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- I. *An Inscription on an antient Sepulchral Stone, or Monument, in the Church-Yard of Kilcummin, with some Remarks on the same, by the Rev. James Little.* 3



# E R R A T A.

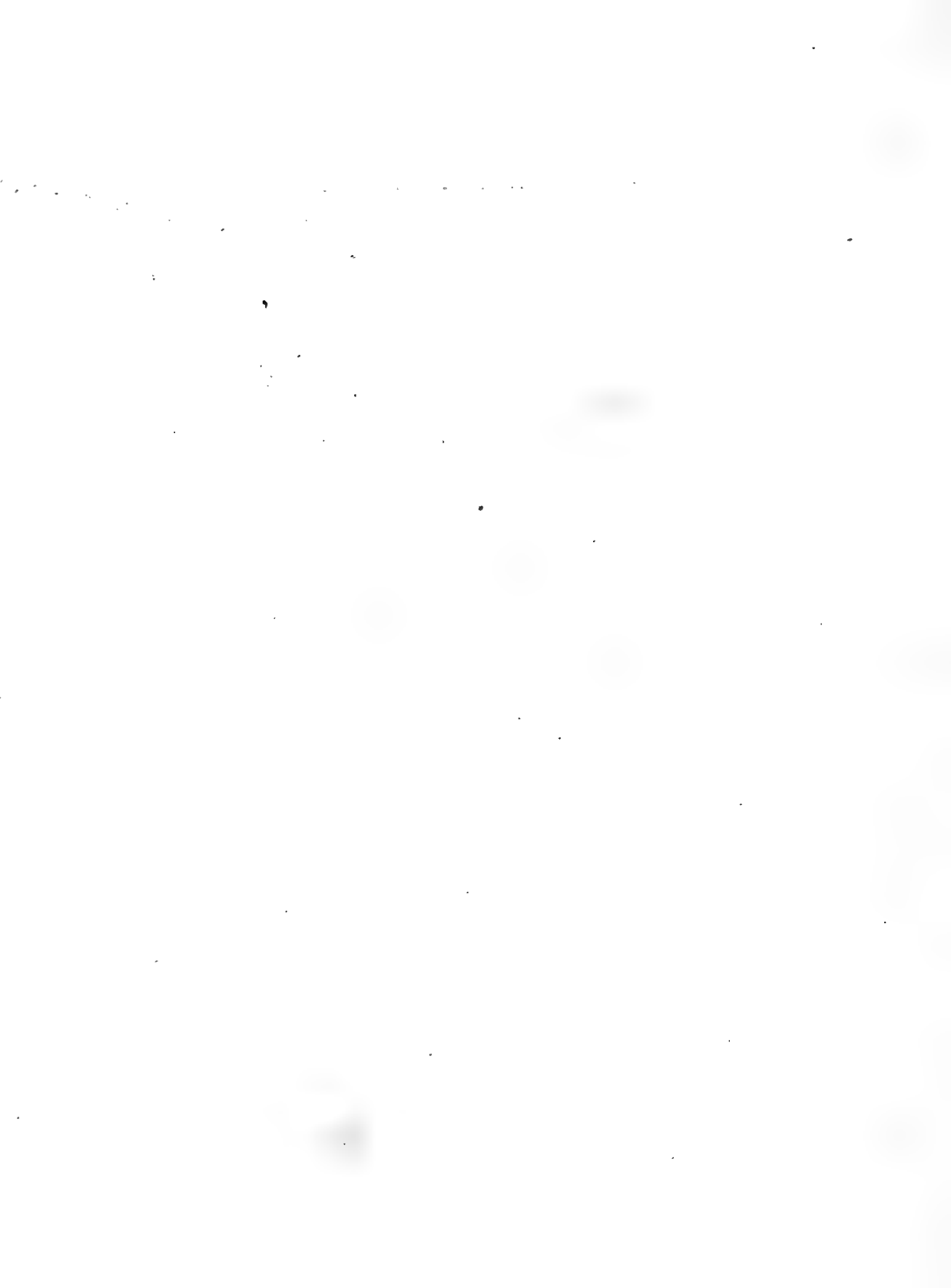
## SCIENCE.

- P. 22, l. 1. for *shifstus*, read *Schiftus*.  
 — 24, l. 32. for *across*; it its &c. read *across it*; its &c.  
 — 29, l. 4. for *Naturalists* who visit our coast rarely, read, *Naturalists* who visit our coast, rarely.  
 — 28, l. 28, for *choert*, read *cheit*.  
 — 36, l. 27, for *as*, read *us*.  
 — 40, l. 3. for *executde*, read *executed*.  
 P. 49, l. 7, after *world*, for , read !  
 — l. 26, *dele* his.  
 — 52, l. 13, for *mult*, read *most*.  
 — 55, l. 3 from the bottom, for *opposite*, read *apposite*.  
 — 59, l. 2, *dele* good.  
 — 72, l. 17, for *labouring*, read *colouring*.  
 P. 97, l. 10, *dele e* is less than 1.  
 — l. 14, a *misplacing*, read  $= \frac{2e}{1 - e^2}$   
 — l. 19, for  $\frac{2e}{1 - e^2}$ , read  $-\frac{2}{1 - e^2}$ , *m*.  
 — last line, for *a*, read *a*.  
 — 108 l. 3, for *c*, read *c*.  
 — 110, l. 22, insert 3 at beginning of paragraph.  
 — 123, l. 5, after BGD, insert a comma, for AC read AG  
 — last line, for 36, read 2. 36.  
 — 125, l. 2, from bottom for *c<sub>2</sub>m*, read *c<sub>2</sub>, m*.  
 — 126, l. 2 from bottom, for *c<sub>2</sub>, c*, read *c<sub>2</sub>, c*.  
 — 132, l. 2, By mistake 36. 12. 3 was used instead of 36. 12. 3, 3; this has rendered the error of the true anomaly about  $\frac{2}{10}$  of a second, had the latter number been used, the true anomaly would not have erred  $\frac{1}{10}$  of a second.  
 — l. 3, for I, read I.  
 — 136, l. 6 and 7, at the end of each, (in some copies) place 2 at the vinculum.  
 — 138, l. 21, for D, read GD.  
 — l. 22, *dele* 's.  
 — 139, l. 49, after *Machin*, instead of , insert .  
 — 147, l. 5, for PR, read PR.  
 — 155, l. 5, for 1, read I.  
 — 157, l. 13, for *sign*, read *line*, and for *are*, read *awc*.  
 — 191, l. 11, between the words *to* and *visionary*, insert *entertain*.  
 — 195, l. 9 from the bottom, substitute , for . after purpose.  
 — 198, l. 8, for *falter* read *fastest*.  
 — 200, l. 4 from bottom, for *apital*, read *capital*.  
 — 207, l. last, for *took*, read *look*.  
 — 209, l. 3, *dele* great.  
 — 213, l. 5 from bottom, for *distaue*, read *distance*.  
 — 220, l. 21, for *country*, read *country*.  
 — 231, l. 2, for *one*, read *the*.  
 — 239, l. 22, for *complete*, read *complex*.  
 — 44, l. 15, for *but*, read *of*.

- 245, l. 1, full stop instead of comma, after a add .  
 — 257, l. 7, for *quires*, read *quire*.  
 — 269, l. 11, for any, read *many*.  
 — 281, l. 5, from bottom, for *operatons*, r. *operations*.  
 — 283, l. 21, for *pigments*, read *pigments*.  
 — 221, lines 19 & 15, *dele* from the word *country*, to this.  
 — 303, l. 10, for *receptables*, read *receptacles*.  
 — 324, l. 16, after *some*, insert *cases*.  
 — 340, l. 3, for *purposes*, read *purposcs*.  
 — 344, l. 23, for *individuals*, read *individual*.  
 — 350, l. 21, for *inary*, read *dinary*.  
 — 358, l. 21, after *now*, read *employ*.  
 — 369, l. 26, *dele* of.  
 — 410, l. 4 from bottom, for *the* read *the*.  
 — 436, l. 3, for *pangyrit*, read *panegyrit*.  
 — 448, l. 21, after *earth*, *dele* ;  
 — 452, l. 32, for *wet* read *wete*.

## POLITE LITERATURE.

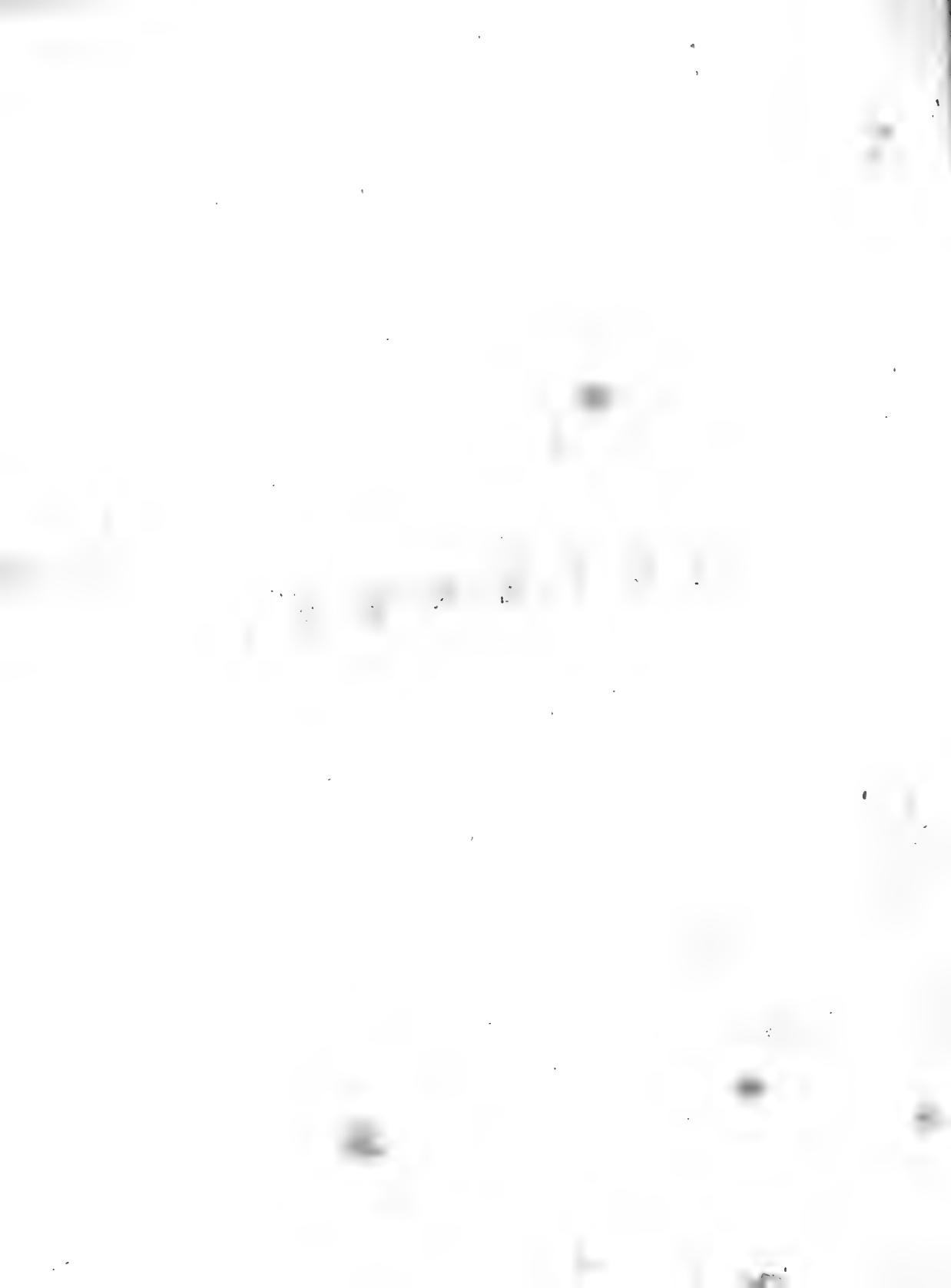
- P. 5. last word in the note, for *Ionics*, read *Tonics*.  
 — 6, l. 6, after *eternal*, *dele* comma, and add a full stop.  
 Ibid. After respect, *dele* full stop, and add it, with a comma.  
 — 7, l. 25, for *bitringa*, read *Vitringa*.  
 — 10, second line from the bottom, for  $\sigma\omega\iota\sigma\tau\tau\omega\upsilon$ , read  $\epsilon\omega\iota\sigma\tau\tau\omega\upsilon$ .  
 — 11, l. 22, for *Troquois*, read *Iroquois*.  
 — 19, l. 17, for *teleutics*, read *teleutics*.  
 — in the note, for  $\sigma\omega\iota\sigma\tau\tau\omega\upsilon$ , read  $\epsilon\omega\iota\sigma\tau\tau\omega\upsilon$ .  
 — 24, l. 4, for *trime*, read *trim*.  
 — 30, l. 22, for *ichmed*, read *ihimed*.  
 — 32, l. 7, for diphthong, read diphthong.  
 — 34 last line in the note, for *Patricio*, read *Fabricio*.  
 — 35, l. 28, for *thefe*, read *three*.  
 — 36, l. 4, after *Ishmael*, add comma.  
 — l. 5, after *Dedanini*, add comma.  
 — l. 22, for *hath*, read *had*.  
 — 38, l. 18, for *imaginary*, read *imagery*.  
 — in the note, for *exidently*, read *evidently*.  
 — 40, l. 9, for *memibotes*, read *memibotes*.  
 — 41, l. 1, for *tacito*, read *Tacito*.  
 — 47, l. 10, for *aborigina*, read *aboriginal*.  
 — 53, l. 20,  $\sigma\omega\iota\sigma\tau\tau\omega\upsilon$ , read  $\epsilon\omega\iota\sigma\tau\tau\omega\upsilon$ .  
 — 57, second line from bottom, for *audum*, read *laudum*.  
 — 72, l. 25, after *poets*, *dele* comma.  
 — 76, l. 2, for *James*, read *Janus*.  
 — 94, second line from the bottom, for 972, read 772.  
 — 95, l. 1, for *on*, read *in*.  
 — 98, l. 11, for  $\sigma\omega\iota\sigma\tau\tau\omega\upsilon$ , read  $\epsilon\omega\iota\sigma\tau\tau\omega\upsilon$ .  
 — l. 18, for *Imago the*, *Image*, read *Imago*, the *Image*.  
 — 99, l. 23, for *epic*, read *epics*.  
 — 140, l. 9, after *Leander*, substitute a comma for a full stop.  
 — 145, l. 22, for *Golophon*, read *Colophon*.  
 — 152, l. the last, for *pleasures*, read *placure*.  
 — 170, l. 4, for *affection*, read *affliction*.  
 — l. 9, *dele* the.  
 — l. 28, for *Meynum* read *Meynun*.  
 — 172, l. 5, after the word *passion*, *dele* full stop and substitute a comma.



S C I E N C E.

Vol. IX.

( A )



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*On DOCTOR HALLEY'S SERIES for the Calculation of LOGARITHMS, by the REV. RICHARD MURRAY, D. D. late PROVOST of Trinity College near Dublin.\*—Read Nov. 16th, 1801.*

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LORD NEPER was, without dispute, the inventor of logarithms. In the year 1614 he published a sketch of his plan, together with some short tables of logarithms calculated by himself, under the title of *mirifici logarithmorum canonis descriptio*; and the obvious uses of the scheme were so many and great, that the invention was received with eagerness by almost all the mathematicians in Europe, many of whom set themselves about improving the hint, and calculating larger tables. Of these the principal was Mr. Henry Briggs, who went twice into Scotland to consult with the inventor; at which times they agreed upon some alterations to be made in the tables, and settled the plan of those logarithms that are the most convenient of all for use, and which are known by the name of *Vulgar Logarithms*; they are also frequently called *Briggs's Logarithms*, because, Lord Neper dying shortly after their second consultation, the whole business of forming the tables devolved upon Briggs.

\* This essay was found among the papers of Doctor Murray, after his death. He had drawn it up, shortly after his appointment in 1763 to the professorship of mathematics, for the instruction of his pupils, and much of it therefore is employed in explanations, which, had he designed it for publication in the present mode, he would have retrenched; but, as the whole is short, it has been thought advisable to give it in its original form.

These two (Neper and Briggs, whom we may call the first authors of logarithms) used two methods in their computations: the one by involution, or raising the number whose logarithm they sought to a certain power; the other by evolution, or extracting out of it a root the denominator of whose index was sufficiently great; and this latter they were obliged to do by repeated extractions of the square root, no easier method being then known.

But afterwards, when Sir Isaac Newton's famous binomial theorem was made public, Doctor Halley took advantage of that invention, and shewed a method of calculating logarithms by throwing the root required (or rather the logarithm derived from it) into a converging series: and this method is as easy and expeditious as can ever be expected, or indeed desired, the law of the series being obvious, the terms easily reduced to numbers, and a very few of them sufficient.

This difference in the manner of extracting the root makes the principal difference between the methods of finding the logarithms used by the first authors and by Halley.

There are some properties of these roots which are necessary to be known, and which are obvious enough when the roots are found out in Briggs's way, but which require proof when they are found by the binomial theorem. These properties are here premised in the form of Lemma's, that the explanation of Halley's method may not be interrupted by proving them afterwards.

#### LEMMA. I.

“ Let  $e$  be a proper fraction, and  $n$  any whole number consisting of many places of figures; if out of the binomial  $1+e$  a root is to be extracted whose index is  $\frac{1}{n}$ , it is required to find the most simple series that shall give that root true to a number of places of decimals less by four or more than twice the number of places of figures in  $n$ .”

(A) I.

$$(A) 1. \quad \frac{1}{n}e. \quad \frac{1}{n} - 1 \quad \frac{1}{n} - 2 \quad \frac{1}{n} - 3 \quad \frac{1}{n} - 4 \\ \frac{2}{2}e \quad \frac{3}{3}e \quad \frac{4}{4}e \quad \frac{5}{5}e \quad \&c.$$

$$(B) 1. \quad \frac{1}{n}e. \quad -\frac{1}{2}e. \quad -\frac{2}{3}e. \quad -\frac{3}{4}e. \quad -\frac{4}{5}e. \quad \&c.$$

$$(C) 1. + \frac{1}{n}e. - \frac{1}{2n}e.^2 + \frac{1}{3n}e.^3 - \frac{1}{4n}e.^4 + \frac{1}{5n}e.^5 \quad \&c.$$

By multiplying together the terms of the first series above marked A, according to the method of the binomial theorem, a new series will be produced, which will give that root true to any number of places of decimals: but in the third and following terms of the series A, the fraction  $\frac{1}{n}$  is so small, that it may be omitted without causing any error within the prescribed number of places, and this will reduce the series A, to the second series above marked B, and the terms of it, multiplied according to the method of the binomial theorem, produce the third series marked C, which therefore is the series required. In it the first term is 1, and the rest are formed by the following laws.

1st, In the 2d, 3d, 4th, and following terms are the several powers of  $e$ , whose indices are 1, 2, 3, &c. the natural numbers.

2dly, The co-efficient or uncia of any term is  $\frac{1}{n}$  divided by the index of  $e$  in that same term: for it is  $\frac{1}{n}$  divided by the denominator of the last of the fractions in the series B, that were multiplied together in order to produce that term.

3dly, The two first terms of it are positive, because the two first terms in B are positive: but the following terms are alternately negative and positive; because the 3d and following terms of B being all negative, in the 3d and following terms of C there will be alternately an odd and even number of negative factors.

And

And that the omission of the fraction  $\frac{1}{n}$  in the third and following terms of the series A will not cause any error within the prescribed numbers of places of figures, will appear by considering the value of the quantity that is thereby omitted in any term of the series C: for it will appear for many reasons to be always less than  $\frac{1}{nn}$ , the greatest possible value of which is a decimal consisting of 1 preceded by twice as many cyphers, except 3, as there are places in  $n$ ; and therefore the value of all the omissions in 100 terms will not amount to an unit in the last of the prescribed places.

LEMMA 2.

“ The values of  $e$  and  $n$  continuing as before, it is required to find a like series that shall give the root of the residual  $1 - e$  true to the same number of places.”

$$(D) \quad 1. \quad \frac{1}{n} \times -e. \quad \frac{-1}{2} + -e. \quad \frac{-2}{3} \times -e. \quad \frac{-3}{4} \times -e. \quad \frac{-4}{5} \times -e. \quad \&c.$$

$$(E) \quad 1 - \frac{1}{n} e - \frac{1}{2n} e^2 - \frac{1}{3n} e^3 - \frac{1}{4n} e^4 - \frac{1}{5n} e^5 \quad \&c.$$

In every term after the first of the series B change the sign of the quantity  $e$ , and there will result the series marked D, whose terms, multiplied as before, produce the series required, which is marked E. This series differs from C only in this, that all the terms after the first are negative: for in the second term of D,  $e$  is negative; therefore the second term of E (having one negative factor) is negative; and in every succeeding term of D, there are two negative factors, whence in every following term of E, there will be an odd number of negative factors, and therefore they will all be negative.

LEMMA



## LEMMA 3.

“ The values of  $e$  and  $n$  continuing as before, let  $m$  be any whole number different from  $n$ , but like it consisting of many places of figures; if out of the binomial or residual  $1 \pm e$  be extracted roots whose indices are  $\frac{1}{n}$  and  $\frac{1}{m}$ , and if the roots be calculated true to numbers of places of decimals less by four or more than twice the numbers of places of figures in either  $n$  or  $m$ ; and lastly if from each root be subtracted unity, then will the remainders be to each other as the indices  $\frac{1}{n}$  and  $\frac{1}{m}$ , or reciprocally as the denominators  $n$  and  $m$ .”

For if 1 be subtracted from the root whose index is  $\frac{1}{n}$ , by the two preceding lemmas, the remainder will be  $\pm \frac{1}{n}e - \frac{1}{2n}e^2 + \frac{1}{3n}e^3 - \frac{1}{4n}e^4 + \frac{1}{5n}e^5$  &c. which is equal to  $\frac{1}{n} \times \left( \pm e - \frac{1}{2}e^2 + \frac{1}{3}e^3 - \frac{1}{4}e^4 + \frac{1}{5}e^5 \right)$  &c. and in like manner, if 1 be subtracted from the root whose index is  $\frac{1}{m}$  the remainder will be  $\frac{1}{m} \times \left( \pm e - \frac{1}{2}e^2 + \frac{1}{3}e^3 - \frac{1}{4}e^4 + \frac{1}{5}e^5 \right)$  &c. and it is evident that these series are to each other as  $\frac{1}{n}$  and  $\frac{1}{m}$ , or reciprocally as  $n$  and  $m$ .

