, whether it shall be composed of one kind of materials or of another.

When a man receives a sum of money in gold or silver, he considers it in no other light, than as an instrument which he may pay away again, for any article that he may have an occasion or an inclination for:—the *faith* and *credit* therefore, which every one entertains of being able at any time to obtain any other article for it, is the only thing that gives it its representative quality; and the continual demand that there is for it, is the only thing that supports the faith and credit so entertained:—And hence, so far as the same *faith* and *credit* shall extend, and be actually supported, with respect to obtaining any desired article in exchange for a *circulating paper*, so far the paper-circulation must necessarily produce the self-same effects, as the circulation of gold and silver, or as the circulation of any other material or materials of

of which the common measure or medium may be composed.

It is evident from these observations, that public stocks of transferable annuities are different from paper-money both in their nature and effects.—The value of the former proceeds from the periodical *fruit* or *interest* which they yield to their proprietor, whereby they become an article to be *bought* and *sold*:—the value of the latter proceeds from the *necessities* or *demands* for a common measure or representative medium wherewith to *buy* and *sell*:—The former contributes to remedy the inconveniencies that would otherwise be attendant on too great an increase in the quantity of circulating money:—the latter contributes to remedy the inconveniencies that would be attendant on such a *demand* for money, as would otherwise be too great, in proportion to the *quantity* previously circulating, and the force or velocity with which it might circulate for the supply of such demand:—Each contributes to the support of the other:—Each operates as a preventative of the evils, which too great a quantity of either might by itself produce: and each, in its turn, contributes to the preservation of a *par* or *equality* in the value of money, considered in its representative capacity, as a commercial medium.

It is also evident from these observations, that whatever evils may have been experienced, either from the establishment of public stocks of transferable annuities, or from the establishment of a paper-medium of circulation, those evils must have arisen altogether from the want of observing and preserving a proper proportion, between the *quantity* established, and the *demand* for such establishment.

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The unparalleled evils that have been produced, by an ill-constructed (and worse conducted) paper-circulation, in this unhappy and bewildered country*, may (not improbably) have created a deep-rooted prejudice against it, even in the most candid minds: if, however, the nature and principles of circulation, and the effects that are inseparable therefrom, should be thoroughly and impartially investigated and developed, it would be found that those evils proceeded, in infinitely a greater degree, from the disproportionate and unsystematic arrangement in the formation of their fabric of finance, than from any other cause whatever.

But not to dwell on a subject that has by mismanagement been rendered disgusting,—let us wave it, and proceed to the object in point; viz, the nature and principles of the fluctuation in the value of annuity stocks, and the means of preserving them at a *par*, as near as the nature of things will from time to time admit, without regard to the establishment of a public *paper-circulation*.

It has already been proved, that a public debt, proportionate to the ability of the state, must be a matter of very great convenience and advantage, in a commercial and industrious nation.—It would indeed appear at first sight, to be a very difficult task, to determine the precise *maximum*, or *point*, to which it might with commercial convenience and advantage be extended, and beyond which, it might be detrimental to extend it:—If, however, it could be admitted, that all the members of the state should be actuated by a spirit of industry,

* The revolted colonies in North America,

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dustry, the difficulty of ascertaining this *maximum*, would be much less than might at first be thought.

In every commercial state, there must from the nature of things, be numbers of commercial persons, who have from time to time more money on hand, than their immediate demands require:—Should the quantity be very large, an efflux might reasonably be expected: but it would be necessary that they should always have an *overplus* or *excedent quantity* ready for any commercial purpose that might offer on any sudden or unexpected occasion:—Should they keep it locked up in their coffers for this purpose, it must, during such time, remain idle and unproductive; nor could they with propriety lend it on interest to individuals, because, in such case, it would be necessary to give a stipulated term of notice for the re-payment; which might be attended with the loss of much more than the interest might amount to. But (as has been observed before) an establishment of public stocks of transferable annuities, will furnish, as it were, a continual market, for the employment and circulation of this excedent quantity of money; whereby it will produce an interest to its proprietor, and will at the same time be always forth-coming by a re-transfer, on the most sudden occasion.—Hence the quantity of public debt that would be most convenient and beneficial to a state, in a commercial view, would be so much as should be just sufficient for the employment and circulation of this *excedent* quantity of money.

Now, when the public debt is just sufficient for the employment and circulation of this excedent quantity of money, it must necessarily follow, that this

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this excedent quantity of money will be just sufficient to keep the necessary circulation of the stocks in *equilibrio*:—that is, this excedent quantity of money will then be just sufficient to create such a *demand* for the stocks as will keep their price at the *par*: and the annuity therefrom produced will shew the natural rate of interest for money.

Hence then, the *maximum* of public debt, for the purpose of commercial convenience and benefit, (admitting all the members of the state to be industriously disposed) will be the *point* at which the prices of the stocks will be at *par*, without the assistance or application of any sinking fund for their redemption.

It must however be acknowledged, that there is no nation wherein all the members are disposed to industry: and, as public stocks furnish a certain and secure income, free from toil and care, some may be induced to place their property in the stocks, and thereby live an easy and indolent life, who, for want of such an opportunity, might *perhaps* have betaken themselves to some industrious occupation.—On this account it would be impossible to determine the precise *point*, to which a public debt might be extended with real advantage and utility; and beyond which, all things considered, it might be detrimental: but it may nevertheless be observed, that as ALL who lay out their money in the public stocks, contribute to increase the *demand*, and consequently to raise the price; and, as raising the prices of the stocks, decreases the rate of interest, and thereby causes a larger capital to be obtainable for a smaller revenue; a public debt must consequently make even the indolent and lazy become beneficial to a state, although not in

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in so great a degree as if they were industrious.

If the debt be not sufficiently large, the *demand* for the stocks, will, of course, be more than proportionate to their *quantity*; and their price will consequently rise higher than *par*:—This will consequently produce a decrease in the rate of interest, and the interest on the debt being accordingly reduced, the quantity of money circulating in that channel will thereby be decreased; and, seeing (page 83) that the quantity of money circulating in that channel, is the measure of the *demand* for the stocks, and of the *value* of them,—that demand and value will consequently be decreased also; whereby the *par* or *equilibrium* will be restored.

Again, if the public debt be more than sufficiently large for the employment and circulation of the aforesaid excedent quantity of money, such excedent money will of course be less than sufficient to create a *demand* for the stocks, proportionate to their quantity; and an additional quantity of money will of course be required to be thrown into that channel of circulation, in order to preserve the *equilibrium*; or, in other words, to keep the prices of the stocks at *par*.

In order to throw an additional quantity of money into this channel of circulation, it will be necessary to increase the taxes, and therewith to establish a *sinking fund* proportionate to the occasion: and the application of such *sinking fund*, will (it may be observed) raise the value of the stocks, and lessen the rate of interest in a double capacity; viz. 1st, there will not only be *by so much* a larger quantity of money thrown periodically into the market of the stocks;—but, 2^{dly}, the *quantity* of
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stock in the market, will also be thereby periodical-ly decreased*.

The additional taxes will, it must be owned, be a weight on the public; but the ill effects or *burthens* thereof, will be in a considerable measure counteracted, and remedied, by the effects that will naturally flow from the consequent decrease in the rate of interest.

It is perfectly evident at the first sight, that increasing the public taxes, (admitting them always to be judiciously laid and applied) must accelerate the circulation of money; because, the money is thereby forced through a greater number of hands, than it otherwise would have passed through, in the same space of time.—This observation perfectly agrees with (and forms a coincidence of) the PRINCIPLES by which the natural rate of interest is governed, as mentioned in page 78†, and the abovementioned EFFECTS that are produced on the rate of interest by a sinking fund:—neither is this observation an exception from the general rule mentioned in page 78, that the briskness of the circulation will go hand in hand with the commercial prosperity of the state, and the general industry of its members; but is rather a confirmation of that general rule; because, the additional taxes will (for a time at least) render an additional degree of industry necessary, on the part of the subject, to enable him to pay them; or (which is all

* The effects produced by the sinking fund will depend much more on the manner in which it shall be applied, than on the periodical *quantity* thereof. The particulars respecting the effects of a sinking fund, will be the subject of a second essay.

† Viz. the briskness of the circulation.

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all the same) to enable him to pay the increase in the prices thereby occasioned on articles of consumption.—This inconveniency, or burthen, will however become (as said before) much less than may at first sight be imagined.

It may not be amiss to digress a moment here, to prove, that an increase in the public taxes, (if judiciously laid and applied) is by no means so grievous a thing as may generally be supposed;—and that their actual burthen, is, in reality, infinitely less than may at first sight be thought.—It is not indeed impossible, but an increase of the taxes may (in some countries at least) produce a real advantage to the subjects in general, instead of being burthensome.

When people (of whatever occupations) are obliged to pay an additional tax, they of course set an additional price on their commodities to enable themselves to pay it:—The price of *one* or of a *few* commodities being thus increased, naturally causes an increase (more or less) in the prices of other commodities also; in order to enable those who provide the latter, to pay the increased prices of the former.—And hence, the ill effects arising from an increase of taxes, consists in the consequent increase of the prices of commodities.—This is universally admitted as an undoubted *axiom*.

This *axiom*, it may be observed, affords a support to the beforementioned observation,—That the taxes accelerate the circulation, and cause the demands for money to become more easily supplied:—For, if the demand for MONEY did not become more easily supplied, it is certainly impossible that its comparative value could become decreased,

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decreased, or, (in other words) that the general prices of commodities could become increased.

Again,—It is also universally admitted as an undoubted *axiom*, that when the rate of interest for money is low, people of all occupations will be content with a smaller rate of gain or profit on their commerce, than when the rate of interest is high:—in short, that a high or low rate of (profit or) interest on *money*, and a high or low rate of profit on *merchandise*, go hand in hand, and are inseparable from each other.

The foundation on which this *axiom* stands, is also very clear:—when the profits on commerce are very high, people will naturally be glad to give a high rate of interest for money, wherewith to carry their commerce on to a greater extent: and the same causes that will make men content with a low rate of interest (or profit) on money, will naturally make them content also, with a low rate of profit on any commodity in which they may lay out such money:—Each flows from the self-same principle; viz. from the VELOCITY or BRISKNESS OF THE CIRCULATION, by which the demands for money become more easily supplied, whereby the rate of interest becomes lower:—And by which also, commercial returns are quicker and more easily made, whereby the necessary profits become decreased.

Hence, as the additional taxes create on the one hand, an increase in the prices of commodities; so also, on the other hand, the additional vigour of the circulation, produced by the application of the taxes, forms a check against that increase:—And hence, it is evident, that the actual *burthen* of these additional taxes, will be no more than the *quantity* by which the *increase* in the prices of commodities,

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modities, occasioned by the increase of the taxes considered *simply*, shall exceed the *decrease* of the necessary profits on commodities, which goes hand in hand with the decrease of the rate of interest, occasioned by the acceleration of the circulation, which the additional taxes (in their application) produce.

If the *latter* of these effects shall become equal to the *former*, it is perfectly evident that the additional taxes cannot then be attended with any actual burthen; and if it shall become greater, which is certainly not impossible, the taxes must consequently produce an advantage to the subjects at large.—This consequence, I say, is not impossible:—It is, on the contrary, evidently probable, and likely to be produced, in countries where the rate of interest for money is previously very high.

To make this more perfectly plain,—let it be supposed (by way of example), that the necessary profits on commodities, (in which a premium of insurance against bad debts is always necessarily included) should be *three times* the rate of interest for money:—let it also be supposed that the rate of interest should be *six per cent.*—and, let us suppose also, that a new tax should be laid, which, in its general effects, should *at first* produce an appreciation of *5 per cent.* in the prices of commodities, taking (by way of average) the whole at large.—Now, if the application of the revenue produced from this tax, should cause the rate of interest to become *5½ per cent.* it is evident that the actual *burthen* of the tax would then become only *3½ per cent.*—if it should cause the rate of interest to become *5 per cent.* the burthen of the tax would then be only *2 per cent.*—if it should

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cause the rate of interest to become $4\frac{1}{2}$ per cent. the burthen of the tax would then be only *an half per cent.*—if it should cause the rate of interest to become 4 per cent. the tax (instead of being any actual burthen) would in reality produce an actual advantage of *one per cent.* to the members of the state at large:—if it should cause the rate of interest to become 3 per cent. the tax would then become an actual advantage of 4 per cent. to the members of the state at large, instead of being burthensome.—And these happy effects must evidently be produced, in a greater or lesser degree, wherever a public debt shall be established and conducted on proper principles; whereby a proper proportion of money shall periodically flow into the hands of the lenders.

From these observations it is clear, that those who consider the ill effects arising from public taxes; without considering also, the advantages that flow from the additional vigour given to the circulation, by the application of them; must be for ever mistaken in their conclusions: and their *predictions* must ever be contradicted by *facts*, if the experiment be tried: which has *indeed* been very much the case, with most of the predictions that have been made, concerning the effects of public debts and taxes.

The foregoing observations of the unalterable connection between *commerce* and the *interest of money*, very naturally introduce reflections, respecting the effects of prohibitions, and monopolies; and such restrictions, drawbacks, and bounties, as may tend thereto, under the denomination of regulations of commerce: but these reflections would carry us too far from our intended field.—

What has been already investigated, of the natural

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ral and immutable laws and principles implanted by the Almighty hand, by which *causes* and *effects* are unalterably and inseparably connected, may probably lead the studious reader to doubt, even of the *possibility* of producing any real good, from *arbitrary* regulations; in which *term*, I would be understood to comprehend all regulations of every fort and kind that shall have the production *only* of a *first effect* in view: and I should not be surprized, I must confess, if on a mature contemplation, the studious reader should find it mathematically demonstrable, that every such arbitrary regulation must be productive of inevitable loss and injury to the state adopting it.

But let us return from these digressional considerations, to the point in hand; viz. the nature and principles of the fluctuation in the value of annuity stocks.

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SECT.

S E C T. VII.

A more particular investigation of the Principles which govern the value of Annuity Stocks; in which, those principles are reduced to a computative system:—Containing the particular depreciations that must take place in the value of the Stocks during a war, and the values to which they will afterwards recover, according to the Ratio or Proportion that shall be kept between the Loans and the Revenue thereto appropriated: With some remarks respecting other causes by which the value of the Stocks will be affected.

WHAT has been said in the former part of the preceding section, respecting the principles by which the rate of interest is governed; and the effects that are produced by a *sinking fund* in raising the value of the stocks, and lessening the rate of interest; will naturally create an opinion, that as the continual application of the *sinking fund* to the redemption of the debt, is a continual throwing of money on the hands of the lenders, such application of it, as well in time of war as in time of peace, must naturally keep down the rate of interest, and thereby keep up the prices of the stocks, in time of war; whereby the new loans will be obtainable on lower terms:—And, on this account, it may at first sight be supposed, that this application of the *sinking fund* would produce a better effect, than if the new loans were made so much the less, by applying the *sinking fund* to the service of the war. — But this opinion (at least the

the latter part of it) will on examination be found subject to an exception; though not indeed a great nor an universal one.

The former part of the opinion; viz. *that the continual application of a sinking fund to the redemption of the debt, as well in time of war as in time of peace, would keep down the rate of interest, and thereby keep up the prices of the stocks in time of war*, is certainly very just from the principles already deduced: but there is also another method by which the same effects may be produced; and in some cases with greater advantage; as will by-and-by be shewn.—In the mean time, in order to examine the latter part of the opinion, it must be remembered, that whatever may be the current price of the stocks, the terms of the new loan must be such as shall afford an *additional profit* or *premium* to the subscribers.—This (as has been mentioned already) flows from the universal principle before laid down; viz. *that when there is an extraordinary demand for any commodity, whether money or any thing else, extraordinary terms must be given to obtain it.*

Now, if we suppose (for example sake) that *ten millions* should be wanted for the service of the war, and that there should be one million in the sinking fund,—if this *one million* be applied to the service of the war, only *nine millions* will be borrowed; and the *premium* will be given on those *nine millions* only:—but if the *one million* in the sinking fund be applied to the redemption of the debt, it can only redeem it according to the current prices of the stocks;* and as it would be necessary in this case

* But if the prices of the stocks be the nett value of the *premium* above par, then this observation entirely ceases;
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case to borrow the whole *ten millions*, the debt on the whole would be none the less, and the *premium* on the *tenth million* would so far be lost*.

In this case, however, the sinking fund would be increased by the interest of the *million* discharged, so that a larger sum by *so much*, would thereafter belong to that channel of circulation; which would of course contribute to the *appreciation* of the value of the stocks, whereby the above-mentioned loss would be in effect restored, or saved, out of the next *premium*.—But this increase in the *sinking fund*, (and consequently, the effects therefrom resulting) could be equally produced, by borrowing only the *nine millions*, and raising the same *revenue* as if the whole *ten millions* were to have been borrowed: and by this procedure the *premium* on the *tenth million* would be saved at the first.

Hence, in case the stocks should be below *par* previous to the loan, it would be better to apply the sinking fund to the public service in time of war, in order to check or lessen the growth of the *new debt*, than to apply it to the redemption of the *old debt*, whereby the new one would be so much more increased*.

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ceases; and this application of the sinking fund (admitting it to be equal to the *premium* required for the new loans) will prevent the stocks from depreciation.—The reader will perhaps be convinced that this perpetual application of the sinking fund to the redemption of the debt, as well in time of war as in time of peace, will prevent the depreciation of the stocks; from this consideration, viz. a sinking fund of one million per annum (or rather £. 500,000 per half year) continually applied during 100 years, admitting the rate of interest to be $3\frac{1}{2}$ per

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As (on the one hand) an extraordinary demand for money, as in time of war, renders it necessary to give an extraordinary profit or *premium* for a new loan; and by so increasing the rate of interest, causes a *depreciation* in the value of the stocks;—and, as (on the other hand) throwing an additional quantity of money into that channel of circulation, produces an *appreciation* in the value of the stocks;—it must necessarily follow, that the *depreciation* in their value in time of *war*, must depend greatly on the manner of giving those *premiums*, whereby a greater or lesser proportion of *money* shall be thrown into that channel of circulation.

The additional interest or profit (which I denominate a *premium*) required for money in time of war, is (per postulatam 5, page 15) a natural and unavoidable consequence of the extraordinary *demand* for money: but although this consequence is a *natural* and therefore an *unavoidable* one, yet the *premium* so required may be given differently.—It may (for instance) be given in an additional interest to continue any term of time, whether longer or shorter; or, it may be given in an additional nominal capital bearing the ordinary rate of interest.

If

$3\frac{1}{2}$ per cent. per annum, will redeem £. 889,347,360; which is equal to the whole debt that would be incurred by supporting a war of eight years out of every twenty years, during such century, at an annual expence (on the average) of £. 22,233,684: and as this application of the sinking fund, prevents the debt from running *a-head*; it must of course prevent the prices of the stocks from falling *a-stern*.—But lest this argument should be deemed too general to be conclusive, I shall pursue the investigation, to see how far it *will* or *will not* stand supported.

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If the *premium* be given in an additional interest, to continue (*indefinitely* as to time) during the continuance of the extraordinary demand for money, the actual amount thereof will be uncertain, because it will depend on the uncertain continuance of the extraordinary demand for money.—But it must also be observed, that the uncertainty in the actual *additional profit* will not be avoided by giving the *premium* in an additional interest to continue a *definite* term of time; or by giving it in an additional nominal capital: because, the *principal* thereof not being demandable, the actual *additional profit* must depend on the *market value* thereof; which (like the *additional profit* in the former case) will depend on the uncertain continuance of the extraordinary demand for money.

The only difference there can be, with respect to the uncertainty in the actual *additional profit*, will evidently be this,—in the one case, it will depend on the time that the borrower may, or may not, have occasion for the money borrowed: and in the other case, it will depend on the time that the lender may, or may not, have occasion for the money lent.—And, it must certainly be best, both for the borrower and the lender, that the *ill effects* that may arise to either of them, in consequence of this uncertainty, be as *little* as is in the nature of things possible.

Now, in order to make the value of the *premium* subject to as little uncertainty as is possible, it must evidently be given in an additional interest to continue as short a time as is possible: because, the shorter the time of its continuance shall be, the less will be the probability of the intervention of such new circumstances, as may produce an alteration in its value.

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It must also be observed, that the shorter the time of the continuance of this additional interest shall be, the greater must be the periodical quantity thereof for the time being: and consequently, the greater will be the periodical influx of money into the hands of the lenders; whereby, the demands of the borrowers will be the more easily supplied; and from thence (per postulatam 4) the rate of interest will be the lower; and the value of the stocks will be (of course) the higher.

On the other hand, the longer the time of the continuance of the additional interest shall be, the less will be its periodical quantity for the time being: and consequently, the less will be the periodical influx of money into the hands of the lenders; whereby, the demands of the borrowers will be with greater difficulty supplied, and (per postulatam 4) the rate of interest will consequently be the higher; and the value of the stocks will consequently be the lower.

In whatever manner the *premium* be given, it will of course be greater or lesser, according as the extraordinary demand for money shall be greater or lesser, and according as that demand may be supplied with a lesser or greater degree of ease: but it must be observed, that the whole of the *apparent premium* cannot be an entire *nett profit*, in whatever manner it may be given.

Those who subscribe to a new loan must necessarily be such whose property may be readily turned into money; and as nothing can in great quantities be turned into money so readily as the stocks, it will reasonably follow, that a considerable part of the money for the new loans, will be furnished from the sale of the old ones:—the additional quantity offered for sale, must necessarily
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(per postulatum 4) depreciate the price:—And hence, the nett profit will be only the *quantity* by which the *apparent premium* shall exceed the *actual depreciation*.

— If the *premium* or additional profit shall consist purely of an extraordinary rate of interest, to continue *indefinitely* during the time of the continuance of the extraordinary demand for money, the *apparent premium* will be the then value of such additional interest during the *probable* time of its continuance.—If the *premium* shall consist either of an additional quantity of *nominal stock*, or an additional interest or annuity to continue for a certain time, and then to cease,—the *apparent premium* will be the then value of such additional quantity of *nominal stock*, or the then value of such additional interest or annuity.

Now, seeing that the *premium* will always be governed by the *demand* for money, and by the ease or difficulty with which such demand may be supplied;—and, seeing also, (per postulatum 4) that the comparative value of money is likewise governed by the demand that there shall be for it, and the ease or difficulty with which such demand may be supplied;—it must necessarily follow, that this *premium* will be the *measure* of the *appreciation* in the comparative value of money, occasioned by such extraordinary demand:—But the *appreciation* in the value of money, and the *depreciation* in the value of the stocks is one and the self-same thing:—Wherefore, this *premium* must also be the *measure* of the *depreciation* in the value of the stocks, occasioned by such extraordinary demand for money: and from thence the *minimum* of their value will be determined:—and the *quantity* by which

their *actual prices* shall exceed the *minimum*, will be a profit to the subscribers.

For example,—Let the common or ordinary rate of interest immediately at the commencement of a war, be supposed to be $3\frac{1}{2}$ per cent. per annum*; in which case, the common or ordinary value of $3\frac{1}{2}$ per cent. *stocks* will (of course) be £.100*; and the common or ordinary value of 3 per cent. *stocks* will be £.85 $\frac{5}{7}$, equal to £.85 : 14 : 3 $\frac{1}{2}$ *.—And let it be supposed, that in consequence of the expences of the war, the extraordinary demand for money should be such as to require a *premium* of 5 per cent. to be given for a new loan.—In this case, the *maximum* of the *ratio* or *proportion* in which the comparative value of money will be increased or *appreciated* by this extraordinary demand, will be, as £.100 to 105: and the *maximum* of the *ratio* or *proportion* in which the value of the stocks will be thereby *depreciated*, must (of course) be as £.105 to £.100: so that the *minimum* value of $3\frac{1}{2}$ per cent. *stocks*, occasioned by this extraordinary demand for money, will be £.95 : 4 : 9 $\frac{1}{4}$; and that of 3 per cent. *stocks* will be £.81 : 12 : 8.—But as the whole of the loan will not be wanted at once, the stocks will not immediately fall to this *minimum* point; and, how-muchsoever their actual prices, during the time limited for the advancement of the loan, shall exceed

* It is necessary to distinguish between the rate of interest immediately at the commencement of a war, and the rate of interest in the time of profound peace; because, so far as an extraordinary demand for money (or for any other commodity) shall be clearly evident, so far it will be the interest of the proprietor to keep it up; and, so far its comparative value must consequently be increased.

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exceed this *minimum* point; so much will be an entire *nett profit* to the subscribers.—And hence, it may be observed, that the less the *actual depreciation* in the prices of the stocks shall be, the better it will be for the subscribers, as well as for the public at large*.