## LEMMA 4.

“ The values of  $e$  and  $n$  continuing as before, if out of the quantity  $1 \pm e$  a root is to be extracted whose index is  $\frac{1}{n}$ ; and unity being subtracted from the root, if the remainder is to be multiplied by the denominator  $n$ ; it is required to find the most simple series that shall give the product true to a number of places of decimals, less by three or more than the number of places of figures in  $n$ .”

From what is said in the first and second lemmas it is plain that the series required is  $\pm e - \frac{1}{2}e^2 + \frac{1}{3}e^3 - e^4 + \frac{1}{5}e^5$  &c. the laws of whose  
continuation

continuation are as follow: first, the indices of  $e$  in the several terms are the natural numbers in their order: secondly, the numeral co-efficient of any term is 1 divided by the index of  $e$  in that term: and thirdly, when the quantity is  $1 + e$ , the terms are alternately affirmative and negative; but when it is  $1 - e$ , the terms are all negative.

And that the omission of the fraction  $\frac{1}{n}$  in the third and following terms of the series A (in Lemma 1) will not cause any error here, within the prescribed number of places, will appear by considering the value of the quantity that is omitted in any term of the series of this Lemma: for it appears to be always less than  $\frac{1}{n}$ , the greatest possible value of which is a decimal consisting of 1 preceded by as many cyphers except two as there are places of figures in  $n$ ; and therefore the omissions in 100 terms will not amount to an unit in the last of the prescribed places.

*Note,* That Doctor Halley has derived the substance of these lemmas in a shorter manner, from a supposition of  $n$  and  $m$ , the denominators of the indices, being infinite numbers. But as there may be some difficulty in conceiving this, I have proposed as much of the doctrine as was wanted here, without making that supposition.

Art. 1. By *ratiuncula* I understand a ratio of inequality, but which is very near to a ratio of equality. Thus if  $r$  be a decimal fraction having many cyphers (as 10, 20, 50, 100) before the first significant figure, the ratio of 1 to  $1 + r$ , or of 1 to  $1 - r$  may be called a *ratiuncula*.

2. Logarithms are the exponents (or numeral measures) of ratios.

3. Now ratios are measured by the numbers of equal *ratiunculæ* of which they are compounded, or into which they may be supposed to be resolved. Thus, if between 1 and 10 be placed 99999999 mean proportionals, then will the ratio of 1 to 10 be resolved into 100000000 *ratiunculæ*, each equal to the ratio of 1 to the first or least of those means: and if of these means 30102999 stand between 1 and 2 the

the ratio of 1 to 2 will be resolved into 301029995 of these ratiunculæ; and these numbers, 1000000000 and 301029995, will be the logarithms of the ratios of 1 to 10 and of 1 to 2, as being the numbers of equal ratiunculæ of which these ratios are compounded.

4. But though these numbers be immediately and properly the logarithms of these ratios, they are not the only ones that can be used as such; any two numbers (or indeed any two quantities of the same kind) that have the same ratio with them, may be made their logarithms. Thus, if there be any convenience in having 1 for the logarithm of the ratio of 1 to 10, and if 0,301029995 be to 1, as 301029995 is to 1000000000, then may 1 and 0,301029995 be made the logarithms of those ratios.

5. If 1 be made the antecedent of any ratio, that ratio may be resolved into any number of equal ratiunculæ, by extracting out of the consequent a root, the dominator of whose index is the number of ratiunculæ that is required. Thus, if it be required to resolve the ratio of

1 to  $1+e$  into  $n$  ratiunculæ, the ratio of 1 to  $1+e^{\frac{1}{n}}$  will be the first of them; and it is sufficient to find one of them, each of the others being equal to it.

6. Let now  $e$  and  $y$  be any two numbers, of which  $e$  is the greater, and between 1 and  $1+e$  let a series of mean proportionals be placed, whose number is  $n-1$ , the ratio of 1 to  $1+e$  will be resolved into  $n$  ratiunculæ; if of these means any number denoted by  $m$  stands between 1 and  $1+y$ , the ratio of 1 to  $1+y$  will be resolved into  $m$  ratiunculæ, each equal to one of the former; and from what was said above (art. 3.) the logarithms of the ratios of 1 to  $1+e$  and of 1 to  $1+y$  will be as  $n$  and  $m$ .

7. The first of these mean proportionals is  $1+e^{\frac{1}{n}}$ , and if this quantity be involved to a power whose index is  $m$ , that power will be equal to  $1+y$ , (or so near to it, that it may be used for it without any error,)

that is  $1+e^{\frac{m}{n}} = 1+y$ , and therefore  $1+e^{\frac{1}{n}} = 1+y^{\frac{1}{m}}$ . Suppose now that

out of  $1 + y$  is extracted a root whose index is  $\frac{1}{n}$ , that root will be  $\sqrt[n]{1 + y}$ ;

and since (by lem. 3.)  $\sqrt[m]{1 + y - 1} : \sqrt[n]{1 + y - 1} :: n : m$ , it follows that

$\sqrt[n]{1 + e - 1} : \sqrt[m]{1 + y - 1} :: n : m$ . But it was proved above (art. 6.) that the logarithms of the ratios of 1 to  $1 + e$  and of 1 to  $1 + y$ , are as  $n$  and  $m$ ;

therefore these logarithms are as  $\sqrt[n]{1 + e - 1}$  and  $\sqrt[m]{1 + y - 1}$ ; that is, if out of two numbers both greater than 1 be extracted the same root, the excesses of these roots above 1 will be as the logarithms of the ratios that 1 has

to these numbers: and therefore if one of these excesses  $\sqrt[n]{1 + e - 1}$  (or any multiple of it) be made the logarithm of the ratio of 1 to  $1 + e$ , the

other excess  $\sqrt[m]{1 + y - 1}$  (or the same multiple of it) must be made the logarithm of the ratio of 1 to  $1 + y$ .

8. Now according to Neper's first plan, as published in the Canon Mirificus, when he resolved any ratio (as of 1 to  $1 + e$ ) into a sufficient number of ratiunculæ, or which is the same thing, when he had placed between 1 and  $1 + e$  a sufficient number of mean proportionals, he made the excess of the first, or least of them above 1, to be the logarithm of one of these ratiunculæ:

thus, if  $\sqrt[n]{1 + e}$  be the first, or least, of the mean proportionals between 1

and  $1 + e$ , then he made  $\sqrt[n]{1 + e - 1}$ , to be the logarithm of the ratio of

1 to  $\sqrt[n]{1 + e}$ , or, as it is usually called, the logarithm of the number  $\sqrt[n]{1 + e}$ ;

and then it will follow from the nature of logarithms, that  $n \times \sqrt[n]{1 + e - 1}$  will be the logarithm of the ratio of 1 to  $1 + e$ , or of the number  $1 + e$ ; and hence

again (by what was said in art. 7.) it follows, that  $n \times \sqrt[m]{1 + y - 1}$  must be the logarithm of the ratio of 1 to  $1 + y$ , or of the number  $1 + y$ .

9. Let

9. Let now  $e$  and  $y$  be proper fractions, and (by lemma 4)  $n \times 1 + e - 1$   
 $= e - \frac{1}{2}e^2 + \frac{1}{3}e^3 - \frac{1}{4}e^4 + \frac{1}{5}e^5$  &c. and also  $n \times 1 + y - 1 = y - \frac{1}{2}y^2 + \frac{1}{3}y^3 - \frac{1}{4}y^4 + \frac{1}{5}y^5$  &c.; and thus by series of this kind we can find Neper's logarithms of all mixed numbers between 1 and 2.

10. In like manner, if the number whose logarithm is sought, be less than 1, that is, if the ratio be that of 1 to  $1 - e$ , having placed a sufficient number of mean proportionals between 1 and  $1 - e$ , he subtracted 1 from  $1 - e$ , the first or greatest of them, and made the remainder  $1 - e - 1$  (which now becomes negative) to be the logarithm of one ratiuncula, and therefore  $n \times 1 - e - 1$  will be the logarithm of the ratio of 1 to  $1 - e$ , or of

the number  $1 - e$ ; and hence as before,  $n \times 1 - y - 1$  must be the logarithm of the ratio of 1 to  $1 - y$ , or of the number  $1 - y$ . But (by lemma 4)  $n \times 1 - e - 1 = -e - \frac{1}{2}e^2 - \frac{1}{3}e^3 - \frac{1}{4}e^4 - \frac{1}{5}e^5$  &c., and also  $n \times 1 - y - 1 = -y - \frac{1}{2}y^2 - \frac{1}{3}y^3 - \frac{1}{4}y^4 - \frac{1}{5}y^5$  &c., and therefore, by series of this kind, we can find the logarithms of all numbers less than 1.

11. Let now any two numbers be proposed,  $a$  the lesser, and  $b$  the greater, the logarithm of whose ratio is required. We must first find a ratio whose antecedent is 1, and which shall be equal to the ratio of  $a$  to  $b$ : this is done by finding the value of  $e$  in the following analogy,  $a : b :: 1 : 1 + e$ ; which being changed into an equation, becomes  $a + ae = b$ , whence  $ae = b - a$ , and therefore  $e = \frac{b - a}{a}$ : and if  $e$  be a proper fraction, we may then find the hyperbolic logarithm of the ratio of 1 to  $1 + e$ , which (by art. 9.) appears to be  $e - \frac{1}{2}e^2 + \frac{1}{3}e^3 - \frac{1}{4}e^4 + \frac{1}{5}e^5$  &c.; and since equal ratios have the same logarithm, that series will also be the logarithm of the ratio of  $a$  to  $b$ .

12. And if the ratio be that of  $b$  to  $a$ , we must still find an equal ratio whose antecedent is 1, which is done by finding the value of  $e$  in

this analogy  $b : a :: 1 : 1 - e$ , which gives this equation  $b - be = a$ , whence  $be = b - a$ , and  $e = \frac{b-a}{b}$ : here  $e$  must necessarily be a proper fraction, and the logarithm of the ratio of 1 to  $1 - e$  (by art. 10.) is  $-e - \frac{1}{2}e^2 - \frac{1}{3}e^3 - \frac{1}{4}e^4 - \frac{1}{5}e^5$  &c., which is therefore the logarithm also of the ratio of  $b$  to  $a$ .

13. From art. 11, we may observe that when the given ratio is ascending, or of lesser inequality, the value of  $e$  is the difference of the given terms divided by the lesser of them: and from art. 12, that when the given ratio is descending, or of greater inequality, the value of  $e$  is the difference of the same terms divided by the greater.

14. Either of the above series might be sufficient for finding all logarithms; but by joining the two together a third series results, much more convenient for the purpose, as it converges twice as fast as either of them; the method of doing it (which must be carefully attended to) is as follows.

15. Between  $a$  and  $b$ , the terms of the given ratio, place  $p$  an arithmetical mean; the whole ratio of  $a$  to  $b$  is thereby resolved into two, that of  $a$  to  $p$ , and of  $p$  to  $b$ : invert the former, and it becomes the ratio of  $p$  to  $a$ ; and if we make  $1 : 1 - e :: p : a$ , then (by art. 13) will  $e = \frac{p-a}{p}$ , and the logarithm of the ratio of 1 to  $1 - e$ , or of  $p$  to  $a$ , is the series  $-e - \frac{1}{2}e^2 - \frac{1}{3}e^3 - \frac{1}{4}e^4 - \frac{1}{5}e^5$  &c. by art. 10.

16. Again, if we make  $1 : 1 + e :: p : b$ ,  $e$  will be  $\frac{b-p}{p}$  by art. 13, but, since  $p$  is an arithmetical mean between  $a$  and  $b$ ,  $\frac{b-p}{p} = \frac{p-a}{p}$ ; therefore  $e$  has the same value as in the last article; and the logarithm of the ratio of 1 to  $1 + e$ , or of  $p$  to  $b$ , is  $e - \frac{1}{2}e^2 + \frac{1}{3}e^3 - \frac{1}{4}e^4 + \frac{1}{5}e^5$  &c. by art. 9.

17. In art. 15, the logarithm of the ratio of  $p$  to  $a$  was found to be  $-e - \frac{1}{2}e^2 - \frac{1}{3}e^3 - \frac{1}{4}e^4 - \frac{1}{5}e^5$  &c. Invert this ratio again, and it becomes the ratio of  $a$  to  $p$ , and its logarithm is the same as before, only its sign is changed: that is, the logarithm of the ratio of  $a$  to  $p$  is the series  $e + \frac{1}{2}e^2 + \frac{1}{3}e^3 + \frac{1}{4}e^4 + \frac{1}{5}e^5$  &c., and by art. 16, the logarithm of the ratio of  $p$  to  $b$  is  $e - \frac{1}{2}e^2 + \frac{1}{3}e^3 - \frac{1}{4}e^4 + \frac{1}{5}e^5$  &c., and therefore the logarithm of the compound ratio, or of  $a$  to  $b$ , is the sum of these two series, which is  $2e + 2 \times \frac{1}{3}e^3 + 2 \times \frac{1}{5}e^5$  &c., or  $2 \times e + \frac{1}{3}e^3 + \frac{1}{5}e^5$  &c.

18. In

18. In art. 15  $e$  was found to be  $\frac{p-a}{p}$ , and in art. 18  $e$  was found to be  $\frac{b-p}{p}$ ; and it was there observed, that  $\frac{p-a}{p} = \frac{b-p}{p}$ , because  $p$  is an arithmetical mean between  $a$  and  $b$ ; from which it also follows that either numerator,  $p-a$  or  $b-p$ , is equal to  $\frac{1}{2}b - \frac{1}{2}a$ , and also that the common denominator  $p$  is equal to  $\frac{1}{2}b + \frac{1}{2}a$ , therefore  $e$  is always equal to  $\frac{\frac{1}{2}b - \frac{1}{2}a}{\frac{1}{2}b + \frac{1}{2}a}$ , or to  $\frac{b-a}{b+a}$ ; that is, the value of  $e$  is always a fraction whose numerator is the difference of the terms of the given ratio, and whose denominator is their sum: and the logarithm of the ratio is the double of a series formed by the following laws: 1st. the several terms of the series contain the powers of that fraction or quantity whose indices are the odd numbers; 2dly, every term is divided by the index of the power of the quantity  $e$  in it; and 3dly, the terms are all affirmative, when the ratio is that of  $a$  to  $b$ , or ascending; but would all be negative if the ratio were that of  $b$  to  $a$ , or descending. And by these series may be found the logarithms that are called Neper's Logarithms, and sometimes the Natural Logarithms, but most usually the Hyperbolic Logarithms of Numbers or Ratios.

This is Doctor Halley's method, as far as it relates to logarithms in general. But it may be necessary to add some observations upon it, and particularly to assign the reasons of the several operations where these reasons are not sufficiently obvious of themselves.

1. I have throughout supposed that the logarithms of an ascending ratio (or of lesser inequality) is affirmative, and that the logarithm of a descending ratio (or of greater inequality) is negative; but this is a matter in its own nature absolutely indifferent: the logarithms of a ratio of either inequality may be made affirmative; but then the logarithms of ratios of the other inequality must be negative, and reciprocal ratios must have logarithms equal in quantity, but with unlike signs.

2. In art. 11 and 12, I have supposed every ratio to be so reduced, as that its antecedent may be 1. I might have reduced them so as to make 1 the consequent of each. But the necessity of one or other will appear from hence, that the logarithms of ratios are found by inserting

serting sufficient numbers of mean proportionals between their terms: for if between two numbers,  $a$  and  $b$ , it be required to insert a series of mean proportionals whose number is  $m$ , the first of them will be  $\sqrt[m]{a^m b}$ , and the last will be  $\sqrt[m]{a b^m}$ ; in each case one of the given terms must be involved to a power whose index is the number of means required; and this, we may safely say, would be impracticable in the present case, if that term be different from 1, on account of the greatness of the number  $m$ : but if that term be 1, this trouble is wholly avoided, every power of 1 being still 1.

Again, the other term of every ratio is proposed under this form  $1 \pm e$ , that is as a binomial or residual of which the first member is 1; the reason of which will appear from this, that if the  $m^{\text{th}}$  power of a binomial or residual  $a \pm b$ , be to be found by the binomial theorem, the first, second, third, and following terms of the series will contain the powers of  $a$  whose indices are  $m, m-1, m-2$  &c. that is  $a^m$  will be the first term,  $a^{m-1}$  will be one factor of the second term,  $a^{m-2}$  one of the third term, and so on; and if (in the case of calculating logarithms)  $a$  be different from 1, it may safely be pronounced impracticable to find those powers of  $a$ : whereas if  $a$  be made equal to 1, all that trouble vanishes, every power of 1 being still 1.

And lastly,  $e$ , the second member of the binomial or residual, is supposed to be a proper fraction; for otherwise the series of art. 9, would either perpetually diverge, or after converging slowly for some time, would afterwards diverge; or lastly, would converge perpetually, but so slowly as to be totally useless: but we need not insist further upon those particulars, because in the series of art. 17, which is the only one that we can ever have occasion to reduce to numbers, the quantity  $e$  must always be a proper fraction, its numerator being the difference, and its denominator the sum of the terms of the given ratio. Some useful cautions however may be given, relating to that fraction; as that it is convenient to have 1 for its numerator; for each succeeding



succeeding term of the series is to be derived from the preceding, and if its numerator be not 1, there will be a necessity of both multiplying and dividing; whereas by making its numerator 1, the multiplication is avoided. And for this reason, if a ratio be proposed whose terms will not immediately give a fraction of this kind, it is to be resolved into others, in each of which the difference of the terms is either 1, or a measure of their sum. Thus, if the logarithm of the ratio of 5 to 8, were required, from what has hitherto been explained, the quantity  $e$  would be  $\frac{3}{13}$ ; but, instead of immediately finding that logarithm, the ratio is to be resolved, either into the ratios of 5 to 6 and of 6 to 8 and then the fractions become  $\frac{1}{11}$  and  $\frac{1}{7}$ ; or into the ratios of 5 to 7 and of 7 to 8, and then the fractions become  $\frac{1}{6}$  and  $\frac{1}{15}$ ; or lastly into the ratios of 5 to 6, and of 6 to 7, and of 7 to 8, and the fractions become  $\frac{1}{11}$ ,  $\frac{1}{13}$ , and  $\frac{1}{15}$ : and the logarithms of any of these sets of ratios being found, their sum will be the logarithm of the ratio of 5 to 8.

There is also frequently another reason for resolving the ratio first proposed, into others; and that is in order to diminish the fraction  $e$ ; for as it is diminished, the series converges the faster, and it may frequently be eligible to find two or three or more logarithms by series that converge fast, rather than one by a series that converges slowly.

3. In art. 15, by adding two series together, a third series results more simple than either of them. The several steps, by which this is effected, are now to be explained.

After the given ratio is resolved into two, it is ordered that one (and one only) of these ratios be inverted; for if neither of them, or both, were inverted, they would still be, either both ascending, or both descending; and, in either case, the two series produced would have their correspondent terms (i. e. terms that involve the same power of the literal quantity  $e$ ) affected by like signs, and therefore no term would vanish by addition. Whereas by inverting one ratio only, one series has all its terms affected by the same sign, and the other has its terms alternately

alternately affirmative and negative; and therefore the two series have their alternate correspondent terms affected by unlike signs; these terms therefore may vanish by addition. But in order to this, it is also necessary that the quantities (both numeral and literal) of these terms should be the same. Now the numeral quantity, or coefficient, must be the same in correspondent terms of these series, because each is 1 divided by the index of the literal quantity  $e$  in that term; it only remains therefore that care be taken to have the quantity  $e$  of the same value in both series; and this is done by providing that both its numerator and denominator be the same: and that its numerator is the same, follows from  $p$ , the quantity inserted between  $a$  and  $b$ , being an arithmetical mean between them; for  $p - a$  and  $b - p$  are the numerators; and that the denominator is the same, follows from its being the first of the two ratios that is inverted, for  $p$ , the quantity inserted, must always be the denominator of both fractions. This appears, when the given ratio is ascending, from what was said in art. 15 and 16: and if the given ratio had been descending, as of  $b$  to  $a$ , still it is to be resolved into the ratios of  $b$  to  $p$  and of  $p$  to  $a$ ; and if the first of them be inverted, it becomes the ratio of  $p$  to  $b$ , or ascending, and therefore by art. 13,  $p$  will be the denominator of the fraction: and the other ratio, that of  $p$  to  $a$ , being still descending, by art. 13,  $p$  will be the denominator of the fraction here also; and thus the second terms of the two series, and the alternate terms from them, being composed of the same quantities, both literal and numeral, and having unlike signs, they will entirely vanish when the series are added together.

It may be proper here to observe, that the two rules, (that for making  $p$ , the inserted term, an arithmetic mean between  $a$  and  $b$ ; and that for inverting the former of the two ratios,) become necessary together; that is, they are so connected together, as that when either is observed, the other must be observed also. But we may neglect both these rules, and yet arrive at the same conclusion, by the following rules: divide the difference of the given terms into two parts proportional

tional to these terms, and to the lesser term add the lesser of these parts, and make that sum the intermediate term, and then invert the latter of the two ratios. But since this method has no advantage over the other, and since the proof of it is not so obvious, Doctor Halley justly passed it over in silence.

The doctrine delivered in art. 7. may perhaps become clearer by being divided into several propositions, as follows.

PROP. 1.

The logarithms of two different powers of the same number are to each other as the indices of the powers.

For the logarithms of these powers are the products of the logarithm of the root into the respective indices; and therefore are to each other as the indices.

PROP. 2

If out of two numbers be extracted roots, whose indices are such that the roots themselves may be equal, the logarithms of those numbers will be to each other as the denominators of the indices of the roots.

For if the common root be raised to a power, whose index is the greater denominator, that power will be the greater number; and if the same root be raised to a power whose index is the lesser denominator, that power will be the lesser number; and therefore (by the preceding prop.) the logarithms of the numbers will be as the denominators.

PROP. 3.

If out of a number, which stands between 1 and 2, be extracted different roots, the denominators of whose indices are

numbers consisting of many places of figures, the excesses of these roots above unity will be to each other as the indices of the roots, or reciprocally as the denominators of the indices; provided that the roots be calculated only to a number of places of figures less by 2 or 3 than twice the number of places in the lesser denominator.

This proposition is the same with lemma 3, and has been proved before.

PROP. 4.

If out of two numbers, both standing between 1 and 2, be extracted roots, whose indices are the same, and of which the denominator is sufficiently great, the excesses of the roots above unity will be to each other as the logarithms of the numbers themselves.

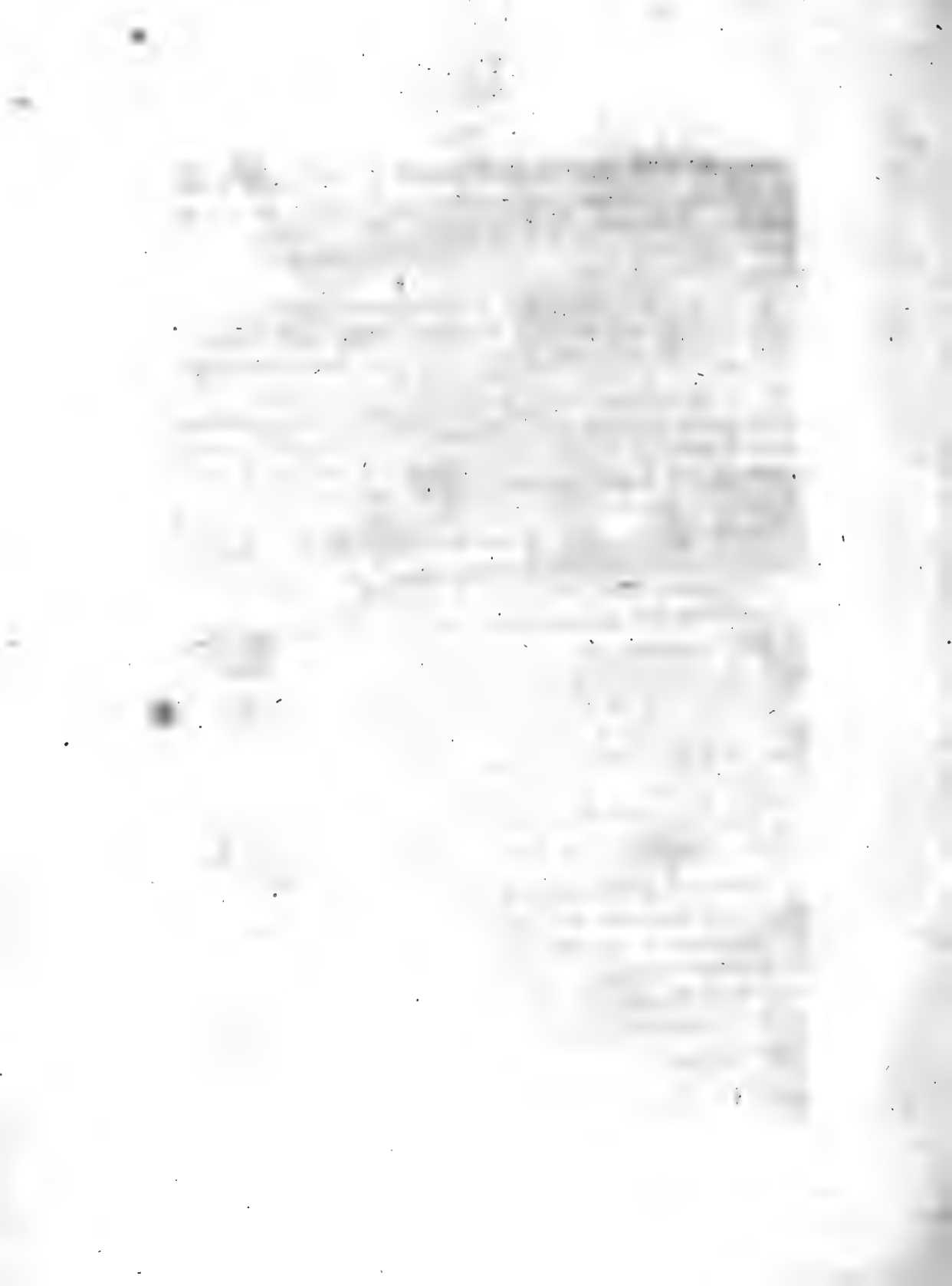
For suppose 1<sup>st</sup>, that roots are extracted out of the numbers whose indices are such that the roots themselves may be equal; then (by prop. 2d) the logarithm of the greater number will be to the logarithm of the lesser as the greater denominator is to the lesser. Suppose 2<sup>dly</sup>, that out of the lesser number another root is extracted, whose index is the same with the index of the root extracted out of the greater number; there are now extracted out of the lesser number two different roots, and (by prop. 3.) the excesses of the greater and lesser of these roots above unity will be to each other as the greater and lesser denominator; that is (as was proved above) as the logarithms of the greater and lesser number. But the greater of these roots is equal (by supposition) to the root extracted out of the greater number; therefore the excesses above unity of the roots extracted out of the greater and lesser number when the index is the same, are to each other as the logarithms of the numbers themselves.

The same argument in symbols is in the next page.

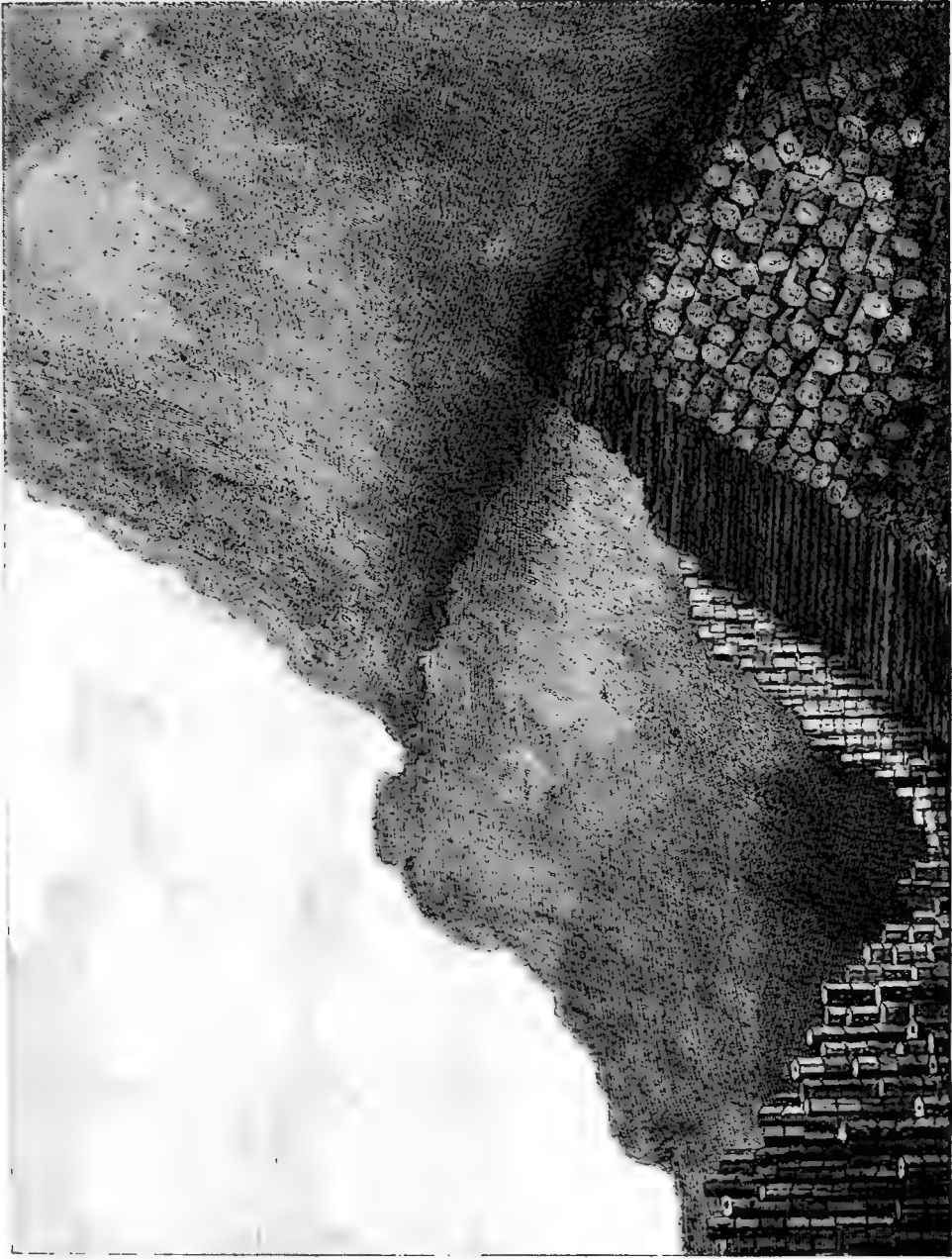
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Let  $e$  and  $y$  be proper fractions of which  $e$  is the greater; then will  $1 + e$  be the greater number, and  $1 + y$  the lesser: also let  $n$  be the greater denominator, and  $m$  the lesser:

By suppo- sition	1	$\frac{1}{1 + e^n} = \frac{1}{1 + y^m}$
By prop. 2nd.	2	Log. of $1 + e$ : Log. of $1 + y$ :: $n$ : $m$ .
By lem- ma 3d.	3	$\frac{1}{1 + y^m} - 1$ : $\frac{1}{1 + y^n} - 1$ :: $n$ : $m$ .
$2 + 3$	4	$\frac{1}{1 + y^m} - 1$ : $\frac{1}{1 + y^n} - 1$ :: Log. of $1 + e$ : Log. of $1 + y$
$1 + 4$	5	$\frac{1}{1 + e^n} - 1$ : $\frac{1}{1 + y^n} - 1$ :: Log. of $1 + e$ : Log. of $1 + y$







*View of a WHYNN DYKE at the Giant's Carlsberg.*



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*Account of the WHYNN DYKES in the Neighbourhood of the GIANT'S CAUSEWAY, BALLYCASTLE, and BELFAST, in a Letter to the LORD BISHOP OF DROMORE, from WILLIAM RICHARDSON, D. D. late Fellow of TRINITY COLLEGE, DUBLIN. Read, April 12, 1802.*

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MY LORD,

When I last had the honour of conversing with you on basalt subjects, you were surpris'd when I told you that the *Whynn Dykes*, which of late have so much occupied the attention of naturalists in the Western Isles of Scotland, originated on our Irish coast, and especially about the Giant's Causeway.

As your Lordship expressed a wish for further information on the subject, I promised to communicate to you such observations as I should make when I had examined the coast a second time, in order to ascertain the *facts* with the utmost precision.

Previous to my entering into a particular account of our dykes, I will take the liberty of making a few general observations on those in both countries.

The Whynn Dykes in the Hebrides are seen under very different circumstances from those on the northern coast of Ireland. There they are found on, and above, the surface, generally a few feet; and often serve as fences, whence they obtain their name. In this form they run northwards quite to the extremity of these islands, ascending and descending mountains, crossing seas, and where these are narrow, the Dykes that run into the water at one side of a channel, are seen rising out of it at the other side, steadily pursuing their formed rectilineal course.

With us they are sometimes exhibited in a very different manner. Their first appearance is in the faces of our vast perpendicular precipices,  
where

where they are seen cutting vertically the several strata of which these are composed, and then burying themselves in the northern ocean.

The observations made on these Whynn Dykes in the two countries, taken together, make our information on the subject complete. In the Hebrides we are surprized at the incredible length to which these mighty walls proceed, and we see them penetrating indifferently all substances they encounter: with us we can measure a part, and a part only, of their stupendous height, as at the Milestone one hundred feet, at Port Spagna three hundred and thirty, at Fairhead probably more: and we can observe the effect, or rather the non-effect, produced at their contacts with the different materials they meet, as they are seen in the faces of our precipices.

By Mr. Mills's account, (Phil. Trans. 1790.) the island of Lismore, entirely limestone, is crossed by Whynn Dykes, as is the limestone at Gartnefs; at Iona granite is the contiguous matter, at Juva chert, at Perfabus a Whynn Dyke is crossed by a lead vein, and another at Glasgow Beg; at the isle of Arran Mr. Jameson finds them cutting through porphyry and micaceous shistus.

With us the Whynn Dykes at the westward of the Giant's Causeway cut through strata of table basalt, and red ochreous matter, placed alternately; at the Giant's Causeway, and Port Spagna, they cut through strata of finer basalt, disposed in prismatic pillars; while at Fairhead they encounter new materials, to wit, alternate strata of freestone and coal.

In both countries these mighty walls are always of basalt; their general thickness is from twelve to fifteen feet, though in one or two instances they do not exceed two or three feet, and at Gartnefs the Whynn Dyke is twenty three yards across; but it has not been ascertained in any instance to what depth they reach beneath the surface, even in the deepest mines.

Though the material of which these walls are composed seems to be in general the same, yet from Mr. Mills's account, there are important differences between the Scotch Whynn Dykes, and with us scarce any two of our Dykes, that are accessible, exactly (as will appear) resemble each other.

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As the Whynn Dykes, Mr. Mills observed, are unquestionably basalt, he calls them all lava, and attempts to prove it by a sort of vague induction; page 75 he says Ilay Whynn Dykes resemble those at Ballycastle, *which take their rise in a country confessedly abounding with volcanic matter.*

Now the specimens from the Ilay Dykes strongly resemble (as he says) the Derbyshire toadstone, formed, as he asserts (page 98), by subterraneous fire.

Of Derbyshire I will not presume to say any thing, having never visited it, but the proof of its strata being lava, rests upon the admission of Mr. Whitehurst's position, that these toadstone strata were formed by successive eruptions of a volcano at the centre of the earth, which pouring up repeated torrents of liquid lava, these spread when they approached the surface of the Earth at different distances, and formed the toadstone strata.

When Mr. Mills endeavours to establish his opinions by assertions relative to my country, I will venture to reply to him.

The precipice from which the Whynn Dykes issue at Ballycastle, by his own account, consists of alternate strata of freestone and coal, not very like volcanic matters; and as to his positive and general assertion, that our basaltic country *confessedly* abounds with volcanic matters, I must reply in his own stile, positively and generally, that it does not afford a single particle of volcanic matter; that I have examined this tract for a longer time, and probably with more attention than any other person ever did, or I would not presume to hazard the assertion so confidently.

When your Lordship is so good as to perform the promise you made me, of spending some time with me at the Giants Causeway, you will be able to judge for yourself as to the truth of these contradictory assertions.

The advocates for igneous operations over the surface of our globe are so prejudiced, that it is sometimes sufficient to refute them merely to quote their own words. As Mr. Mills's paper is now before me, I will give your Lordship an instance: he says page 98. " In short,

“ short, from the very rude and irregular appearance of the summit of the hill (Loffit Hill), from its rising so suddenly from the limestone strata, and from the Whynn Dyke that runs through it, I am strongly inclined to believe it of volcanic origin.” Now, as limestone and volcanic matters are not very congenial, and as we do not find that a Whynn Dyke has been met with in the neighbourhood of any volcano, I conceive, with great deference to Mr. Mills, that if he was determined to draw a conclusion from these data, it should have been a contrary one. But it is time to proceed to facts.

The westernmost Whynn Dyke I have met with on our coast, is near what is called the Black Rock, at the end of the Bush Strand. The perpendicular precipice is there not very high (probably sixty feet), it is composed of horizontal strata of table basalts, separated from each other by red ochreous layers.

The Dyke, (which is inaccessible) is seen from the water to cut all these strata vertically, each of them being interrupted in its course by this wall, and resumed on the other side of it, precisely at the same level.

The second Dyke is three or four hundred yards farther on, towards the north-east; it is a much finer one, and so happily marked that it cannot be mistaken.

A solitary rock, about two hundred yards distant from the main, and visible from a great part of the coast on each side, is called the *Mile Stone*, from its supposed distance from the Giant's Causeway, but in reality it is much nearer to it. The precipice here has considerably increased in height, being near to one hundred feet, accurately perpendicular, and stratified as at the other Dyke.

This second Dyke reaches, from the summit to the water, beneath which we can see it continued northwards, until it reaches the Milestone, which is a part of it.

Though this Dyke be also inaccessible, it is plainly formed of strata laid horizontally, and extending quite across; its thickness seems to be about twelve feet.

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The strata are interrupted here, and resumed again, without disturbance, at the other side, as before; nor in either case does the slightest separation appear where these Dykes meet the contiguous strata, all forming one solid mass.

The third Dyke is situated near the western point of the bay, by which we begin to descend to the Giant's Causeway; of this an isolated fragment alone remains, about one hundred feet long by fifty feet high; like the rest it is composed of rude prisms laid horizontally.

Our fourth Dyke is at the Giant's Causeway itself; it divides vertically part of the cliff, at the foot of which the causeway is situated, and descends quite down to it.

The precipice is not perpendicular here, as at the other Dykes, by which means our view of this one is partially interrupted; there is, however, enough of it laid bare, to ascertain its nature beyond a doubt, and especially as it is composed of horizontal prisms, a property that seems essential to all Whynn Dykes.

Where this Dyke divides the upper part of the columnar stratum which forms the Giant's Causeway, the basalt pillars on the west side of it have fallen from their original vertical position, until they lean forward almost horizontally; while on the east side of the wall they stand steadily vertical.

The basalt septa, which frequently divide the strata in mines, and appear to be of the same nature with our Whynn Dykes, are generally attended by a sinking or subsiding of the strata on one side of them, without disturbing the parallelism of these strata. This too is the case with our own Whynn Dykes at Fairhead; but of the six Dykes at Bengore promontory this fourth is the only one where any thing like a subsiding or depression of the strata can be observed.

This Dyke is so accessible, that we are enabled to examine its material and internal construction, from which we are precluded in the former cases; the basalt of which this is composed, though contiguous to, or rather mixed with the Causeway-pillars, is very different from the Causeway-basalt, it is somewhat coarser, more granular in the fracture, and though darker than the grey whynn-stone of the Fairhead

pillars, it resembles their colours, more than the fine blue of the Causeway-basalt.

The Causeway-Dyke is fifteen or sixteen feet thick, sometimes quite solid, sometimes shivery, it is entirely composed of small trapezoidal prisms, their sides about an inch each, and their axes horizontal, they are strongly agglutinated together, and when this wall is attacked by the sledge, it sometimes breaks into fragments composed of an accumulation of the smaller prisms, abundance of which are scattered about the foot of the precipice.

The fifth Dyke is at the eastern point of the semicircular bay, of which the Giant's Causeway forms the western point; it is inaccessible, and visible only from the water, it cuts vertically three or four strata of table basalt, also a great stratum of red ochreous matter, and is then lost in the precipice.\*

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\* When I discovered this Whynn Dyke in the year 1801, I was prevented from examining it accurately by an heavy surf, which deterred me from venturing among the sunken rocks at the foot of the precipice; the next summer I was more fortunate, and enabled twice to reach the bottom of the cliff, where the Dyke immersed into the water perpendicularly.

I traced it downwards as it cut the horizontal strata of table basalt vertically, and observed each of these merging into its solid mass without any the least separation of the material; each stratum, having then as it were passed through the Dyke, resumed its former position on the other side at the same level it held before; about forty yards from the place where the Dyke immersed in deep water, it arose again ten or twelve feet above the surface, continuing its course due north for thirty yards, exactly like a wall; shewing the horizontal prisms of which it was constructed, whose bases formed the surface of the wall.

The most curious part of this Dyke is discovered by tracing it up the cliff, whose summit it reaches a little to the eastward of its original course; here it projects boldly from the face of the rock like the rectangular corner of a mighty wall about twenty feet thick: yet this curious wall is not entirely Dyke, but only its west side, which, at its termination, shews the horizontal prisms composing it; the east side is formed by a range of vertical pillars fifty feet long, part of a great columnar stratum which the Dyke there cuts through.

The

The sixth Whynn Dyke is at Port Spagna, the third semicircular bay east from the Causeway; this is the only one of our Whynn Dykes that has ever yet been noticed. Mr. Mills, (Phil. Transf. 1790,) saw from the top of the cliff *a kind of a Whynn Dyke, which ran into the sea towards the N. N. E;* but he did not go down to examine it, and it is from below only that any observations can be made upon it.

This Dyke runs into the sea, like a quay about twenty feet broad, formed of huge black stones; its direction near the water is S. S. W. and its two sides accurately parallel; having proceeded thus about sixty yards from the water, the eastern side deflects a little, forming an obtuse angle, while the western side proceeds farther in its former direction; the breadth of the Dyke thus increases for a little, but the western side is soon resumed parallel to, and at its former distance from the other

( D 2 )

side

The upper surface of this tremendous wall is easily approached from the top of the hill, and covered with high verdure; I have frequently dined upon it, as fortunately the surface is hollow in the middle, by which the dread of a perpendicular precipice, above two hundred feet high, (and on three sides not more than eight or ten feet distant) is considerably abated; the height of the point of the wall from the sea immediately under it is three hundred and twenty feet.

I dwell upon this Dyke both because it is so easy of access from above, (for even carriages can drive to the edge of the cliff) and also because it is so happily marked as not to be mistaken; it forms the middle point between the Giant's Causeway and the solitary pillar called the Chimney, or in other words the common horn of the two crescents or semicircular bays next to the Causeway on the east side.

I will add an account of another Dyke lately discovered by my friend Capt. R. O'Neil; it is situated three or four hundred yards N. W. from the beautiful villa called Seaport on Port Ballinistay, a mile and a half west from the Giant's Causeway.

The face of the precipice here seems about fifty feet high, composed of horizontal strata of coarse basalt or trapp, abounding with zeolite, and of a reddish tinge, friable, and decomposing; all these strata, from the summit to the sea, are cut through obliquely at an angle of about forty five degrees, by a Dyke of sound blue basalt, very fine at its edges, but coarser in the middle, and nearly five feet thick; the fine basalt of this Dyke and the coarse trapp of the strata, notwithstanding the difference of their grain, unite solidly on both sides of the Dyke; this important fact is more easily ascertained here, than in any other Dyke I know, it is so accessible; I must observe, that this Dyke is not accurately rectilinear,

side, and the Dyke proceeds now due south: all this is best explained by a figure.



The Dyke, after having proceeded a short way in its new direction, is lost under the rubble that has fallen from above; but whenever the precipice becomes perpendicular, it appears again in its last direction, cutting the strata vertically from the bottom of the precipice to the top, above two hundred feet; the height of the upper part of the cliff above the sea is here three hundred and thirty feet.

These strata are almost all columnar, and the horizontal prisms of the Dyke are strongly contrasted with the vertical pillars of the strata.

The basalt of this Dyke is very nearly of the same grain with that of the Dyke at the Causeway, rather coarser, its fracture granular, and full of shining points; but it differs materially from it in another respect, the latter having but one principle of construction, to wit, the minute prisms into which it breaks, and the agglutination of these forming it into a mere wall; while the Dyke at Port Spagna has, like some other varieties of our basalt, a double principle of construction, being first formed into huge massive prisms four and five feet in diameter, and these again being divided into small quadrangular prisms whose sides do not exceed an inch.