Now, seeing that the stocks do not fall immediately to the *minimum*;—and, seeing also, that an additional quantity of money being thrown into this channel of circulation, produces an *appreciation* in the value of the stocks;—the aforesaid *ratio* of the *depreciation* must consequently be thereby decreased, and the *depreciation* must accordingly be checked, or counteracted, in proportion to such *appreciating* force.

If, for instance, the said *ratio* of the *depreciation*, should, during the time of the advancement of the loan, be reduced from the aforesaid *ratio* or *proportion* of 105 to 100, to the *ratio* or *proportion* of 104 to 100, 103 to 100, 102 to 100, 101 to 100, &c. the *actual depreciation* (so far as it shall flow from the extraordinary demand for money in itself considered) must consequently be checked at, or recovered to, those respective points.—This periodical reduction in the *ratio* of the *depreciation* of the value of the stocks, during the time limited for the advancement of the loan, will depend on the manner of giving the *premium*, by which the said *ratio* is governed; whereby a greater or lesser proportion of money shall (as said before) be thrown into this channel of circulation.

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* See the additional observation at the end of the 5th proposition, page 20.

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* To make this plain,—Let it be supposed as before, that the ordinary rate of interest immediately at the commencement of a war should be $3\frac{1}{2}$ per cent. per annum, payable half-yearly; in which case (as said before) the ordinary value of $3\frac{1}{2}$ per cent. stocks will be £.100, and that of 3 per cents. will be £.85 $\frac{5}{7}$, equal to £.85 : 14 : $3\frac{1}{2}$.—And let it be supposed that in consequence of the expences of the war, the extraordinary demand for money should be such as to require a *premium* of £.5 per cent. for a new loan; in which case, the *maximum* of the proportion in which the comparative value of money will be increased by such extraordinary demand, will (as said before) be as £.100 to £.105; and the *maximum* of the proportion in which the value of the stocks will thereby be depreciated, will of course be as £.105 to £.100; whereby the *minimum value* of $3\frac{1}{2}$ per cent. stocks during the time limited for the advancement of the loan will (as said before) be £.95 : 4 : $9\frac{1}{4}$, and that of 3 per cents. £.81 : 12 : 8.

Now this *premium* of £.5 on every £.100 so required to be advanced, may be given in either one or other of the following annuities; each of which will

SYMBOLIC DEMONSTRATIONS continued from p. 73.

50th.—* If the common or ordinary rate of increase by interest at the commencement of a war be r ; and, in consequence of the extraordinary demand for money, any definite *premium* or additional profit p , be required for any new loan M of money to be advanced;—Then, it is evident, that the *maximum* of the increase in the comparative value of money occasioned by such extraordinary demand, will be as M to $M+p$.

51st.

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will be worth the said £.5 premium so required; viz.

1st.—£.5 annuity stock bearing $3\frac{1}{2}$ per cent. or £.5½ annuity stock bearing 3 per cent. per annum; each of which produces an annuity or interest of £.0 : 3 : 6 per year, or rather £.0 : 1 : 9 per half year until redeemed.

2dly.—A determinate annuity or additional interest of £.0 : 3 : 7 $\frac{1}{4}$ per annum, or rather £.0 : 1 : 9 $\frac{1}{4}$ per half year, to continue 99 years and then to cease.

3dly.—A determinate annuity or additional interest of £.0 : 5 : 5 per annum, or rather £.0 : 2 : 8 $\frac{1}{2}$ per half year, to continue 30 years and then to cease.

4thly.—A determinate annuity or additional interest of £.0 : 7 : 0 per annum, or rather £.0 : 3 : 6 per half year, to continue 20 years and then to cease.

5thly.—A determinate annuity or additional interest of £.0 : 16 : 2 $\frac{1}{2}$ per annum, or rather £.0 : 8 : 1 $\frac{3}{8}$ per half year, to continue 7 years and then to cease.

6thly.—A determinate annuity or additional interest of £.1 : 15 : 5 per annum, or rather £.0 : 17 : 8 $\frac{1}{2}$

51st.—And the *maximum* of the proportion in which the value of annuity stocks will be depreciated by such extraordinary demand for money, will (of course) be as $M+p$ to M .

52d.—Wherefore, the *minimum value* of any annuity stock which was ordinarily worth M in money, will now become $\frac{M^2}{M+p}$.

53d.

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£.0 : 17 : 8 $\frac{1}{2}$ per half year, to continue *three years* and then to cease.

7thly.—A determinate annuity or additional interest of £.2 : 12 : 2 $\frac{1}{2}$ per annum, or rather £.1 : 6 : 1 $\frac{1}{4}$ per half year, to continue *two years* and then to cease.

8thly.—A determinate annuity or additional interest of £.5 : 2 : 7 $\frac{1}{2}$ per annum, or rather £.2 : 11 : 3 $\frac{3}{4}$ per half year, to continue *one year* and then to cease.

It must be observed here, that the half-yearly *influx of money* into this channel of circulation, in proportion to every £.100 so actually raised, or, in proportion to every £.105 so constituted into a new *property* to be circulated in this channel, will be the half-yearly interest of the £.100 so raised, viz. £.1 : 15 : 0, together also with the farther half-yearly influx flowing from the £.5 premium; which

53d.—Now, if this premium p , so required as a natural consequence of the extraordinary demand for money, shall consist of an additional quantity of annuity stock, bearing the ordinary rate r , whereby *only* the ordinary interest of the loan M , and of the premium p , viz. $M+p \times r - 1$, shall be thrown into this channel of circulation; it is perfectly evident, that there can be nothing to diminish the depreciating denominator $M+p$ (in N° 52); whereby to prevent the depreciation from proceeding to the said *minimum point* $\frac{M^2}{M+p}$, or whereby the

value of the stocks may be recovered therefrom, during the time of the advancement of the said loan M ; unless produced from some cause totally independent of the present consideration.

54th.—And consequently, a second loan requiring the same premium p , must carry the *minimum value* of the stocks

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which in each of the foregoing cases, respectively, will be as follows; viz.

In the 1st case, this half-yearly influx of money will be	-	-	-	-	£.1	16	9
2d case	-	-	-	-	1	16	9 $\frac{7}{10}$
3d case	-	-	-	-	1	17	8 $\frac{1}{2}$
4th case	-	-	-	-	1	18	6
5th case	-	-	-	-	2	3	1 $\frac{3}{4}$
6th case	-	-	-	-	2	12	8 $\frac{1}{2}$
7th case	-	-	-	-	3	1	1 $\frac{1}{4}$
8th case	-	-	-	-	4	6	3 $\frac{3}{4}$

It must also be observed, that £.1 : 16 : 9 is the half-yearly influx of money now necessarily required in this channel of circulation, in proportion to every £.100 so actually raised, in order to pay the interest thereof; viz. £.1 : 15 : 0 for the half-yearly interest of the £.100 so advanced, and £.0 : 1 : 9 for the half-yearly interest of the *premium* so required for the advancement of it, in consequence (as said before) of the extraordinary demand for money; and the remainder of each of the

stocks still lower in the same proportion of $M+p$ to M , whereby the said *minimum point* will then become $\frac{M^3}{M+p}$.

55th.—In like manner, a third loan must bring the said *minimum point* to $\frac{M^4}{M+p}$.

56th.—A fourth loan must in like manner bring it to $\frac{M^5}{M+p}$.

And so on, in the proportion always of $M+p$ to M .
57th.

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the aforesaid half-yearly sums is a sinking fund by which the said *premium* is discharged:—And, seeing that the *premium* thus required, is the measure of the *appreciation* in the value of money, occasioned by the extraordinary demand; or, (which is all the same) the measure of the *depreciation* in the value of the stocks, occasioned by such extraordinary demand for money;—any DISCHARGE of the said *premium* so composing the *ratio* of the *depreciation* in the value of the stocks during the time limited for the advancement of the loan, must consequently be a DISCHARGE of the said *ratio* so composed:

57th.—But, if the said *premium* p , shall consist of an additional interest or annuity a , to continue a certain time T , and then to cease; so as that (see N° 36, page 57) $\frac{r^T - 1}{r - 1} \times a = r^T \times p$

58th.—We shall have $a = \frac{r^T \times p}{\frac{r^T - 1}{r - 1}}$

59th.—And $p = \frac{r^T - 1}{r - 1} \times \frac{a}{r^T}$

60th.—Wherefore, the *minimum value* of the stocks (N° 52, page 110, viz. $\frac{M^2}{M+p}$) will be equal to

$$\frac{M^2}{M + \frac{r^T - 1}{r - 1} \times \frac{a}{r^T}}$$

61st.—Now, seeing (N° 39, page 58) that the quantity by which the annuity a exceeds the *interest* of the said *premium* p , operates as a sinking fund, and periodically

composed: which, in each of the foregoing cases respectively, will be as follows; viz.

	£.	s.	d.		£.	s.	d.
1st Case	0	0	0	per half year, or	0	0	0
2d Case	0	0	0	per half year, or	0	0	0
3d Case	0	0	11	per half year, or	0	1	11
4th Case	0	1	9	per half year, or	0	3	6
5th Case	0	6	4	per half year, or	0	12	10
6th Case	0	15	11	per half year, or	1	12	2
7th Case	1	4	4	per half year, or	2	9	1
8th Case	2	9	6	per half year, or	5	0	0

Wherefore, if the loans be made annually, the aforefaid ratio or proportion of £.105 to £.100, will,

cally diminisheth the said quantity $p = \frac{r^T - 1}{r - 1} \times a$;

whereby, at the expiration of any part t of the time T ,

the said quantity $\frac{r^T - 1}{r - 1} \times a$ becomes reduced to

$\frac{r^{T-t} - 1}{r - 1} \times a$; it must necessarily follow, that if any

time t be given for the advancement of the said loan M , the beforementioned depreciating denominator (N^o 60,

viz.) $M + \frac{r^T - 1}{r - 1} \times a$ will then become $M +$

$\frac{r^{T-t} - 1}{r - 1} \times a$; and the value of the stocks will conse-

quently become recovered from the said point (N^o 60)

$\frac{M^2}{M + \frac{r^T - 1}{r - 1} \times a}$ to the point $\frac{M^2}{M + \frac{r^{T-t} - 1}{r - 1} \times a}$.

62d.

will, during the year so limited for the advancement of the loan, become reduced to the following ratio's or proportions, in each of the foregoing cases respectively; viz.

1st Case	-	As	£.105	0	0	to	£.100
2d Case	-	As	104	19	10	to	100
3d Case	-	As	104	18	1	to	100
4th Case	-	As	104	16	5	to	100
5th Case	-	As	104	7	2	to	100
6th Case	-	As	103	7	9	to	100
7th Case	-	As	102	10	10	to	100
8th Case	-	As	100	0	0	to	100

And consequently, the value of $3\frac{1}{2}$ per cent. stocks, and of 3 per cent. stocks, during the year thus limited for the advancement of the loan, will, in each of the foregoing cases respectively, be recovered from the aforelaid respective minimum points of £.95 : 4 : 9 $\frac{1}{4}$ and £.81 : 12 : 8, to the following

62d.—Wherefore, if the same extraordinary demand for money should continue, or rather be repeated, and the same premium p should be required for a second loan; the minimum value of any annuity stock which was ordinarily worth M in money, will

then be $\frac{M^3}{M + \frac{r^{T-t} - 1}{r - 1} \times a \times M + p}$

63d.—And, the point at which it will become counteracted, or recovered, during the time of the advancement of the said second loan, will be $\frac{M^3}{M + \frac{r^{T-t} - 1}{r - 1} \times a}$

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64th.

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lowing points respectively; unless prevented therefrom by some other cause, separate from this extraordinary demand for money in itself considered; viz.

	£.	s.	d.		£.	s.	d.
1st Cafe $3\frac{1}{2}$ per Ct. stocks	95	4	$9\frac{1}{4}$	3 per Cts.	81	12	8
2d Cafe - - - - -	95	4	$10\frac{1}{2}$	- - - - -	81	12	9
3d Cafe - - - - -	95	6	6	- - - - -	81	14	$1\frac{3}{4}$
4th Cafe - - - - -	95	7	$11\frac{1}{2}$	- - - - -	81	15	$4\frac{3}{4}$
5th Cafe - - - - -	95	16	$5\frac{3}{4}$	- - - - -	82	2	$8\frac{1}{2}$
6th Cafe - - - - -	96	14	$4\frac{3}{4}$	- - - - -	82	18	$0\frac{1}{2}$
7th Cafe - - - - -	97	10	$4\frac{3}{4}$	- - - - -	83	11	$9\frac{1}{4}$
8th Cafe - - - - -	100	0	0	- - - - -	85	14	$3\frac{1}{2}$

If the same extraordinary demand for money should continue, or rather, be repeated; and the same *premium* should be required for a second, third, or fourth loan, &c.—the *minimum* values of the stocks, as also the points to which they will be recovered from such *minimums*, during the time of the advancement of such second, third, or fourth

64th.—In like manner, a third loan requiring the same *premium* p , will bring the *minimum value* of the stocks to - - - - -

$$M + \frac{r^{T-t} - 1}{r - 1} \times a \times M + p$$

65th.—And the point at which they will become counteracted, or recovered, during the time of the advancement of the said third loan, will be -

$$M + \frac{r^{T-t} - 1}{r - 1} \times a$$

And so on.

66th.

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fourth loans, will of course be governed by the same respective *ratio's* or proportions, as during the time of the advancement of the first loan.

Wherefore, during the time of the advancement of the second loan, the minimum value of $3\frac{1}{2}$ per cent. stocks, and of 3 per cent. stocks, will, in each of the foregoing cafes, be *respectively* as follows; viz.

	£.	s.	d.		£.	s.	d.
1st Cafe $3\frac{1}{2}$ per Ct. stocks	90	14	$0\frac{3}{4}$	3 per Cts.	77	14	11
2d Cafe - - - - -	90	14	2	- - - - -	77	15	0
3d Cafe - - - - -	90	15	$8\frac{3}{4}$	- - - - -	77	16	4
4th Cafe - - - - -	90	17	$1\frac{1}{4}$	- - - - -	77	17	$6\frac{1}{4}$
5th Cafe - - - - -	91	5	$2\frac{1}{2}$	- - - - -	78	4	$5\frac{1}{2}$
6th Cafe - - - - -	92	2	$3\frac{1}{2}$	- - - - -	78	19	$1\frac{1}{4}$
7th Cafe - - - - -	92	17	$6\frac{1}{4}$	- - - - -	79	12	2
8th Cafe - - - - -	95	4	$9\frac{1}{4}$	- - - - -	81	12	8

And

66th.—Now, if the time t given for the advancement of the loan, and the time T of the continuance of the additional interest or annuity a , shall be equal to each other, $T=t$; then, it is evident, that the *exponent* $T-t=0$; and consequently, the several *powers* of which the said quantity $T-t$ is the *exponent*, must in such case be $=0$ also; and must therefore vanish.

67th.—Wherefore, the foregoing *minimum points*, during the time of the advancement of each respective loan, will in such case stand as follows; viz.

1st Loan	$\frac{M^2}{M+p}$
2d Loan	$\frac{M^3}{M \times M+p} = \frac{M^2}{M+p}$
3d Loan	$\frac{M^4}{M^2 \times M+p} = \frac{M^2}{M+p}$
And so on always	$= \frac{M^2}{M+p}$

I 3

68th.

[118]

And the points to which they will be recovered during the time of the advancement of the said second loan, will be *respectively* as follows; viz.

	£.	s.	d.	£.	s.	d.
1st Cafe 3½ per Ct. stocks	90	14	0¾	77	14	11
2d Cafe - - - - -	90	14	3	77	15	1
3d Cafe - - - - -	90	17	4½	77	17	9
4th Cafe - - - - -	91	0	1¾	78	0	1½
5th Cafe - - - - -	91	16	5¼	78	14	1
6th Cafe - - - - -	93	10	11½	80	3	8
7th Cafe - - - - -	95	2	0¼	81	10	3½
8th Cafe - - - - -	100	0	0	85	14	3½

In

68th.—And, the beforementioned points at which the said depreciation will be counteracted, or to which the value of the stocks will be recovered, during the time of the advancement of each respective loan, will, in such case, be as follows; viz.

1st Loan	-	-	-	-	$\frac{M^2}{M} = M$
2d Loan	-	-	-	-	$\frac{M^3}{M^2} = M$
3d Loan	-	-	-	-	$\frac{M^4}{M^3} = M$

And so on always - - - - - = M

69th.—And consequently, if the loans be made annually during a war, and the *premiums* naturally required on account of the extraordinary demand for money, be given in an additional *interest* or *annuity*, to continue *one year* and then to cease; the whole of the depreciation in the value of the stocks, occasioned by the extraordinary demand for money, will be counteracted or recovered during the year, by the additional strength or vigour communicated to that channel of circulation, by that part of the said additional *interest* or *annuity* which operates as a sinking fund.

6

70th.

[119]

In like manner, during the year limited for the advancement of a third loan, requiring the same *premium*, the *minimum* value of 3½ per cent. *stocks*, and of *three per cent. stocks*, in each of the foregoing cafes, will be *respectively* as follows; viz.

	£.	s.	d.	£.	s.	d.
1st Cafe 3½ per Ct. stocks	86	7	8	74	0	10¼
2d Cafe - - - - -	86	7	10½	74	1	0½
3d Cafe - - - - -	86	10	10	74	3	6¾
4th Cafe - - - - -	86	13	5¾	74	5	10
5th Cafe - - - - -	87	8	11¾	74	19	1½
6th Cafe - - - - -	89	1	10¼	76	7	3¾
7th Cafe - - - - -	90	11	5¼	77	12	8
8th Cafe - - - - -	95	4	9¼	81	12	8

And the points to which they will be counteracted, or recovered, during the time of the advancement of the third loan, will be *respectively* as follows; viz.

	£.	s.	d.	£.	s.	d.
1st Cafe 3½ per Ct. stocks	86	7	8	74	0	10¼
2d Cafe - - - - -	86	7	11½	74	1	1¼
3d Cafe - - - - -	86	12	5	74	4	11
4th Cafe - - - - -	86	16	4½	74	8	4
5th Cafe - - - - -	87	19	9	75	8	4½
6th Cafe - - - - -	90	9	7¼	77	11	1
7th Cafe - - - - -	92	14	10	79	9	10¼
8th Cafe - - - - -	100	0	0	85	14	3½

And so on for a 4th, 5th, or 6th loan, &c. requiring the same premium.

* And, seeing that this extraordinary demand for money *appreciates* the comparative value thereof in

70th.—* And, seeing that the aforesaid *appreciation* of the comparative value of money, or *depreciation* of the value of the stocks, in the said ratio $\frac{M}{M+p}$ is a natural

I 4

consequent

[120]

in the proportion of 100 to 105, and causes thereby a *depreciation* in the value of the stocks in the proportion of 105 to 100; the discontinuance of the said extraordinary demand must of course cause the stocks to recover their value in the said proportion of 100 to 105.

But, seeing that the continuance (or rather repetition) of the extraordinary demand for money, causes the value of the stocks to depreciate lower and lower (unless counteracted) in a *progreffional* series; as for instance, in the first of the foregoing cases,

1st Loan, 2d Loan, 3d Loan, &c.
 $\text{£.}95 : 4 : 9\frac{1}{4}$, $\text{£.}90 : 14 : 0\frac{3}{4}$, $\text{£.}86 : 7 : 8$, &c.

And seeing also that the discontinuance of the extraordinary demand for money operates on the *whole* of the said *progreffional* series, and not on any

consequent of the extraordinary demand for money;—the value of the stocks must *naturally* recover again, in the same *ratio*, whenever such extraordinary demand for money shall cease or discontinue.

71st.—But, seeing that if the part p of the depreciating denominator $M+p$ be not *wholly* discharged during the time of the advancement of the loan, a certain part thereof (which for contraction sake let be called) p must necessarily remain, whereby the value of the stocks must be depreciated lower and lower, in a *progreffional* series, by the *ratio* $\frac{M}{M+p}$; viz.

1st Loan, 2d Loan, 3d Loan, 4th Loan, &c.
 $\frac{M^2}{M+p}$, $\frac{M^3}{M+p^2}$, $\frac{M^4}{M+p^3}$, $\frac{M^5}{M+p^4}$, &c.

And, seeing also, that the *discontinuance* of the extraordinary demand for money, has relation to the *whole* of the

[121]

any particular term thereof; the points to which the value of the stocks will so recover, in consequence of the discontinuance of such extraordinary demand for money, will of course be, as the *mean-proportional* of such *progreffional* series.

Wherefore, if the extraordinary demand for money shall cease or discontinue at the expiration of the time limited for the advancement of the first loan, the points to which the value of $3\frac{1}{2}$ per cent. and 3 per cent. stocks will then recover, will be as follows, in each of the foregoing cases respectively; viz.

	£.	s.	d.		£.	s.	d.
1st Case $3\frac{1}{2}$ per Ct. stocks	100	0	0*	3 per Cts.	85	14	$3\frac{1}{2}$ *
2d Case	100	0	$1\frac{1}{3}$		85	14	$4\frac{1}{2}$
3d Case	100	1	10		85	15	$10\frac{1}{4}$
4th Case	100	3	$4\frac{1}{4}$		85	17	2
5th Case	100	12	$3\frac{3}{4}$		86	4	10
6th Case	101	11	$1\frac{1}{2}$		87	0	$11\frac{1}{4}$
7th Case	102	7	11		87	15	$4\frac{1}{4}$
8th Case	105	0	0		90	0	0

* This point, it must be observed, is not the point at which the stocks would stand in the preceding time of profound peace; but the point to which they would fall immediately at the commencement of the war, as mentioned in the note, page 107.—They cannot (it must be observed) recover in this case to the point at which they would stand before, because the debt is in this case increased, without any increase in the proportion of money thrown into this channel of circulation.

If

the said *progreffional* series, and not to any particular term thereof, more *one* than *another*; the point to which the value of the stocks will so recover, in consequence of the discontinuance of the extraordinary demand for money, must of course be *as the mean-proportional* of such *progreffional* series.

72d.

[122]

If the extraordinary demand for money shall cease or discontinue at the expiration of the time limited for the advancement of the second loan, the points to which the value of the stocks will then recover, will be as follows, in each of the foregoing cases respectively; viz.

	£.	s.	d.		£.	s.	d.
1st Case $3\frac{1}{2}$ per Ct. stocks	97	11	$9\frac{1}{2}$	3 per Cts.	83	12	$11\frac{1}{2}$
2d Case - - -	97	11	$11\frac{1}{4}$	- - -	83	13	1
3d Case - - -	97	14	$5\frac{1}{4}$	- - -	83	15	$2\frac{3}{4}$
4th Case - - -	97	16	$8\frac{1}{2}$	- - -	83	17	2
5th Case - - -	98	9	10	- - -	84	8	5
6th Case - - -	99	17	$6\frac{1}{2}$	- - -	85	12	2
7th Case - - -	101	2	$4\frac{1}{2}$	- - -	86	13	$5\frac{1}{4}$
8th Case - - -	105	0	0	- - -	90	0	0

If

72d.—Wherefore, if the extraordinary demand for money shall cease or discontinue, at the expiration of the time limited for the advancement of the first loan, the point to which the value of the stocks will thereupon recover, will be $-\frac{M^2}{M+p} \times \frac{M+p}{M} = \frac{M}{M+p} \times \overline{M+p}$

73d.—OR, if the extraordinary demand for money shall cease, or discontinue, at the expiration of the time limited for the advancement of the second loan, the said point of recovery will be $\frac{M^{\frac{5}{2}}}{(M+p)^{\frac{1}{2}}} \times \frac{M+p}{M} = \frac{\overline{M}}{M+p}^{\frac{1}{2}} \times \overline{M+p}$

74th.—OR, if the extraordinary demand for money shall cease, or discontinue, at the expiration of the time limited for the advancement of the third loan, the said point of recovery will be $\frac{M^{\frac{6}{2}}}{(M+p)^{\frac{1}{2}}} \times \frac{M+p}{M} = \frac{\overline{M}}{M+p}^2 \times \overline{M+p}$

75th.

[123]

If the extraordinary demand for money shall cease or discontinue at the expiration of the time limited for the advancement of the third loan, the points to which the value of the stocks will then recover, in each of the foregoing cases, will be respectively as follows; viz.

	£.	s.	d.		£.	s.	d.
1st Case $3\frac{1}{2}$ per Ct. stocks	95	4	$9\frac{1}{4}$	3 per Cts.	81	12	8
2d Case - - -	95	4	$11\frac{1}{2}$	- - -	81	12	10
3d Case - - -	95	8	3	- - -	81	15	$7\frac{1}{4}$

4th

75th.—OR, if the extraordinary demand for money shall cease, or discontinue, at the expiration of the time limited for the advancement of the fourth loan, the said point of

recovery will be $\frac{M^{\frac{7}{2}}}{(M+p)^{\frac{1}{2}}} \times \frac{M+p}{M} = \frac{\overline{M}}{M+p}^{\frac{3}{2}} \times \overline{M+p}$

And so on, according always to the powers of the square root of the said ratio $\frac{M}{M+p}$.