This property possessed by some varieties of our basalt, and other curious circumstances attending them, as for instance, that some of our prismatic basalt in thin strata, abound with marine exuviae, shells and impressions of cornua ammonis,\* while others, columnar and prismatic, but

\* The nature of this stone is, I know, not yet fully ascertained. Sir Joseph Banks informs me, that the specimens I sent to him, are pronounced by his friends not to be *genuine*



but not articulated, and others columnar, prismatic, and articulated, contain cavities full of fresh water to the amount of a thimble-full; all these facts have hitherto escaped notice.

Naturalists, who visit our coast rarely, allow themselves time enough to examine any thing, and, while there, are occupied in looking for arguments to support the theory they patronize, not in studying nature for information: they never examine any of our basalts but that at the Giant's Causeway; this, it is true, has none of the properties I mention, it has but one principle of construction, to wit, the visible prismatic form so much admired, this afterwards breaks indifferently in all directions.

To return to my subject; though the basalt septa in mines in general, and every one of our own Whynn-Dykes at Ballycastle, are attended by a depression of the strata on one side; yet those I have described at Bengore Head are accompanied by nothing similar, except the one at the Causeway, and proceeding farther eastward, coasting this promontory, we meet with three depressions of our strata, where nothing like a Whynn Dyke is to be found.

The first is singular and beautiful; it is near a mile east from the Causeway, and a quarter of a mile beyond the last Dyke. The precipice here is uncommonly magnificent, its height more than three hundred and fifty feet above the water; and the upper part of this, which is accurately perpendicular and extends half a mile on either side, is one hundred and fifty feet.

This whole face is composed of three strata, two of them formed of superb basalt pillars forty-five and fifty-five feet long, with an intermediate

*genuine or legitimate basalt:* An eminent Scotch Naturalist, who visited the spot last summer, I am told, asserts this stone to be *Chert. Petrofilius* or *Schistus*.

On the other side, Mr. Kirwan, to whom I gave specimens, asserts in a late publication, that it is basalt; our ingenious Mr. Higgins is of the same opinion, and the celebrated Professor Pictet of Geneva, who did me the honour of a visit last summer, considers it to be basalt, containing a greater portion of *silice* than usual; I believe Monf. Pictet is right.

diate stratum, near sixty feet of another variety of basalt; the lowermost of these strata, when produced westward, dips, and at its intersection with the sea forms the Giant's Causeway.

This grand facade, together with the whole promontory, is as it were cut down and bisected by a vertical plane, on the west side of which the promontory and all its strata have sunk and subsided about forty feet, without any other shake or disturbance, all the strata in the subsided part still remaining accurately parallel to the permanent strata, and proceeding westward in their former direction, only from points forty feet lower.

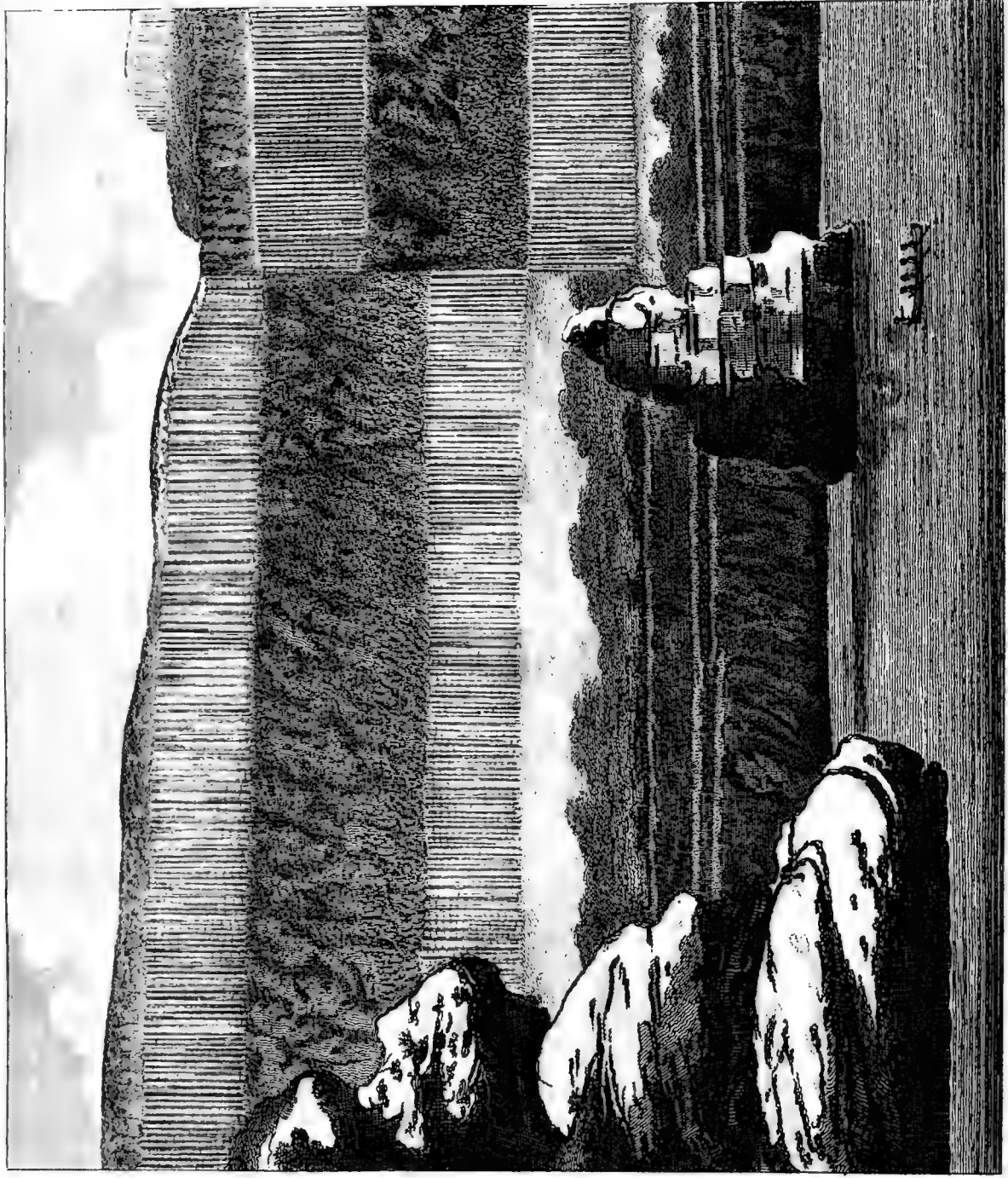
An account of the variety, arrangement, and alternations of these strata, so completely displayed in the superb face of this precipice, where nature seems to have intended to exhibit to the philosopher the order in which she has disposed her materials, without putting him to the trouble of penetrating into the bowels of the earth; would lead me far beyond the limits of a letter. How these strata, with their ascent, culminations, dip, and immersions, have hitherto escaped the observation of naturalists, is quite beyond my comprehension.\*

The two depressions farther east are much inferior to this; I shall only observe that there is not the least appearance of crack or disruption, the strata (at Portmoon 8) on both sides of the depression are all consolidated into one mass.

When searching for Whynn Dykes upon our northern coast, I was obliged to omit about four miles of it lying between Bengore-Head and Carrickarede, as being too distant from Portrush and Ballycastle, where I was used to take boat, and totally void of shelter, even for the smallest craft.

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\* I cannot avoid quoting a passage from a late traveller, who seems to possess two qualities very necessary in a naturalist, to wit, *attentive observation* and *freedom from system*; he says, "no subject is more interesting or useful than an examination of the intricate position of strata and veins; in short, upon this is founded all our knowledge of geology; it is, however, attended with great labour and difficulty." (*Jameson's Mineralogy of Scotland and Arran, page 61.*) With us such an examination is attended neither with labour nor difficulty.



Remarkable Depression of the Basalt Strata at Bengore Head  
one Mile East of the Giant's Causeway.



To the westward of Ballycastle I saw only one Dyke. On the east side of Kenbaan Point, a rock emerges from the water, which I have no doubt is part of a Dyke, from the appearance it made; and as I approached it, I perceived it was formed of horizontal prisms: here too a new feature occurred, common indeed in the Dykes farther eastward, but which I had not observed in any of those I had yet examined; the centre and sides of this one were constructed differently, the prisms in the centre being larger than those in the sides, and all very neat, the grain too probably, as in other cases, also differed, but I was precluded from examining any of the circumstances which attended this curious little solitary rock, by the violent surf which then broke upon it.

Hitherto the precipices cut through by the Whynn Dykes, and the rocks from among which they sometimes emerge, were all basalt, uniformly stratified, but the accumulation of these strata, after regularly dipping, immerses beneath the sea to the westward of Ballycastle, and a new system of materials arises at the end of the strand to the eastward, to wit, alternate strata of freestone and coal; these are cut through exactly in the same manner the basalt strata were, by vertical Whynn Dykes, which all run into the sea, across the beach at the foot of the precipice:

The first of these is about two miles from Ballycastle, and though a rude imperfect one, it is not to be overlooked; the black or dark blue of the basalt being strongly contrasted with the brown colour of the freestone it passes through on the beach; here the high road runs close under the precipice, and affords a good opportunity to examine the contacts of the basalt Dyke with the freestone it cuts through.

The next Dyke, some hundred yards farther east, is more perfect, and so accessible on the beach, that its singular construction can be examined without any trouble; it is of the same breadth with most of the others; that is, about twelve feet; it more accurately resembles a quay than any of them; its surface is flat and its sides perpendicular; it is divided in its whole length by three right lines one bisecting it

it through its middle, and one on each side of this, about a foot distant.

These three lines determine the stile of masonry (if I may use the expression) with which it is built, to wit, horizontal prisms about five feet long, laid in rows on each side, and in the middle two rows of prisms about one foot square each. I attempt a sketch of these lines thus:



The bases of the long prisms shew their polygonal figures on the sides of the Dyke, and, if taken up and laid horizontally, would exhibit a rude pavé; these prisms are obviously composed of smaller ones like those at Port Spagna, but I had not a sledge sufficiently weighty to ascertain the fact with precision.

When I was on the spot Mr. Magawly, who is concerned in, and superintends the colliery, told me they were then cutting across this Dyke seven hundred yards within the precipice.

The next Dyke is of ruder basalt, and more imperfect; it seems to exhibit nothing remarkable.

The fourth Ballycastle Dyke, or as it is called there the Great Gaw, emerges from beneath the precipice, of the same breadth and of the same rude material and construction with the first and third; but it is soon joined by what the colliers call its wing, that is a new wall annexed to it on each side, by which it becomes triple; these wings are of a very different material from the centre, being precisely the same in grain with the very fine Portrush stone, which sometimes contains shells and impressions of *cornua ammonis*, but in these wings I did not observe any.

\* When

\* When this Dyke enters the water it accumulates into an island; or rock, of much greater height and breadth, still the two materials keeping distinct, though so united at the contact as to form but one stone; thus the arrangement of the coarse, and very fine, basalt here and at Portrush, are precisely the same, saving only one difference, that at the latter place the planes of the strata are horizontal, while at the Great Gaw of Fairhead they are vertical, and in both places grow into each other without interrupting the continuity, or solidity of the material, yet leaving the line of demarcation distinct.

Though the precipice at this part of Fairhead be not so accurately perpendicular as at Bengore, yet the depression of the strata on one side of this Dyke is visible from the water, and what is curious, a range of massive pillars, near one hundred feet each, appears over the permanent part, while over the depressed part nothing is to be seen, whence it is plain that these strata have not been depressed by incumbent weight.

The miners tell me there is also a fifth Dyke here, faintly marked without the precipice, while the Gaw, or sept, within the mine is to them very important, and has also its depression on one side, like all the others at *Fairhead*, while at *Bengore head* no depression is found but in the Dyke at the *Causeway*; all these depressions, as well as those at Bengore, where no Dyke is found, are on the west side of the line, or plane, separating the permanent from the subsided part; I mention this curious fact for the information of geologists who may possibly make some use of it.

These singular walls are not confined to the northern coast of our basalt country; its eastern side abounds with them still more. It was not in my power to examine any of those except such as lie in the bay of Belfast, but my ingenious friend Doctor M'Donald, (a zealous mineralogist, whose pursuits in that line have of late been much impeded by great

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success

\* I mentioned before that some naturalists have denied this Portrush stone to be basalt; but its being found here in a Whynn Dyke seems strongly to support the affirmative, as I have never heard of a Whynn Dyke composed of any material but basalt alone.

success in his profession) informs me that they commence near Murlogh, where my tour on that side ended; that they are very numerous about Torr point, Garron point, and in general on all projecting points on that coast; and he conceives (I think judiciously) that points being found where the Dykes are most numerous, arises from the protection they give the land in those places, preventing the sea from making the same inroads there it did on the adjacent parts.

Doctor M'Donald and I examined together the Dykes at White-house point four miles from Belfast; several of them are crowded together, three or four run parallel in an E. S. E. direction at about one hundred and fifty yards from each other, and are in one place crossed by another at acute angles; several of these Dykes, (I am told) are traced across the county of Down on the opposite side of Belfast lough.

Though these Dykes were so near, yet they differed materially from each other; in many the middle part and the sides were not of the same grain, nor constituted on the same principle; in some we found zeolite in the centre, but not in the sides, in others the middle part was formed by cutting it across (no doubt into prisms), while the sides were a rude mass studded with coarse round stones, about the size of an eighteen pound ball; these last Doctor M'Donald assured me he had often broken, and found them composed of concentric spheres, like the pellicles of an onion; some of the Dykes were of solid massive prisms laid quite across, while one or two had a longitudinal division running through their middle, as in the second Dyke at Fairhead,

In all the lines marking the construction of the Dykes, whether accurate or faint, were across at right angles to their directions, but the perfection of the workmanship was very different, and when we attacked them with a light sledge, we found some to crumble, being in a state of decomposition, others resisted our efforts, while some broke into small quadrangular prisms, like the Dykes at Port Spagna and the Giant's Causeway.

Doctor M'Donald shewed me in his cabinet prisms he had taken from a quarry (no doubt a Dyke) near Belfast; they were nine or ten inches long, and entirely composed of triangular pyramids of the same length,

put



put together as if to illustrate Prop. 7. Lib. 12th Eucl. Elem. I had found two or three small triangular pyramids among the quadrangular prisms at the Giant's Causeway Dyke, but at the Belfast Dyke triangular pyramids were the sole elementary figure.

As the shore in Belfast lough is low, there are but few opportunities of examining the materials that come in contact with the basalt Dykes; in fact I noticed but two, stratified clay and freestone; this clay is very plentiful on the shore and the adjacent country, it is arranged in very thin horizontal strata, and when exposed to the air hardens almost to the consistence of stone.

At the contact the basalt and freestone were strongly united together, and for two or three inches the basalt had in some sort acquired the colour and grain of the sandstone; I was particularly attentive to this fact as Mr. Werner alleges the transition of basalt into other stones, and Mr. Jamefon found in Arran (pages 131 and 135) basalt sometimes mixed with, and at others penetrated by sandstone; but on this occasion Doctor M'Donald by some experiments, found that notwithstanding the freestone appearance, the stone remained pure basalt.

The basaltic area, from the north and east sides of which these singular walls diverge in such abundance, comprehends a considerable part of the county of Derry, and a much greater of the county of Antrim; its breadth varies from twenty to near thirty miles, and its length exceeds thirty-five; it seems composed almost exclusively of vast and steady basalt strata accumulated upon each other; in one place we count sixteen, in others we conjecture more, especially at Magilligan rock, as we know the basalt to be twelve hundred feet deep there. This whole mass rests upon a vast stratum of white limestone about two hundred feet thick, of the same extent with the basaltic area, but discoverable only at its periphery, which extends above eighty miles.

This mighty stratum ascends to the southward, until its lower edge acquires on the east side an height of eight hundred feet, and on the west at least seventeen hundred; the country below the limestone stratum, and without

it, is on the west side mostly schistus, on the east sand stone and clay penetrated by basalt Dykes, which furnish stones in abundance for all purposes.

The Scotch Whynn Dykes have been generally supposed to originate in Ireland. If this fact be admitted, we can easily trace them by attending to the directions of our own; thus those that issue from the coast west of Ballycastle, proceeding north with a slight inclination to the east, are to be sought for in Islay, Jura, Mull, &c., where Mr. Mills actually found them in great numbers.

Our Dykes which are seen at Murlog, Torr, and Cushendun, are obviously those which, having crossed the Mull of Cantyre, were observed by Mr. Jameson in such abundance in the Isle of Arran.

Dr. Hutton also mentions twenty or thirty Whyn Dykes he found "in the shire of Ayr to the north of Irvine on the coast." These correspond with the numerous Dykes about Garron point and its neighbourhood, whose rectilinear course is directed towards that part of the Scotch coast.

The Dykes about Larne may be expected to be found on the Mull of Galloway, while those I examined far up in Belfast lough, on account of their S. E. direction, probably do not catch Scotland, nor meet land until they arrive on the coast of Cumberland.

Whether our Whynn Dykes be *identically* the same with those on the Scotch coast opposite, is not easily ascertained, though highly probable; but even confining ourselves to our own country, we find sufficient matter for astonishment in contemplating our basaltic area, formed by accumulations of horizontal strata, with numberless vertical planes radiating from it; had Dr. Beddoes been acquainted with this structure of our basaltic country, I think he would scarcely have asserted, that "a right knowledge of basaltes is conducting us fast to a just theory of the earth." I think very differently from Dr. Beddoes, and conceive that instead, of *affixing*, basaltic facts are throwing new difficulties in the way of cosmogonists, who flatter themselves they have developed the secret of nature; and that those in

my

my country, (to which I confine myself) are utterly irreconcilable to any theory I have met with.

Two sects of naturalists, distinguished by the names of *Volcanists* and *Plutonists*, have of late taken possession of all the basalt in the world, and have divided it between themselves, under the descriptions of *erupted* and *unerupted lava*; and they have so convinced Dr. Beddoes of the validity of their claim, that he says, "I shall assume the origin of basaltes " from subterranean fusion to be thoroughly established."

After such a round assumption it may be deemed uncivil to question the igneous origin of our basalt Dykes; but natural history is not to be sacrificed out of respect to confident assertion; I will therefore try by the test of *facts* whether that description of basaltes (which your Lordship wishes for information upon) ever was in fusion.

Foreigners seem to know little of Whynn Dykes except in mines. Mr. S. Fond found at Chamarelle in Vivarois, what is obviously a Whynn Dyke, and it embarrassed him more than any fact he ever met with; it will be found entertaining to look into his *Vol. ex. de Vivarois*, and into his *Min. des Vol.* to see the difficulties into which this *courant de lave compacte* this *ruisseau de basalte en fusion* has thrown him, and the swinging postulates he is obliged to make, in order to get over them.

Dr. Hamilton on behalf of the *Volcanists*, and Dr. Hutton, the great advocate for the *Plutonic* system, are more ready at their expedients; the first of these forms our Whynn Dykes by pouring in erupted lava at the upper aperture of mighty chasms; while Dr. Hutton conceives these chasms were filled up by his own unerupted lava, forced up at the lower.

In discussing the opinions of these gentlemen I will make them the most liberal concessions; for instance, I will concede to both, that they have discovered the process by which nature has formed chasms of immeasurable length, immeasurable depth, and of inconsiderable, though uniform, breadth.

I will concede to Dr. Hamilton that he has brought to the edge of the chasms his lava, "this foreign substance, which issuing from the vast

" mass

“ mass of basalt that forms the northern extremity of Fairhead, has descended over the adjoining strata,” and that he has it ready “ to fill up each cleft and vacancy.” (Ham. Antrim. let. 5 part 1.)

I will also admit in favour of Dr. Hutton, that he has his unerupted lava ready at the bottoms of these chafins, that he has his machinery prepared for forcing it up, and that he has surmounted his great difficulty, and discovered a mode of supporting such a mass when raised; a point upon which, having failed himself, he would discourage others from forming conjectures. (Edinburgh Transf. vol. 1 page 285.)

Notwithstanding these concessions it will not be difficult to shew that these gentlemen have not discovered the secret of nature in the construction of these singular walls, and that they were not formed by liquid lava filling up mighty chafins.

1st. Many of our contiguous Dykes differ materially from each other, yet their proximity is such, that according to the theory of either Dr. Hamilton or Dr. Hutton, they must have been filled up from the same source, and with the same material.

2dly. Many of these Dykes, both in Ireland and Scotland, shew a material difference between their middle parts and their sides, both in grain, and internal principle of construction; the change too is not gradual, but per saltum, as if the dissimilar parts were separated from each other by planes parallel to their sides; all this is perfectly incompatible with the high state of fluidity in which the lava must have been, to enable it to fill up vast chafms of such diminutive breadth.

3dly. Our Whynn Dykes come in contact with a great variety of different substances, without producing such effect upon any one of them, as might be expected from the contiguity of so glowing a mass; but however this argument may bear against the *Volcanists*, the *Plutonists* will say it does not apply to them, for the chemical operations of nature are carried on in Dr. Hutton's subterranean laboratory very differently from what we see on the surface of our globe, in the former Dr. Hutton says *calcareous strata are consolidated by the operation of heat and simple fusion*, and again, *having proved that these strata had been consolidated by simple fusion*

*fusion*, (page 253). Dr. Hutton however confesses it is not easy to comprehend this: "and to be convinced that this calcareous stone, which calcines so easily in our fires, should have been brought into fusion by subterraneous heat without suffering calcination, must require a chain of reasoning *which every one is not able to comprehend.*" (Page 271.)

But it is not necessary on this occasion to enter into the mysteries of a laboratory, to which we have not access, nor to calculate the force of Dr. Hutton's great agent *compression*; for our observations on the contacts of the matter of our Whynn Dykes with the substances they encounter, being made on the surface of the earth, in the open air, even admitting those Dykes to be formed as Dr. Hutton supposes, his un-erupted lava is now become erupted, and of course, to use his own words, "those substances which calcine and vitrify in our fires, should suffer similar changes when delivered from a compression which renders them fixed." (Edinburgh. Transf. page 280.)

I am aware I must fatigue your Lordship by dwelling so long upon the question of the igneous origin of our Whynn Dykes; but as most modern writers and travellers call them *lava veins*, and the *facts* I have observed with much attention, induce me to combat so general and so popular an opinion, I hope you will excuse me for adding a fourth argument, which I conceive to be conclusive.

All substances, when ignited, are in an high state of dilatation; this is followed, when they cool, by a contraction, *une retraite*, by which they occupy less space than they did when heated; of course, had our Dykes been chasms filled up with glowing lava, when this material cooled and contracted, it could no longer fill up these chasms as before, but must crack and separate from their sides, leaving intervals and disruptions; but nothing like this is observed, the Dyke and contiguous matter, whatever it be, are solidly united together, forming but one mass.