76th.—But, if the aforesaid part p of the depreciating denominator $M+p$ be wholly discharged during the time limited for the advancement of the respective loans, the aforesaid quantity p becomes $= 0$, and therefore vanishes.—Wherefore, in this case, the aforesaid several

powers of the square root of the ratio $\frac{M}{M+p}$ must conse-

quently become $\frac{M}{M} = \text{unity}$; and the aforesaid points of recovery of the value of the stocks, at the discontinuance of the extraordinary demand for money, will consequently become $M+p$.

End of the Symbolic Demonstrations.

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	£.	s.	d.		£.	s.	d.
4th Case $3\frac{1}{2}$ per Ct. stocks	95	11	$1\frac{1}{4}$	3 per Cts.	81	18	$1\frac{1}{2}$
5th Case - - -	96	8	3	- - -	82	12	$9\frac{1}{2}$
6th Case - - -	98	4	6	- - -	84	3	$10\frac{1}{4}$
7th Case - - -	99	17	$1\frac{1}{2}$	- - -	85	11	$9\frac{3}{4}$
8th Case - - -	105	0	0	- - -	90	0	0

And so on, as in the following Table.

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A TABLE of the Depreciations in the value of $3\frac{1}{2}$ per cent. and 3 per cent. Annuity Stocks, that will be produced by such an extraordinary demand for money, during a war of any continuance from one year to eight years, as shall require a Premium of £. 5 per cent. to be given for each Loan;—admitting the ordinary rate of interest at the commencement of the war to be $3\frac{1}{2}$ per cent. per annum, and that the Loans be made annually, and the interest payable half-yearly:—Shewing, the *minimum* value of the Stocks, and the points at which the depreciation will be counteracted or recovered, during the time of the advancement of each respective Loan; as also the points to which the value of the Stocks will recover, in consequence of the discontinuance of the extraordinary demand for Money; according to each of the beforementioned methods by which the said *Premiums* shall be given; exclusive of such effects as may be produced on the value of the Stocks from other causes.

Loans or years of the war.	1st—If an additional quantity of nominal stock be given.			2d—If an additional interest or annuity be given for 99 years.		
	Minimum points.	Points of recovery during the advancement of the loan.	Points of recovery if the demand ceases.	Minimum points.	Points of recovery during the advancement of the loan.	Points of recovery if the demand ceases.
	£.	£.	£.	£.	£.	£.
1 st	95 4 9 $\frac{1}{4}$	95 4 9 $\frac{1}{4}$	100 0 0	95 4 9 $\frac{1}{4}$	95 4 10 $\frac{1}{2}$	100 0 1 $\frac{1}{2}$
2 ^d	90 14 0 $\frac{1}{2}$	90 14 0 $\frac{1}{2}$	97 11 0 $\frac{1}{2}$	90 14 2	90 14 3	97 11 1 $\frac{1}{4}$
3 ^d	86 7 8	86 7 8	95 4 9 $\frac{1}{2}$	86 7 10 $\frac{1}{2}$	86 7 11 $\frac{1}{2}$	95 4 11 $\frac{1}{2}$
4 th	82 5 4	82 5 4	92 18 10 $\frac{1}{2}$	82 5 8 $\frac{1}{4}$	82 5 9 $\frac{1}{4}$	92 19 1 $\frac{1}{4}$
5 th	78 7 0	78 7 0	90 14 0 $\frac{3}{4}$	78 7 4 $\frac{3}{4}$	78 7 5 $\frac{3}{4}$	90 14 4 $\frac{1}{4}$
6 th	74 12 5	74 12 5	88 10 3 $\frac{1}{2}$	74 12 10	74 12 11	88 10 7 $\frac{1}{2}$
7 th	71 1 4	71 1 4	86 7 8	71 1 10	71 1 11	86 8 0 $\frac{1}{4}$
8 th	67 13 8	67 13 8	84 6 1 $\frac{3}{4}$	67 14 2 $\frac{1}{2}$	67 14 3 $\frac{1}{2}$	84 6 7 $\frac{1}{4}$
3 per Cent. Stocks	£.	£.	£.	£.	£.	£.
1 st	81 12 8	81 12 8	85 14 3 $\frac{1}{2}$	81 12 8	81 12 9	85 14 4 $\frac{1}{2}$
2 ^d	77 14 11	77 14 11	83 12 11 $\frac{1}{2}$	77 15 0	77 15 1	83 13 1
3 ^d	74 0 10 $\frac{1}{4}$	74 0 10 $\frac{1}{4}$	81 12 8	74 1 0 $\frac{1}{2}$	74 1 1 $\frac{1}{4}$	81 12 10
4 th	70 10 4	70 10 4	79 13 4	70 10 7	70 10 7 $\frac{3}{4}$	79 13 6 $\frac{1}{4}$
5 th	67 3 2	67 3 2	77 14 11	67 3 5 $\frac{3}{4}$	67 3 6 $\frac{1}{2}$	77 15 2
6 th	63 19 2	63 19 2	75 17 4 $\frac{1}{4}$	63 19 7	63 19 7 $\frac{1}{2}$	75 17 8
7 th	60 18 3 $\frac{3}{4}$	60 18 3 $\frac{3}{4}$	74 0 10 $\frac{1}{2}$	60 18 8 $\frac{3}{4}$	60 18 9 $\frac{1}{2}$	74 1 2 $\frac{1}{4}$
8 th	58 0 3 $\frac{1}{2}$	58 0 3 $\frac{1}{2}$	72 5 3 $\frac{1}{4}$	58 0 9	58 0 9 $\frac{3}{4}$	72 5 8

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TABLE continued.

Loan OR years of the war.	3d—If an additional interest or annuity be given for 30 years.			4th—If an additional interest or annuity be given for 20 years.		
	Minimum points.	Points of re- covery during the advance- ment of the loan.	Points of reco- very if the de- mand ceases.	Minimum points.	Points of re- covery during the advance- ment of the loan.	Points of reco- very if the de- mand ceases.
3 1/2 per Cent. Stocks						
1 st	95 4	9 1/4	95 6 6	100 1 10	95 4	9 1/4
2 ^d	90 15	8 3/4	90 17 4 1/2	97 14 5 1/4	90 17	1 1/4
3 ^d	86 10	10	86 12 5	95 8 3	86 13	5 1/4
4 th	82 9	11	82 11 5 1/4	93 3 1 1/4	82 13	1 1/4
5 th	78 12	9 1/2	78 14 2 3/4	90 19 0 1/2	78 17	7 1/4
6 th	74 19	3 1/4	75 0 7 3/4	88 15 11 1/4	75 5 0	6 1/4
7 th	71 9	2 1/4	71 10 6	86 14 0	71 15 8 3/4	1 1/2
8 th	68 2	4 1/2	68 3 7 1/2	84 13 1 1/4	68 9 8	11 1/2
3 per Cent. Stocks						
1 st	81 12	8	81 14 1 3/4	85 15 10 1/4	81 12	8
2 ^d	77 16	4	77 17 9	83 15 2 3/4	77 17	6 1/4
3 ^d	74 3	6 3/4	74 4 11	81 15 7 3/4	74 5 10	1 1/2
4 th	70 14	2 1/2	70 15 6	79 16 11 1/4	70 17 5 1/2	10
5 th	67 8	1 1/4	67 9 4	77 19 2	67 14 6	7 1/4
6 th	64 5	1	64 6 3 1/4	76 2 2 3/4	64 10 2	6 1/4
7 th	61 5	0 1/4	61 6 3 1/4	74 6 3 1/4	61 10 7 1/2	1 1/2
8 th	58 7	9	58 8 9 3/4	72 11 3 1/4	58 14 0	11 1/2

TABLE

[127]

TABLE continued.

Loans OR years of the war.	5th—If an additional interest or annuity be given for 7 years.			6th—If an additional interest or annuity be given for 3 years.		
	Minimum points.	Points of re- covery during the advance- ment of the loan.	Points of reco- very if the de- mand ceases.	Minimum points.	Points of re- covery during the advance- ment of the loan.	Points of reco- very if the de- mand ceases.
3 1/2 per Cent. Stocks						
1 st	95 4	9 1/4	95 16 5 3/4	100 12 3 3/4	95 4	9 1/4
2 ^d	91 5	2 1/2	91 16 5 1/4	98 9 10	96 14 4 3/4	101 11 1 1/2
3 ^d	87 8	11 1/2	87 19 9	96 8 3	93 10 11 1/2	99 17 6 1/2
4 th	83 15	11 1/2	84 6 3 1/4	94 7 6 1/2	90 9 7 1/4	98 4 6
5 th	80 5	11 1/2	80 15 10 1/4	92 7 8 1/2	86 3 5	96 12 0 1/4
6 th	76 18	10 3/4	77 8 4 1/2	90 8 8 3/4	83 6 10 3/4	95 0 1
7 th	73 14	7 1/2	74 3 8 1/2	88 10 7 3/4	80 12 2 1/2	93 8 8
8 th	70 13	0 3/4	71 1 9	86 13 3 3/4	77 19 4 1/2	91 17 9 1/4
3 per Cent. Stocks						
1 st	81 12	8	82 2 8 1/4	86 4 10	81 12	8
2 ^d	78 4	5 1/2	78 14 1 1/4	84 8 5	82 18 0	87 0 11 1/4
3 ^d	74 19	1 1/2	75 8 4 1/4	82 12 9 1/2	80 3 8	85 12 2
4 th	71 16	6 1/2	72 5 4 1/2	80 17 10 3/4	77 11 1	84 3 10 1/4
5 th	68 16	6 1/2	69 5 0 1/4	79 3 9 1/4	75 0 2 1/2	82 16 0 1/4
6 th	65 19	0 3/4	66 7 2 1/4	77 10 4	73 17 2 1/2	81 8 7 3/4
7 th	63 3	11 1/2	63 11 9 3/4	75 17 7 3/4	72 11 0	80 1 8 1/2
8 th	60 11	2 1/4	60 18 7 1/4	74 5 8 1/4	66 16 6 3/4	78 15 2 1/4

TABLE

TABLE continued.

Loans OR years of the war.	7th—If an additional interest or annuity to be given for 2 years.			8th—If an additional interest or annuity to be given for one year.		
	Minimum points.	Points of recovery during the advance-ment of the loan.	Points of recovery if the demand ceases.	Minimum points.	Points of recovery during the advance-ment of the loan.	Points of recovery if the demand ceases.
3½ per Cent. Stocks						
1 st	95 4	97 10	102 7	95 4	100 0	105 0
2 ^d	92 17	95 2	101 2	95 4	100 0	105 0
3 ^d	90 11	92 14	99 17	95 4	100 0	105 0
4 th	88 6	90 8	98 12	95 4	100 0	105 0
5 th	86 2	88 3	97 7	95 4	100 0	105 0
6 th	83 19	86 0	96 3	95 4	100 0	105 0
7 th	81 18	83 17	94 19	95 4	100 0	105 0
8 th	79 17	81 15	93 15	95 4	100 0	105 0
3 per Cent. Stocks						
1 st	81 12	83 11	87 15	81 12	85 14	90 0
2 ^d	79 12	81 10	86 13	81 12	85 14	90 0
3 ^d	77 12	79 9	85 11	81 12	85 14	90 0
4 th	75 14	77 10	84 10	81 12	85 14	90 0
5 th	73 16	75 11	83 9	81 12	85 14	90 0
6 th	71 19	73 14	82 8	81 12	85 14	90 0
7 th	70 4	71 17	81 7	81 12	85 14	90 0
8 th	68 9	70 2	80 7	81 12	85 14	90 0

It

It must be observed, that if the *premiums* from time to time naturally required on account of the extraordinary demand for money, should be less than *£.5 per cent.* the values of the stocks will from time to time be *higher* than in the foregoing table: and on the other hand, if the *premiums* so from time to time required be greater than *£.5 per cent.* the values of the stocks will from time to time be *lower* than in the foregoing table; unless prevented by some separate cause: and in order that the *effects* flowing from different causes, may not be confounded together, the reader will be pleased to observe, that I shall in future distinguish between the *computative value*, and the *market value* or price.

I must also mention, that the foregoing table of *3½ per cent.* stocks will serve, exceedingly near the truth, to shew the depreciations in the value of any annuity stocks bearing the ordinary rate of interest, whatever such ordinary rate of interest may be.

There will indeed be a small difference, in case the ordinary rate of interest at the commencement of a war should be higher or lower: because, the higher the rate of interest shall be, the greater must be a determinate annuity of any given continuance, in order to be worth the same given principal: and the less will be the *proportionate part* of such determinate annuity, that operates as a *sinking fund*; because, the higher the rate of interest shall be, the less will be the periodical sum required for discharging any given principal in the same given time.—But this difference will not be so great, as to cause a variation of *one shilling* between the values of the *3½ per cent. stocks*, as laid down in the foregoing table, and the values of the

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3 per

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3 per cent. *stocks* in the like cases, if 3 per cent. should be the ordinary rate of interest at the commencement of a war.

It is however necessary to be observed, that the actual *prices* of the *stocks* may be somewhat *higher* or *lower* than their *computative* values thus deduced; in consequence of the intervention of other causes.

An influx of wealth, for instance, would naturally carry the *prices* of the *stocks* higher than their computed value, in as much as the purchasers of *stocks* should thereby be increased.—Commercial misfortunes, on the other hand, would naturally carry the *prices* of the *stocks* *lower* than their computed value, in as much as the sellers of the *stocks* should thereby be increased.

Nothing however, during a war, can cause the *prices* of the *stocks* to vary from their *computative* value, in any greater degree than the market competition for the new loans, and the market competition for the old *stocks*, shall be greater the *one* than the *other*.—Neither can any thing in time of peace, cause the market *prices* of the *stocks* to vary from the respective *computative* points of recovery, in any greater degree, than as a greater or lesser proportion of money shall actually be thrown into that channel of circulation for *purchase* or *redemption*. And, as it cannot be supposed that any temporary *influx* or *efflux* of wealth, shall bear any great proportion to the whole wealth of the state,—so, consequently, the effects thereby produced on the general or ordinary competitions of the market, can be but trifling*.

But

* A LOAN is, in fact, an actual buying and selling of the annuity or annuities so established, at a *whole-sale*; conditioned,

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But such is the nature of men and things, that the market competition for the *stocks*, and the market competition for the new loans, may be somewhat different the *one* from the *other*, without regard to any influx or efflux of wealth.

It is the nature of man to lay out his money, or to keep it by him for a while, according as the *one* or the *other* shall be visibly likely to be attended with the greatest profit to himself.

Now, if a man lays out his money in the *stocks*, the *interest* will be a profit to him while he has no occasion for the *principal*: but if the *stocks* *depreciate* in their value, that depreciation will be a loss to him, when he comes to have occasion for the *principal*:—Hence then, if the periodical depreciation in the value of the *stocks*, shall be greater than the periodical interest, it will be more profitable for a man to keep his money by him for a new loan, (or for any other purpose) than to lay it out in the *stocks*, and receive the interest thereon in the intermediate time.—In this case, therefore, the market competition for the *stocks* will not be so

conditioned, that a certain part of the payment be made immediately, and that the remainder be paid by installments at short periods.—Now, if the ordinary or general competition of the market be such, that an actual buying and selling of TEN or FIFTEEN MILLIONS of stock more than ordinary, in this *wholesale* way as one may call it, shall be attended only with a difference of *four* or *five* per cent. from the current (or *retail*) market price for the time being;—it must certainly be impossible that the market prices can be much affected, by the *extraordinary* quantity that may be required to be bought or sold, in consequence of an extraordinary influx, or efflux, of a million or two of wealth.

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so great as the market competition for the new loans: and consequently, their market prices will be lower than their computative value, so long as this cause shall continue.—If indeed there should be a great probability that no farther loan would be wanted, this cause then becomes removed, and the money that might be so locked up on speculation, being suddenly thrown out into circulation, the market prices of the stocks would naturally rise as *high*, and probably *higher* for the moment, than their true computative value, unless prevented by some farther cause.

On the other hand, if the periodical *interest* shall be greater than the periodical *depreciation* in the value of the stocks, it will always be most profitable for a man to lay his money out in the stocks, even for ever so short a time, rather than to lock it up; because, it can be turned into money again on the most sudden occasion.—In this case therefore, the market competition for the stocks will be the greatest, and their market prices will of course be higher than their computative value.

For example,—If the periodical depreciation in the value of the stocks should be at the annual rate of £.4 per cent. it would be more profitable for a man to lock up his money on speculation, than to lay it out in 3 per cent. stocks, until such stocks should fall as low as £.75:—If the periodical depreciation in the value of the stocks should be at the annual rate of £.5 per cent. it would be more profitable to lock up money on speculation, than to lay it out in 3 per cent. stocks 'till they should become as low as £.60:—If the depreciation should be at the annual rate of £.6 per cent. it would be more profitable to lock up money on speculation, than to lay it out in £.3 per cent. stocks

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stocks 'till they should become as low as £.50:—And so on:—Because, 'till then, the *depreciation* in the value of the capital will be greater than the *interest* received thereon.

But,—If the periodical depreciation in the value of the stocks shall be at the annual rate of *three per cent.* it cannot be worth a man's while to lock up his money on speculation, if he can buy a three per cent. stock at any price not exceeding £.100:—If the depreciation be at the annual rate of *2 per cent.* the locking up of money on speculation would be at least one per cent. per annum against the speculator; and if the stocks should be under *par*, such speculation would be still more against him:—If the depreciation should be at the annual rate of one per cent. the speculation would be at least two per cent. per annum against the speculator, and still more if the stocks should be under *par*:—If the loans should be made according to the eighth of the foregoing cases, the locking up of money would be the whole amount of the interest against the speculator. In these cases, therefore, the demands for the stocks will be *increased*, and in the former cases they will be *decreased*, by those natural principles of *profit and loss* which are inseparable from commerce.

It must be observed, that the effects flowing from these speculative considerations, are *naturally* and therefore *inseparably* connected with their respective causes; and must therefore consequently take place, in a greater or lesser degree, whether the causes themselves *shall* or *shall not* be adverted to.—For, people cannot help seeing, with their own eyes, whether the periodical depreciation in the value of the stocks be greater, or lesser, than the periodical interest; and those who are men of

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business by profession, will naturally govern themselves accordingly; as near (at least) as they may be able to form a judgment.—If they do not investigate the cause from whence the depreciation flows, they may indeed err somewhat in their judgment, and so far as they shall buy or sell in consequence of such error, so far (but no farther) will the market prices of the stocks vary from the natural laws here laid down. This error in judgment cannot however be materially great, excepting in one particular; viz. the point of recovery in the value of the stocks, in consequence of the discontinuance of the extraordinary demand for money.

It has already been demonstrated, that in case the premiums necessarily required for new loans, in consequence of the extraordinary demand for money, be given in an additional quantity of annuity stock, the *computative ratio* of the depreciation in the value of the stocks, will be as the *premium* so required: and that, if the *premium* so required be given in an additional interest or annuity, to continue any considerable length of time, the said *ratio* of the depreciation will be very near as great: As also, that if the *premium* so required, be given in an additional interest or annuity, of the same continuance as the time limited for the advancement of the loan, then, the said *ratio* of the depreciation becomes equal to *unity*, and therefore vanishes.

Hence then,—If to those demonstrations, we add the foregoing observations of the natural and unalterable principles of commercial speculation; it must consequently follow,—That, if the *premiums* naturally required for new loans, in consequence of the extraordinary demand for money, shall be greater than the amount of the interest during

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during the time necessarily limited for the advancement of the loan; and the *premiums* so required, should be given, *either* in an additional quantity of annuity stock, *or* in an additional interest or annuity of a long continuance;—Then, the *market prices* of the stocks must necessarily and unavoidably be *lower* from time to time than their *computative value**. And, on the other hand, whether the *premium* so required shall be *greater* or *lesser* than the interest,—if it be given in an additional interest or annuity, of no longer a continuance than the time limited for the advancement of the loan;—Then, the *market prices* of the stocks must necessarily and unavoidably be *higher* from time to time than their *computative value*.

Invasion, insurrection, or such-like capital disasters, as should render the collection and appropriation

* It must be observed here, that, as the terms from time to time required for new loans, in consequence of the extraordinary demand for money, will necessarily have the *market prices* of the stocks for their *basis*; and, as the points of recovery in the value of the stocks in consequence of the discontinuance of the extraordinary demand for money, must necessarily depend on the terms that were required in consequence of such demand;—those *market prices* must of course be the *basis*, from whence the points of recovery must be deduced: so that the above principle extends, not only to the market prices during the war, but also to the point of recovery at its discontinuance. And consequently, although the market prices will naturally rise *higher*, immediately at the discontinuance of a war, in consequence of the sudden throwing out of the speculative money, in the same manner as the locking it up carries them below their *computative value*; yet, they must necessarily fall again, unless prevented by throwing a sufficient additional quantity of money into that channel of circulation regularly.

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priation of the necessary revenue impracticable, would indeed destroy all system, by causing the necessary circulation to fail: but these are considerations entirely foreign from the present subject; which is confined *solely* to the effects of an extraordinary demand for money; and its extraordinary circulation, for the supply of such demand.

It may also be observed, that if the loans are made in this last mentioned manner, the *effects* that are produced on the rate of interest by the extraordinary demand for money, are entirely counteracted; whereby, annuity stocks bearing different rates of interest (if any such there should be) not exceeding the ordinary rate, will be in *value* to each other respectively, in the same simple proportion as their respective rates of interest: which cannot possibly be the case, if the *premiums* necessarily required for new loans, be given in any other manner.—This remark is indeed sufficiently clear from the 5th section: but, to make it still more plain,—Let it be supposed, by way of example, that 3 *per cent.* stocks should fall (as in the last line of the 1st and 2d cases in the table, page 125) to £.58; and let it be supposed that a £.5 *per cent.* stock should be offered for a new loan:—Now, seeing that the point of recovery of the 3 *per cent.* stock is £.72 $\frac{1}{4}$; and, seeing that the £.5 *per cent.* stock is always redeemable at £.100;—no man, consistent with his own interest, could give more than £.80 in the market, for such £.5 *per cent.* stock*: whereas, according to the proportion of

* It may perhaps appear to the studious reader, at first sight, that a 5 *per cent.* stock would in this case be worth £.82;

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of 3 to 5, such 5 *per cent.* stock would appear to be worth £.96 $\frac{2}{3}$.

If any part of what has been said, respecting the laws and principles by which the fluctuations in the value of annuity stocks are governed, should stagger the faith of such of my readers, as shall omit an attention to the symbolic demonstrations; I would beg leave to put a *question* to them.—It is perfectly

£.82; because, the next point of recovery of the 3 *per cents.* (admitting the necessary *premium* to be as before, viz. £.5 *per cent.*) would be only £.70 $\frac{1}{2}$: but it must be observed, that by the establishment of a 5 *per cent.* stock, an additional proportion of money is naturally thrown into this channel of circulation, whereby the depreciation is naturally lessened; so that the point of recovery of the 3 *per cents.* must necessarily be higher than £.70 $\frac{1}{2}$: how much the depreciation would be checked, must depend on the whole terms of the loan taken together; but it must at all events be checked some, whatever might be annexed to the 5 *per cent.* stock.—If the 3 *per cents.* should be preserved at £.58, their point of recovery would be higher than £.72 $\frac{1}{4}$; and if they should fall to £.56, or even lower, their point of recovery would still be higher than £.70 $\frac{1}{2}$: no man therefore, consistent with his own interest, could give more than £.80 in the market for such £.5 *per cent.* stock; notwithstanding the extra interest thereon.

But it must also be observed, that the natural principles of commercial speculation will still be against the *five per cent. stock*; because, if the premiums are given in the above manner, the stocks must fall lower than their computative value in consequence of the encouragement thereby afforded to the locking up of money on speculation; and must afterwards rise higher, for a time, than their computative point of recovery, in consequence of the sudden throwing out of such speculative money: although they must necessarily fall again after the speculative money shall have become thrown out.

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perfectly evident, that if the value of the stocks be not as I have mentioned, they must necessarily be either *higher* or *lower*:—I would ask then, whether they shall be *higher*, or whether they shall be *lower* in the foregoing respective cases?