These Whynn Dykes suggest other curious questions: Were they formed at the same time with the contiguous materials?

Were they posterior to them as Dr. Hamilton and Dr. Hutton suppose?

Or

Or were they antecedent to the stratified masses, that every where come in contact with them?

The inutility of such speculations deters me from entering into them. I must however confess, that the *facts* seem to give stronger negatives to the two first questions, than to the last; but who would hazard so bold an opinion, as that these mighty walls were the first part of our world that was formed? what an idea must it convey to us of this *frame work* or *skeleton* of our globe?

A new theory I conceive more likely to be a nuisance than an acquisition to natural history; and that the road to the advancement of the science would be better laid open by destroying some of those we have already.

Should therefore your Lordship think that the arguments I have adduced against the igneous origin of our Whynn Dykes are of any weight I will probably make further inroads into the territories of *Vulcan*, and question the igneous origin of basalt in general.

To this your Lordship will very likely reply, that the topic is worn threadbare; that most modern writers, without entering into the question, pronounce it to be already decided in the affirmative; and that I shall never obtain attention to so stale a subject.

My opportunities however to procure information upon it have been superior to those of any other person; I have lived very many summers in the most important basaltic country in the world, and my fondness for the sea, and possession of boats, have enabled me repeatedly to explore our coast, which I know that no other naturalist ever did. It is to this coast and country that the advocates for particular opinions come, to look for arguments to support the theories they patronize; it is painful to follow such gentlemen, correcting their statements, and contradicting their assertions: nor are they cursory travellers alone who misrepresent our facts; it will appear that men of science and ability are equally disposed to support their opinions at any expence; a favourite theory is an adopted child, that must be maintained.

But

But it is not by exposing the errors of others that science, and especially *natural history*, is to be advanced, nor is it by puzzling ourselves to find out in what manner, and by what process, nature has executed her work; let us rather examine attentively what she has actually done; let us quit disputing about the whimsies of our own brains, and study the code of *facts*.

In our basaltic country these are curious, as well as abundant; and it will be from such of these alone as have escaped the attention of my predecessors, and from the geological construction of the country, that the arguments to be applied to the question of the igneous origin of basalt will be drawn; and whatever may be their weight, at least they will have the merit of novelty to recommend them.

I am, with great respect,

your Lordships

most obedient,

humble Servant,

PORTRUSH

W. RICHARDSON.

P. S. When I found an opportunity for examining the Whynn Dykes to the northward of Whitehouse-point, I omitted several under the demefine called Macedon, which were much covered by sea-wreck; here I knew the surfaces of the Dykes were decomposed, and their distinctive characters defaced.

Between Macedon and Carrickfergus there are many, all as usual differing from each other; some not so rectilinear in their course as those I have hitherto described, in one or two the prismatic construction was scarcely perceivable, while in the greater number the arrangement of these prisms laid across the Dyke was most distinct. In

In two contiguous Dykes I observed, that the axes of these prisms were not horizontal as usual, but in one greatly elevated to the north, and in the other towards the south.

Human attention could not follow the variety which nature has displayed in the formation of these Dykes; therefore, not to fatigue the reader, I will describe but two more particularly; I select these, both on account of the new circumstances attending them, and also because they are easy of access, being within a few yards of the great road from Belfast to Carrickfergus.

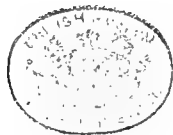
The first of these runs eastward along the strand, about four hundred yards south of the gallery; we approached it from the north, and found it composed of long well formed horizontal prisms, lined on the north side by a sort of basaltic wall about eighteen inches thick; this a military gentleman of our party called its *revetement*, I adopt the word on this occasion for convenience.

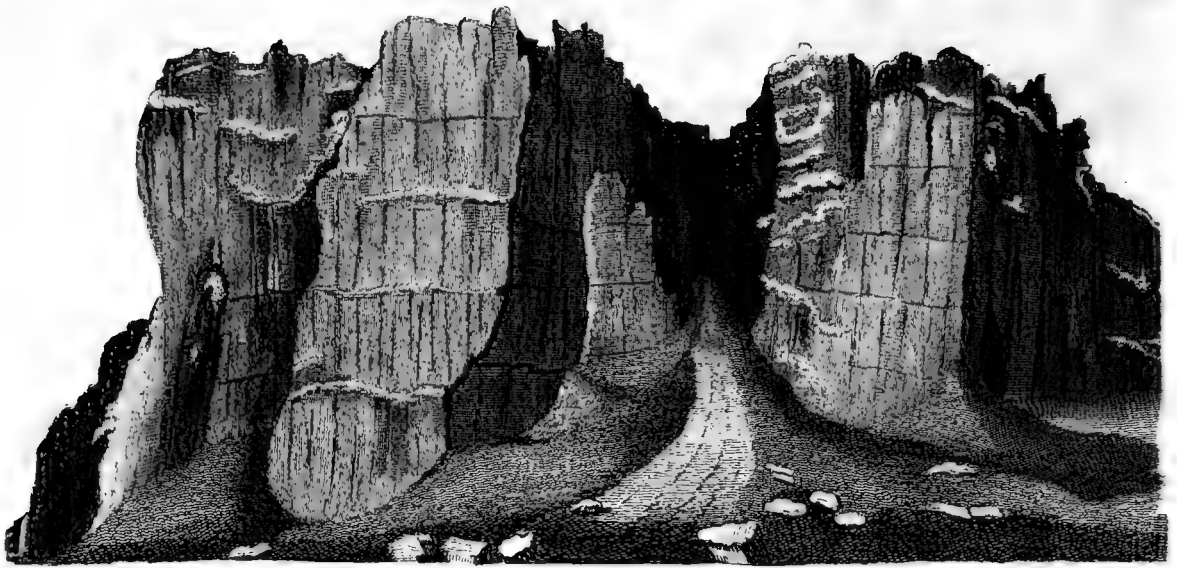
After we had traced the Dyke eastward for several yards, we observed this *revetement* separate from it, and diverge at a considerable angle, then, forming a curve, disappear beneath the sand to the north-east; this new circumstance exciting our attention, we traced the *revetement* back to the Dyke, then along it to the westward, when after some time we perceived it entering the Dyke at an acute angle, and crossing it diagonally; when across, it formed for several yards a *revetement* on the south side of the Dyke, then diverging from it, and curving as before, it was again lost under the sand to the south-west.

The second Dyke I will describe particularly, lies about five hundred yards north from the *silver stream*, and about three miles from Carrickfergus; it seemed composed of four or five distinct walls, agglutinated together; in each of these the prismatic construction was different from that of the others, and in one the axes of its prisms were not as usual at right angles, but oblique to the direction of the Dyke.

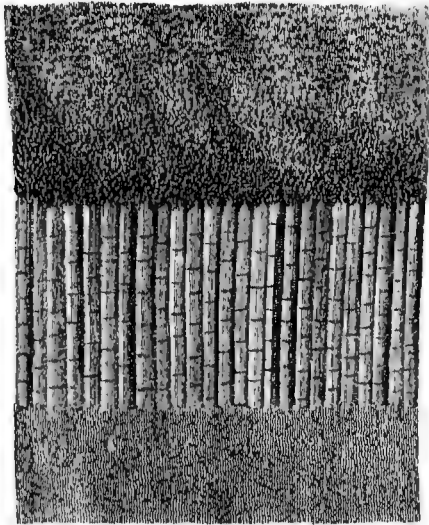
A new circumstance occurred here too; this Dyke, about twenty-five feet broad, had a *revetement* of freestone on each side, and was also twice or thrice penetrated by walls of freestone similar to, and in the same direction



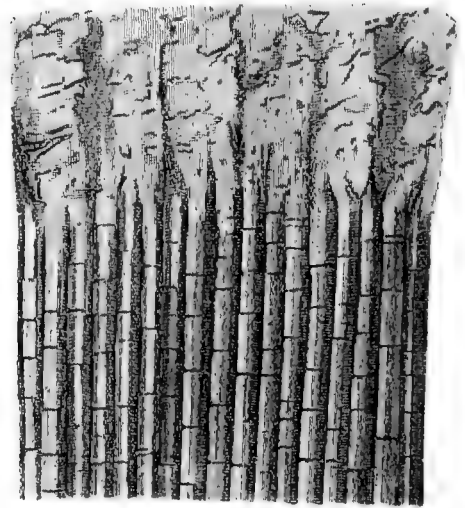




Basalt Prècipice, at the Summit of Cave Hill Mountain, near Belfast.



Lower Columnar Stratum with Red Ochre at Pleskin.



Upper Columnar Stratum at Port Spagua & Pleskin.

rection with the basalt walls between which they lay; these freestone walls were more than a foot broad, and sometimes composed of horizontal laminæ, and at others of vertical.

I have since discovered a magnificent Dyke in the face of the stupendous precipice of Cave hill\* which it cuts vertically near two hundred feet, and is afterwards to be traced a great way down the hill.

Though this Dyke be attended by very curious circumstances, I will take no further notice of it, as I hope to see it soon accurately described by my ingenious friend Dr. M'Donald, who was with me when I discovered it, and whose vicinity affords him better opportunities of accurately examining this beautiful and interesting façade.

\* A stratified basaltic mountain, nearly hanging over Belfast; it is well worth the attention of naturalists.



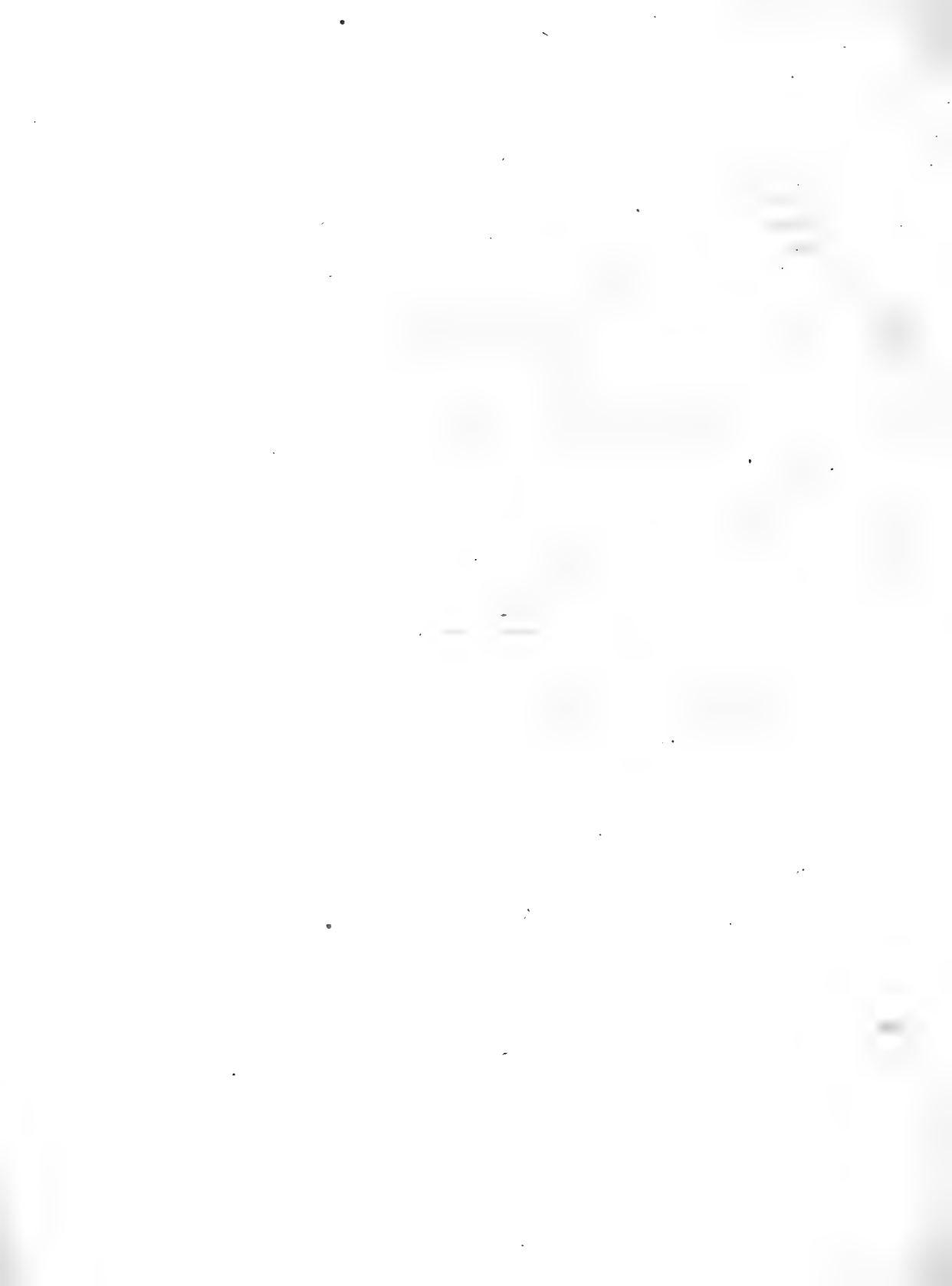
AN ESSAY  
ON CREDULITY,

*BY WILLIAM PRESTON, ESQ.*



La plus utile, et la moins avancé de toutes les connoissances humaines, me paroît être celle de l'homme.

ROUSSEAU.



## INTRODUCTION.

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AMIDST the spirit of research and the general extension of knowledge, which have distinguished the present age, some departments of science have not been cultivated as much as they deserve. The natural history of the mind and the philosophy of the passions are, surely, objects of the utmost moment to human happiness; and yet they have not been studied in equal degree with the animal oeconomy of man, and other creatures, or even with the nature and properties of the vegetable and mineral kingdoms; although the materials and leading facts, which might serve to found the conclusions of moral investigation are more numerous, more faithfully detailed, and more methodically digested, than the experiments on which natural philosophers have built their theories. What is history but a collection of experiments in human conduct, or, in other words, the natural details of moral agency? and, in addition to the data, which history furnishes, without travelling abroad, without risque, or expence, every man has within himself an object of interesting investigation, and the means of extending his knowledge of the moral part of human nature, whereas an extended acquaintance with the animal, the vegetable, or mineral kingdoms, requires distant voyages, fatiguing journies, personal danger.

The importance of a knowledge of the human mind, and of the springs and motives of moral agency may be estimated, by the degree of success, and superiority among men, which it usually insures to the possessor.

Why

Why have *Plutarch's Lives* been the favorite volumes of the wise and great, in every country, where letters are known? and why have they contributed so largely to the formation of statesmen and heroes?—they open to us the secret recesses and sanctuaries of mind; they unlock the casket of the human breast; and expose to view the minute springs of action. It is the duty and the interest of every body, but it is doubly the duty and the interest of those, to whom the task of governing men is confided, to study the human heart, and to consider well the springs, the most frequent and powerful motives of human action.

Notwithstanding a diligent study of history supplies much of that kind of knowledge, which is requisite for the purpose of managing the passions and prejudices of men, and of applying them in the production of great political movements, and important revolutions; yet, neither the study of history, nor an acquaintance with the theoretical writers on government and morals will suffice, without the aid of a practical and self-acquired experience of the ways of men, which in the critical moments, and cardinal turns and vicissitudes of fortune, should be combined with natural sagacity. We have read of many artful adventurers, like *Cromwell*, who have been able to acquire this most important knowledge, and to apply it successfully, in the accomplishment of their daring schemes, and in the direction and government of their fellow men; and this without any aid from literature, or the study of books. It is thus we often see, that the knowledge and use of the most efficacious and drastic medicines rests with irregular and unauthorized empirics, who are openly despised, and secretly envied, by the graduated practitioner. Yet should not men be discouraged, on this account, from resorting to the aid of science; or think, that diligence and regular studies are indifferent to their success.

To this knowledge of the human mind we may attribute, in most instances, the surprising aggrandizement of obscure and low-born individual; the effect which seemingly light and trivial incidents have on the destinies of men; and the mighty and stupendous commotions and revolutions, which take place in states and empires, by the intervention of mean and despised agents, and the operation of apparently inadequate causes;



in fine, all those events, which mock the rules of human wisdom, and the laws of moral calculation, and are ascribed, by superficial observers, to chance or fortune. What a striking analogy prevails between the physical and moral world! what minute invisible materials, how secret in their generation, and low, in their original, of how little weight or power, in the disjunctive, are the seeds of commotion or change, in the material world, congregated together, and sublimed in air, or concealed and labouring in the womb of earth, they produce the storm and tempest; overwhelm the strong tower; uproot the giant oak; tear the solid rock from its base; change the course of mighty rivers; and swallow up populous cities, with their inhabitants! equally minute, impalpable, and of small moment and estimation, in the eyes of superficial observers, are, at most times, the political agencies and moral causes, which fill the intellectual system with storm, convulsion, change and dissolution, which subvert the most powerful states, and the most absolute sovereignties; and prostrate on earth, or engulf from view, all that has been, for ages, reputed most great and venerable among men.

When we consider the various springs and motives of human action, which the daring and impetuous may employ, by chance, the profound and politic, on principle and by design, to gain a power, and purchase, with which they turn and wield the human instrument, and make it most efficaciously perform the purposed work of the mover; we must be convinced, that there is none more potent than the *Principle of Credulity*.—The force and aptitude of epidemic credulity, and of popular delusion to forward, and even to produce great revolutions, is exemplified, in almost every page of his history. We shall see, particularly, in the details of civil commotion, how this great moving spring is perpetually touched, and practically employed: sometimes to agitate religious enthusiasm, to render a sect, a party, or an individual odious: at other times, to conciliate towards them the confidence and attachment of a populace. Sometimes, the principle of credulity becomes the means of misleading the public attention, of impressing false notions of the views and motives of governments, and states; and of concealing their real characters, and purposes.

Sometimes, it diffuses panic fears, and causeless desperation, the source of maddening tumult and cruel outrage. At other times, it takes possession of the public imagination with *high conceits engendering pride*, it raises airy hopes; intoxicates the multitude with vain confidence; it impels them to enterprises above their strength, and contrary to their interests—without descending to modern instances, we may see this exemplified, in the disastrous attempt of the *Athenians* in *Sicily*.

Superficial observers, indeed, must they be, and wholly unacquainted with the human heart, who consider the prevalence of floating rumours, and the unhappy assiduity, the invention fertile in poisons of those, who operate on the public credulity, as light and trivial objects: they most vitally affect the government of states, and the subsisting order of things. No principles of reason, however certain, are able to set bounds to the torrent of credulous delusion; no circumstances of probability, however obvious, are able, when set in opposition to the multiplied horrors, antipathes, and prejudices of prevailing rumour, to gain the least attention from the populace, and the great and the rich, when they do not avail themselves of the advantages of their education, when they revolt from the guidance of reason and are swayed by absurd and vulgar motives: what are they but a populace?—the powerful effects of popular credulity, the great use, which may be made of it, in producing revolutionary movements, and the arts, which may be employed, to inflame the passions of the multitude, through this medium, are fully exemplified, in the mournful details, of that civil conflict, which conducted the unhappy *Charles* to a scaffold, and the successful usurper to supreme command. Were any additional illustration requisite, to this subject, we may find it in the history of the present *French* revolution, which in many of its features, will be found to bear a most striking similitude, to that which convulsed *Britain*.

When the delusion, excited by popular credulity, has taken entire possession of the mind, it becomes a most powerful source of actions, and imparts

See Hume's history of England: Vol. 6. and 7. particularly, for various passages to this effect.

parts a supernatural and inconceivable degree of strength, and energy, like that which delirium bestows on the maniac. According to the circumstances, that exist at the moment, or the bias impressed, by those who are interested in guiding the movements of the populace, it rouses the good, or the bad passions, hope or despair, courage or fear, mercy or cruelty; its operations are instantaneous and involuntary; the people are scarcely conscious of their own acts; they rush, with impetuosity, to effectuate mighty changes unforeseen by themselves.—It is the office of great address and ability, in the statesman, or the general, who has studied the human character, to seize the public mind in this moment of ignition; to strike without respite, and forge and fashion it, to his will; whether he designs, to make it an instrument of good, or to employ it, as a powerful engine of destruction. We shall be convinced of the immense force, and diffusion of panic credulity, by considering, that it propagates itself, and at the same time encreases its momentum, in a sort of geometrical progression. Every man, who is fully possessed with it, is anxious to infect others, and becomes an apostle of delusion, to a circle, that surrounds him. When the influence of credulity becomes thus epidemic, reason is silent; law and authority are inoperative; it is vain to oppose mounds, to the popular torrent. In proportion as the agents and managers of parties are low, worthless, and unprincipled; in proportion, as parties themselves are exasperated against each other; persons will be found more ready, both to circulate and to credit such pernicious falsehoods; and the work of general delusion and fanatical imposture will be rendered more extensive, and more ruinous.

Through this principle of credulity, we often find a whole nation adopting the passions and prejudices of an individual. The people are thus rendered their own, dupes;\* and impose on themselves through the medium of their own adopted passions. They resign themselves, to the delusions of fancy; and are hurried on blindly and madly, at the suggestions

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\* In the year 1626 we find the British House of Commons making open profession of credulity, and giving sanction to popular rumour by a vote of the legislature. "On some queries of Dr. Turner's, it was voted, (says *Hume*) "that common fame was sufficient ground of accusation by the Commons. Vol. 6,"

of craft and folly. When the general mind is thus inflamed, when all the furious emotions are brought into act, the moral and physical power of our nature are in arms; all the metes and bounds of civil order are violated; the people under such circumstances exhibit a curious but a tremendous spectacle; they rush on, like an impetuous torrent of ignited lava; and every thing they touch is destroyed, or assimilated. In fact, there is no power, in the whole mechanism of moral existence, which has such momentum, as fanatic credulity; all things seems possible to him who firmly believes, and where all things seem possible, there is in reality a kind of omnipotency. For often it is only necessary to make the attempt, in order to succeed; and the very difficulty and wildness of the attempt prove the cause of success. Fanatic credulity becomes the fruitful parent of every crime; inasmuch as it is the most prevailing engine, by which the spirit of faction is raised. It is no wonder, that faction is so productive of vices and crimes of every kind; for it not only inflames the passions, and particularly the worst passions, but it also tends to remove the care of reputation, and the great restraints of honor and shame; while men find, that no iniquities or atrocities can lose them, the countenance and applause of their own party: and that no innocence of intention or rectitude of conduct can secure them against the calumnies of their opponents. The feelings and opinions of men in a gregarious state, are not their own; they borrow them, by a sort of electric impulse, suddenly, and in spite of themselves; and they find them roused and augmented, by a continued contact and communication, with their fellow men.