If the loans should be made (as in the first of the foregoing cases) by giving £.105 annuity stock for every £.100 to be advanced in money; and, at the expiration of the time limited for the advancement of such loan, the same extraordinary demand for money should continue, and a second loan should be required; it is evidently impossible that such £.105 annuity stock, could then be worth more than the £.100 which had been given for it, unless the market competition for the stocks, during the time of the advancement of the loan, should have been greater than the market competition for the loan with its profits annexed.

Now, if any principle of reasoning was advanced, whereon it might be supposed, that this extra competition for the stocks might in *possibility* be produced, without an additional proportion of money being (by some means or other) thrown into that channel of circulation; we should then have something whereon to build a farther argument and examination: but I must confess that I cannot find even the smallest thing to propose for that purpose. And, unless such principle of reasoning be proposed, there cannot be the smallest foundation for a supposition that the value of the stocks might be *higher* than has been laid down.

On the other hand,—It is perfectly evident from the 4th postulatam, that, if the influx of money into the hands of the lenders, shall from
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time to time bear a sufficient proportion to the demands of the borrowers, the rate of interest in that case cannot rise; and consequently, the value of the stocks cannot fall.

Hence then, unless some principle of reasoning should be advanced, on which it might be supposed, that the *extraordinary* proportion of money, necessarily required to flow into the hands of the lenders, should be greater than the *premium* necessarily required, in consequence of the *extraordinary* demands of the borrowers;—unless (I say) such principle of reasoning should be advanced, there can be nothing to examine, with respect to a supposition that the value of the stocks might be *lower* than has been mentioned: nor any foundation whereon such a supposition could stand.

It is not indeed entirely impossible, but the reader (who shall have omitted an attention to the symbolic parts) may, at the first glance, be struck with an opinion, that when an extraordinary demand for money shall be such as to be productive of any given depreciation in the value of the stocks; the additional proportion of money necessary to be thrown into that channel of circulation, in order to prevent that depreciation, ought to be proportionate to the whole debt; instead of being proportionate to the extraordinary sum required to be raised.—But the studious reader (even if he shall not have attended to the symbolic parts) will observe, on reflection, that this depreciation flows SOLELY from the *extraordinary* demand for money; with which, the previous debt has not the remotest connection, in any degree whatever, other than as it points out the state of the comparative value between money and *annuity stocks* for
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the time being*. And as the extraordinary demand for money is the GOVERNING CAUSE, from whence the *effect* (viz. the *depreciation*) flows; it must necessarily GOVERN likewise the degree of means that shall be required, in order to *balance* or *counteract* that effect.

The foregoing opinion (that the whole debt should in this case be taken into consideration, and that the additional quantity of *money* necessary to be thrown into that channel of circulation, in order to prevent a depreciation in the value of the stock, should thereby be governed) is perfectly similar to another opinion, which may also strike the mind at the first reflection:—viz. *that the comparative value of money will be governed by the quantity in circulation*; without regarding the *velocity* with which it circulates, whereby the demands therefor become supplied.

This remark naturally leads us to a simple enquiry into the principles by which the comparative value of money is governed; in order to determine how far the results *will* or *will not* coincide with what has been already deduced.

* It may perhaps be said, that as the quantity of stock is thus increased, that increase must necessarily affect the value of the stocks:—this must certainly be granted:—but this increase in the quantity of stock is also an *effect* of the extraordinary demand for money: so that, viewing the depreciation in whatever light we please, the extraordinary demand for money is the GOVERNING CAUSE, entirely independent of the *previous* debt.

S E C T. VIII.

A simple Enquiry into the Principles by which the comparative Value of Money is governed; whereby the doctrines contained in the foregoing seventh section are farther supported.

IT may at the first reflection be supposed, that the comparative value of money will be governed purely by the quantity thereof in circulation: and from thence, it will of course be supposed also, that as the adoption of bills of exchange, and promissory notes, for commercial conveniency, increases the quantity of the circulating medium; the comparative value thereof will thereby be *lessened*; or (in other words) the prices of commodities rendered *higher* than they would be, if gold and silver *only* were permitted in circulation.

In order to examine this opinion,—Let us for a moment suppose that there should be twenty persons (more or less) of whom, the *first* owes a sum of money to the *second*; the *second* to the *third*; the *third* to the *fourth*; and so on to the *twentieth*, who also owes the same sum to the *first*.

Now, First,—If the *twentieth* of these persons should actually pay this sum to the *first* in gold and silver money, and the *first* person should pay the same money to the *second*,—the *second* pay it to the *third*,—the *third* pay it to the *fourth*,—and so on to the *twentieth*;—OR

Secondly,—If the *first* of these persons should draw his bill of exchange on the *twentieth*, and pay

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pay such bill of exchange to the second person,—the second pay it to the *third*,—the third to the *fourth*,—and so on to the *twentieth*;—OR,

Thirdly,—If the *twentieth* of these persons should give his promissory note in writing to the *first* person,—the first person pay that note to the *second*,—the second pay it to the *third*,—the third to the *fourth*,—and so on to the *twentieth*;—OR,

Fourthly,—If the debts all round should be cancelled by mutual agreement (which would be precisely the same as exchanging the commodities for which the debts were contracted, the *one* for the *other*) without the intervention either of *money* or *writing*;—it is perfectly evident, that the self-same effects would be produced in the *one* case as in the *other*.

In the first case, the effects are produced by the additional velocity with which the money is circulated; or passed, from the one person to the other:—in the second and third cases, the same effects are produced by the additional quantity of the circulating medium:—and in the fourth case, the self-same effects are produced by the circulation of the commodities; which (per postulatum 3d) represent the circulating medium, and are represented by it.

Hence then, if the term MONEY be considered to signify *purely* a circulating medium, or instrument wherewith to buy and sell, the self-same effects will be from time to time produced on its comparative value, either

1st,—By increasing the velocity with which it shall *circulate*, or *pass*, from one person to another, for the performance of its functions;—or,

2dly,—By increasing the quantity thereof in circulation;—or,

3dly,—By the exchanging of other commodities

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ties the *one* for the *other*; whereby the use of money is supplied without its presence*.

Hence also, the term MONEY being thus considered *technically*, as the instrument of local circulation, wherewith to buy and sell; its local value from time to time, compared with other commodities, will be governed by the local demand for a circulating medium, and the velocity of its *circulation* whereby those demands shall be supplied: and the term *circulation of money*, will, in its technical sense, comprehend the *circulation* or *exchanging* other commodities the *one* for the *other*, as well as the *literal circulation* (or *actual payment*) of MONEY from one person to another.—In these technical senses therefore, I shall use the terms MONEY and CIRCULATION, in the investigation of the *ratio* by which the comparative value of money is governed.

What has been said, it may be observed, perfectly agrees with the universal axiom contained in the fourth postulatum; viz. *That the comparative value of commodities of all kinds (whether money or any thing*

* It may also be from hence observed, that the comparative value of MONEY considered *purely* as an instrument for the local convenience of buying and selling, is entirely nominal; and cannot in this sense comprehend any part of the wealth or capital of a state; but the sense in which it makes a part of the wealth or capital of a state, must be only in its quality as an article of merchandize to *be bought and sold*; in contradistinction to its quality as a local instrument wherewith to *buy and sell*; and consequently, so far as it shall be made use of as a local instrument wherewith to buy and sell, so far it must be entirely a *dead capital* to the state; like a man who is continually travelling about, without doing any thing that shall increase his own property, or that of his neighbours.

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thing else) will depend on the demand that there shall be for such commodities respectively, and the ease or difficulty with which such demand may be supplied.

If the *quantity* of circulating money in any nation, be considered as a *standing* or *given quantity*, it is perfectly evident, that the demands which there shall be for it, will be supplied with greater or less ease, according as the *circulation* shall be swifter or slower:—If the *velocity of the circulation* be considered as *the given quantity*, the demands for money will evidently be supplied with greater or less ease, according as the *quantity* of circulating money shall be greater or lesser: and its comparative value will of course be lesser or greater accordingly: or, in other words, the prices of other commodities will be accordingly *higher* or *lower*.

Hence, then, the comparative value of money, will not be *inversely*, in a *simple ratio*, as the *quantity* of circulating money in any nation; but, as the *PRODUCT* of the multiplication of the *quantity*, by the *force* or *velocity* of the *circulation*, *inversely*.—And consequently, the adoption of bills of exchange, and promissory notes, for commercial conveniency, can produce no other effects whatever, than would be produced by the additional velocity of the *circulation*, which the same commerce must necessarily enforce, if the *quantity* of the circulating medium was not so increased.

There is also another point of view from whence the force and effects of the *circulation* will appear in a most striking light on the very first reflection.—Should we compare the *quantity* of circulating money in any nation, with the *VALUE* of the other property contained in such nation, computed at the prices daily current; how small a proportion would

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would the former bear to the latter! If the *circulation* (in itself considered) had no effect on the comparative value between *money* and other *property*; the *VALUE* of all the other property in a state, could not exceed the *quantity* of *money* contained in such state: the truth of this observation will be perfectly evident, if we should suppose for a moment, that the whole of the other property in a state should be exposed to sale at one and the same time: in which case, it is evidently impossible that it could fetch more than the whole of the money*.

But such is the velocity with which money circulates, that the self-same identical *shilling*, *crown*, or *guinea*, may with the utmost ease, in the space of a few days, or even a few hours, pass through twenty different hands, and thereby pay twenty different debts, or represent (in acts of buying and selling) twenty different commodities: so that any sum of money, by passing through twenty different hands, produces the self-same *effects*, as would be produced by a sum twenty times as large, in case it should in the same space of time, pass through the hands of only one person.—The conclusion flowing from this observation, is precisely the same as the last; viz. that the comparative value of money will not be *inversely* in a *simple ratio*, as the *quantity* of circulating money; but, as the *PRODUCT* of the multiplication of the *quantity*, by the *force* or *velocity* of the *circulation*, *inversely*.

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* The reader may perhaps find this observation more strikingly clear, by forming an idea of a state, composed of only half a dozen or half a score persons, in a remote corner of the world.

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The demands for money being thus supplied (not by the *quantity* merely, but) by the *PRODUCT* of the multiplication of the *quantity*, by the *force* or *velocity* with which it circulates; it must necessarily follow, that, when the usual or ordinary demands for money shall become increased in any proportion,—if the beforementioned *PRODUCT* by which the demands are supplied, shall become increased likewise, in the same proportion as the demands; the comparative value must consequently remain at the usual *par*: whether such increase in the *PRODUCT* shall proceed from an increase in the *one* or the *other* of its factors.

For example,—Let it be supposed, that taking the whole machine of circulation together, the demands for money should become increased in the proportion of 100 to 105, as mentioned in the last section;—

Now, 1st,—If the quantity of circulating money in each respective channel (supposing each channel of circulation to be affected equally) should be increased in the proportion of 100 to 105, by the adoption of a paper auxiliary, as a legal tender in all payments required to be made into the public treasury or exchequer; or,

2dly,—If the velocity of the circulation should be increased in the proportion of 100 to 105 by collecting an *extra* proportion of money out of the ordinary channels of circulation by taxes, and throwing the same into any one particular channel, through which the extraordinary supply should be immediately drawn; to the amount of the extraordinary $\frac{5}{100}$ parts of the quantity so required to be drawn through that channel, in addition to the proportion which the ordinary circulation through that channel required for its support;

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port;—then, in either of these cases, it is perfectly evident, that the beforementioned *product*, by which the demands for money are supplied, will be increased in each respective channel, in the same proportion as the *demands* are increased; and consequently (per postulatum 4) a *par* or *equilibrium* in the comparative value of money must thereby be preserved: which is the very point that was demonstrated in the last section.

The extraordinary supply thus drawn from the several and respective channels, naturally returns again, like the waters of the ocean, to the respective channels to which it shall naturally appertain: from thence it must of course be re-drawn, in like manner as before, and the same *par* or *equilibrium* will necessarily remain preserved by the same means.

If what has been said, should be applied relatively to a machine, consisting of sundry channels or cisterns of water, connected together by tubes, through which the water should be continually flowing or circulating, whereby those several cisterns should continually *supply* and be *supplied* by each other; the conception might perhaps appear still more simple and easy:—For, in that case, the mind must at once be struck with convictive and irresistible force, that a *par* among those several cisterns must infallibly be preserved by the beforementioned means: and, if we reflect a single moment, we must be perfectly convinced, that there cannot be any possible difference, whether the circulating matter shall consist of *water* or of *money*.

It could not indeed be possible to preserve a general *par* or *equilibrium* in the comparative value between money, and those kinds of property that

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are the periodical productions of the soil; particularly such as are of a perishable nature: because, these must depend (not on the proportion *altogether* between the number of hands that *cultivate* and the number that *consume*, but also) on the fertility or infertility of the season. But these are not the kinds of property here spoken of:—The *par* or *equilibrium* here spoken of, respects *only* such kinds of property as produce a certain fixed rent or income, which is in all seasons *periodically* the same.

S E C T. IX.

Of the ability or inability of any nation to raise such a Revenue as would be required for preserving the value of the Stocks at a Par; and the consequences that must be attendant on their depreciation: with a concluding observation, on the Agreement between the foregoing Principles of PUBLIC CREDIT, and the immutable Laws and Principles which govern the UNIVERSE, and all things in it.

FROM what has been said in the foregoing sections, it is perfectly evident, that the grand practical point on which the good or evil of a public debt will depend, consists in raising* and applying

* It cannot but be remarked, from what was said in the last section, respecting the power and effects of the *circulation* of money, that the method of levying the taxes must be a very important consideration.—It would be opening

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applying from time to time, such a revenue as shall produce an *equation* between the *demands* for money, and the force of the *circulation* by which those demands are supplied with the quantity circulating; whereby the *value of the stocks* and *ready-money* shall be preserved at an *equilibrium* or *par* with each other.

But it may perhaps be objected, *that a nation may be unable to raise such a revenue as may be necessary for this purpose, when the extraordinary demands for money shall be very great, as in time of war.*

It must be confessed that this objection may have some weight; but it will on examination be found, that the whole weight of the objection will depend on this circumstance; viz. whether a nation be or be not able to support a sufficient force for her defence.

There can be no doubt of its being possible, that in the vicissitudes of human things, a nation may have such powerful enemies to contend with, that she may be absolutely unable to support a sufficient force for her defence; and may therefore be compelled to submit to a conqueror. But as all nations pre-suppose themselves to be permanent and durable, a pre-supposition that a nation shall be unable to support a sufficient force for her defence, is entirely inadmissible.

Now,

opening too large a field for this Essay to enter into an *investigation* of that subject; but it may not be amiss to say a word or two respecting the *primary principles* on which (according to the principles already deduced) the art of taxation must depend: which (to avoid interrupting the thread of the present subject) shall be mentioned by way of postscript.

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Now, if we admit that a nation be able to support a sufficient force for her defence, we must necessarily admit that she shall be (at least) able to raise the revenue required for that purpose, provided that her finances shall be conducted according to such *method* or *system*, as that no more than the *least* revenue that is possible shall be exacted.

But it must be observed, that the same system of financing that will require the *least revenue*, in case the war should be of a short duration; will not require the *least revenue*, in case the war should be of a long duration: and, as the duration of a war is altogether uncertain, it is necessary always to pursue such system of financing, as shall (according to the ordinary or probable course of things) enable a nation, with any given resources to defend herself (in case of necessity) the longest possible time.

Extreme cases (in contradistinction to the ordinary or probable course of things) may indeed be proposed; wherein the smallest *revenue* would be the actual periodical *expence* of the war:—this would evidently be the case, if we should suppose the rate of interest to be *ten per cent. per annum*; and that a war should continue a dozen years: for, in this case the revenue that would be required for the payment of the interest, on the *last* or *twelfth* year, would evidently be 20 per cent. greater than the annual expences of the war, taking the average; exclusive of the premiums necessarily required for the loans, in consequence of the extraordinary demand for money.—It may however be observed, from what was said in the latter part of the sixth section, that a small sinking fund, in addition to this high interest, would throw such an influx of money into the hands of the lenders, af-

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ter the extraordinary demand for money should cease; that the rate of interest would fall in such a rapid manner, as would effectually cure the malady in a very short time; and would cause the debt to become productive of a *real* and *very great advantage*, by the commercial effects which must unavoidably go hand in hand with the decrease of the rate of interest*.

But let us leave *EXTREME* cases, and illustrate (where illustration shall be necessary) by cases that are both probable and common, in the present state of the several commercial nations of the world.

It is perfectly evident, that the *least* possible revenue that can be required on the first year of a war, must be the *interest* of the money that shall be wanted for defraying the expences thereof, together with the *interest* of the *premium* (whatever it may be) that shall be necessarily required for the advancement of the loan, in consequence of the extraordinary demand for money:—In this case, therefore, the *premium* so required for the advancement of the loan, must consist of an additional quantity of annuity stock.

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* If the reader will attentively re-peruse the latter part of the sixth section, as also the latter part of the third section, he will be perfectly satisfied, that if a public debt be properly conducted, it will always, in its own nature, produce a remedy adequate to the malady; in every case that can be proposed.—In a word, nothing but an error in the method of conducting a public debt can prevent it from producing an actual advantage to a state: and it shall be demonstrated in a second essay, that every error that can creep in, will be mathematically correctible, until the public credit itself shall be no more.

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On the other hand, it is perfectly evident, that, if the money for defraying the expences be annually raised by loan, the greatest possible revenue that can be required on the first year of a war, will be the *interest* of the money so required to be raised, together with the *amount* of the *premium* so required for the advancement of it:—In this case, therefore, the *premium* so required for the advancement of the loan, must consist of an additional interest or annuity to continue one year, and then to cease.

Now,—It has been demonstrated in the seventh section, that if the *premium* so required shall consist of an additional quantity of annuity stock, the value of the stocks must be depreciated lower and lower by every repetition of the demand for money; and consequently, the rate of interest must rise in the same proportion.—It has also been demonstrated in the seventh section, that if the *premium* so required shall consist of an additional interest or annuity to continue one year and then to cease, the rate of interest cannot possibly rise, nor the value of the stocks cannot fall, in consequence of the repetition of the demand for money.—And, on examination, it will be found, that if the rate of interest at the commencement of a war should be *3 per cent. per annum*, and the *premium* so required for the advancement of the new loan *£. 5 per cent.* the periodical increase in the rate of interest in the former case, will render a greater revenue necessary on the *eighth* year of a war (should the war so long continue) than would be required in the latter case.

If the rate of interest at the commencement of the war should be *3½ per cent. per annum*, and the *premium* so required *£. 5 per cent.* the former system of

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of financing will require a greater revenue on the seventh year of a war, than would be required on such *seventh* year by the latter system.—And the higher the *premium* or the *rate of interest* (or either of them) shall be, the sooner will the former system of financing require a greater revenue than the latter system.

Hence then, if a nation be able to raise a revenue sufficient for the payment of the interest of the loans necessary for carrying on such war, (and she certainly must be able to do that, if she be able to support a sufficient force for her defence during such war) she must consequently be able to raise a sufficient revenue to keep the comparative value between *money* and *annuity stocks* in *equilibrio*, or (in other words) to preserve the prices of the stocks from depreciation. And hence, the whole weight of the foregoing objection, with respect to *inability*, depends on the inadmissible pre-supposition of a nation being unable to defend herself.

To make these observations plain by an example,—Let it be supposed that the rate of interest at the commencement of a war should be *3 per cent. per annum*, and the *premium* necessarily required for each loan *£. 5 per cent.* and let it be supposed also, that the annual expences of the war should be *£. 10,000,000* to be raised by an annual loan:—

Now, 1st,—If the *premiums* be given in an additional quantity of annuity stock bearing *3 per cent.* it is perfectly evident, that *£. 105* of such annuity stock, must be given for every *£. 100* of the loan; so that *£. 10,500,000* of annuity stock bearing *3 per cent.* must be given for the first loan, and the annual interest thereof will be *£. 315,000*:—It would be perfectly absurd to suppose, in this case, that if the same extraordinary demand for money

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money should continue, the £.105 annuity stock so given for every £.100 of the first loan, should become worth more when another new loan became wanted, than the £.100 which was so given for it at first:—it could not, in fact, be worth so much, because of the natural and unavoidable commercial speculations mentioned in the latter part of the seventh section; but for regularity, let us take it at that rate.—In this case therefore, £.110 : 5 : 0 annuity stock bearing 3 per cent. must be given for every £.100 of the second loan, so that £.11,025,000 annuity stock must be given for the whole £.10,000,000 of the second loan; and the annual interest thereof will be £.330,750, which added to the interest of the first loan makes £.645,750.—In like manner, £.11,576,250 annuity stock bearing three per cent. must be given for the third loan, and so on continually increasing in the proportion of 100 to 105; and the revenue required for the payment of the interest will of course be greater and greater in the same proportion.

Wherefore, if the war should continue eight years, the least possible debt to be (in this case) incurred will be £.100,265,643 : 3 : 0; and the least possible revenue that can be required for the payment of the interest thereof will be £.3,007,969 : 5 : 10 $\frac{3}{4}$ per annum.—This, I say, is the least possible debt and revenue that can in this case be established: the debt and the revenue must *in fact* be much greater, because, the market prices of the stocks must in this case infallibly fall below their computative value, in consequence of the natural and unalterable principles of commercial speculation, mentioned in the latter part of the seventh section: in consequence of which, the

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the nominal capital of the debt from time to time established must be greater than has been mentioned, or else the premiums given for the loans cannot be £.5 per cent.*

2dly,—If the aforesaid premiums of £.5 per cent. should be given for the same loans of £.10,000,000 per annum, by giving an additional interest or annuity to continue one year and then to cease, each loan will make a debt of £.10,000,000, bearing an interest of £.8 : 2 : 3 (or rather £.8 $\frac{11277916}{10000000}$) per cent. per annum for one year, and afterwards 3 per cent. per annum.

Wherefore, if the war should continue eight years, the debt incurred will in this case be £.80,000,000; and the greatest possible revenue that can in this case be required, will be £.2,911,277 : 18 : 3 $\frac{1}{4}$.—This, I say, is the greatest possible revenue that can in this case be required;—the revenue must *in fact* be less, or else the premium that will be produced to the lenders must be greater than £.5 per cent. because, the market prices of the stocks must in this case be higher than their computative value, in consequence of the aforesaid natural and unalterable principles of commercial speculation, mentioned in the latter part of the seventh section. And here I may repeat what was *proposed* to be proved in the remark at the end of the 5th proposition, page 20, viz. that the first of the abovementioned methods is disadvantageous to the lenders, as well as to the public*.

Hence,

* It is supposed by some, that those terms that are the most disadvantageous to the public (or body politic) must be the most advantageous to the lenders; but we may observe,

Hence, then, a greater annual revenue by £.96,691 : 7 : 7, will (in the foregoing case) be required on the eighth year, for the payment of the bare interest of the loans, in consequence of the depreciation in the value of the stocks, than would be required on the said eighth year, both to prevent that depreciation, and to pay the interest of the self-same loans. And consequently, if a nation be able to raise the revenue required in the former case, she must be more than able to raise

observe, that as the capital or principal is not demandable by the lenders, but is dependent on the market competition for its value; such principle can no more hold true as a *necessary consequent*, than an opinion can hold true, that a wound or incision given to some or one of the members of the *body natural*, shall produce advantage to the other members of the same body.—The particular state of the circulation of the fluids of the *body natural*, and the manner of making the incision, must determine whether such incision shall produce advantage to the other members, or whether it shall not produce disadvantage, and even death itself to the whole.—In like manner, the state of the *circulation* (viz. the *market competition*) with respect to the stocks, must determine whether the terms of a loan shall produce advantage or disadvantage to a lender: and, seeing that the market competition with respect to the stocks, must depend on the proportion of money that shall be thrown into that channel of circulation; as also, that the proportion of money so thrown into that channel must depend on the administration of the revenue; it must necessarily follow, that the administration of the revenue must determine, whether the lender shall receive advantage, or whether both borrowers and lenders (like the several members of the *body natural*) shall not sustain loss: or whether even a *public bankruptcy* shall not be produced, like the *death* of the *body natural* in the foregoing simile.

raise a sufficient revenue for the preservation of the prices of the stocks from depreciation.

It must also be observed, that £.511,277 : 18 : 3 $\frac{3}{4}$ of the revenue in the latter case, either ceases, or becomes a sinking fund, immediately at the end of the war: whereas, no part of the revenue in the former case either ceases or becomes a sinking fund; but it is wholly taken up for the payment of the interest alone:—Wherefore, the former method of raising the money, must, in this example, be productive of a loss to the public of a perpetual revenue of £.607,969 : 5 : 10 $\frac{3}{4}$ per year; or rather (as the interest is here supposed to be paid half-yearly) £.303,984 : 12 : 11 $\frac{3}{8}$ per half year; (exclusive of the still farther losses that must be produced from the beforementioned natural and unavoidable commercial speculations) which, computed according to the aforesaid rate of interest at 3 *per cent. per annum*, is exactly equal in value to £.20,265,643 : 3 : 0; the difference between the debt incurred in the one case, and that incurred in the other case.