Yet, were it possible to do so, we should not wish wholly to eradicate this disposition. There was a wise reason, for implanting in our nature a principle of credulity, producing a proneness to believe, and a ready disposition to act upon belief: such a disposition is absolutely necessary to the conduct of social life, and to the very preservation of our existence.— So imperfect are the lights, which we receive from our senses, from reason, and from analogy; that, were we to wait for certainty, or even for strong probability, we should, on many occasions, be left without any motives

motives sufficiently strong to impel us to action. Activity and toil being necessary, not only to the perfection, but to the preservation of our nature; many of our feelings and propensities, are implanted purposely to make us active. Thus, we see, that the pernicious, the self-tormenting propensity, which eagerly receives the most monstrous and terrific rumours, and by implicit belief, raises them to importance; which disposes the young and old alike, to swallow superstitious legends, and tales of fairies, enchanters and apparitions; proceeds from the same cause, which gives the ceremonies of a rigid and gloomy religion such a strong hold on the mind, through the force of the imagination; and induces men to crowd to executions, and other spectacles of distress and horror.

The author of our nature has framed us for an active probation; in which we may earn by our actions a superior existence, and fit our mental faculties, advanced to perfection by exercise, for the enjoyment of a more exalted rank, in the chain of being, and the perception of more pure and refined pleasures. A torpid state, therefore, is peculiarly irksome to our feelings, and every thing, that rouses and puts in act the inert faculties of man, accords with his nature, and powerfully draws him with a secret charm. Every thing which tends to excite passion, whether of wonder, fear, anger, hatred, love or pity, it matters not, is of this kind. It relieves us from the listlessness, the weary stagnation, which is so irksome to the spirit. It is from this cause, that we catch with so much eagerness, at the delusions of popular rumour; they give employment to the mind. Fame descends with her wings, like the angel in scripture, and agitates the stagnant pool. Thus necessary to our state and being here is credulity. It has often been employed, no doubt, with destructive artifice, by crafty politicians. It has, at times, contributed to hide from the people their true interests, to alienate them from their true friends, and to impel them to violent, irrational, and atrocious measures. But even the blind excesses of credulity, and the wild paroxysms of popular delusion have sometimes been skilfully seized, and wisely directed to the best, and most salutary purposes. The most mortal poisons, as opium, hemlock, mercurial precipitate, and  
even

even arsenic and barytes, when judiciously exhibited, may become safe and efficacious medicines.

It is to be lamented, however, that the credulity of men has been more frequently directed to destroy, than to save; and has too commonly been productive of sanguinary rage, and cruel persecution. The destruction of a party, the extinction of a sect, the downfall of a minister or favourite, the accomplishment of a revolution, such are the objects to which it is generally directed, and these objects it cannot obtain, but through the medium of the passions and feelings, which too frequently prompt men to deeds of atrocity. At different periods, there have unhappily been peculiar objects of popular odium and popular credulity. Under the first *Roman* emperors, the primitive *Christians* were the subjects of general hatred and obloquy; the most heinous crimes, and abominable practices were imputed to them, and the imputation was received, as fact, by popular credulity, during the earlier ages of Christianity. Under the *Greek* emperors, this principle took a new direction, but was uniform, in its tendency, to excite sanguinary rage and cruelty; and the *Sorcerers* became objects of universal fear and abhorrence. Sorcery was exalted into a state crime, a most cruel and general persecution was excited, and multitudes perished under the imputation of this imaginary delinquency. At an æra somewhat more advanced, the *Jews* became objects of hatred and persecution; and popular invention and popular credulity were busy, to forge and disseminate a thousand horrid and improbable tales, calculated to provoke or justify the excesses, which were practised against those wretched people.\* Thus, every age has had its own peculiar bugbears, its objects of credulous fascination, of horrible and monstrous fiction, and of blind antipathy; and perhaps, were it necessary to resort to more modern periods, it would appear, that they have not been, nor are they even now devoid of their phantasms and spectres

\* It was generally believed, among other things, that they used to entice away Christian children, and sacrifice them.

speñtres of hatred and difmay, raifed by credulity, and calculated to alarm not only women and children, but even the fage and enlightened.

Credulity has not, I believe, been exprefsly and diftinctly confidered, by any writer of metaphysics or morality, as an inherent principle of the human mind, or an object of fcientific investigation. It has been carelefsly configned to the lighter effayift, to the comic or fatiric writer, as the theme of cafual reprobation, or the fubject of ludicrous portraiture. Yet the confideration of credulity is of a much higher and more important nature; it is neceffary to the hiftory of the human mind, and tends to difclofe the fprings of human action. In confidering the doctrine of faith or affent to propofitions not demonftrable, our beft metaphyfical writers have paid little attention to this principle. We have been taught, to difcufs the nature and grounds of faith, too much in the abftract; we have been only led to confider man, as if he were perfect and unimpaffioned, as if reafon fat unmolefted in every breaft, calmly adjusting with her fcale and ballance, the degrees of faith, according to the preponderance of argument, or of testimony. The effects of paffion, of temperament, of caprice, of education, of external accidents, are not taken fufficiently into the account. No allowance is made for the *foregone conclufions*,\* for the preparation of the mind of the hearer. I flatter myfelf, that an attempt to confider this fubject, in a point of view fomewhat novel, will not be unacceptable to the reader; although I can boaft of nothing more than the mere attempt. I am confcious, that I have been betrayed into much prolixity, and yet have been able to fay very little. The nature of my fubject led me, of neceffity, to employ fome illuftrations and examples from hiftory; but I have ftudied to avoid, with a fcrupulous care, which, in my mind, even borders on prudery and affectation, all that might feem an introduction of modern politics. It would have been eafy to have fwelled this effay to a confiderable volume, by an accumulation of hiftorical illuftrations, and perhaps, to have found many more oppofite, than thofe which I have felected; but it is not amifs, to leave fomething to be fupplied, by the induftry and fagacity of the reader.

SECTION

\* Shakefpeare.

## SECTION I,

*Credulity is an innate principle, and distinguished from rational belief—  
Use of credulity—it is sometimes joined with distrust and suspicion, and  
why—Instances of successful imposture, adduced to show the general pre-  
valence of Credulity.*

Credulity is a principle inherent in man, and admirably adapted to the limited nature of his faculties, his situation on earth, and the ends of his being. Destined to collect analogies, and govern his conduct, by assenting to probabilities, he feels, that an innate impulse predisposes him to credit an assertion or a narrative, on the mere authority of the relator. It requires some degree of practice and attention, to make the mind an object to itself, to catch its fugitive operations, and impulses to fix and anatomize what is volatile and in motion; but self-knowledge demands it. We must be convinced, that *credulity* is an instinctive and universal propensity of unsophisticated unadulterated man; if we will but watch the operations of our own minds, when we yield our belief to any asseveration or story. Our assent seems to be independent and instantaneous, without reference and without gradation: belief, in fact, seems to be rather an emotion of feeling, than an operation of intellect. This disposition is prevalent, in proportion as our feelings are lively, and our passions ardent. Infancy and youth are the seasons of fond belief, and unsuspecting confidence; age as it chills the bosom, and nips the bloom of hope, represses the facility of belief. In the great school of the world, we gradually learn distrust, and suspicion. Frequently deceived, we are, at length, taught, by fatal experience, to suspect deceit and falsehood, in our brethren; and begin to question the veracity of an assertion, or the credibility of a witness. We discover, to our sorrow, that, the native integrity of men, and the inborn propensity to love and practise truth are not sufficient guarantees against dissimulation, fraud, and falsehood; and begin to enquire, what secret motives may pervert and trouble the pure stream of sincerity. What interest or advantage

men



men may find, or promise to themselves from the propagation of an untruth. As children and novices are thus prone to belief, we find, also, that the principle of credulity is more strong in rude and unpolished nations, who still remain nearer to a state of nature than among those people, who have attained to a greater pitch of refinement. All this may serve to convince us, that credulity is an innate principle. In speaking here of the principle of credulity, and considering it, as innate, I speak only, with a reference to the popular and instinctive kind of faith or belief, which every man feels within himself, and which is the chief spring of action, in the common transactions of life. There is another kind of faith or assent more sedate and elaborate in kind, which must be distinguished from this, which I call credulity.

Credulity is instinctive and instantaneous, the other kind of faith technical and progressive. Credulity seems to be the child of feeling, the other species the work of intellect. Credulity occurs every day, every hour. It attends the most common propositions. It takes place, in the most ordinary occurrences of life. The other kind of faith appears, in the gradual yielding, and chastised assent of the mind, to preponderating evidence, whether we decide on controverted points of history, and contested facts in juridical proceedings, or yield to the conviction, that accompanies the truths of religion. The one, as I have said, predominates from nature; and its force and degree depend on the temper and feelings of each person; the other on his understanding the degree of his sagacity, and the perfection of his reasoning powers. In this, however, they agree, that the prevalence or absence of the one and the other will be regulated in a great measure, by the education, the habits, the society, the pursuits, and course of study of the individual. The first lies within the province of morality, should be regulated by law and rules, is to be restrained like other passions or propensities, and is address'd by motives; the other belongs to logic and metaphysics, is independent of motives, and capable of strict demonstration. The neglect of distinguishing sufficiently between two principles of assent, so different in themselves, must be productive of considerable obscurity and confusion. It should

be remembered that these are not different shades or degrees of the same operation; but operations of the mind totally distinct, it will be advisable when we speak or write concerning them to employ terms peculiarly appropriate; and to call the rational the inductive or comparative ground of assent to a proposition *faith*, while we exclusively term the instinctive or implicit principle of belief *credulity*. It is the principle of credulity which I mean to consider, in the progress of this essay. *Plutarch* has remarked that credulity is an innate principle in man; and to confirm this position, he observes, that all men are fond of dreams and omens, that is to say of divination. On the same principle it is, that we find old and young, greedily swallowing superstitious legends, and tales of fairies and enchanters. On the same principle it is, that rigid, gloomy and mysterious forms of religion, where much is unexplained, and much is required to be implicitly received, as matter of faith, have ever taken a fast hold on the imagination, and to this cause, too, may we ascribe the love of quacks, of charlatans, and impostors, which prevails and manifests itself in the populace of every country.

It may be said, that credulity cannot be supposed to be an innate or universal principle; or at least that distrust is a principle equally general and equally innate; since we find that the vulgar and savages are commonly suspicious and distrustful; and what is yet stranger, that even in those people collectively, and individuals separately, where credulity prevails we find it joined in many instances with a distrustful suspicious temper. It is observed by some traveller respecting the inhabitants of *Paris*, that, while, from time immemorial, they have swallowed, and seemed nearly to live upon an eternal succession of the most absurd and improbable tales, plain undisguised truth has been received by them with caution and doubt, and supposed to conceal some guile, deception, or disguise. Something of the same kind is observable in the *English* nation, a people, at once slow and impetuous, distrustful and credulous, ever on its guard against deceit, yet for ever the prey of false pretensions, frauds, and impositions. The fact cannot be denied, it is perhaps among the paradoxes and inconsistencies of our nature. Yet, I think the seeming inconsistencies, I have stated,

stated, may be rationally reconciled. The credulity is natural and spontaneous, the distrust is adventitious and acquired by good habit. Even the savages of *America* are not in a pure state of nature. Society, though rude among them, is yet sufficiently advanced to bring with it some of the vices necessarily attendant on the civil combinations of men. Wars being introduced, distrust and suspicion, the necessary consequence of fear and hatred, must follow in their train. The mode of carrying on war among savage nations is usually a system of fraud and deception; but the natural disposition of a savage, when he is in a state of peace, and left to himself, free from the influence of the extrinsic dispositions, which the new relations and situations of society have imposed on him, is, to practice and love truth himself, and to expect and believe, that he shall meet with veracity in others. If, with respect to the *European* traveller, or *American* settler, the savage appears to depart from his principle of credulity; and to shew a spirit of indiscriminate distrust; we must consider, that this distrust is the child of woeful experience; and that the repeated frauds, perfidies, usurpations and wrongs of his christian neighbours too generally justify the harshest conclusion, which the savage can draw within his own breast. When we find distrust prevalent among the vulgar, in a more advanced state of society; we must account for it, by their having observed, and perhaps imbibed a portion of the vices of society, which leads them to distrust others, from a consciousness of what passes in their own minds. This tendency to distrust is not in them a settled principle. It is a mere impulse and emotion, like their credulity; and is the result of the scattered impressions, which they derive from a rude, imperfect, and depraved intercourse with mankind, thus, it happens, that credulity and distrust often prevail in the same bosom, actuate it alternately, and succeed to each other instantaneously, without any guide or principle but the caprice of the moment.

An argument, to shew that the natural disposition of man includes a principle of credulity, may be drawn from the facility, which various impostors, in different ages of the world, have found in establishing their pretensions; and the success, and influence over the human mind, which

have usually attended their illusions and artifices. *Sertorius*, by a judicious direction of the credulity of mankind, and the adoption of means suited to operate on tempers where it was predominant, was enabled to maintain an ascendancy for many years over barbarous nations, among whom he was a stranger and led them on to victory, against the most consummate warriors in the world. *Apollonius* of *Tyana* of whom *Philostratus* has related so many strange things, pretended to understand all languages, without having learned them; to know the thoughts of men; and to understand the oracles delivered by the chirping of birds; *Antoninus Caracalla*, *Severus*, and *Aurelian* believed in his divinity; and his fictitious miracles were opposed to those of *Christ*, by the advocates for paganism. *Lactantius* tells us, he continued to be worshipped, in the beginning of the fourth century. “*Simulachrum ejus sub Herculis alexi-*”  
 “*caci nomine ab Ephesus etiam num honorari.*” *Divin. Instit. Lib. 5. Cap. 3.* *Mahomet*, by taking advantage of the credulity of mankind, became, at once, a prophet, and a conqueror, the founder of a most diffusive and prevailing sect of religion, and of mighty and extensive empires,\* among tribes who were persuaded of his divine mission, and immediate intercourse with heaven†.

It must be admitted in favour of the natural disposition of man to veracity, that the first commencement of imposture has most usually been fortuitous. Thus it was with respect to *Mahomet*. Being subject to attacks of epilepsy, and wishing to conceal this infirmity from his wife, he told her that his convulsions were occasioned by the sight of the angel *Gabriel*, who came to reveal to him many things, in the name of God.

*Cadigba*

\* Whenever *Mahomet* had some scandal to remove, some discontents of the people to pacify, or some new thing to be done, he had recourse to the angel *Gabriel*, for some new revelation; and inserted in the *Alcoran* an addition to answer the ends proposed, hence almost the whole of the *Alcoran* is a tissue of contradiction.

† *John Matthias* and *John Bocold*, the leaders of the Anabaptists in *Munster*, are among the most distinguished instances of those who have obtained a most absolute sovereignty over the minds of men, through the medium of their credulity. The latter proclaimed himself King of *Sion*, and taught his deluded followers to expect divine assistance.

*Cadigba* immediately went about, and told from house to house, that her husband was a prophet; and endeavoured to procure him followers. It is observable, that a similar infirmity induced a woman in *England* of the name of *Elizabeth Barton*, to commence prophetess. She too had many followers; and was able to persuade them that the access of her disease was a divine trance, during which she was favoured with revelations from heaven. It is not improbable, that the inspiration of the *Pythian* priestesses was of the same nature; and that she had habitually acquired the power of working herself into trances and convulsions. *Cromwell*, at his first outset in life, was sincerely and truly an enthusiast. He first deceived himself, and afterwards became the deceiver of his adherents. His dissimulation was gradual, it was forced on him by incidents; and he was borne on, by the stream of events, to sovereign hypocrisy, and sovereign power. "In fact, there is nothing so improbable in itself, but what persons of a certain turn of mind may be predisposed to believe." Thus, we find in this enlightened age *Baron Swedenborg* has published a new religion, an account of his conversation with angels, and of the wonders of heaven and hell, and many believe in his reveries.

## SECTION II.

*Locke's grounds of probability do not apply to credulity which is a feeling. Reason, with respect to Credulity, is rather to be employed to determine the grounds of dissent.*

*Locke* has given us certain canons of probability, by which men may be enabled, to regulate the assent, which they ought to yield to propositions, on the credit of the propounder, but these rules have relation to the rational, the chastised, and gradual kind of Belief, which we distinguish by the name of *faith*. *Credulity*, as an innate principle, an emotion, or feeling, operates instantaneously, and without reserve: it admits neither deliberation, nor degree. It is not necessary, here, to suggest grounds of assent.

assent, every man, whose natural bias has not been strongly counteracted by education, finds those grounds within himself. He finds them, in his own temper, in his passions, and prejudices. He finds them, in the natural predisposing impulse of the moment. It is not requisite, here, then, nay, it would not, perhaps, be practicable, with respect to a subject so fluctuating and variable, to suggest grounds of assent. The mind is, of itself, but too prone to belief. Much more useful would it be, to stay the headlong current of credulity, and suggest principles of doubt,—the motives of salutary dissent. It will be found, that, when we consider popular rumours, and the usual objects of credulity, *Lock's* grounds of probability do not always furnish an effectual touchstone, by which we may bring them to the test. In popular rumours, it is not always the congruity of the matter related with the course of our own experience, or the intrinsic probability of the story, that should render us the more ready to receive and adopt it as truth. The very probability that any certain event (of great political moment and influence, for instance) may happen, will be a ground and motive for inventing a rumour,\* which may realize expectation and conjecture, by announcing that it has actually happened. It is not commonly to be presumed, that the inventors of a delusive tale will perform their tasks so awkwardly or unskilfully, as to neglect the dress and circumstances of probability. A man of knowledge and address, who undertakes to impose a fiction on the public, will pay a just attention to chronology and geography. He will so far arrange the incidents in time and place, and introduce the actors of the Drama so plausibly, that he will meet and obviate the *incredulus odi*, the disposition to doubt and examine of the acute and experienced observer. Such a conduct is so natural and obvious, that, not unfrequently, too much care and sollicitude, on this head, defeat the purposes of the deceiver, and become the means of detecting falsehood. I have seen it happen, on trials in the courts of justice, that different witnesses deposing to the same fact, by too nice and elaborate

\* As of an important victory or defeat according to the wishes or interest of the reporter when hostile armaments are on foot;—of the rupture or conclusion of a treaty, when negotiations are pending.

elaborate an agreement, in swearing with minute precision and exactness to all the trifling and immaterial circumstances of the case, and perhaps in nearly the same terms, have impeached their own credit, and excited suspicions of their rehearsing a false and fabricated tale, dictated to them by one and the same master.

Capricious, indeed, is the nature of popular credulity; it sets all the rules of common sense and common probability at defiance. So that the success and propagation of a rumour do not always correspond to the skill and care, which the authors and contrivers have employed to dress it up, and render it credible; they depend more on the previous preparation and predisposition of the public mind. It is observed by the philosophical historian,\* in speaking of the Popish plot produced by *Titus Oates*, “ that it seemed at the the time, that the very improbability of the tale, and the wild circumstances of horror and atrocity with which it was filled, by applying themselves to the imagination of the hearer, and arresting the love of the marvellous, proved its chief recommendation; and that a plot, invented by impostors of more knowledge, art and ingenuity, would not have been so successful in exciting popular attention, and diffusing parties among the vulgar. This effect, (continues he,) we may safely say, no one could before have expected, and a fool was, in this case, more likely to succeed, than a wise man. Had *Shaftsbury* laid the plan of a Popish conspiracy, he had probably rendered it moderate, consistent, credible; and on that very account, had never met with the prodigious success, with which Oates’s tremendous fictions were attended.” We have had in later times, and among an enlightened people, a strange and horrible illustration of the power of credulity, acting under the impulse of popular prejudice, despising all the rules of probability, all the laws of evidence, and receiving implicitly the most wild and revolting tales, in the tragical fate of the Calas family at *Toulouse*. Instances occur of a more light and ludicrous nature, which serve to shew, that the

the intrinsic absurdity of a report, not only does not prevent, but, to all appearance, facilitates its reception and belief among the vulgar. Such for instance, was the inspiration of Miss *Kitty Cadere* and her extatic intercourse with the seraphic *Pere Gérard*. Such the imposture of *Elizabeth Canning*, equally ridiculous and criminal; where an unfortunate woman must have fallen the victim\* of wicked contrivance and popular delusion, (though the story was replete with absurdity,) to the eternal reproach of the nation, had she not been rescued, by a train of circumstantial evidence almost miraculous, furnishing proof of her innocence. Similar to this tragic farce, (although public credulity was not quite so long sustained,) was the affair of the *Cock-Lane Ghost*, yet, we find the great moral philosopher‡ of the country gravely employed, in an examination of this foolish conspiracy. The force of blind credulity, inspiring sanguinary rage, and nourished by wild and gloomy absurdities, applying themselves to the gross and vulgar imaginations of a populace, appears in the clamour and fury, which at different periods, have been excited against forcerers. In the earlier ages of Christianity, during the sway of the Greek emperors, multitudes perished under this ridiculous but fatal imputation. Hume observes, respecting Scotland,† “ the fanaticism which prevailed, so full of sour and angry principles, had acquired a new object of abhorrence, the forcerers. So prevalent was the opinion of witchcraft, that great numbers were burned by sentence of the magistrates, through all parts of Scotland. In one village near *Berwick*, which contained only fourteen houses, fourteen persons were punished with fire; and it became a science, every where much studied and cultivated, to know a true witch, by proper trials and symptoms.” The same blind, absurd credulity, the same panic abhorrence, and dread of witchcraft, engrafted on a similar stock of sour fanaticism, raged in *America*, within the present century. Norepectability,

\* See the account of this strange trial which occupied an extraordinary space of time, in the collection of State Trials.

† Hume's History of England, Vol. 7th, Page 151.