The following Tables, the *one* supposing the rate of interest at the commencement of a war to be 3 *per cent. per annum*, and the *other* supposing it to be 3 $\frac{1}{2}$ *per cent. per annum*, will shew the total quantity of debt incurred, and the total revenue thereby required at each year of a war, admitting the annual loan to be £.10,000,000, and the premium required for the advancement of it, in consequence of the extraordinary demand for money, to be £.5 *per cent.* from whence the losses attendant on the former method of giving the premiums (exclusive of the farther losses produced from the beforementioned speculations) will be seen by inspection.

TABLE

TABLE supposing the rate of interest at the commencement of the war to be 3 per cent. per annum payable half-yearly.

Years of the war.	Debt and annual Revenue if the premium be given in an additional quantity of stock.		—If the premium shall be given in an additional interest or annuity to continue one year.	
	Debt.	Revenue.	Debt.	Revenue.
1 st	£. 10,500,000	0 0	£. 10,000,000	0 0
2 ^d	21,525,000	0 0	20,000,000	0 0
3 ^d	33,101,250	0 0	30,000,000	0 0
4 th	45,256,312	10 0	40,000,000	0 0
5 th	58,019,128	2 0	50,000,000	0 0
6 th	71,420,084	10 0	60,000,000	0 0
7 th	85,491,088	14 0	70,000,000	0 0
8 th	100,265,643	3 0	80,000,000	0 0

N. B.—In this case no part of the revenue ceases nor becomes a sinking fund; and the quantity by which the debt in this case exceeds the debt in the annexed case becomes a public loan.

TABLE supposing the rate of interest to be 3½ per cent. per annum.

Years of the war.	Debt and annual Revenue if the premium be given in an additional quantity of stock.		—If the premium be given in an additional interest or annuity to continue one year.	
	Debt in 3½ per cent. stock.	Revenue.	Debt.	Revenue.
1 st	£. 10,500,000	0 0	£. 10,000,000	0 0
2 ^d	21,525,000	0 0	20,000,000	0 0
3 ^d	33,101,250	0 0	30,000,000	0 0
4 th	45,256,312	10 0	40,000,000	0 0
5 th	58,019,128	2 0	50,000,000	0 0
6 th	71,420,084	10 0	60,000,000	0 0
7 th	85,491,088	14 0	70,000,000	0 0
8 th	100,265,643	3 0	80,000,000	0 0

N. B.—In these cases no part of the revenue ceases nor becomes a sinking fund; and the quantity by which the debts in these cases exceed the debt in the annexed case becomes a public loan.

N. B.—In this case, £513,162:18:11½ of the revenue, either ceases, or becomes a sinking fund immediately at the end of the war.

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If the loans should be made by giving the *premiums* in an additional interest or annuity to continue any determinate number of years, the *losses* will be less in such case than the *losses* in the foregoing case, in the same proportion as the *depreciations* in the value of the stocks shall be less in such case than the *depreciations* in the foregoing case. But it may be observed, from the seventh section (see the Table, page 125) that if the additional interest or annuity shall continue any considerable number of years, the depreciations in the value of the stocks will be but little less than if the *premiums* were given in an additional quantity of annuity stock: and consequently, the loss to the public can be but little less in such case than in the foregoing case.

The attentive reader will observe, that what has been mentioned in this section, respecting the losses, perfectly agrees with what was mentioned in the fourth section; although the principles of deduction are totally and entirely different.

But it may perhaps be objected here, *that, as in the cases of giving the premium in an additional quantity of annuity stock, or in an additional interest or annuity to continue any determinate number of years, the value of the stocks will not recover to par when the extraordinary demand for money ceases; they may consequently be redeemed at a discount, whereby the before-mentioned losses will be avoided.*

This objection appears at first sight to have some weight; but on examination, it will be found, that the savings attendant on the redemption of the stocks at a discount are entirely imaginary; and that the loss, instead of being thereby avoided, will in reality be increased.

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It must be observed, that (per postulatam 1st) a time of war is not only followed by a time of peace; but a time of peace is also followed by a time of war: wherefore, in order to investigate the effects that are attendant on any system of financing, it is necessary to take more wars than one into consideration.

Let it be supposed then, that the rate of interest at the commencement of the first war should be 3 per cent. per annum, payable half-yearly; and let it also be supposed, that the continuance of the war should be eight years, and that the expences thereof, and the *premiums* necessarily required for the loans in consequence of the extraordinary demand for money, should be the same as in the foregoing examples.

Now, if the *premiums* required for the loans shall be given in an additional quantity of annuity stock, the nominal capital of the debt will be greater by £. 20,265,643 : 3 : 0, than it would be, if the same *premiums* should be given in an additional interest or annuity to continue one year.— See the Tables in pages 158 and 159.

This nominal capital, so far as it shall exceed the *market value* thereof, is indeed (in itself considered) rather imaginary than real; but it must be observed, that after the termination of the war, the debt in the former case will be attended with a perpetual revenue of £. 607,969 : 5 : 10 $\frac{1}{4}$ per annum, more than in the latter case: and consequently, so much as it would actually cost to redeem or release this revenue, so much must be a *real* (not an *imaginary*) loss to the public, considered as a capital.

The point of recovery in the value of the stocks, at the termination of the war (exclusive of the effects that shall have been produced by the

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commercial

commercial speculations mentioned in the latter part of the seventh section) will in this case be £.84 : 6 : $1\frac{3}{4}$ cash, for £.100 of annuity stock*.—See the $3\frac{1}{2}$ per cent. table in page 125, which will in

* If the reader should not have entered fully into the spirit of the computative system demonstrated in the seventh section, he will nevertheless be able, in this particular case, to convince himself very nearly with respect to the point of recovery; by considering simply, the general intentions of the parties borrowing and lending.

For instance,—There are in this example eight loans, and the intended *premium* on each is £.5 per cent.—Hence then, a lender who advances £.100 towards each loan, advances in the whole £.800; for which he ought (in order to fulfil the intention) to receive £.840 besides the interest: the interest he does receive periodically; and he also has £.1002 : 13 : $1\frac{1}{2}$ annuity stock, for such £.800 so advanced, or for such £.840 which he so ought to receive: wherefore, in order to fulfil the honest intention of the parties, each £.100 stock ought to be worth £.83 : 15 : $6\frac{1}{2}$.—The difference between this £.83 : 15 : $6\frac{1}{2}$, and the abovementioned point of recovery £.84 : 6 : $1\frac{3}{4}$, is produced by the ADDITIONAL proportion of money thrown into this channel of circulation for the payment of the *interest* of the loans, in consequence of the *increase of the rate of interest* which goes hand in hand with the *depreciation of the stocks*.

We may observe here, how very closely the general intentions of the parties are pursued, by those immutable laws of nature, which the great Creator has ordered, for the governance and connection between *causes* and *effects*.—It must however be observed, that as NATURE governs by general laws, she cannot correct the irregular distribution, which this system of financing must produce among the several lenders.—Those who contribute *only* to the last loans, instead of receiving a natural or reasonable profit, must have a very unnatural and unreasonable one: and those who contribute only to the first loans, instead of receiving a reasonable profit, must sustain a prodigious loss by this system of financing.

in this case shew the depreciations of 3 per cent. stocks exactly.

But the stocks cannot be redeemed at this price, because, throwing a sinking fund into this channel of circulation creates a new demand for the stocks, and consequently carries their prices higher.—If the sinking fund should be sufficient to carry the stocks to *par*, it is perfectly evident, that the aforesaid revenue of £.607,969 : 5 : $10\frac{3}{4}$ per annum, could not be redeemed or released under the aforesaid sum of £.20,265,643 : 3 : 0; and if the sinking fund should only be sufficient to carry the prices of the stocks to £.85 or £.86, the redemption or release of the said revenue, would, even in that case, cost more than £.17,000,000: so that the redemption of it at this discount would make the capital loss, *only* about £.3,000,000 less than it would be in case the sinking fund should be sufficient to carry the prices of the stocks to *par*.

It must also be observed, that if the sinking fund should be sufficient to raise the prices of the stocks to *par*, a second war of the same duration and expence would require *only* an equal revenue with the first war: but, if the sinking fund should be sufficient only to raise the stocks to £.85 or £.86, the rate of interest at the commencement of the second war would be $3\frac{1}{2}$ per cent. per annum: and if the second war should be supported by the same system of financing (see the Table in page 159) it would require a perpetual revenue of £.3,509,297 : 10 : 2 per annum: whereas, if the same premiums for the loans during the first and second wars, should be given in an additional interest or annuity to continue one year, the revenue required for the second war would be only

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£.2,911,277

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£.2,911,277 : 18 : $3\frac{1}{4}$, the same as in the first war; out of which last mentioned revenue, £.511,277 : 18 : $3\frac{1}{4}$ would be released from the debt immediately at the end of the war:—Wherefore, at the end of the second war there must be another public loss, of a perpetual revenue of £.1,109,297 : 10 : 2 per year; exclusive of the still farther losses that must be produced by those natural and unavoidable speculations, mentioned in the latter part of the seventh section.

The point of recovery in the value of 3 per cent. stocks at the end of such second war (exclusive of the effects that shall have been produced by the beforementioned speculations) will be £.72 : 5 : $3\frac{1}{4}$, as in the Table, page 125.—But, seeing that throwing a sinking fund into this channel of circulation, creates a new demand for the stocks, and thereby raises their price, the aforesaid revenue of £.1,109,297 : 10 : 2 could not be redeemed or released at that price: and, if we should suppose that the sinking fund should be such, as should only raise the 3 per cents. to £.75, whereby every £.3 of such revenue would be redeemable for £.75 ready-money; the rate of interest would then be 4 per cent. per annum: and a third war of the same duration and expence as the former, supported on the same system of financing, would require a perpetual revenue of £.4,010,625 : 14 : $6\frac{1}{4}$ per year; and would consequently be attended with another public loss, of a perpetual revenue of £.1,610,625 : 14 : $6\frac{1}{4}$ per year; exclusive of the still farther losses produced by the beforementioned speculations;—Wherefore, the *apparent public saving* produced by the redemption of the stocks at a discount, is, *in effect*, no

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no other than a *real public loss*, attended with a perpetual accumulation of interest.

Hence then, to sum up in a few words, by way of conclusion,—The good or evil with which a public debt will be attended, must depend on the manner in which it shall be conducted; which becomes resolved into these simples; viz.

If the *premiums* necessarily required for new loans, on account of the extraordinary demand for money, be given in an additional quantity of annuity stock, or in an additional interest or annuity to continue longer than the time of the continuance of the extraordinary demand for money, the debt must increase in a *geometric progression*; and unless the sinking fund to be applied to its redemption in time of peace, shall in *quantity* be proportionate to the loans in time of war, according as the times of the continuance of *war* and *peace* shall be proportionate to each other, (—a proportion which, *in fact*, can never be ascertained) the farther the *loans* and the *sinking fund* shall proceed in their respective progressions, the farther the latter will be left behind.

On the other hand,—If the premiums so required shall be given in an additional interest or annuity, of the same continuance as the times necessarily limited for the advancement of the loans, the debt will increase in an *arithmetic progression* only; and by the application of a sinking fund in time of peace, the redemption of the debt will proceed in a *geometric progression*: and consequently, whatever shall be the proportion between the *loans* and the *sinking fund*, with respect to *quantity*, the *latter progression* must infallibly overtake the *former* and become the conqueror.

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If

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If the *premiums* shall be given as in the former cases, the *balance* or *equilibrium* in the circulation of the capital will become lost; or, in other words, the value of the stocks will depreciate from the *par* of ready-money; and a public loss must be thereby sustained: and, although the stocks, in consequence thereof, shall afterwards become redeemable at a discount; yet, so far is that circumstance from producing any real advantage to the public, that the *loss* must from thence be for ever increasing: and consequently, in whatever nation such system shall be pursued, however great the resources of such nation shall be (admitting them only to be *finite*) they must infallibly become exhausted, and a public bankruptcy must therefore be inevitable.

On the other hand,—If the premiums shall be given in an additional interest or annuity of the same continuance as the times necessarily limited for the advancement of the loans, the *circulation* will be thereby preserved in *equilibrio*; or, in other words, the value of the stocks will be thereby preserved from depreciation; and, the sinking fund that shall be applied to the redemption of the debt in time of peace, will necessarily raise the stocks above the *par* of ready-money; and thereby cause the rate of interest to decrease:—Wherefore, in this case, every new war will require a less revenue, in proportion to its expence, than the war preceding it: and consequently, in whatever nation this system of finance shall be pursued, the public debt must be productive of a saving and advantage to the state at large, and to every of its members individually.

The studious reader will have observed, that the same immutable laws and principles that were given

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given to the UNIVERSE by its GREAT CREATOR, pervade and govern all things throughout all nature, on one and the same general and universal BASIS.

It is not public credit *alone* that is supported by the preservation of a *balance* or *equilibrium* in the CIRCULATION;—the animal, the vegetable, and every other thing in the creation, is supported on the self-same principle; and each equally declines, whenever the necessary circulation discontinues to proceed in *equilibrio*.

The planetary system or *universe* is supported *solely* by the *balance* or *equilibrium* which is preserved among the heavenly bodies, by their respective motions or *circulations* in their respective orbs:—The *primum mobile* of that circulation, is the *conjunct* power of GRAVITATION AND REPULSION which the Great Creator implanted:—While that continues, the universe must be immortal: but if that *primum mobile* be withheld, the planets must consequently wander; and the whole system of nature must infallibly fall to nought.

In like manner, the PUBLIC REVENUE* is the *primum mobile* of the circulation which preserves the *balance* or *equilibrium* necessarily required for the support of public credit:—If the revenue be applied in its due proportion, public credit must infallibly flourish with immortal health and vigour: but if the revenue be not so applied, public

* The public revenue, until it be actually collected, may be properly considered as a *want* or *necessity*; and after it is collected, it becomes the *supply* of such *want*:—it therefore forms a most perfect simile with the *conjunct* power of *gravitation and repulsion*, mentioned above.

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lic credit must (with equal infallibility) *decline*, and *die*.

It is generally considered as a *maxim*, that when the source or fountain of a malady becomes thoroughly investigated and developed, a cure is easily effected.—This *maxim* holds perfectly true with respect to the maladies that may befall public credit:—However great those maladies may become, they will ever remain perfectly curable, until the public credit itself shall become totally exhausted. The remedy will also be simple and natural: and will be productive of benefit to ALL, without producing the smallest new disadvantage to ANY.

It has been fully demonstrated in the foregoing pages, that the maladies of public credit proceed (not from the *greater* or *lesser premiums* that may be required for new loans, in consequence of the extraordinary demands for money in time of war, but) principally from the *MANNER* in which the self-same *premiums* shall be given, for the self-same loans.—In like manner, it shall be demonstrated hereafter, that the time required for the cure of those maladies, will depend (not on the *greater* or *lesser sinking fund*, that shall be applied to the redemption of the debt in time of peace, but) principally on the *manner* in which the self-same *sinking fund* shall be applied, for the redemption of the self-same debt.

The mere redemption of a part of the debt can contribute no farther to the cure of the *malady*, than the amputation of a mortified limb, contributes to restore the patient's health:—That amputation may indeed be a necessary part; but the grand and principal object will be the restoration of the proper *circulation*:—if that be not effected, the

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the patient must infallibly *die*: and so likewise must public credit.

I have often heard it mentioned as a *maxim*, that in all cases whatever, the remedy ought to be so applied, as to operate in conjunction with nature; and, that if the remedy be so applied, as to obstruct, or be obstructed by, the unalterable course and order of nature, the disease will be thereby the more increased, and the cure will be at best more tedious.

There cannot be any case whatever, in which this *maxim* holds more perfectly just, than in public credit.—The only remedy in nature, for the maladies of public credit, is a *sinking fund*; or, in other words, a revenue wherewith to redeem the debt.—The larger this *sinking fund* shall be, if properly applied, the sooner the cure will be effected: but if the sinking fund be improperly applied (although actually applied to the redemption of the debt, as invariably as in the former case) the larger it shall be, the more the malady will be for a time increased; and the more tedious in *proportion* will be the cure.

In a word,—If the malady shall become any thing considerable, however large the *sinking fund* shall be, there can be but little (if any) probability of ever effecting the cure, by using an improper method in the application of it: and, on the other hand, however small the *sinking fund* shall be, or however great the malady,—if the sinking fund shall be properly applied, it will infallibly effect a perfect cure, and INFALLIBLY RESTORE THE PUBLIC CREDIT TO ITS PRISTINE STATE.—This shall be the subject of a future essay.

P O S T-

P O S T S C R I P T.

S E C T I O N I.

Brief Observations respecting the PRINCIPLES on which the Art of levying Taxes must depend; with some brief Observations respecting the Principles of Paper-Money, and Real Resources.

IN the note in page 149, I promised to say a word or two, by way of postscript, respecting the PRIMARY PRINCIPLES on which (from what had been then previously deduced) the art of levying taxes must depend.

It may be observed, as a leading principle, that the natural use and intention of taxes, is to divide the public burthens of a state among the different members who compose it, in proportion (as nearly as may be) to their respective abilities; which, in reality, is, in proportion to the benefits which they respectively derive from the protection of the state.

Money, as has already been observed, is the general representative of other property, and the instrument by which the value of the several kinds of property is defined and measured: and it will doubtless be admitted, that it must be the most convenient

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convenient for the service of the state, that this *general representative* should be the *article* in which the taxes should be collected.

If the comparative value of money was governed altogether by the *quantity* in circulation, whereby its value (compared with other kinds of property) would be in a *simple ratio*, as the *quantity of circulating money inversely*; then, it is perfectly evident, that in order to divide the public burthens of the state, in proportion to the respective abilities of the different members, the taxes must in such case be levied in proportion to the respective *estates* or *visible abilities* of the people.

But it has been demonstrated (in the eighth section) that the comparative value of money is not in a *simple ratio*, as the *quantity of circulating money inversely*; but, as the *product of the multiplication of the quantity, by the force or velocity with which it shall circulate*, by which *product* the demands for money become supplied; and it has also been demonstrated, that the circulation of *other property* and the circulation of *money* is in *effect* one and the same thing.

Hence then, if taxes should be levied in proportion to the visible abilities or *estates* of the people without regard to the *circulation*; those kinds of property that have naturally but little circulation, must be thereby depreciated in their value; and the value of those kinds of property that have naturally a brisk circulation, must, on the same principle, be thereby increased: wherefore, this method of levying the taxes must in reality destroy the very effect which was intended to be supported.

It must also be observed, that if the taxes should be levied in proportion to the visible abilities or *estates*

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estates of the people, without regard to the *circulation*, large proportions of money will be required from channels wherein only small proportions circulate:—In this case therefore, the taxes (so far as they may be collected) must evidently be excessive burthensome; and if the requisitions should be very large, the full collection must be impracticable: for, it is evidently impossible to take an hundred gallons of water, or an hundred pounds of money, where there are only ninety-nine: and every principle of finance must evidently be thrown into irregularity, confusion, and disorder by the attempt.

If taxes and contributions fail of being collected, the deficiencies can be supplied *only* by new emissions of money, of some kind or other:—by this means the ordinary channels of circulation must become overloaded, and a depreciation in the comparative value of the circulating medium (whatever it shall be composed of) must consequently take place.

If the new emitted medium should be of universal circulation, as *gold* and *silver*, the depreciation will naturally be checked by its efflux to foreign countries, as an article of *merchandise* to be bought and sold: but so far as the ordinary channels of circulation shall be therewith overloaded, as a *local instrument* wherewith to buy and sell, so far the depreciation in its comparative value must necessarily prevail.

Should the new emitted medium have only a local circulation as *paper-money*, there can be no efflux to check the depreciation; and by repeated new emissions, its comparative value must consequently fall to nought.

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It does not indeed follow, that the actual wealth or resources of the state shall be on this account diminished, in any greater degree than the industry and oeconomy of its members shall be decreased: because (as was observed in the note, page 143) *money* considered *purely* as an instrument wherewith to buy and sell, does not (properly speaking) compose any part of the actual capital or wealth of a state.

It is always necessary to distinguish between the REAL WEALTH OF RESOURCES of a state, and the *instrument* by which such WEALTH OF RESOURCES may be represented and defined.

The REAL WEALTH OF RESOURCES of any nation, can evidently be no other than the ability (or means) of such nation, to supply a greater or lesser number of people, with whatever shall be requisite for the performance of the duties required of them.

If a nation shall from time to time become able to maintain and supply a greater and greater number of people, the real wealth or resources of such nation must consequently be increasing: this must evidently be the case, if the productions* of the state shall, on the whole, exceed its consumptions.—On the other hand, if the consumptions of a state, shall, on the whole, exceed its productions, its wealth and resources must consequently decrease; whatever may be the quantity of money in such state, or whatever may be the materials of which such money is composed.

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* By the productions of a state I would be understood to mean every thing whatever that shall be honestly acquired; whether by one kind of occupation or another.

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It is perfectly evident, that the *productions* of any nation must depend on the *industry*, and that its *consumptions* must depend on the *economy* that shall prevail in such nation: wherefore, the sole fountain from whence the real wealth or resources of any state can flow, consists in the number of her industrious and frugal members: and consequently, MONEY, whatever materials it shall be composed of (while it shall be used as an instrument for the local conveniency of buying and selling, or for the necessary exchanging of one article for another) cannot have any farther connection with the real wealth or resources of a state, nor cannot be productive of any other effects thereon, than as the *industry* and *economy* of the members shall be thereby stimulated on the one hand, or clogged on the other.

The expectation of *profit* is evidently the *primum mobile* or *main spring* both of industry and economy, and consequently, in proportion as this main spring shall be weakened by the fluctuation in the comparative value of money, or of other property, in that proportion (and no other) the state must, in consequence thereof, verge towards its ruin.

Of all the evils that can befall a nation, war is perhaps the most expensive and the most destructive; but it must evidently be admitted, that so far as the industry of any nation shall provide the articles necessary for carrying on a war, and shall actually collect those articles together, so far the war may be carried on; whether the articles so required, are taken from the industrious proprietors *with* or *without* giving an equivalent for them.—The distress, calamity, and ruin, that must be inseparable from such a state of things, is indeed too

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too perfectly obvious to need description: but these evils fall *first* on the individuals, and reach the state, as a body politic, in that proportion (and no other) as the ruin of the individuals shall be effected.

This distress, calamity, and ruin, (it may be observed) flows from the unequal division of the public burthens; and it is perfectly evident, that it must prevail in a greater or lesser degree, according as the industrious proprietor of the articles so required, shall receive a lesser or greater proportion of their value in return for them:—It is also equally evident, that so far as the comparative value between *money* and *other property* shall become altered from its ordinary PAR, in consequence of the public demands for money; so far this unequal division of the public burthens, and the distresses and calamities that are inseparable therefrom, must consequently take place; whether the *depreciation* shall be in the value of the *money*, or in the value of the *other property*, which is represented and measured by the money, and must be given to obtain it.—The only difference in the effects that will be produced by the *one* and the *other* depreciation, will evidently be this;—in the *one* case, the *immediate* distress will fall on those to whom money shall be paid; and, in the other case, the *immediate* distress will fall on those from whom money shall be demanded: but the *eventual* consequences to the state, as a body politic, are precisely the same.

This observation will appear perfectly clear, by considering on the one hand, the additional burthens that must fall on those who shall be obliged to receive payment for debts, in money that shall be depreciated to half the value at which it was current

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current when such debts were contracted; and, by considering on the other hand, the additional burthens that must fall on those who shall be obliged to raise money by selling annuity stocks (or any other estates) when the current value of such property shall be depreciated to half the sum which it cost them.

The burthens of the state must indeed *unavoidably* fall somewhere; but so far as people shall sustain loss from either of these depreciations, so far those burthens must evidently fall in a distressful disproportion:—It is also perfectly obvious, that an immense encouragement to idle speculation, and an immense discouragement to honest industry, must naturally be thereby produced.

Hence, then, the grand practical PRINCIPLE on which the art of levying taxes must depend, in order to divide the public burthens of the state, proportionately (as nearly as may be) among the members, consists in the preservation of a *par* or *equality* (as nearly as may be) in the comparative value between *money* and *other property*, throughout the whole machine of circulation.

And, seeing (per section 8) that the comparative value between money and other property is (not as the *quantity* of circulating money, but) as the *PRODUCT* of the multiplication of the *quantity* by the force or velocity of the *circulation*;—and, seeing also, that the circulation of *money* and the circulation of *other property* is *in effect* one and the self-same thing;—so, CONSEQUENTLY, in order to preserve such *par* or equality, the taxes ought to be levied (not in proportion to the *apparent value* of the property or estates of the people, but) in proportion to the *PRODUCT* of the multiplication
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of the *apparent value* of such property, by the *force* or *velocity* with which it shall actually circulate, or be bought and sold.

This, I say, is evidently the GRAND PRINCIPLE on which the art of taxation must depend, in order to divide the public burthens of the state, among its several members, in proportion to their respective abilities*. And it may also be observed, that if the ordinary channels of circulation shall be supplied with a proper sufficiency of the circulating medium, for the purposes of buying and selling; and the system of taxation be founded
on

* It was not proposed (and indeed it would be too tedious) to endeavour here, to reduce this PRINCIPLE to a regular practical system: but there cannot, I think, be the remotest degree of doubt, with respect to the truth of the *principle itself* considered as a *basis*: and although there may (at the first sight) appear to be something of a difficulty with respect to its practical application; yet I will venture to say, that the reduction of it to a system of practice, cannot, in the nature of things, be a proposition much less simple, than that of reducing the principles of the fluctuation in the value of annuity stocks to a system of computation.

Nothing can, in my opinion, be more perfectly clear and evident, from every observation which nature holds forth to our view, that there is in all cases a perfect chain of connection laid down by Divine Providence, between *causes* and their respective *effects*; whereby the *one* may be regularly traced from the *other*. And I am fully of opinion, that the *mysteries* with which things *appear* (at the first sight) to be enveloped, proceed (generally speaking) from an *apprehension* of difficulty which somehow or other prepossesses the mind with a kind of languor, rather than from any intention of the Supreme Being, to hide the regular chain of connection from his creatures.

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on this principle; the taxes required from the respective channels, will be proportionate to the *quantity* of money therein naturally circulating, and the *force* or *velocity* with which it shall return again (in the natural course and order of things) into its respective channel: in which case, the collection of the taxes will also be natural and easy, like the collection of water in large proportions from streams where large proportions naturally flow; and in small proportions from streams where small proportions naturally flow; and the natural order and proportion among the several streams will evidently be preserved: which could not possibly be the case, if the same proportions should be required from channels wherein the circulation is naturally flow, as from channels that have naturally a brisker circulation.

The necessary circulation of property in a state, in order to divide the public burthens *proportionately* among the members, may (not improperly) be compared to the necessary motions of any other fabric of machinery, in order to produce any required effect.

It is in all cases indispensably necessary to the production of a regular effect, that the machine be so constructed, as to have an *uniform* or *homogeneous* motion among its several parts, according to their respective powers.—If this shall be the case, the *effects* thereby produced, will likewise be uniform and regular: but if the motion among the several parts be heterogeneous, the effects must consequently be heterogeneous also.—It is evidently immaterial, whether the flowing matter by which the primary wheel of the machine be set in motion, shall consist of *water* or of *wine*.—Wine would indeed be preferable to water, in case it

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should be withdrawn from that service, but not else.—In like manner, whether the flowing matter (*viz.* MONEY) by which the primary wheel of a state (*viz.* INDUSTRY) is set in motion, shall be composed of *one* kind of materials or of *another*, the self-same *effects* will be thereby produced, so long as it shall remain in that particular service.

Paper-money is by some considered as a *mockery* and *delusion* because (they say) it has no *intrinsic* value.—It must indeed be admitted, that there is no *intrinsic* value in paper-money: but this admission will not, in the smallest degree, support the opinion of its being a *mockery* or *delusion*.

If we trace the value of property, according to the natural course and order of things, to the real source or fountain from whence that value proceeds, we shall find that there is no article whatever, whereof the *value* has any *internal* or *intrinsic* residence in the article itself.—The *value* of any article of whatever sort or kind, is (not *intrinsic*, *independent*, or *absolute*, but) *extrinsic*, *dependent*, and *comparative*; and resides altogether (as mentioned in the 4th postulatam) in the *demands* or *occasions* that there shall be for such articles, and the *ease* or *difficulty* with which those demands may be supplied.

Those things which are the most immediately essential for man's existence, may perhaps be the most proper, and the most convictive, for the elucidation of this observation.

Food and raiment, then, are evidently the most essentially necessary; and, consequently, the most truly valuable of all commodities: but their value has no kind of *internal* or *intrinsic* residence in the articles themselves.—If men went universally *naked*, and neither *ate* nor *drank*, what value could

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there possibly be in *eatables, drinkables, or clothing*?—the *VALUE* therefore is *extrinsic*, not *intrinsic*:—it does not reside in the things themselves;—it evidently resides altogether in the wants and occasions of man.

In like manner, the *VALUE* of every thing else, of whatever sort or kind, is *extrinsic*, not *intrinsic*; and it is the *demand* (and the *demand alone*) that makes it *valuable*.

Hence, then,—If *paper-money* be created, and a proportionate *demand* therefor be at the same time created also, it must consequently have the self-same value as any thing else, so far as such demand extends.

In every civilized state there must be a necessity for *taxes*, and (of course) a *demand* for a *circulating medium* of some kind or other: and while the *taxes* or *demands* therefor are proportionate to the *supply* thereof, how is it possible that its value can depreciate, whether it be composed of *one* kind of materials or of *another*?—It is perfectly evident, from the very nature of things, that it cannot in that case suffer any depreciation whatsoever.—On the other hand, it is equally evident, from the nature of things, that if the *supply* shall exceed the *demand*, its value must infallibly depreciate, whatever may be the materials of which it shall be composed.

Every inhabitant of the commercial zone bears experimental testimony to the truth of the above principle, by the depreciation which has actually taken place in the value of *gold and silver money*, since the discovery of the *mines* of the western world. And, although it was not the intention of this essay, to enter into enquiries of an historic kind; but *purely* to trace, by fair deduction, those unerring

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unerring paths of nature, by which *causes* and *effects* are unalterably and inseparably connected; yet, I cannot help observing, that should history be unfolded, the deductions herein contained will be thereby supported in every part.—Neither are we under a necessity of examining the annals of different ages, languages, and nations: our own age and nation furnishes a sufficiency of these historic proofs.—The doctrines herein before deduced, respecting the nature and properties of *annuity stocks*, and the principles by which the comparative value of *money* is governed, are verified by every English magazine in which the current prices of the stocks are given: and the British colonies in America afford a complete and perfect (though now indeed a very *melancholy*) experimental proof of the truth of the foregoing observations, on the principles of *paper-money, taxation, and real resources*.

S E C T. II.

Brief Remarks respecting the actual State of Public Credit, and the current Prices of the Stocks from time to time in Great Britain; and the Agreement thereof with the Principles and computative Values demonstrated and deduced in the foregoing sections.

HAVING little or nothing but my own memory to refer to, for what I shall lay down as the *actual state* of public credit from time to time in Great Britain, I am obliged to be rather *general* than *particular* in my comparison of it, with the foregoing principles: this general comparison

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will however be perfectly sufficient to shew the agreement and coincidence of the *one* with the *other*.

From the foregoing sixth section, it appears, that one of the natural *properties* or *effects* of a transferable public debt, is the introduction of money into a regular and free circulation, which would otherwise lay dead from time to time, in the coffers of those who have from time to time an occasion to make use of it, in the course of their business.

That this *effect* was thereby actually produced in Great Britain, is perfectly evident from the immense increase in the business of banking, which followed (I must say *NATURALLY FOLLOWED*) the establishment of the public debt; and which was not confined to the metropolis, but spread itself throughout the whole kingdom; in spite of the many vulgar prejudices, and other obstacles which lay in its way.

It also appears from the sixth section, that the rate of interest for money is governed (not by the *quantity*, but) by the *circulation*, whereby it shall regularly flow through the hands of the lenders: and, that any additional proportion being thrown into that channel of circulation must naturally produce a decrease in the rate of interest.—And we accordingly find, that after the establishment of the public debt, the rate of interest in England did actually decrease from *eight per cent. per annum*, to less than *three per cent. per annum*, in spite of the very many and very great errors in the system of practice with which the public debt was conducted, whereby that decrease in the rate of interest was retarded in its progress.

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From the latter part of the sixth section it also appears, that although a public debt is necessarily attended with taxes on the subjects; yet, while it produces a decrease in the rate of interest, the ill effects or *burthens* of those taxes will naturally be counteracted, by the inseparable connection between the rate of interest and the necessary commercial profits: and, that in case the decrease in the rate of interest be very great, the taxes so required will (in their effects) produce an actual advantage to the members of the state at large, instead of being burthensome.

This part has also been perfectly verified in England, as evidently appears, from the increasing comfortableness and decency in the manner of living, which actually diffused itself throughout all ranks and orders of the state, as the rate of interest decreased.

Some writers who are prejudiced against a public debt, have endeavoured to account for this decrease in the rate of interest, and the happy effects which naturally resulted from it, on different principles;—the following is the only one of those principles that I recollect to have heard of, which is any way worth mentioning.

The abovementioned decrease in the rate of interest, which took place in England after the establishment of her public debt, has been attributed to the increase of commerce and industry, which went hand in hand with the decrease in the rate of interest: but I am of opinion, that on examination, we shall find that the *cause* has in this instance been mistaken for the *effect*; and the *effect* for the *cause*.—Which was the *effect*, and which the *cause*, I shall submit to the reader's judgment.

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judgment and decision on the following consideration.

It is perfectly evident, if we reflect a single moment, that the CAPITALS which shall be actually employed in commerce and industry, are the sole foundations on which that commerce and industry can be supported and carried into effect.—Hence, then, the commerce and industry of any nation can never increase in any other proportion, than as the capitals so EMPLOYED shall be increased: it therefore behoves us to enquire into the *causes* that increased the *capitals* that were so employed; because, those *causes* were evidently the *real causes* of that increase of commerce and industry which then took place.

It is the nature of man, when engaged in any profitable undertaking, to employ therein as large a capital as he is conveniently able to obtain; and his periodical resources or incomes (either *real* or *supposed*) are evidently the measures of his ability with respect to obtaining such capital; whether it be obtained on credit, or by an actual sale of some estate: it is also perfectly evident, that as the rate of interest *decreases*, the CAPITAL which will be obtainable for any given periodical income becomes *increased* in the same proportion.

In agreement with these principles, as fast as the rate of interest decreased, so fast those who were engaged in any branch of business, were enabled (with the self-same resources) to increase the capitals which they had usually employed therein; and in proportion as the capitals so employed were increased, in that proportion the commerce and industry to which those capitals were applied, naturally increased also.—The increase therefore which took place in our commerce and industry,

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was the *effect* of the decrease in the rate of interest,—not the *cause* of it.

As an increase of commerce and industry must necessarily require an increase of CAPITAL to carry it on, it must necessarily increase the *demand* for capitals; and must therefore, in the first instance, contribute to *increase* (not to *decrease*) the rate of interest.—The commercial returns will indeed *afterwards* have a tendency towards decreasing the rate of interest:—If the increase in the commercial returns, shall exceed the increase of the demand for capitals, it will naturally produce a decrease in the rate of interest, so far forth as such *excess* shall *actually* be thrown into the hands of lenders: but it is evidently impossible that a decrease in the rate of interest can flow in any farther degree from this cause.—It is evidently the circulation of money through the hands of the lenders (and that circulation *alone*) which governs the rate of interest; and those commercial effects that are *naturally* connected with the rate of interest, must necessarily go hand in hand with it, whether the money so thrown into that channel of circulation shall flow from *one* fountain or from *another*.—On every consideration, therefore, the increase of our commerce and industry was immediately the *effect* (not the *cause*) of the decrease of the rate of interest.

The PRIMARY CAUSE of every human action, has its origin in the wants and necessities of man.—From that original fountain every of the effects proceed, in a natural and regular chain of connection: and those effects will be either *good* or *evil*, according as a proper or improper method shall be pursued for supplying those wants and necessities.

It was the want of money for the public service that gave rise to our public debt:—The punctuality

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lity with which the interest was paid, and the ease with which the stocks were transferable from one person to another, removed the difficulty which had prevailed before, with respect to re-obtaining money, after a man had put it out of his own hands:—This naturally brought those sums into circulation, which had used to lay from time to time dead; and thereby raised the business of banking (that very essential branch, which may almost be considered as a *vital* of the commercial system) to its proper rank and dignity in the scale of commerce: the regular influx of money into the hands of the bankers (or lenders) naturally produced a decrease in the rate of interest:—The decrease in the rate of interest enabled the industrious (on the same resources that they had before) to increase the capitals they had usually employed in their respective undertakings:—The commerce and industry of the state naturally increased with the capitals so employed:—And, the increase of commerce and industry naturally diffused the blessings of an increasing plenty and abundance through the land.

I submit this simple chain of connection to the reader's candid judgment, and I cannot but flatter myself that on serious contemplation (laying aside those ideal suppositions of *mysterious complication* which are apt at first to impose on the mind) he will find this simple connection to be truly just and natural, and perfectly coincident with that universal chain, by which the Almighty Framers of the universe has linked all other *effects* with their respective *causes*.

By observing the several links of this truly natural and simple chain of connection, we shall find, that in order to supply our several wants and necessities,

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necessities, COMMERCE and INDUSTRY must be encouraged and promoted:—In order to promote and increase commerce and industry, the CAPITALS therein employed must be increased:—In order to increase the capitals so to be employed, the means of bringing capitals into motion must be rendered more easy:—In order to bring CAPITALS into motion on easier terms, the rate of interest must be decreased:—And in order to produce a decrease in the rate of interest, an additional proportion of money must be thrown regularly into the immediate channel of the lenders.—And hence, seeing that a public debt is in reality a wheel of the commercial machine, wherewith to throw money into this particular channel of circulation;—so consequently every public endeavour for an increase of the commerce and industry of a state, ought to be directed SOLELY to this particular wheel; and if this be properly conducted, every desirable effect will from thence naturally flow*.

The public debt of Great Britain has never been conducted on any regular preconcerted principle: the beforementioned happy effects were neither sought nor expected from it: and it cannot therefore be wondered at, that doubts should have arisen

* Seeing that commerce and industry cannot be increased otherwise than by increasing the *capitals* so to be employed;—and seeing also, that the only natural method of increasing those capitals, is to render them obtainable at a lower periodical expence or interest;—I shall leave it to the determination of the studious reader, how far the regulation of the commerce of any state by positive laws, can be productive of any other possible effect to the state, than that of turning industry out of its natural channel; with the inevitable loss of the expences attendant on the ejection.

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arisen in the minds of many, with respect to the CAUSE from whence those effects flowed.—There were, however, many who maintained, that those effects must have been produced by means of the debt: they perfectly saw the enlivening vigour of a free and regular circulation of money; but they did not sufficiently survey the PRINCIPLES and PROPERTIES of that circulation:—They omitted to consider the indispensable necessity of throwing a proper proportion of money periodically into that channel of circulation, in order to keep the debt in a capacity for continuing to produce such effects.

While the increasing vigour of the *banking branch* of the commercial system shall continue to draw a sufficiency of money into that channel of circulation, any farther influx into that channel is not indispensably necessary for the production of a decrease in the rate of interest; although, it is nevertheless perfectly proper, for the acceleration of that grand and happy effect. But when the banking branch shall have acquired its full weight and dignity in the commercial scale, so as to have the circulating medium in a regular obedience to the commercial calls; nothing after that can carry the rate of interest lower, but the actual throwing of a surplusage of money into that immediate channel of circulation, by a sinking fund: and if a sufficient proportion of money be not so actually thrown into that channel of circulation, the rate of interest must necessarily rise at every extra demand for money; as has been demonstrated in the foregoing seventh section.

The banking branch of the commercial system arrived at its highest state of perfection in Great Britain, about the year 1750, and so continued 'till

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'till the breaking out of the last war in 1755.—It would doubtless have arrived at that state (and even at a state of greater perfection) much sooner, had it not been for the checks it had received from the depreciations which took place in the prices of the public stocks, in consequence of the insufficiency of money carried into that channel of circulation, with the loans that were made during the preceding wars: and the same causes that then checked the rising state of that branch, has since produced its decline; and caused the rate of interest to increase.

As the decrease of the rate of interest in Great Britain, previous to the above period, had been considered as the *effect* of the *increase* of our commerce and industry; so also, the increase in the rate of interest since that time has been imputed to the *decrease* of our commerce and industry: but here also the *effect* has (in my opinion at least) been mistaken for the *cause*.

That our commerce and industry may have been rather declining since the rate of interest has taken a turn, is not only probable, but truly natural to be supposed.—Commerce and industry (as was observed before) cannot be carried into effect, but by means of the capitals so employed: and as the increase in the rate of interest renders an increase of resources necessary for procuring the same given capital; so, consequently, any given resources become unable to keep the former proportion of commerce and industry in motion.—It is therefore perfectly natural and reasonable, that wherever the rate of interest *rises*, the commerce and industry will *decline*: but here, it must be observed, the *decrease* of commerce and industry is the *effect*, not the *cause*.

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It must also be observed, that if the commerce of a state decreases, the periodical returns must necessarily exceed the periodical demands for capitals wherewith to carry on such decreasing commerce:—This is said to have been the case with respect to the external commerce of Great Britain during the last peace: but if the commercial returns shall periodically exceed the demands for capitals, it is perfectly evident, that so far forth as such *excess* shall flow into the hands of lenders (which, in fact, is the only channel of circulation into which it can flow immediately) so far forth the increase in the rate of interest must necessarily be *counteracted*, not *accelerated**.—It is therefore impossible, that this increase in our rate of interest, could be the *effect* of the decrease of our commerce and industry.

There is still another circumstance from whence the reader may be convinced, that neither the increase in our rate of interest since the year 1755, nor the decrease thereof during the preceding sixty years, could be an *effect* flowing from the *difference* between the state of our commerce during the *latter* period, and that during the *former* period.

The *rate of interest*, and the *price of the stocks*, are each the precise measure of the other: and it is perfectly evident, that the price of any article whatsoever

* The increase in the rate of interest must necessarily be thus counteracted, until the commerce and industry shall have declined so far, as that the consumptions of the members of the state shall, on the whole, exceed their productions: after which, the demands for payment will *accelerate* the increase in the rate of interest: but I cannot admit this to have become the case with Great Britain.

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whatsoever (consequently the price of the stocks, and therewith also the rate of interest) can never vary in any other degree, than as the proportion between the quantity required to be *bought* on the one hand, and the quantity required to be *sold* on the other hand, shall actually vary.—The ordinary competition of the market, with respect to the stocks in England, is such, that we have repeatedly seen with our own eyes, during the last and present wars, the immense quantities of *ten, fifteen, and twenty millions* of new stock established for a single loan; and we have continually seen the whole of these immense quantities of stock actually disposed of, at once, by *wholesale*, at a price within about £.5 or £.6 (sometimes a little more, and sometimes a little less) *per centum* on the money, from the *retail* market-price previously current.—Now, if the ordinary competition of the market be actually such (and I appeal to the reader's own eyes, whether it be or be not so) that the actual buying and selling of such immense quantities of stock by *wholesale*, shall be attended *only* with so small a difference from the actual *retail* market-price previously current; it must evidently be altogether impossible, that the prices of the stocks can be much affected, by the additional quantities that may be required to be *bought* or *sold*, in consequence of an additional influx or efflux of a million or two of wealth, on the whole of the commercial scale.—On every consideration, therefore, the *increase* and *decrease* which has alternately taken place in our commerce during this century, must have been the *effect*, not the *cause*, of the alternate *decrease* and *increase* in the rate of interest.

From what has been said, it evidently appears, that sundry of the opinions that have been entertained,

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tained, with respect to our national debt and commerce, have been founded on erroneous principles.

I have already shewn that the general principles of public credit, as contained in the foregoing sixth section, stand supported and confirmed, by a comparison thereof with the actual state of Great Britain, from the commencement of her public debt, down to the year 1755; about which time our public credit was at its highest pitch, and has since been declining.

I come now to examine how far the computative system, demonstrated and deduced in the foregoing seventh section, *will or will not* stand supported and confirmed, by the actual state of our public stocks from time to time since that period.

During the peace which preceded the war of 1755, the *banking business* (that *essential*, that *vital* branch of the commercial system) was so full of health and vigour, that the *three per cent. stocks* proceeded up to £.105; so that the rate of interest for money in the public market was as low as $2\frac{6}{7}$ per cent. per annum.

There was, during this peace, a sinking fund of about *half a million* (or, I believe, rather less of the two, taking the average) per year, applied to the redemption of the debt.—When this sinking fund ceased to be so applied, in consequence of the apprehension of the war, and the preparations thereby required to be made; the stocks naturally fell.—I do not recollect how much they fell, nor have I any thing to refer to for information; but as it is necessary to lay down something by way of *data*, I will suppose that they fell to £.103 or thereabout, at the first serious apprehension of the war;

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war; and that they fell to *par* at the first commencement of funding, in 1756.

Seven loans were made during this war, from 1756 to 1762, both years inclusive.

The *premiums** required for these loans (taking the whole one with another) were less than £.5 per cent.

* The reader will be pleased to recollect, that what I denominate the *premium*, or measure of the appreciation in the comparative value of money, in consequence of the extraordinary demand, is the *difference* between the *quantity of money* to be actually supplied by the lenders, and the *value* of the annuities given therefor, computed according to the actual market prices of the stocks, for the time being: because, such *difference* is, in reality, the actual increase in the *price* required for the money, in consequence of such extraordinary demand: what I denominate the *premium*, is not therefore precisely the same as that which is called the *bonus*, or *douceur*, in the debates of parliament; the latter being computed (not from the actual prices of the stocks for the time being, but) from a lower price, to which it is supposed the stocks will fall, in consequence of the loan.—The *bonus* (for instance) of the loan of 1781 (according to a piece of a magazine which I lately happened to stumble across) is £.5½; but what I denominate the *premium*, is £.7¼ on that loan.—The actual price of the three per cents. was then £.59; but in the computation of the *bonus*, they were taken at £.58; which makes the above difference of £.1¾ per cent. between what is called the *bonus*, and what I denominate the *premium*, or measure of the appreciation in the comparative value of money, in consequence of the extraordinary demand.

I shall by and by mention this piece of a magazine, containing the debates on the loan of 1781, in confirmation of the doctrines contained in the foregoing 5th section, and of the particulars contained in page 136 of the 7th section.

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cent.—how much less than £. 5 per cent. I am unable (where I now am) to inform myself:—I shall therefore (in order to avoid a supposition of my taking *data* in favour of my own system) admit the *premiums* so required to be full £. 5 per cent. taking the loans one with another.

These loans were made by giving the *premiums* partly in an additional quantity of nominal stock, and partly in determinate annuities of different lengths (I believe) from 20 to 99 years.

This being the case, the market competition for the stocks, must (according to the foregoing seventh section) be *less* than the market competition for the new loans; and, in consequence thereof, there must be a farther depreciation (which, for distinction sake, I will call by the name of a *collateral* depreciation) in the *market value* of the stocks, in addition to the depreciation in their (*mathematic* or) *computative value*, as deduced according to the principles demonstrated in the former part of the foregoing seventh section.

On enquiry, I find this to have been precisely the case; for, according to the foregoing *data*, the *mathematic* or *computative value* of the *three per cents.* immediately before the seventh loan, in 1762, must (from the principles demonstrated in the seventh section, exclusive of the abovementioned *collateral* depreciation) be £. 74 $\frac{3}{4}$; and I find their actual prices at that time to be about £. 69.—What their prices were afterwards, I do not know.

According to the latter part of the seventh section, these collateral depreciations (being, *in reality*, consequents of the extraordinary demand for money) are productive of the self-same *effects*, as if they themselves were part and parcel of the *effects* measured

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measured by the *premium* actually required, in consequence of the extraordinary demand for money: so that, according to my principles, the point of recovery (or *mathematic centre of gravity*, if I may be permitted to use that expression) of the *three per cent. stocks* at the discontinuance of the last war, was about £. 85 as nearly as may be.

The abovementioned *collateral depreciations*, the reader will recollect are the *immediate consequents* of the locking up of money on speculation; which, by the abovementioned method of making the loans, necessarily becomes more profitable for a time, than the laying it out in the stocks: but when the extraordinary demand for money ceases, this cause for the locking up of money, necessarily ceases with it: and, the money so locked up, being afterwards thrown into this channel of circulation, must naturally produce a *collateral appreciation* of the value of the stocks; whereby their prices must, for a time, be carried *higher* than their centre of gravity, in the same manner as the locking up of money carries them *lower*.

Hence, then, while the money so locked up, was flowing out, after the peace took place in 1763, the prices of the *three per cents.* must (according to my principles) have been carried up as high or higher than £. 90,* according as the money

* It must be observed, that in order to avoid being accused of taking *data* in favour of my own system, I have taken the *premiums* required on account of the extraordinary demand for money, at *more* than what I really believe them to have been.—In this case, therefore, a greater part than is abovementioned, of the actual depreciation in the prices of the stocks, must have flowed from

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ney so locked up, might be thrown out in greater or lesser proportions.