‡ Dr. Johnson.



bility, no good qualities were a protection; all ranks and conditions accused their neighbours, and, in turn, became themselves the accused. At last, after a multitude of sacrifices to this epidemic fury, the deadly accusation fastened on a clergyman, a person universally beloved, of exemplary piety, and distinguished probity. The people suddenly recovered from their frenzy, like one that awakes from an horrid dream; they were sensible and ashamed, too late, of their folly; they bewailed the judicial murders, of their insanity. The dreadful catastrophe of the *Calas* family above-mentioned is an instance, of blind credulity prompting stupid sanguinary rage, which one would scarcely have expected to find in an enlightened age, and civilized country, and serves to shew, that the intrinsic absurdity and improbability of a tale, do not always form an obstacle to popular belief. But indeed the strongest proof of this observation is afforded by the *English* statute-book, in the descriptions of witchcraft, which it has promulgated, and the penalties which it has enacted, against this imaginary crime.\* These observations are sufficient to shew that the probability of circumstances and plausibility of a story may sometimes fail of securing for it, a favourable reception among the populace; and, on the other hand, that the very absurdity and improbability of a tale may sometimes be the true cause of its obtaining an extensive circulation, and a ready and eager credence among the populace. Consequently, we plainly see that popular credulity is

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something

\* 33d Hen. 8th. Cap. 8, makes all witchcraft and sorcery, "felony, without benefit of clergy. And again, 1st Jac. 1st. Cap. 12, all persons invoking any evil spirit, or consulting, covenanting with, entertaining, employing, feeding, or rewarding any evil spirit, or taking up dead bodies from their graves, to be employed in any witchcraft, sorcery, charm, or enchantment, or killing or otherwise hurting any person, by such infernal arts; should be guilty of felony, without benefit of clergy. And if any person should attempt by sorcery, to discover hidden treasure, or to restore stolen goods, or to provoke unlawful love; or to hurt any man or beast, though the same were not effected, he or she should suffer imprisonment and pillory for the first offence, and death for the second."—And what is, indeed, most surprising, the liberal and enlightened *Blackstone* expresses his belief of the possibility, nay, of the probability of such a crime being committed! See *Blackstone's Commentaries*, Vol. 4. Page 60.

something of a very unaccountable and capricious nature, which it is not easy, to reduce to any thing of a fixed or regular rule or standard. In the present state of society and morals, it will be found more useful, to curb than to excite this propensity.

Thus, although it must be admitted on all hands, that passions are implanted in our natures, by the Almighty, for the wisest and best purposes. Philosophers and divines, who have written on the subject of the passions, confine themselves to the necessity of governing and restraining them, and the most effectual modes of obtaining this end; leaving to nature the province of urging us to the gratification, and indulgence of passions and appetite.

Popular rumour sets at defiance some of the other causes of probability, which Mr. *Locke* has furnished.—Does the skill or expertness of the reporter add much to the credibility of the floating story of the hour?—Is it always taken into the account, or ought it to add much weight, if it were? I believe not. What may be gained, perhaps, on the one side, from the superior competency of the reporter, may be lost, on the other, through the additional motives for suspecting his fidelity. An intimate acquaintance with the subject of the rumour may have suggested to him the idea of fabricating some report; and enabled him to carry his purpose into effect, by making him master of such facts and terms, as qualify him to dress up fiction, in the garb of probability. If these artificers of fraud happen, not to be conversant in the affair, which is the subject matter of imposition, they will take care to associate with themselves, in the task of deceit, (unless they are gross bunglers in their trade) persons, who are capable of giving a colour to the tale. Again, the number of reporters, with respect to popular rumours, seems to add little to their credit. We are not to confound the number of reporters, asserting and disseminating any story, with the number of actual eye-witnesses, deposing to the same fact. The number of mere reporters, however great it may be, is still resolvable into the credit of the first witness, or the original authors of the report; and it is plain, that Mr. *Locke* meant real eye-witnesses, when he speaks of the  
the

the number of witnesses, not such pretended witnesses, as appear to vouch the rumours of the day. With regard to such rumours, we must consider, that every remove from the fountain head diminishes the force of the evidence, and renders the credit due to the story more questionable; since it encreases the chances of our being deceived, both through the fallibility of our senses, and the possibility, that, in every transmission, the report may be more or less falsified, by addition or subtraction of some material circumstance. All that the augmented number of reporters shews is, that there are many persons, who believe the report to be true; but, when we come to reflect, how anxious men usually are to persuade others of the truth of what they themselves strongly believe; how many interested motives may exist, to render others extremely zealous in the propagation of the story; and, in fine, how the spirit of credulity flies about among the vulgar, like an epidemic malady, and spreads by contagion. We shall not give much weight to the number of reporters; and we shall always remember to distinguish between reporters, and witnesses. In fact, the integrity of the reporter is chiefly to be considered, in an examination of the credit due to popular rumours.

### SECTION III.

#### *Grounds of dissenting from popular Rumour.*

Although the grounds of popular credulity are fluctuating and various, often inconsistent with each other; various as the passions, prejudices, dispositions, and tempers of men; and, even on these grounds often inexplicable: the motives of our inclining to doubt and disbelief are more rational and certain; nor is it difficult, to establish certain salutary tests of dissent, by which we may, for the most part, appreciate the demerits of popular rumour.

The principle of credulity has its use, in the conduct of life, as I have already observed; it is implanted in man, as the motive of action, by the wise author of his nature; but it is the province of reason, to regulate this principle, and guard us against the abuse and excess of a propensity, which is so liable to both, although, under due control, and in a moderate degree, it is useful and salutary. As reason and morality ought to hold the passions in proper subjection, though they are infused into our composition for the best purposes; so, good sense and virtue require, that we should study and fortify the mind, with a general diffidence, against all popular rumours. We should consider, that they seldom include in themselves any intrinsic evidence, to guide us in our assent or dissent; and that, in order, to estimate the degree of credit they deserve, we must resort to collateral and extraneous circumstances. I am far from presuming, to attempt a complete enumeration of such circumstances, but the following reflections may have their use.

When popular rumour spreads abroad; it should be our care, to trace each report to the fountain head, if we soberly and sincerely wish, to be furnished with such data, as may enable us to form a sound and solid judgment, respecting the degree of credit, to which it is entitled. Thus shall we be enabled to discover and estimate the character of the reporter. Thus we may discern the passions, prejudices, views of things, the temper of mind, whether sanguine and credulous, or distrustful, and the connexions, by which he is swayed, and actuated; and learn to appreciate his motives. If the rumour is calculated to advance the interests, or promote the views of the reporter, it is more than probable that he is a deceiver. If the event reported is such as conspires with his hopes and wishes, it is likely that he is deceived.

There is an obvious ground, for cautious diffidence and distrust, when we perceive, that the individuals or the party, from whom a popular report or rumour is found to proceed, have a manifest interest, which may be served, a palpable object, which may be promoted, its circulation, and free reception; as if, for instance, a rumour emanating from a ruling party in a state, should be calculated, to throw a lustre of popularity

popularity on their measures, and to maintain them in power; we must believe with caution.—If a report flowing from a party, in opposition to those who govern, should tend to make the measures of government odious and contemptible, and to shake those, who administer it, from their seats, that they may make room for their opponents; we must believe with caution. Contending sects of religion are usually animated with great mutual hostility and rancour, and employ no small share of industry and malice, in traducing and villifying each other.—When we find reports ushered into circulation, under the auspices of religious contest, and acrimonious bigotry, we must assent with caution. When a story, tending to place an individual in a ridiculous or odious light, proceeds from his rival, or his enemy; or when, on the other hand, a report calculated to advance his fame and fortunes, or to exalt his character, is circulated by his friends, his dependants, his near connexions, or the party or faction to which he has devoted himself; in such cases, we must assent with caution.

History is crowded with instances of the fallaciousness of popular rumours, originating from such polluted sources. The *Jews*, ever odious, yet ever necessary in the commercial world, have been a constant object of oppression, and resource to rapine; they have thriven, and been plundered, in almost every country of the habitable globe. As a pretext for this conduct, popular prejudice was excited against this unhappy sect, and rumours of atrocities, imputed to them, were busily circulated, and eagerly believed. Among other enormities, it was said of them, in early times, that they used to entice Christian children from their parents, in order to crucify them.\* The Christians, in the reign of *Nero*, were accused by authority,† and believed by many, to have been guilty of setting *Rome* on fire; and this calumny became the pretence for a cruel persecution against them.

“ Qui

\* See the old Ballad of the “*Jewis Dochter*,” Percy’s Collection.

† Ergo abolendo rumori, *Nero* subdidit reos, et quæsitissimis pœnis adfecit quos per flagitia invidos vulgus Christianos appellabat.

*Tacitus.*

“ Qui stantes ardens et fixo gutture fumant.”

With equal foundation of truth, in the reign of the second Charles, the great fire of London was attributed to the papists, and the calumny remains to this day recorded, on the monument, which

“ Like a tall bully lifts the head and lies.”

That cruel and ambitious tyrant Philip the fair, being determined to ruin the order of the knights templars, and to seize their possessions, imputed to them such enormous and absurd crimes, as were of themselves sufficient to destroy the credit of the accusation. They were universally charged with robbery, murder, and vices the most shocking to human nature. It was said, that every one received into their order, was obliged to renounce his Saviour, to spit on the cross, and to join to this impiety the superstition of worshipping a gilded head. The candidates, it was said, were initiated with such infamous rites, as could serve only to degrade the order. Above an hundred of those unhappy gentlemen were put to the torture. The more obstinate perished in the hands of their tormentors. Some, to procure a present respite, confessed all that was required. Forged confessions were imputed to others. And *Philip*, as if their guilt was certain, proceeded to confiscate their treasures. No sooner had the templars recovered from their tortures, than they disavowed their confessions, exclaimed against the forgeries, and appealed to their gallant actions, in former and later times, as a full apology for their conduct. The tyrant ordered fifty-four of them to be burned at Paris, as relapsed heretics, and great numbers were put to death, in like manner, in other parts of the kingdom.—We find this powerful engine popular rumour, employed, with fatal effect, by the opponents of the court, in the unfortunate reign of *Charles the first*\*. The tragical catastrophe

\* In *Hume's* history of that unhappy period, are instances, in abundance, of the industrious use, which was made of the power of rumour. We find, in particular, that the pa-

trophe of the illustrious brothers, the *Dewits* shews how popular rumour may be directed by party rage, to the destruction of the most estimable and venerable characters\*. But, on no occasion was the inventive talent of faction and the deadly efficacy of popular rumour more powerfully exemplified, than in the progress of the French revolution†.

It

nic fear of popery was most successfully employed, to enflame the fanaticism of the intolerant multitude. Every day teemed with new reports of conspiracies by the papists. They had entered into one plot (it was said) of extraordinary atrocity, indeed, no less than to blow up the river *Thames* with gun powder, in order to drown the city.—And we find the parliament at that time giving a sanction to popular credulity and adopting it as a rule of conduct by their resolution, “that common fame was a good ground of proceeding.”

\* When the *Dutch*, in their distress, began to cast their eyes on the young Prince of *Orange*, as their only hope; John *Dewit* who continued to oppose the repeal of the perpetual edict, became the object of popular resentment, the misfortunes of the republic were falsely ascribed to his conduct, assassins actuated by no other motive than mistaken zeal, attacked, and with many wounds left him, for dead; his brother *Cornelius*, who had served with prudence and courage on board the fleet, was obliged by sickness to come on shore. One *Tichelaar* a barber, a man noted for infamy, accused him of having endeavoured by bribes, to engage him to murder the Prince of Orange, the accusation, though attended by the most improbable and absurd circumstances, greedily received by the multitude.—*Cornelius* was cited before a court of judicature; the judges, blinded by prejudice, or not daring to oppose the popular torrent, condemned him to the question. He was delivered to the hands of the executioners, and torn in pieces with inhuman torments. Amidst his agonies, he still made protestations of his innocence, and repeated an ode of *Horace*, which contained sentiments suitable to his situation. The judges condemned him, to lose his offices, and to be banished the commonwealth, the pensionary, who had not been terrified from performing that part of a kind brother, during the prosecution, came to his brother's prison, determined to accompany him to the place of exile; the signal was given to the populace; the prison doors were forced; a thousand hands vied with each other which should be first embued in the blood of the *Dewits*. Even their death did not satiate the brutal rage of the multitude, they exercised on the dead bodies of these virtuous citizens indignities shocking to be recited.

† Reports were circulated tending to shew the violent intentions of the court, as if it was utterly bent on the extirpation of the *French* nation. The scarcity of corn gave rise to a variety of injurious rumours. The groupes which assembled in the streets were inflamed, by the constant arrival of bulletins or notes giving an account, of the proceedings as *Verfailles*, and of the speeches and expressions of popular orators. One of the charges against the Queen was, that she had procured the construction of a mine under the hall of the national assembly.

It is a safe and prudent rule, to conclude, that where uncommon heat and zeal are employed, in the propagation of a report, and are accompanied with an impatience of contradiction, and a resistance to all free disquisitions, such circumstances are an indication of a fabricated tale, which will not bear the test of rigid enquiry. And we must be still more confirmed in this persuasion, when we find a tendency to revile and depreciate those, who would enter into any discussion, of the probability of the story, or the merits of the reporters. Surely, with impartial men and lovers of truth, such a conduct must be sufficient cause of doubt. The language of truth is calm and moderate; it rests its success on its own intrinsic merit; it does not seek to prepossess or intimidate the hearer; the spirit of truth does not prescribe and anathematize examination.

When a report has a tendency to blacken a character already unpopular, or to vilify a sect or party already obnoxious; and to aggravate the load of hatred and suspicion, under which they already labour; we should receive it with caution and reserve; for we may be sure, that the story is charged with much of the labouring of passion and prejudice; and is circulated to answer a particular purpose of malevolence. With equal hesitation and distrust should we listen to the voice of party, when it is loud, in displaying the merits, the sufferings, or the services of the idol of the hour; or descants on its own purity of principle, numbers, importance, and resources. We should class these exaggerated tales, with the legends, which bigotted sects sometimes propagate respecting the sanctity and miracles of their saints and founders. The spirit of party is the grand softener and concealer of all absurdity, the grand promoter of all belief.

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assembly. Falshoods and forgeries were the constant resource and favourite weapons of the Cabals in *Paris*, the most positive assertions, the most minute details of facts, the strongest appearances of probability were made to accompany the grossest falshoods. Some were even audacious enough to publish forged letters, in the name of the national assembly, and forged edicts, in the name of the King, exhorting the peasants to destroy the patents and pedigrees of the nobility.



In times of great agitation and alarm, when the public mind is roused, and forcibly possess'd by the violent emotions, of religious enthusiasm, or party rage, or acted upon by the calamitous progress of foreign or intestine war; public opinion is afloat; and men with eagerness catch at every novelty. Invention will then be perpetually on the stretch, to serve the purposes of designing men; then is the reign of prejudice and passion in all its glory; and, therefore, every rumour of good or ill success, of praise or vituperation comes in a most questionable shape. Contending parties, then, brand each other, with the most reproachful epithets, they impute to each other the worst motives; and reprobate, as an unpardonable sin, all incredulity with respect to the rumours fabricated, or received by the faction.

With respect to the number of reporters, it has already been observed; that the mere number of those, who report, or believe a popular rumour, will not give it credibility. If it bears on its front the stamp of interest, of prejudice, and of faction, it will be received with suspicion, whether it is in a dozen or an hundred mouths. The number of reporters, in such a case, will serve only to shew the zeal and credulity of a party; and in times of passion and prejudice ought to raise little or no presumption in favour of the intrinsic probability, of the matter related, or of the integrity of the first reporter. During the reign of party a sort of fascination prevails. Men are no longer masters of themselves; they do not think, or use their organs and faculties, like other people; their understandings, their voices, all their senses are at the disposal of the ruling spirit, the presiding genius, that *rides in the whirlwind, and directs the storm*. The number of witnesses therefore must still be resolved into the first reporter, the accumulation of credulity is no proof of intrinsic credibility.

Let it not appear a chimerical or far-fetched notion; if I assert, that there is reasonable ground, for receiving a rumour with suspicion, at least, with diffidence, to be found in the very circumstance of its having originated with the party, which is prevalent in the government of the community; whether, for the time being, that party is the mass of the populace—the few—or the single potentate. My reason for making the assertion is, that

such a party having dominion over the public strength, and wealth, the administration of government, the distribution of justice, the management of the public treasure, the means of advancing and ruining individuals, and a power of controlling the press, and other channels, by which sentiment and intelligence may be communicated, is enabled, both to garble the evidence of facts, which it suffers to come before the public, and to bias, and fashion the reasonings upon those facts. As it possesses abundant means of suppressing truth, disseminating falsehood, and of misleading and perverting the popular kind, through the operation of hopes and fears on the interests and feelings of individuals; so, it will not want abundant temptations, and frequent opportunities, to employ these means. When *Nero* burned *Rome*, and thought proper to charge the *Christians* with the nefarious deed, the general reception and circulation of the tale was no evidence of its truth, it would not have been very safe or practicable, at the time, to have impeached the credit of the tyrant, or examined the probability and foundation of the rumour, when the emperor himself lent his gardens, for the exhibition of their tortures, as though it were some pleasing public spectacle; and assisted himself, at it; and in the garb of a common charioteer mixed with the populace.

We should listen with caution, and study to suspend our assent, where we perceive that the national disposition is in itself, prone to credulity, and disposed to catch and diffuse with eagerness, the rumours of the hour. *Demosthenes* describes and reprobates such a disposition in the Athenian people, περιουσιες ανων πυνθανισθαι κατὰ την αγοραν—"λεγειναι τι καινον;—τεθνηκε φιλυππος;—it is usually the offspring of a vain and fantastic love of novelty, conspiring with a sanguine temperament, easily elated by hope, and depressed by fear; and where it prevails must contribute exceedingly to the growth and progress of falsehood. Such a disposition has ever been observable in the people of *England*, and appears in the favourable reception, which they afford to quacks, charlatans and impostors. It has of late years been carried to an extravagant pitch, since the fearful increase of the funding system has augmented the power and importance of rumour, and offered prospects of enormous gain to the invention and the mendacity of those,

those, who avail themselves of moments of public anxiety, to abuse and mislead public credulity. Daily rumours and artful fabrications will be circulated by those, who feed on transitory and floating falsehoods. While the tutelar genius of a country resides in the paper castle of public credit, a breath can shake the structure, and expel the inhabitant. The herd of gamblers in the public funds, whose study and ingenuity are perpetually employed, to raise and depress them, as suits the purpose of private interest, will avail themselves of the believing temper of the people, of the sort of predisposing preparation, which they find in the mind of the hearer, and the avarice, the ambition, the vanity, the education, the prejudices, the wishes and fears of the multitude\* will lead them to implicit confidence in the reporter. The destructive explosion of the *South-Sea* bubble in *England*, and the consequences of the *Mississippi* scheme in *France*, are instances, to show how a few artful projectors may excite a delirium of general credulity, in a nation; and how necessary it is, to suspend the assent, while such a spirit of implicit belief is predominant.

No argument, in favour of popular credulity, can be drawn from the observation, that many rumours and presages which have appeared improbable and unfounded, or chimerical, at the moment when they were first in circulation, have afterwards, in fact, been verified and fulfilled. It must be considered, how much popular rumours and predictions contribute to their own completion; "*possunt quia posse videntur*" is a saying (K 2).

\* We have had two very remarkable instances in *England*, of the acuteness and dexterity of those, who speculate in the funds. During the former war between the English and Tippoo Sultan, which was carried on by Lord *Cornwallis*, a forgery of a Madras gazette was produced; it was said to have been brought by a ship that arrived at *Bristol*, and announced the capture of *Seringapatam*, an event at that time very probable. The fallacy was discovered, the stock exchange was filled with consternation and ruin. Another very remarkable instance occurred lately; a forged copy of *L'Eclair* a *Parisian* newspaper was handed about in *London*; it purported to contain the outlines of a treaty between the Emperor of *Germany*, and the French Republic, and was intended to operate on the funds, although it failed of producing any considerable effect of that kind.

ing as juſt as it is trite. Rumours, which inſpire high notions, and ſerve to produce great public exertions, thus become the means of verifying themſelves. On the other hand, reports, which anticipate diſaſters, may contribute to produce the calamity, which they thus prematurely announce, by depressing the public mind, and inſpiring a languid deſpair, a fatal torpor of conſternation, which unnerves the arm of public exertion. Thus, the prophecies or traditions, that one nation ſhould finally be ſubdued by another, have uſually been fulfilled: and why? Be-  
 cauſe the very exiſtence and circulation of the report or prediction tended and contributed to its completion; by inſuſing, on the one hand, enthuſiaſm, hope, and confidence; on the other, panic, terror, and deſpair. The traditions and oracles, which pronounced, that the *Aſiatics* ſhould finally be conquered by the *Greeks*, were, at length, verified.—It is ſaid, that there are prophecies in circulation, among the *Turks*, that they ſhall one day be conquered by the ſons of *yellowneſs* (which expreſſion is ſuppoſed to portend the *Ruſſians*), who, it is ſaid, ſhall enter *Conſtantinople*, at a particular gate. Such prophecies, by their operation to diſpirit the public mind, and paralyſe national ſtrength, might, in the event of a future conteſt between the nations, contribute to the downfall of the *Turkiſh* ſtate. We read, that *Mark Antony* had uſually with him an *Egyptian*, ſkilful in the calculation of nativities, who adviſed him to beware of *Cæſar*; might not the ſentiments of fear, thus inſuſed, make him think, that he found his *Genius rebuked by that of Cæſar*; and inſpire the feeble and irrefolute conduct reſulting from deſpair, after the fatal battle of *Actium*, which facilitated the triumph of his rival.

To diſpoſe us, to liſten with caution and reſerve, to rumours, and to repeat them with diffidence and hesitation; we may recollect, that even reſpecting the moſt celebrated and important facts of hiſtory, and ſuch too as paſs before the greateſt number of witneſſes, and make the deepeſt impreſſions on the minds of cotemporaries, as the circumſtances of the deaths of great and memorable perſonages, battles, ſieges, and revolutions, there is often a wide diſagreement and even abſolute contradiction

tradition between the different reporters. A late writer\* has very strenuously endeavoured to show that no such event as the siege of Troy ever took place. *Walpole*, in his historic doubts, has ventured to call in question some of the passages of *English* history, which seemed to be most authentic. *Affinius Pollio*, we are told, found in the history of *Cæsar* written by himself, some things misreported; and it is somewhat surprising, that the account, which *Cæsar* himself has left us, of the memorable battle of *Pharsalia*, should meet with contradictions. Surely, his evidence must be of the highest authority; and yet, *Plutarch* and *Appian* differ from him materially, in some particulars; and also differ from each other. Innumerable instances of the same nature might be adduced from history.

We may remark an extraordinary disagreement in the accounts of a modern transaction of great importance, and, as one should suppose, of unquestionable publicity, the death of the Marquis of Argyle, in the reign of Charles the Second. Lord *Clarendon* says, that he was condemned to be hanged, which was performed the same day. *Burnet*, *Woodrow*, and *Echard* concur, in stating that he was beheaded, though condemned to be hanged; and that, though the sentence was pronounced on Saturday, he was not executed until the Monday after. Yet these are all writers of credit, wrote near the time, and had the means of being well informed.