How far this *was* or *was not* actually the case, I am unable (where I now am) to inform myself. The reader may, however, easily determine, by any of the London news-papers, or magazines of that time, unless (like myself) he should be where they are not to be met with.

But, be their prices what they might, immediately after the peace took place, £.85 or thereabout, as nearly as may be, was (if my principles are true) their actual centre of gravity, to which they must by degrees infallibly proceed; unless prevented by the intervention of some *cause* whereby the ordinary competition of the market should become either increased on the one hand, or decreased on the other.

It has been said (and it is very likely to be true, from natural causes, as I observed before) that our commerce was declining during the last peace:—In this case, the commercial returns must necessarily exceed the demands for capitals, wherewith to carry it on; and, unless we should suppose that this *excess* was consumed, in addition to our productions (a supposition which I can by no means admit) it would most naturally and most probably be laid

the locking up of money on speculation: this, therefore, being admitted, a greater *appreciation* in the prices of the stocks must (according to my principles) be produced for a time by the flowing out of that money; although the centre of gravity to which they must afterwards descend would still be the same.—If the average of the *premiums* actually required, on account of the extraordinary demand for money, was *only* £.4 per cent. taking them on the average, the probable point of the collateral *appreciation* would (according to my principles) be about £.96.

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laid out in the stocks:—This circumstance, therefore, would contribute to keep the stocks something higher than their centre of gravity.—There was also a larger sinking fund applied to the redemption of the debt during the last peace, than during the preceding peace: which must also carry the centre of gravity of the *three per cents.* higher than £.85.

I do not recollect their prices during the last peace; I must therefore leave them to the reader:—one thing, however, I have met with, which will serve sufficiently for the general comparison:—a remnant of a magazine, which I believe was published in the year 1774 or 1775 (but the date is gone) mentions the *three per cents.* at £.88.

During the present war seven loans (including the loan of this present year 1782) have been already made:—The *premiums* that have been required for these loans, have been generally greater than the *premiums* required for the loans of the last war:—I have already mentioned, that the *premium* for the loan of 1781 was £.7 $\frac{1}{4}$; but I believe this was the only instance, wherein any thing near so large a *premium* has been required.—The *bonus* (so far as my memory serves me) has been generally stated at much less than £.5, and sometimes, I believe, less than £.4: so that what I denominate the *premium*, or measure of the *appreciation* in the comparative value of money, in consequence of the extraordinary demand, must have been less than £.6, taking the loans one with another:—I will, however (to prevent being accused of taking *data* in favour of my own system) suppose the *premiums* so required to have been full £.6, taking the loans one with another.

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These *premiums* also have consisted *partly* of an additional quantity of nominal stock, and *partly* of determinate annuities, of different lengths, from 20 to 99 years; as in the last war.

I do not recollect the exact price of the *three per cents.* previous to the first loan of the present war in 1776; but as it is necessary to lay down something by way of *data*, I will suppose them to be £.86, in which, I am confident, I cannot be far from the truth; according to their previous centre of gravity, and the effects that must necessarily have been produced thereon, by the sinking fund which was applied to their redemption, during the last peace.

Taking the above as *data*, their computative value previous to the loan in 1781, would (according to my principles, admitting the market competition for the old stocks and the market competition for the new loans to be equal) be £.64 $\frac{1}{4}$; and their computative value previous to the loan in this present year 1782, would be £.60 $\frac{1}{2}$.

But, according to the latter part of the foregoing seventh section, if the *premiums* so required in consequence of the extraordinary demand for money, shall be given in the above manner, it must be more profitable to lock up money on speculation, while there shall be a probability of its becoming wanted for a new loan; than to lay it out in the stocks, and receive the interest thereon, in the intermediate time; from which *cause*, the market competition for the stocks, must necessarily be less than the market competition for the new loans; whether the *actual cause* itself be, or be not, adverted to; and, in consequence thereof, the *actual*

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actual prices of the stocks must necessarily be lower than their *computative value*.

On enquiry, I find this to have been precisely the case: for, previous to the loan of 1781, I find, that the *three per cents.* (instead of the aforesaid £.64 $\frac{1}{4}$) were as low as £.59; and that, a few days before, they were even lower; although I am unable to inform myself how much lower.

I am unable (where I now am) to inform myself of their exact prices previous to the loan of of this present year 1782; but, I am persuaded, that (instead of the aforesaid £.60 $\frac{1}{2}$) they were only at about £.55:—For (besides the *effects*, which, according to my principles, must necessarily flow from the terms of the loan of 1781) I have now before me Lloyd's Evening Posts, of the 15th and 18th of March 1782 (which was only a short time after the loan) in each of which, the prices of the *three per cents.* are recorded at £.54 $\frac{3}{8}$ a $\frac{1}{4}$.—I have also before me Lloyd's Evening Post of different dates, since the 18th of March, by which it appears, that a pacification is likely soon to take place; or, at least, that it is generally expected that such will be the case:—this, according to my principles, must necessarily remove the cause of the beforementioned *collateral depreciations* in the value of the stocks, while such opinions shall actually prevail: and, in agreement therewith, I find by the same papers, that the *three per cents.* had actually risen to £.60 $\frac{3}{8}$, on the first of July.

If either physical deduction, mathematic demonstration, or actual experiment, or even, if the whole three put together, be admitted to amount to a PROOF of the TRUTH of any doctrine; I cannot entertain a doubt, but the reader will admit, that

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that the doctrines contained in the foregoing sections, with respect to the nature and properties of annuity stocks, and the PRINCIPLES by which the comparative value of money is governed, are sufficiently and effectually PROVED.

If the *premiums* required for the several loans of the last and present wars, had consisted of an additional interest or annuity to continue one year and then to cease; and, the additional interest or annuity so required, had been established as a sinking fund, and applied to the redemption of the debt in time of peace; the additional influx of money so thrown into the hands of the lenders, would have kept our *three per cents. at par*, generally speaking, during the wars.—Admitting the money for the loans to have been advanced *half-quarterly* (that is, at eight instalments, half a quarter of a year asunder) in equal proportions, the *three per cents.* could not by *mathematic possibility*, have been so low as £.97, at any one single moment of time, from the year 1755 to the present hour; the *expences, fortunes, and misfortunes*, being in all other respects precisely as they have been; and admitting always that no irrational *panic* should enter into the competition of the market.—In this case, I say, they could not by *possibility* have fell so low as £.97; nor in *rational probability* they could not well have fallen so low as £.98½.—Admitting every person to be actuated by *self-interest*, unmixed with either *envy* on the one hand, or *panic* on the other, the *three per cents.* could not at any time since 1755 have been so low as £.99, had the abovementioned method of giving the necessary *premiums* been adopted: and in time of peace they must infallibly have been higher than in the peace preceding the war of 1755.

Both

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Both *envy* and *panic* will however, sometimes, enter into the actions of men; and, so far as people might have been thereby disposed to let their money lay dead, rather than to lay it out in the stocks, and receive the interest thereon;—so far, and no farther, must the stocks have fell lower, in the foregoing case, than £.99: but as neither *envy* nor *panic* can be ranked among the natural causes, particularly when *self-interest* counteracts it; so, I should take it for granted, that their effects would be only momentary; and *self-interest* regaining the command, the stocks must, in the foregoing case, infallibly have risen to *par*, between every instalment; and the fluctuations in their prices must necessarily have formed a precise resemblance of the vibrations of a balanced *beam*, suspending two scales, or heavy bodies, of equal weight.

The reader will recollect, from the ninth section, that although this method of making the loans, by giving the necessary *premiums* in an additional interest or annuity to continue one year and then to cease, requires a greater revenue on the first year of a war; yet, should the war continue seven or eight years, a less revenue will in this case be required, than if the *premiums* were given in determinate annuities of a longer continuance, or in *annuity stock*.—A sinking fund proportionate to the loans, is also provided, by this method of giving the *premiums* so required; and the sinking fund thus provided, is always kept free for action, as soon as the extraordinary demand for money shall cease: which cannot be the case, if the loans are made according to the other methods.

As I have nothing to refer to for particulars, so, consequently, I am unable to lay down the precise state in which our debt, revenue, and sinking fund,

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fund, would have stood at this time; in case the several loans since the year 1755 had been made, by giving the same *premiums* in an additional interest or annuity to continue one year: but (admitting every other circumstance to have happened as it has) I am persuaded, that I shall be within bounds, if I say, that the established taxes (including the sinking fund) that would, in that case, have been required at this time, would have been less than they now are, by upwards of a *quarter of a million per year*:—the sinking fund at this time would have been greater than it now is, by upwards of *one million and a quarter per year*:—and the debt would have been less than it now is, by upwards of *fifty millions**.

After

* This, it must be confessed, is an immense loss: the whole of it must not, however, be considered as an *absolute* or *irrecoverable* loss: the greater part is a *temporary* loss only.—Seeing that the capital is not demandable by the creditors; the loss to the state may perhaps be better considered with respect to the *revenue*, than the *capital*.—The above loss, then, is the loss of a revenue of *one million and an half per annum*: but the last-mentioned *one million and a quarter* thereof, is as yet a *temporary* loss only.—It will indeed become an *absolute* or *irrecoverable* loss, if not prevented: but is as yet preventible.—So far as it shall become an *absolute* or *irrecoverable* loss,—so far the creditors must be losers likewise by the depreciation in the value of the capital: and, so far as it shall be prevented, so far a mutual advantage must flow to the state at large, as a *body politic*; and to the creditors, as *individuals*.—It is therefore equally the interest of *ALL*, to prevent it from becoming an *absolute* or *irrecoverable* loss: and I shall endeavour to demonstrate, in a second essay, that if the sinking fund be applied on proper principles in time of peace, no loss can fall on any body; excepting
only

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After I had finished the *demonstrative* and *computative* parts of the foregoing essay, and had proceeded about half way through the *writing* part, I was favoured with the perusal of a pamphlet, written by DOCTOR PRICE: entitled, "*Additional Observations on Civil Liberty*," with observations on schemes for raising money by public loans, &c. Printed in 1777.—In this pamphlet the Doctor points out sundry of the losses with which our methods of raising money are attended; amounting at that time (see page 112, note *a*, in that pamphlet) to about *twenty millions*: and he says, that had he extended his examinations to all our loans, the amount of the losses would have been found much greater.

Shortly afterwards, I was favoured with the perusal of a treatise on CIRCULATION AND CREDIT, written in French (I don't know the author's name) and published at the Hague in 1771.—Many parts of that treatise, will be found (on strict examination) to agree exactly with many parts of this essay.

These were the first informations I had ever received, that the *power* and *effects* of the CIRCULATION of money, and the losses attendant on our method of making loans, had ever before been
observed:

only that which shall have actually been sustained, previous to the first proper application of the sinking fund.—As the principles that have been demonstrated in the foregoing essay, stand perfectly supported and confirmed, by the actual state of public credit in Great Britain, from the establishment of our public debt, to the present time; I would willingly hope, that the reader will take my word in the present instance, until my second essay shall be laid before him.

observed: but some errors have crept into both these publications.

The treatise on CIRCULATION and CREDIT, contains some passages (particularly with respect to the augmentation and application of the *sinking fund* in time of peace, and the method of restoring the public stocks to their former state) which appear to have struck the author in a hurry, and to have escaped his strict examination:—A discussion of them here, would require too much room: but I shall endeavour to demonstrate in my second essay, that the effects produced by a sinking fund, will depend much more on the *manner* of its application, than on its periodical *quantity*.

Doctor Price also, in speaking of the losses attendant on our methods of raising money, mentions *only* the losses on the *perpetual* annuities; and takes no notice of the losses on the *determinate* annuities, whether *long* or *short*: whereas, the *determinate* annuities, which always make a part of the terms of our loans, are attended with a loss as well as *perpetual* ones: and if the *determinate* annuities are very long (which is often the case with ours) the loss thereon is very near as great as if they were *perpetual*.—It is unnecessary here, to refer the reader back to the demonstrations contained in the fourth section of this essay, for a proof of the above remark; because, reason itself perfectly evinces, that if *perpetual* annuities are attended with a loss, *determinate* ones must necessarily be attended with a loss also, according to the length of their continuance.

I should have considered the above omission in Doctor Price's pamphlet, as a mere *omission only*, had I not been perfectly astonished at the BASIS,
on

on which the whole entire substance of his arguments and observations are founded.

The Doctor not only omits to make the necessary distinctions between *perpetual* and *redeemable* annuities, as laid down in the definitions contained in the beginning of the second section of this essay; but, he also assumes it for granted, as a BASIS, that the *values* of annuity stocks bearing any rate of interest not exceeding the current rate for the time being, are in a simple ratio to each other, as their respective *rates of interest*:—or, to use the Doctor's own words, "*that there is no one who would not be glad to lend to government, on any higher interest than that which he can make in the funds.*"*—But if we reflect a single moment, we must be perfectly convinced, that there is no one, who has the smallest knowledge of the comparative value

* Page 105, note a.—I will submit it to the Doctor's own re-consideration, whether such an immense principle as the above, can with any degree of propriety be assumed as a *basis* in any case whatever, without being previously demonstrated from simple axioms; even supposing the person so assuming it, to be ever so perfectly convinced of its mathematic truth.—I will also submit it to the Doctor's own re-consideration, whether his observations on the principles of government, are not founded on a *basis* as nearly similar to the above, as is in the nature of the two things possible: and consequently, whether they are not subject to as great errors, as his observations on the principles of funding.

The above quotation from Doctor Price's pamphlet, may perhaps appear reasonable enough, if one should only read it cursorily: but the more reasonable it shall appear on a cursory reading, the greater is the lesson which it affords us, not to admit any thing for a *basis*, but what shall be demonstrated *link by link* from the most simple data.

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value of annuities, that would do any such thing.

Those who see the prices of the stocks fall when there is an extraordinary demand for money; and rise again when that extraordinary demand for money ceases; must know, on the smallest reflection, that that difference in the price (whatever it shall be) must be a profit to the person so laying out his money, in ADDITION to the extraordinary *interest* produced therefrom.—A very careless observer must therefore see with his own eyes, that the values of annuity stocks bearing different rates of interest, cannot possibly be as their *rates of interest* in a *simple ratio*.

I am the more astonished at the abovementioned error in Doctor Price's observations, because his remarks on the loan of 1762 (page 96 to 98) evidently shew that his general *basis* must be erroneous.

If the reader should be desirous of an EXPERIMENTAL proof of the truth of what I have here remarked, in addition to the principles contained in the foregoing *fifth* and *seventh* sections; that experimental proof may be had also.

I lately happened (as I mentioned a few pages back) to stumble across a piece of a magazine, containing the debates on the ways and means of 1781.—By these debates I find that a *five per cent.* annuity stock was actually proposed for a part of the loan of that year; but was rejected by the lenders (and was accordingly given up) for this declared reason, that they could not *agree* in what to value it at:—some put *one* value on it (the debates say) and others *another*.

Now, according to Doctor Price's principles, when the *three per cents.* are at £. 58 (which is what they

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they were then taken at) a *five per cent. stock* would be worth £. 96 $\frac{2}{3}$.—But, we find that all parties perfectly saw that it could by no means be worth so much as that; although they differed, with respect to what it really was worth.

This debate therefore proves two things, viz. 1st, That every body saw *clearly*, that the comparative value between *annuity stocks* bearing different rates of interest, cannot be in a *simple ratio*, as those *rates of interest*: and, *secondly*, That the laws and principles which govern and determine the comparative value of annuities were not at that time understood:—For, had the laws which govern their comparative value been understood, gentlemen who make money transactions their business would naturally have studied those laws; in which case, they could have found no difficulty in determining the value of the *one* from the value of the *other*.*.

The

* Taking the three per cents. at their then price, viz. £. 59, the comparative value of the *five per cent. stock* would be £. 79 $\frac{2}{3}$; but taking the *three per cents.* at £. 58 (the rate at which they were then actually taken) the comparative value of the *five per cent. stock* would be £. 78 $\frac{2}{3}$, as nearly as may be.

No man, however, consistent with his own interest, could give so much as the full comparative value, because the natural principles of commercial speculation were on the *balance* against the *five per cent. stock*, in the following manner.

The centre of gravity, or point to which the three per cents. would stand recovered as a natural consequent of the discontinuance of the extraordinary demand for money (according to the principles demonstrated in the foregoing seventh section) was at that time £. 74 or thereabout, as nearly as I can furnish myself with data; which I am persuaded (from the then actual prices of the stocks)

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The PRIMARY BASIS on which these laws and principles depend, is very easily determined; although (as we find in the foregoing seventh section) the reduction of those laws and principles to a computative system is something more elaborate.

The following short and easy reflection, will at once determine the PRIMARY BASIS, on which the comparative value of annuities must depend:—viz.

As the competition among the *buyers* and the *sellers*, must, in all cases whatsoever (whether with respect

stocks) cannot be far from the truth. But it must be observed, that the market price of the *three per cents.* was at that time more than £.8 per cent. lower than their natural point, in consequence of the money that had been locked up on the principles of commercial speculation: and as this speculative money would naturally be thrown out, when the extraordinary demand for money discontinued; the market price of the three per cents. would naturally be thereby carried about £.8 per cent. higher than their centre of gravity: whereby they would for a time run up as high or higher than £.80; although they must afterwards descend again to £.74:—It is not indeed possible to say *exactly* how far they would actually rise above their centre of gravity, because it must depend on the proportions in which the speculative money shall be thrown into that channel of circulation: but this £.8 per cent. was the probable degree: and thus far the natural principles of commercial speculation were against the *five per cent. stock*; because, the *five per cent. stock* would always be redeemable at £.100.

On the other hand, the *five per cent. stock*, during the time of its continuance, would produce a greater interest for the money so laid out, than the *three per cents.* would do, by almost *one and an half per cent. per annum*:—Here the natural principles of commercial speculation would be in favour of the *five per cent. stock*: but its continuance would

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respect to annuities or any thing else) determine the *value* or *price* of the things so to be bought and sold;—and, as all annuities of whatever sort or kind, produce a *fixed* and *given income* or fruit, until that income or fruit shall discontinue or expire, according to the conditions stipulated, whatever those conditions shall be; so, consequently, all annuities of whatever sort or kind must necessarily have a *relative* or *comparative* value with respect to each other.—And, seeing that they must have a *relative*

would be uncertain: and should its probable chances be valued at £.5 on £.100, there would still be a balance of £.3 per cent. (on the natural principles of commercial speculation) against the *five per cent. stock*.—No man, therefore, consistent with his own interest (which I presume will always govern, as far as it is understood) could have given more than from £.76 to £.77 in the market for such *five per cent. stock*, had it been created: and if I have taken the *premiums* too high in the foregoing *data* (which I am fully of opinion is the case) no man could consistently have given so much.

The debates contained in the piece of a magazine now before me, furnish (so far as they are truly related) demonstrative evidence, that the gentlemen who opposed the terms actually given for the loan of 1781, would by no means have made so good terms for the public, as those made by the noble Lord then at the head of administration.—There have been errors in the system on which our public debt has been conducted, from the time of its first establishment; as I have already observed: but those errors are chiefly correctible, and will long remain so, unless the whole fabric should be blown up by *imaginary* reformatations:—Immensely as our public debt is, it furnishes no real cause for despondence or despair.—There is infinitely more real danger to be apprehended from *imaginary* reformatations, than from all other possible causes put together.

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relative or comparative value with respect to each other;—so, consequently, there must be a mathematic ratio of some kind or other, between the value of the one and the value of the other.—But, seeing that the conditions, on which the fruit or income shall be exorable, may be different;—so, consequently, this mathematic ratio cannot be as the fruit or income, simply; but must be, as the fruit or income, and the terms or conditions on which it shall be exorable, compoundly.

The fluctuations in the prices of the stocks have been generally supposed to be governed by such a complication of mysterious and unfathomable causes, that I do not recollect ever to have heard of any body that had even attempted to investigate (properly speaking) the laws and principles on which they depend.—But (although the investigation of these laws and principles, and the reduction of them to a system, is attended with some little labour, as we have seen in the seventh section; yet) the following very short and easy reflection will sufficiently demonstrate that they must be subject to mathematic laws: and consequently, the supposition of their being enveloped in unfathomable mystery, must be erroneous.

It is perfectly evident, on the slightest reflection, that the *comparative values* of annuities, with respect to each other (more particularly the *comparative values* between annuity stocks bearing different rates of interest) are entirely and inseparably connected with the *fluctuations in their prices*:—Wherefore, seeing (as above) that their *comparative values* are, subject to mathematic laws, and therefore capable of a mathematic investigation;—so, consequently, their *fluctuations* (with which their comparative values are inseparably connected)

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ed) must be subject to mathematic laws, and be capable of a mathematic investigation also.

Short and conclusive reflections like these, contributed greatly towards inducing me to attempt a reduction of these laws and principles to a mathematic code or system:—How far I have succeeded in my attempt, I must leave to be decided by the studious reader: and I would willingly hope, that what has been said, will (on the whole) be found irresistibly convictive, that the prices of the stocks are not governed by those mysterious causes which have been generally imagined; but, on the contrary, that they are *in reality* governed by laws and principles, as simple, and regular, as those which govern the motions of the planetary bodies: and, that the variations or *difference* between their computative value and their actual prices, in consequence of collateral causes, may (very properly) be compared to the variations of the planets from their respective orbs, in consequence of the passing of a comet through the planetary world.

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of the great blunders of the late system (to
which no regard was paid) and to the
great distresses which it occasioned.

SECTION III. *Three branches
of the subject are here considered.*

*Brief Remarks respecting the State of the Paper-Credit
of the American Provinces at different times; and
the Agreement thereof with the Observations on the
Principles of Paper-Money, Taxation, and Real
Resources; contained in the first section of this
Postscript.*

AS I have nothing to refer to for what I shall
here lay down as facts, I shall confine myself
chiefly to circumstances which fall within living
memory; part of which came under my own oc-
cular observation, and the other parts were im-
pressed on my memory, by repeated conversations
with the elderly inhabitants of the respective pro-
vinces, previous to the present troubles.

These being my only materials; and the con-
versations to which I allude having happened many
years before I had any thought of writing the
present essay; the reader will (I hope) excuse any
trifling inaccuracies that may arise from my me-
mory having failed me.

The very material circumstance which I shall
relate respecting the paper-money of New Jersey,
falls within my own personal observation; and
what I shall mention with respect to the Congress
paper-money, has I believe been the subject of
such universal conversation, that a bare relation
will be sufficient to bring it to the reader's mind.—
In the one of these cases (as I shall by and by re-
late) the paper-money was higher than the *par* of
gold and silver; and in the other case, it fell to
nought:

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nought:—These two circumstances are therefore
the two *extremes*; and these being either esta-
blished or admitted, the inaccuracies (if any such
there shall be) that may happen in my relation of
any thing that shall be comprehended between
these extremes, can no way affect the tenor of the
argument.

The principles to be supported in this section
are (in substance) these; viz.

1st, That in case the *taxes* to be actually col-
lected, shall be proportionate to the *paper-money*
emitted; such *paper-money* must be equally va-
luable, and productive of the self-same effects, as
any other kind of money that can be made use of,
while applied to the local or internal service of
buying and selling; whether such other money
shall be composed of *gold and silver*, or of *diamonds*,
or of any other material or materials whatsoever.—
And,

2^{dly}, That in case the taxes shall be levied on
the people in proportion to the apparent value of
their respective property or estates, those taxes
must be very burthensome, so far as they shall be
collected; and if large taxes shall be so required,
the full collection of them must be impracticable:
in consequence whereof, the whole system of
finance must necessarily be thrown into irregula-
rity, confusion, and disorder.

I shall leave it particularly to the American
reader to decide for himself, with respect to the
truth of the facts which I shall relate, as an expe-
rimental support of these principles; and (seeing
that the system of *FINANCE*, is the *MAIN SPRING* of
every possible system of government; and that
every other part of the machine must infallibly la-
bour under an insupportable and destructive fric-
tion,

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tion, in case this MAIN SPRING be constituted with an improper temperament) it is not impossible but reflections may occur to his mind, with respect to the fitness or unfitness of his present rulers, for the business of constructing a new machine of government: and with respect to the propriety or impropriety of the revolution for which they are contending.

Previous to these unhappy troubles (as well as since) the circulating medium in North America consisted partly of *gold and silver*, and partly of *paper-money*:—the latter was infinitely the greatest proportion.—The paper-money of some of the provinces depreciated:—That of other provinces preserved its value equal to gold and silver; and some even higher.

The regular competition of the market (by which the current value of every thing whatever is naturally governed) unawed, uninfluenced, and unassisted, by any positive law, actually carried the paper-money of New Jersey above the *par* of gold and silver, at New York.

The paper-money emitted by New Jersey passed current in New York (although a different province) at more than *one and an half per cent.* above the *par* of gold and silver, and that too as well in exchange for gold and silver money as for goods and merchandize*.

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* The nominal currency of New Jersey was 7s. 6d. for the Spanish dollar:—that of New York was 8s. for the Spanish dollar:—Hence £. 3 New Jersey money was equal (at the *par* of gold and silver) to £. 3 : 4 : 0 New York money: but a New Jersey bill of £. 3 passed current in New York for £. 3 : 5 : 0, and so in proportion; which is $\frac{1}{10}$ per cent. higher than gold and silver.

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It is unnecessary to enter into particulars with respect to the *causes* of this circumstance;—it is sufficient to say that it ORIGINATED in the principles of commercial speculation, with intent to bring the commerce of New Jersey through the market of New York; and was SUPPORTED by a regular circulation, and the profits so produced.—It continued at this *par* many many years:—Measures were attempted by the Chamber of Commerce (a legal corporation in that city) to prevent it from passing current for any more than the actual quantity of gold and silver that was mentioned in the bill; but those measures proved ineffectual:—it was at length (in or about the year 1774) reduced to the *par* of gold and silver; but the reduction was not at last effected, without having recourse to the general assembly of the province.

I shall not enter into an examination of the propriety of this speculation on the one hand, nor of the propriety of its prohibition by a positive law on the other:—It is however perfectly evident, that this *par* could not possibly have preserved itself for any continuance, if the profits and advantages flowing from it, had not been equal to the task of supporting it there: for, the bills being redeemable by the province of New Jersey (without interest) at the *par* of gold and silver, there could be no possible cause that could continue them higher, excepting only the profits and advantages flowing from their circulation in the commercial service:—And, seeing also that the gold and silver was not actually demandable for these bills; if the profits and advantages flowing from their circulation would not support them at *one par*, they must necessarily have depreciated to

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whatever

whatever those profits and advantages would actually support them at; had that been never so little; or had it even been nothing at all.

On the other hand, it is perfectly evident, that the profits and advantages flowing from this speculation, in itself considered, could not have been very great; but the same must have flowed as well, or nearly as well, without this speculation as with it:—For, had not this been the case, the effects of the prohibitory law must have been felt, and murmurs and complaints must have ensued; which did not happen, excepting only at the moment in which the reduction took place.

If the several effects naturally flowing from this speculation should be investigated, it would be found, that the speculation was not on the whole well judged; although the profits did actually support the paper-money at that extra *par*: but this investigation would be no way material to our present purpose, which is perfectly fulfilled by proving, from *experiment*, as well as *principle*, that paper-money will produce the self-same effects as gold and silver, if it be properly conducted.

The paper-money of the other middle colonies, viz. New York, Pennsylvania, Delaware, and Maryland, preserved its value also, equal to gold and silver.

But this was not the case with the paper-money of the eastern and southern colonies.—The paper-money of that well-inhabited province of Massachusetts-Bay, which was emitted at the nominal rate of *six shillings* for the Spanish dollar, depreciated to the rate of *forty-five shillings* for the Spanish dollar, which is *seven hundred and fifty per cent.* below the original *par* at which it was emitted.

Various

Various imaginary contrivances were concerted in Massachusetts-Bay, for stopping this depreciation in its progress; but the raising of a proportionate tax, which alone could produce the desired effect, was, it should seem, too *simple* a contrivance to merit a deliberation; and the *mysterious* contrivances proving ineffectual and fruitless, the use of paper-money was at length (I think somewhere between thirty and forty years ago) totally prohibited in that province; and so remained 'till the commencement of the present troubles.

In the very rich province of South Carolina, the depreciation was nearly as great for a time as in Massachusetts-Bay.—The paper-money of South Carolina depreciated to the rate of *thirty-two shillings and six pence* for the Spanish dollar*.—This province however acted more coolly and deliberately on the occasion, than Massachusetts:—They did not prohibit the use of paper-money in South Carolina, but levied taxes proportionate to its then value; after which there was not the smallest depreciation, but its then value was as firmly and effectually supported as gold and silver for very many years, until all proportion was again destroyed, by that unaccountable system of financing, which forms a part of the present new system of government.

My memory does not enable me to relate the particular depreciations in each of the other respective provinces; nor are they material to our present purpose.

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* The first emission of Carolina, I have been informed, was at the rate of *4s. 6d.* for the Spanish dollar: what the highest *par* of the emissions within living memory has been, I have not been able to inform myself.

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As the principles and properties of paper-money were never reduced to a scientific system in any of the colonies, the depreciations which happened in the eastern and southern provinces, naturally produced a timidity in most of the colonies, with respect to the quantities to be emitted: and, in addition to this timidity, the instructions from the mother-country to those of the provincial governors that were immediately appointed by the crown, restricted the paper-money still more.

The immense capacity of the country for improvement, naturally created a great demand for such kinds of commodities as would enable people to carry those improvements into effect:—Much of the surpluses of the American produce was therefore naturally sent out for these kinds of commodities; and a very small proportion thereof for gold and silver.

From these circumstances put together, the quantity of money circulating in the provinces in general (including both gold, silver, and paper together) was for some years, previous to the breaking out of the present troubles, infinitely short of a sufficiency for the purpose of carrying on the internal commerce of the country, with that ease and facility which might be wished.

The paper-money, it must be observed, had been generally made a legal tender for all payments, in the respective provinces by which it was emitted; so that a *depreciation* of it must naturally defraud creditors of their just dues:—To prohibit it from being made a legal tender, was therefore perfectly just and right. But to prohibit the use of it as an auxiliary instrument of circulation, would be contrary to the very principles of circulation; and must therefore be injurious and wrong.

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wrong.—Some of the colours, I remember, made complaints at the restrictions on their paper-money, but my memory does not serve me as to particular instances, wherein (according to these principles) there might or might not have been a *cause* for complaint.

Paper-money ought to be a legal tender ONLY for the payments required to be made into the local treasury from whence it was emitted. A provision ought also to be established at the time of the emission, whereby any superfluous quantity that might at any time be in the market, should have a natural passage from thence to the treasury, and from thence again into the market, as occasion might from time to time require.—The right use of paper-money depends altogether on forming the wheel of finance, so as to produce this regular circulation, in all possible cases that can flow from natural causes.—The effects that may flow from *panic* or from *envy* cannot be provided against: but from what has been remarked in the last section, respecting the agreement of the *actual prices* of the stocks in England, with the *natural laws* and *principles* deduced in this essay, we may safely conclude, that the effects produced from *panic* or from *envy* will seldom be either great or lasting, when counteracted by those natural principles of PRIVATE INTEREST, which are inseparable from a regular circulation of property.

The colonies (as I said before) did not construct their paper-money on any regular preconcerted plan or system: but there were nevertheless some instances in some of the colonies, that border in some degree on the principles mentioned above.

Some few years previous to the commencement of the present troubles, an emission was made at
New

New York, called *Loan-Office Money*, which was lent to individuals on interest:—here a depreciation was effectually barred; because, had the market become at any time overstocked with it, the superfluous quantity would have naturally flowed out of the market into the treasury, for the discharge of the bonds that had been given for it; for which, and for which only (including the *interest* and *taxes* there required to be paid) it was a legal tender.

The insufficiency in the quantity of the circulating medium (including both gold, silver, and paper-money) in the provinces, previous to the breaking out of the troubles, was a circumstance very favourable to the Congress at the commencement of their power; and enabled their first emission to introduce itself into circulation, in spite of the many reasons which in the nature of things would (and which in truth actually did) operate against it, with the thinking people of both parties.—In spite of this natural and unavoidable influence, it actually circulated for a short time in an equal current and equal value with gold and silver; although it was built on no foundation whatsoever with respect to redemption, but supported *solely* by the natural *demand* for a circulating medium of some kind or other.—Every one knew that while the Congress retained the power, this money would serve for the payment of the taxes;—it was also visible, that so many must (in the natural and unavoidable course of things) be affected by it, that it would become the interest of ALL to make some kind of provision or other respecting it, when the troubles should cease.—This was its only support:—and the considerations which naturally operated against it, were so effectually counteracted

counteracted by the natural demands for a circulating medium of some kind or other, that it actually preserved its value equal to gold and silver, 'till the ordinary channels of circulation became overstocked.—Then, but not 'till then,—a depreciation naturally took place*.

A supposition, that these effects were produced in any material degree by hope, fear, or force, or by any thing else, excepting only the actual demand for a circulating medium, is a supposition that will not stand the reflection of a single moment: because, the same degree of hope, fear, or force, would equally have stopped its depreciation afterwards; which was proved to be absolutely impracticable, by the most determined experiments that could be imagined, or suggested: in spite of all which (such was the disproportion between the taxes and the quantities emitted,—that) the depreciation continued 'till the paper-money actually fell to nought; even while it still continued to be (in some sort) a legal tender.—The force, therefore, which was avowedly attempted for its preservation, was, in reality, so far from contributing towards the desired effects, that (like every thing else that operates contrary to the natural course and order of things) it served only to increase the malady which it was intended to prevent.

But (which agrees exactly with the principles contained in the first section of this Postscript) these depreciations were far from producing the effects that were generally expected.—Calamities and

* In the year 1775, goods of all kinds were bought and sold at New York (the most loyal place on the continent) as cheap for the *Congress-money* as for *gold and silver*.

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and distresses, both numberless and inexpressible, were indeed produced; but the *real* or *actual resources* of the country were not thereby exhausted. The *real* or *actual resources* (as was observed in the first section of this Postscript) of any country, are the productions of the industry of the people, without regard to the *money* that shall be made use of as the instrument for *circulating* or *conveying* those productions from one person to another.—It is indeed perfectly natural and reasonable to suppose that the industry of the people of any country will be decreased by a rapid depreciation in the value of the money so made use of: because, as the *money* to be received for the fruits of a man's industry, loses its value; it becomes immaterial to him whether he is industrious or not: but the depreciation in the value of the circulating medium can have no *farther* effect on the *real* or *actual resources*.

If the following relation be true (which I verily believe is the case) the industry of the people of America has been greatly decreased in consequence of the depreciation of the Congress money.—The *difference* between the quantity of produce exported from America periodically before these troubles, and the quantity that has been periodically exported since, is said to be infinitely greater than what would be proportionate to the *numbers* and *extra consumptions* of the people that have been taken from their industrious employments to serve in the war: notwithstanding which, the general prices of the produce of the country, even in those parts where no armies have marched, are said to have been much higher (in gold and silver money) for these last four or five years, than heretofore.—So far as this shall have been the case, so far the *real*

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real or *actual resources* of America must have diminished in consequence of the depreciation of the paper-money, but no farther.

It is perfectly evident to every body, that this depreciation did not render them unable to carry on the war, as was generally expected:—On the contrary (a circumstance which is highly worthy of remark) the time in which their paper-money made its final exit, was the very time of their greatest military glory and unabating success*.

Had the people of America enjoyed the same degree of personal freedom as formerly, it might indeed have been reasonable to expect, that such a depreciation would have overturned the government in a short time: but when the small degree of personal freedom that can be enjoyed under their present form of government, is considered, it ceases to be very surprizing that such an effect was not produced by it.

Some people, who do not consider the *natural* (which is, without exception, the only *true*) *connection* between *causes* and *effects*, entertain an opinion that military success will support public credit. But the foregoing instance of the public credit of America falling entirely to the ground, in the very hours of the most unabating successes that can be imagined, must afford an ample proof, to every man who will think seriously, that *military successes* and *public credit* cannot possibly have any material connection *immediately* with each other.

Public

* The latter part of the year 1781; at which time they recovered Virginia, and North Carolina entirely; together also with South Carolina, and Georgia, within a few miles of Charles-Town and Savannah.

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Public credit can (in fact) be supported *only* by the preservation of an *equilibrium* or *balance* between the *ordinary* and the *extraordinary channels* of circulation.—If that *balance* or *equilibrium* be preserved, public credit must infallibly flourish: and, on the contrary, if that *balance* or *equilibrium* shall fail, public credit must infallibly fail with it; whether the military success be good or bad; or whether the *actual resources* are great or small.

I have heard it supposed, that the Americans were actually unable to bear the burthens of so high a tax as would have been necessary for the preservation of their paper-money from depreciation: but this supposition will not bear the serious reflection of a single moment; because, by the depreciation itself, they did actually bear *not only* the self-same burthens, but still greater ones.

The value of the articles (whatever they may be) that have been actually collected from the inhabitants for the support of the war, is evidently a burthen which has actually been sustained by some or other of them; without regard to the payments that may or may not have been made to the particular persons from whom those articles were immediately collected.—If a proportionate part of this burthen had been borne by each individual, by the means of taxes, the burthen could not possibly have been greater, taking the whole of the people together:—on the contrary, it must evidently have fell much easier:—and, in whatever light we survey it, the conclusion will be the same.

If a man has *twenty shillings*, he cannot possibly labour under a greater *burthen* or *loss* by giving up *one* of those shillings as a *tax* for the preservation of the value of the other *nineteen*, than he must necessarily

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necessarily labour under by keeping the whole twenty, whereby their *value* shall be *depreciated* to the *value of nineteen*.—By giving up a proportionate part, the value of the remainder must infallibly be preserved: but by omitting so to do, the value of the whole must infallibly fall.

By the payment of the necessary taxes the Americans would have preserved so much of their paper-money at *par*, as would have properly filled every channel of circulation: but it is perfectly evident, that they have now sustained the additional burthen of that part likewise: together also with the farther additional burthens, and innumerable inconveniencies, that must ever be inseparable from the want of a steady and sufficient circulating medium.

These burthens would also have been borne with much more ease by the payment of the necessary taxes; inasmuch, as they would thereby have been more proportionately divided.—Many individuals have been reduced from affluence and plenty, to total and entire poverty and ruin, by bearing more than their proportionate part; and many of those who may be considered to have borne less than their proportionate part, must necessarily have been bruised more by the inequality of the *poise*, than they would have been by bearing their full proportion in a regular and steady weight.—The time and labour that must have been taken up by individuals, in finding means to put off the paper-money, to prevent its depreciating farther on their hands, was evidently *wasted* in consequence of the depreciation; and this (in many cases at least) must have been infinitely a greater burthen, than the payment of the necessary taxes would have been.

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It may perhaps be said, that the people of America have an aversion to taxes:—This must without doubt be admitted as a perfect truth, or else the people of America must be altogether unlike the people of other countries, which I cannot so readily suppose to be the case:—There is no country in the world, I believe, but what the people have an aversion to taxes: but it is absurd to suppose that the people of any country whatsoever would lose *twenty shillings* by omitting to pay a tax, rather than pay a tax of *one shilling* for the preservation of the other *nineteen*.

The truth of the case with respect to America is this,—The taxes were levied (or rather attempted to be levied) in proportion to a valuation of the visible abilities or estates of the people, without regard to the nature of the circulation; in consequence whereof, large proportions were required, from channels wherein only small proportions of the *money* could in the nature of things circulate: and, although the several channels of circulation were *full* and *running over*, yet, by requiring large proportions where large proportions could not (in the nature of things) flow, the collection was in its nature absolutely impracticable.

It is perfectly evident, that they did actually collect the real resources of the country wherewith to feed their armies: for, without that, those armies could not have been fed:—It is also perfectly evident, that they had a greater abundance of circulating money than was requisite for the regular circulation of their other articles:—for, without that, their money could not have depreciated.—How then (it may very naturally be asked) could they be able to collect the former, and be unable, at the same time, to collect the latter?—The
cause

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cause was evidently this:—They fought for the *former* in the channels where it flowed; and for the *latter* in channels where it did not flow.—It is perfectly evident, from the very nature of things (either *with* or *without* much reflection) that there could be no other possible cause, whereby they could be able to collect the *former*, and be unable at the same time to collect the *latter*.

I have heard that some people impute the distresses and confusions that have so long prevailed in the American finances, to the want of gold and silver money; but I am astonished that any body should suppose that their system of practice could have derived any possible advantage from that quarter.

There was not the smallest difficulty in their finances *internally*, till the ordinary channels of circulation had become sufficiently filled with their circulating medium, and taxes had thereupon become necessary:—The difficulty with respect to their internal finances must therefore have proceeded from their being unable to collect the necessary taxes: and, if these could not be collected, what possible advantage could their system of practice have derived from a circulating medium, whether it should be made of one kind of materials or of another?

If their system of taxation was incapable of collecting the *paper-money* when sufficiently plenty, it is absurd to suppose that the same system of taxation could have been capable of collecting *gold and silver money* if that had been equally plenty.—Their difficulties, in this respect, must have been rather greater with *gold and silver money*, than with *paper-money*: because, *gold and silver* might have been put away as an article of merchandize, and
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thereby rendered less easy to be obtained; which the *paper-money* (not being an article for foreign markets) could not be subject to.—On every consideration, therefore, the distresses and confusions which have prevailed in the American finances, proceeded altogether from the incoherence of the system of practice with which they were conducted; and from no other cause whatever.

Some people estimate the resources and prosperity of a country from the quantity of gold and silver that is contained in it; but I am entirely at a loss to conceive, how gold and silver can be supposed to possess any other possible quality, than every other article of merchandize possesses.—Gold and silver can produce no effect, but by being exchanged for those articles that men have a more immediate occasion for:—and any other article of merchandize may evidently be exchanged in the same manner at any wholesale market, and will therefore produce the self-same effects.

If the resources of North America previous to these troubles had been estimated from the quantity of gold and silver in the country, what idea must we have formed of them?—Every body well knows that North America never had any material quantity of *gold and silver*; but let these last seven years decide whether she had or had not *real resources*.

Had the American provinces heretofore made it a point to introduce gold and silver, they could doubtless have introduced any reasonable quantity that might have been wished; but this would have been an exertion inconsistent with their true interest.

Nature is in all cases the best guide to follow: and the natural influx of gold and silver into these provinces,

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provinces, was counteracted by the following very natural cause:—The immense capacity of the country for improvements, naturally invited and attracted the attention of the industrious, who engaged in them:—this naturally created a great demand for implements of husbandry, cloathing, and all such other articles of merchandize as would enable them to carry these improvements into effect:—the greater part therefore of the *surplus* by which the productions of the country exceeded its consumptions, was naturally sent out for these necessary materials; and but a small part thereof for gold and silver.

Had a larger proportion of the American productions been sent out for gold and silver, a larger proportion of gold and silver would of course have been introduced: but, in this case, the proportion sent out for the materials that were necessary to carry on their improvements, must evidently have been less; and those improvements (and therewith the *real resources* of the country) must consequently have been less likewise.

Had the improvements of the country been so far perfected, as that the productions would have been sufficient to have supplied the internal consumptions, and to have provided the materials necessarily required for carrying the farther improvements into effect, and to have still left a surplusage; this surplusage would naturally have brought in gold and silver: but any endeavour to obtain gold and silver for domestic or internal services, faster than it should be thus naturally introduced, would have been *premature*: and would evidently have checked (not accelerated) the growing improvements and resources of the country.

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The prosperity of the provinces before these troubles sufficiently evinces the truth of these observations.—There is not perhaps on this whole earth a country that arrived to a state of equal perfection, in so short a time; as some of the American provinces where the internal commerce was carried on by a well supported paper-money.

The taxes raised in the American provinces previous to these troubles were so exceeding small, that no very great art was necessary with respect to the method of levying them; the methods, however, that were adopted in some of the provinces were so very inconsistent with the principles of circulation, that the taxes (small as they were) were a good deal burthensome to the people.—In some of the provinces they did raise what was necessary for the support of a regular circulation of the paper-money which they emitted; but in others of the provinces they did not.—This, and this alone, was the cause that the paper-money of some of the provinces depreciated, while that of other provinces preserved its full value: there is indeed no other rational cause to which imagination itself can impute it.

It would be perfectly absurd to suppose that the stability which I have related respecting the New Jersey money, could have been regularly supported for so many years together, by visionary phantom and phrenzy.—If it had not been supported by the advantages flowing from its regular circulation, it must certainly have fell.—Phrenzy may indeed form a machine and set it in motion: but, if it has no other support, its motion must necessarily be as frenzical as its *motor*.

It is too perfectly absurd to suppose that any thing of a frenzical nature could have performed a part

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part so truly regular and steady, as did the paper-money of sundry of the colonies:—It certainly performed that regular and steady part, *purely* by means of the support that was communicated to it; in the self-same manner, and on the self-same GENERAL and UNIVERSAL PRINCIPLES, as the *animal* and the *vegetable*, and every other thing in the creation performs *its* functions.—Its *value* was supported by the *demand*, in the self-same manner as the *value* of every thing else whatever, is supported.—It was (in a word) supported by the force of a regular CIRCULATION, in the same manner as the UNIVERSE itself, and every thing therein contained, is supported.

The same general and universal principles which governed and supported the paper-money of some of the colonies, governed also the depreciation in that of the other provinces:—where the taxes were insufficient for the preservation of a regular circulation, the paper-money *depreciated*; in the same manner, and on the same principles, that animals and vegetables, in the like case, *sicken* and *die*:—in the same manner also as the planets must wander from their orbs, and (in a word) as the UNIVERSE itself, and every thing therein contained, must fall to nought, if the *primum mobile* of the regular circulation be withheld.

A very easy and familiar conception of the PRINCIPLES on which any regular motion or circulation must depend, may at once be formed, by considering the construction of a common clock, for the purpose of pointing out the hour of the day by an index.

In speaking of *regular motion* (in contradistinction to that *general motion* which may be either *regular* or *irregular*) the term *primum mobile* must comprehend

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hend the *conjunct* or *compound* power of gravitation and repulsion; because, it is this *conjunct* or *compound* power, which makes the motion an *uniform* or *regular* one.—On this principle the *primum mobile*, or governing power of the index of a clock, is the *compound*-power of the *weight* and *pendulum*: because, although the weight itself will give the index a *motion*; yet, without the pendulum, it will not be that *regular motion* which is required.—This PRINCIPLE applies *equally* in all other cases of regular motion; whether it relates to *mechanical machines*, or to *public finances*, or to any thing else.

But an unhappy fertility of imagination seems to have prevailed in some of the provinces, as if it had become necessary to invert the order of nature, by *compounding* those things which nature has made *simple*; and by making those things *simple* which nature has made unalterably *compound*!—How this unhappy fertility of imagination could have become so general, seems to be one of the greatest prodigies in nature!

I have (I believe) sufficiently demonstrated, both from natural deductions and from experimental proofs,—that the confusions and distresses which have prevailed in the American finances, have proceeded altogether from their being unable to collect the necessary taxes:—That (seeing they were actually able to collect the *real resources* of the country for the support of their armies, and had a still greater abundance of *circulating money* than of any thing else) their inability to collect the taxes must have proceeded altogether from the mistaken principles on which they attempted to collect them:—AND, that these *mistaken principles* were owing to their considering the TRUE PRINCIPLE

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PLE of taxation to be a *simple* proposition, whereas, in nature and in truth, it is a *compound* one.

It is perfectly evident, on the smallest reflection, that no government under heaven can possibly preserve the LIBERTIES, and protect the PROPERTIES of a people, unless the system of financing be such, as to draw forth the resources of the state, in due proportions from the several members.—This (I aver it mathematically) is totally and absolutely impossible to be done, under the present *new constitution* of America.—If therefore it should actually be supposed, that their new constitution of government had no other fault in it; even *this alone* must produce a total insecurity and destruction of the *liberties* and *properties* of the people.

I am however fully of opinion, that if the whole fabric of their new constitution was to be examined on a regular and natural *basis*, every part and parcel thereof would be found to be constructed on the same mistaken principles.—But, having sufficiently demonstrated the CAUSES of the distresses and confusions that have prevailed in the financing branch, and shewn the dreadful point to which those causes must infallibly tend, I shall leave the rest to the contemplation of the reader; and I am almost fully persuaded, that on deliberate and mature reflection, he will be perfectly convinced, that there is no probable chance in nature for avoiding the remaining direful evils and calamities with which the present new constitution is still pregnant, but by a re-union with the mother-country.

It would be infinitely best all round to lay aside contention, and to survey with steady strictness those unerring and unalterable paths of NATURE,

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which lead *mathematically* and *infallibly* from CAUSES to EFFECTS.—In so doing, the well disposed of each contending party would be pleasingly astonished, at finding with how much ease an infallible remedy may be administered to all the distresses and calamities that have been produced by the depreciation of the *paper-money*; and with how much ease its credit may be again infallibly restored, and supported, so far as the natural demands for a *circulating medium* can render it either necessary or convenient.

F I N I S.