#### SECTION IV.

*How the abuse of popular Credulity may be remedied or prevented.*

It may be enquired, what remedy, or rather what preventative, shall government apply to the excess and abuse of popular credulity, which, like an habitual germ of pestilence, lurks in the crisis and constitution

\* Mr. Bryant.

stitution of human nature, and social institutions; appears so suddenly and unexpectedly; and produces such mighty effects. The principle, in itself, and within due bounds, is not only salutary, but absolutely necessary to human action: it is only requisite, to guard against the immoderate redundancy.—Shall we restrain or annihilate the freedom of the press?—Shall we prevent the abuse of popular credulity, by impeding and interrupting the intercourse of the people; and by the severity of a state inquisition?—Such are the visionary attempts, to counteract what is inseparably inherent in human nature! Yet visionary as they are, how generally have they been adopted, with one consent, by the rudest, and most enlightened nations!

*Cæsar* relates, that the ancient *Gauls* prohibited the spreading of news, of any kind, which had not first been communicated to the magistrate.\* “Habent legibus sanctum, si quis quid de republicâ a finitimis rumore aut famâ acceperit, uti ad magistratum deferat, neve cum alio communicet; quod sæpe homines temerarios atque imperitos falsis rumoribus terreri, et ad facinus impelli, et de summis rebus consilium capere cognitum est.” The descendants of those ancient *Gauls*, down to the present day, seem to have entertained the same notions respecting the power of popular rumour, and the mode of preventing the abuse of popular credulity. It were easy to dilate on this topic, were the present time and place, proper for the purpose.

The legislature of *Britain* early turned its attention to the same subject; and has, at different times, interposed, with various statutes, to check the progress of delusion, and to prevent or punish the abuse of public credulity. “The spreading false news, to make discord between the king and nobility, or concerning any great man of the realm,” was punishable, even at common law, by fine and imprisonment; and this law was confirmed by the statute of *Westminster*, as it is called,† and afterwards by two different statutes of *Richard the Second*.‡ It appears,

\* De Bello Gallico, Lib. 6. Cap. 19.

† 1st Edward 3d, Cap. 34. ‡ 2 Rich. 2d, St. 1. Cap. 5. 12 Rich. 2d, Cap. 11.

pears, from the reiterated introduction of this subject, under the latter prince, that he was very solicitous to controul the prevalence of rumour, and check the current of popular opinion; and he is an instance, to show the vanity of such precautions. He was dethroned, by a successful usurper, who, in some particulars, availed himself, in his artful progress to royalty, of the credulity of the people, and of the circulation of popular rumours, “tending to make discord between the king and the nobility.”\* false and pretended prophecies, with intent to disturb the peace, are also prohibited, by the law of *England*, and rendered more penal, than the mere circulation of rumours, because they are more deliberate in their nature, and more dangerous in their tendency, being obviously calculated and meant, to disturb the public peace, to raise a spirit of sedition and opposition to the laws and government, through the medium of enthusiastic hope, or the terrific operation of imaginary fear. Such false and pretended prophecies were subjected to capital punishment, by a statute of *Edward* the Sixth; this, however, was repealed, in the reign of *Mary*, his successor; and now, by a law passed in the reign of *Elizabeth*,† the punishment, for the first offence, is the fine of 100*l.*; and for the second, forfeiture of all goods and chattels, and imprisonment during life. But laws and regulations of this kind are ineffectually opposed, to the natural bias of popular credulity, and the strong prevalence of popular rumour. They may, perhaps, delay the paroxysms of credulous enthusiasm; but, then, these paroxysms will be more sudden, more violent, and more destructive, when at last they do break out, and prevail.

It is remarked by medical writers, with respect to the plague; that, in proportion, as the intervals of time between its appearances are great,  
so

\* He circulated among the vulgar, rumours impeaching the king's legitimacy.

† 5th Eliz. Cap. 15. In 1621, “James 1st, by reiterated proclamations, forbid the discoursing of state affairs. Such proclamations, if they had any effect, served rather to inflame the curiosity of the public, and in every company, or society, the late transactions became the subject of argument and debate.” Hume, V. 6, C. 49.

so are its ravages destructive. The same remark may be applied, to the paroxysms of popular credulity, and its concomitant enthusiasm and agitation. When the free circulation of intelligence is checked, when the intercourse of society is rendered stealthy, fearful, and taciturn, and a factitious and unnatural criminality is attached to the intercourse of man with his neighbour; the general mind will brood, in fullen privacy; it will be filled with melancholy, engendering gloomy visions, and rancorous hopes. Every rumour, that announces a change, that flatters the secret desire, of emancipation, or of vengeance, will be fondly received; it will spread abroad with the rapid secrecy of a fire, in the dead of night; the rulers of the people will be the last, to know and mark its progress; their fears, their jealousies, their very precautions, paradoxical as it may seem, will prove the efficient cause of their being lulled into a false security, by establishing a system of jealous vigilance, on which they will too implicitly rely. The rumour will have spread unnoticed, and operated its full effect, before any pains shall have been taken, to check its progress, or counteract its tendency. They shall at last be awakened from their trance, by some ruinous explosion, by the bursting forth of some devouring flame. Governments which are administered on principles of terror, by keeping the people ignorant, by preventing the free circulation of opinion, and the open communication of facts and matters of intelligence, must give greater force to the artifices of persons, whose interests, or whose passions lead them to impose on the credulity of the multitude. The people, from their ignorance and grossness of intellect, will be incapable of distinguishing between truth and falsehood, or detecting the arts, which may be practised, to delude them. Besides this, it is probable, that the rumour will have an importance and authenticity attributed to it, in proportion to the difficulties which attend its circulation; and the very idea of learning a secret will fasten on the natural curiosity, and prying disposition of men. Thus, though the injunction of the magistrate may silence audible voices, it multiplies whispers and murmurs, and those whispers and murmurs are precisely what he has the most reason to fear. It is for the interest of truth,



truth, that every thing should be viewed in the fair and open day. The sinister purpose alone is favoured by darkness and concealment.

Where, then, shall we find an antidote against the prevalence of this epidemic malady? To counteract what is inherent in human nature must, as I have said, appear even in theory, a visionary attempt, and has been proved such by repeated experience. The growth of the evil may be checked; the consequences of it may be rendered less fatal; but the means, I fear, will seem *Utopian* to the generality of mankind. What are they? the promoting of a free circulation of opinion, an increase of rational lights, the diffusion of knowledge, the facilitating and giving publicity to the statement of important facts, in which the people are interested, by means of which, freedom of speech, and of the press, ought to be maintained. The approaches to public instruction should be facilitated, judicious systems of public education should be adopted. An enlightened and well educated people will doubt, will enquire, will think for themselves; while a rude, ignorant, and miserable peasantry, discontented with their present state, their understandings clouded by barbarism, and warped by their wishes and their fears, will eagerly catch at every report or suggestion, that flatters the hope of change; of change which must naturally be ever welcome to the miserable. I forbear to enlarge on this subject, it might betray me into a length of discussion inconsistent with the form and measure of an essay, but I trust that the great importance and political utility of considering this subject, will appear; and if the slight essay which I now venture to lay before the Academy, should induce some writer of more leisure and ability, to treat this topic in a more detailed and perfect manner, I should flatter myself that I had rendered a service to science and morality.



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AN EXAMINATION of various Solutions of KEPLER'S Problem, and a short practical Solution of that Problem pointed out. By the Rev. J. BRINKLEY, A. M. M. R. I. A. Andrews Professor of Astronomy in the University of DUBLIN.—Read Nov. 1<sup>st</sup>, 1802.

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FROM the time when Kepler discovered by the observations of Tycho Brahe, that the motions of the planets were performed in elliptical orbits, astronomers and mathematicians have been continually proposing different methods of obtaining the true from the mean place of a planet. A direct method of solution was long unknown, and even after the improved state of the analytical art furnished a direct solution, or more strictly speaking, a direct approximation, it was found that indirect solutions are the readiest for practice. Many indirect solutions have been given, and I cannot but think that an examination of the principal of them, and a comparison of their different degrees of accuracy, will be considered both as curious and useful. It is certainly an object for curiosity to compare together solutions, some of which brought to their respective authors, in their day, no small credit, and some of which have since been very inaccurately appreciated by different writers; and it is also both curious and useful to contemplate the present state of the analytical art which now so readily furnishes methods of making a comparison. I know not that this comparison has before been made, and I have been the

more induced to do it, as thereby striking examples are afforded of the advantage of the method of deducing series which I gave in a memoir read at the Academy, Nov. 1798.\* The utility of this enquiry will be more readily allowed at the present time, from the remarkable circumstance, the discovery of two new planets. Heretofore an enquiry of this kind might have appeared of little use, as tables for the equation of the centre were already constructed for all the planets. Now we actually have two new bodies, one moving in an orbit more excentric than that of Mercury, for which the application of Kepler's problem will be continually necessary, till the elements of their orbits are settled with precision, and tables constructed. It also may reasonably be expected that the industry of astronomers will, ere long, discover other bodies of the same kind.

The indirect method, which I have here recommended, and which for orbits not very excentric appears to me as ready in practice as can be desired, is deduced from a combination of the methods of Kepler, Newton, and the second Cassini; it is also applicable to the excentric orbits of comets, and will, in all cases, rapidly approximate.

The mode of examination of the principal solutions, and the results from that examination are briefly as follows.

The two series for the true and the excentric anomaly ascending by the powers of the excentricity, and by the series of multiples of the mean anomaly are first given to serve as it were for a scale to measure the

\* This Memoir was read at the Academy, Nov. 1798, and printed in the seventh volume, published in 1800. In the latter year, a work of considerable magnitude in quarto, by M. Arbogast appeared, entitled "Calcul des Derivations". The purport of this work is precisely the same as that of my memoir. The method of M. Arbogast is, however, very different from mine; but, if I am not mistaken, my method is susceptible of much more general application, and of greater facility in practice. The limited nature of a memoir prevented me from entering into much detail. I have therefore engaged in drawing up a full and regular account of the method, and of its application to all the purposes to which M. Arbogast has applied his, some of which had not suggested themselves, till I saw his book, and to other important ones in which his method does not appear to be readily applicable.

the true and excentric anomalies deduced from the indirect methods examined.

Kepler's statement of his problem, and his own solution are then noticed.

Boulliald's first hypothesis, and Seth Ward's simplification of that hypothesis are next in order considered. Seth Ward's simplification, which is better known by the name of Seth Ward's hypothesis, or the simple elliptic hypothesis, is particularly examined, and the anomaly as deduced thereby, is compared generally with the true anomaly. The series expressing his anomaly is remarkable by its simplicity, and may be of use in other enquiries.

The examination of Boulliald's correction of Ward's hypothesis follows next. It is shewn that this correction, contrary to what has been generally supposed, at least in more modern times, was a real correction, and afforded a very short and exact method of deriving the true from the mean anomaly. The error is of the same order as the third power of the excentricity, and the error of Ward's hypothesis is of the same order as the second power of the excentricity. Observations made at that time, could not have detected any error in the places of Venus, the Sun, Jupiter and Saturn; and even in Mars the error, when at its maximum, could scarcely have been noticed, except when Mars was then in opposition.

In the year 1664, Mercator proposed a new hypothesis,\* which he, having compared it with forty-two observed places of Mars, asserted to be more ready in practice, and more accurate than any before given. His hypothesis is here shewn to be somewhat less accurate than Boulliald's correction of Ward's, although as ready in practice.

Accurately speaking, the above mentioned solutions of Ward, Boulliald and Mercator ought not to be called solutions of Kepler's Problem. Kepler, resting upon observation, asserted that the orbit of a planet was an ellipse, the sun being in one of the foci, and also that the law of the elliptical motion was such that equal areas were described in equal times,

\* Afr. Edit. 1671, p. 163, 164.

times about the sun. The problem, therefore, was to assign at any time the place of a planet moving according to such a law. Ward, Boulliald and Mercator, however, only adopted the orbit, but not the law of the motion in the orbit. They imagined such a law as would *readily* enable them to deduce the place of the planet, and then had recourse to observation, to establish the truth of their respective hypotheses. No one attempted to compare his own hypothesis with Kepler's discovery of the equable description of areas. Each considered his own hypothesis as resting upon as solid foundations as Kepler's. Till the physical discoveries of the illustrious Newton, and the more improved state of astronomical instruments, it might perhaps have been impossible to have decided between the respective hypotheses of Kepler, Boulliald, and Mercator. In respect to Ward's Hypothesis, there could have been no doubt of its imperfection. The superior sagacity of Kepler, in eliciting from the observations of Tycho Brahe the true law, and not resting upon such a conclusion as Ward has done, can be never sufficiently admired. However the extreme simplicity of the application of Ward's hypothesis to practice, will always occasion it to be noticed.

After Mercator's, the two practical solutions given by Sir Isaac Newton\* are examined. From the former of these two solutions a practical one may be derived, which appears to be far preferable to any other that has been given. The second solution, although considered by its great author, as better adapted for practice, is not sufficiently exact for the present state of astronomy, and by extending its accuracy, nothing would be gained in point of brevity.

The next solution deserving notice, was given by the second Cassini. He pointed out, in 1719,† a very near approximation for the excentric anomaly, and then a correction of that excentric anomaly. The approximation was adopted by De la Caille,‡ and corrected

\* Schol. 6 Sect. Lib. 1. Princ. Math.

† Mem. R. Acad. 1719. Cassini's Astr.

‡ De la Caille's Astronomy, Art. 144. Vincens Ast. 225.

rected by him nearly in the same manner, as Kepler corrects the assumed excentric anomaly. Cassini's corrections of his approximation are very ingenious, but not sufficient in excentric orbits for the nice purposes of modern astronomy.

This first approximation of Cassini has been adopted by many authors, practice having shewn its value; for I know of no one that has attempted to shew its exact and general value. It is shewn here, and I think for the first time, how close an approximation it is, the error depending on the third power of the excentricity. In the orbit of Mars the error is not greater than  $20''$ , and in the orbit of Mercury not greater than  $5'$ . The approximation consists in adding half Seth Ward's anomaly to half the mean anomaly, the sum will be very nearly the excentric anomaly. The angle Cassini computes is readily shewn to be equal to Seth Ward's anomaly.

It is from this approximation that the method recommended, is partly derived. That method is as follows.

Cassini's first approximation, which is equivalent to the sum of half Seth Ward's anomaly, and half the mean anomaly, is taken for the excentric anomaly. With this excentric anomaly the mean anomaly is computed by Kepler's method. The difference between this computed mean and the true mean anomaly is multiplied by a number taken out of a small table. This product properly applied to the difference, gives the correction of the approximated excentric anomaly.

The error of the excentric anomaly so obtained, is of the same order as the seventh power of the excentricity, and less than a second in all the planets.

The formula from which the table is computed, is derived from Sir Isaac Newton's first method.

If with the corrected approximate excentric anomaly, the operation be repeated, the error of the next approximation will be of the same order as the 15th power of the excentricity, and by repeating the processes, the errors will be of the same order as the 31st, 63d, 127th powers of the excentricity.

Machin

Machin has also given a solution of Kepler's problem,\* remarkable for its ingenuity. His motive for attempting the solution was, as he tells us, to give one which might be general. None of the methods, according to him, being applicable to excentric orbits, and all of them requiring some rule or hypothesis to begin the computation. He himself was aware that his method was too intricate for common practice in regard to the planetary orbits, and had he considered Newton's first method, he would not have asserted that no rule was subsisting, but what was absolutely useless in the elliptical orbits of comets. With respect to a rule for beginning the computation it may be observed that if the mean anomaly be assumed for the first excentric anomaly, the error of the first corrected anomaly will be of the same order as the third power of the excentricity; the second of the seventh power, &c. and therefore in the most excentric orbits, such an assumption would be sufficient for beginning the computation. Machin's method however, is peculiarly applicable to very excentric orbits. It consists of two parts. By the first is obtained an approximation for beginning the computation. The rule, although intricate in practice, is as accurate for very excentric orbits, as for orbits of small excentricity, and in this the merit of the method consists. By the second part, the approximated excentric anomaly is corrected. His method of correction is, as may be readily shewn, deduced from a combination of Kepler's and Newton's first method; but the author has not acknowledged this circumstance.

Thomas Simpson, who ranks so high among the British mathematicians, exerted himself on this problem with his usual ingenuity.† His two first methods may be considered as illustrations of Newton's first method. In his third method he obtains the true anomaly, by reversing the series for expressing the mean in terms of the true; and from this solution he deduces a short approximation for the true anomaly, but limited, as he observes, in point of exactness. This practical rule is  
justly

\* Phil. Transf. Vol. 40. Abridg. vol. 8.

† Simpson's Essays, p. 41. Miscell. Tracts, p. 46.



justly commended by Lalande,\* as affording a short and accurate method of computation, in orbits not very excentric. It is considerably more accurate than either the approximations of Boulliald or Mercator, and nearly as ready in practice as either of their rules. Simpson compares his rule with the methods of Boulliald and Ward: but by a reference to the passage, it will appear that Simpson mistook the nature of Boulliald's correction, and therefore he erroneously makes Ward's and Boulliald's methods nearly equal in point of accuracy.

In his miscellaneous essays, he computes the correction to be applied to the mean anomaly, to obtain the angle at the higher focus. His motive for attempting this method of solution seems to have been to shew how the accuracy of Newton's second method of finding the anomaly might be farther extended, and also to correct some mistaken notions that had been entertained respecting Newton's solution.

Dr. Matthew Stewart has given also a solution of Kepler's problem,† the geometrical elegance of the demonstration of which is to be much admired, as well as the great accuracy of the method, in respect to the planetary orbits. His method consists in obtaining an approximation for the excentric anomaly and then correcting that first approximation.

The first approximation is precisely the same as the above mentioned one of Cassini. But Stewart's correction of his approximation is more accurate than Cassini's correction of his approximation. For, as is hereafter shewn, the error of the excentric anomaly deduced by Stewart's method depends, only on the seventh and higher powers of the excentricity. This method does not appear to furnish readily a continued approximation the contrary of which is stated in the Life of Stewart, published in the first vol. of the Edinburgh Transactions. It may also be observed, that the first approximation, corrected by Newton's method, depends only in the seventh and higher powers of the excentricity and the process is somewhat more simple than by Stewart's method.

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( M )

The

\* Lalande's Edit. Halley's Tables, vol. 2. p. 23.

† Edinburgh Transactions, 8vo, vol. 3, pag. 105, 120. Stewart's Tracts,

The last indirect method which I have noticed, and I know of none of any consequence later, is De la Caille's.\* Lalande recommends this in practice; and has himself given a demonstration of it: But it does not appear to be so convenient in practice, as De la Caille's improvement of Cassini's solution, except when the true anomaly is very nearly known; for, as is hereafter shewn, the respective corrections proceed according to the excentricity, and consequently in excentric orbits, must be repeated many times. Indeed, in examining the accuracy of a table of equations of the centre, this method is very convenient.

I am aware that there are other solutions of this problem, not examined here, some of which did not require notice, and others, as Lorgna's and Trembley's, cited by Montucla,† I have not seen, but suppose if they had furnished any considerable improvement they would have been detailed in the last edition of Lalande's Astronomy.

*Of the Series for expressing the excentric and true anomaly in terms of the mean anomaly.*

Let  $m$  = the mean anomaly to radius unity,  $e$  = the excentricity of the orbit, the femiaxis major being also unity, and let  $c$  and  $a$  represent the excentric and true anomalies respectively, then

$$c = m - es, \quad m + \frac{e^2}{1.2} s, \quad 2m - \frac{e^3}{1.2.4} s, \quad 3s, \quad 3m - s, \quad m + \frac{e^4}{1.2.3} 2s, \quad 4m - s, \quad 2m + \text{\&c.}$$

$$a = m$$

\* Mem. Acad. 1750. Mem. Acad. 1755. Lalande's Ed. Hall Tab.

† Hist. Mathem. vol. 2. p. 345.

$$a = m - 2es, m + \frac{1}{2}e^2 s, 2m + \frac{1}{4}e^4 s, m \left. \begin{array}{l} e^3 - \frac{1}{2}e^4 s, 2m \\ -\frac{1}{2}e^4 s, 3m \end{array} \right\} + \frac{1}{8}e^6 s, 4m \left. \right\} e^4 \text{ \&c}$$

These series are here given to serve for scales of comparison, as it were, to the different series hereafter investigated from the respective hypotheses examined. It is sufficient for my present purpose, merely to state the series without entering particularly into their investigation. They are to be met with in various authors.\* I shall only observe that the series for  $c$ , is derived from the equation  $c = m - es, c$ . This equation is readily solved, and also any function of  $c$  found by a remarkable and elegant theorem invented by Lagrange,† and afterwards demonstrated by Laplace. The latter theorem for the true anomaly has been investigated by several authors by reversing the series for expressing the mean anomaly in terms of the true. It has been deduced by others from first finding the excentric from the mean, and then the true from the excentric anomaly. The latter mode is adopted by Laplace, in his incomparable work “Mecanique celeste.” This great mathematician has there given an investigation strikingly elegant. He first has obtained, by an ingenious transformation, the law of the series expressing the true in terms of the excentric anomaly and excentricity. By combining this conclusion with the series for the excentric anomaly, and the sines of its multiples, the series for the true anomaly may be continued at pleasure.

It is hereafter pointed out, how the same series for the true anomaly, in terms of the excentric, may be obtained without the introduction of impossible quantities. The law of the series, indeed, is not demonstrated, but only collected by induction; yet it may be a ques-

( M 2 ) tion,

\* Lagrange Berl. Aft. 1769. Coufin's Aft. Phys. 43, 44. Laplace Mécanique Céleste, Liv. 2. c. 3, 22. Lalande Aft. vol. 3. Tran. R. I. A. vol. 7. 347, 350.

† Berl. Acad. 1768.

tion, in many instances, how far the demonstration of a law by the introduction of impossible quantities, exceeds in evidence, a conclusion obtained by induction.

*On Kepler's own Solution of his Problem.*

Kepler having satisfied himself, that the orbit of Mars was an ellipse, and that equal areas were described in equal times about the Sun, in one of the foci, reduces the problem of finding the coæquate or true anomaly from the mean, to this,\* “*Aream semicirculi ex quocunque puncto diametri in datâ ratione secare,*” and observes “*mihi sufficit credere solvi a priori non posse propter arcus et sinus* ετερογενειαν. “*Erranti mihi quicunque viam monstrabit, is erit mihi magnus Apollonius.*”

Accordingly, he himself has recourse to a tentative method of solution; † he assumes the excentric anomaly, and then computes the mean anomaly; the error of the mean anomaly so computed, he applies to the first assumed excentric anomaly, and with the excentric anomaly so corrected, he repeats the operation as often as necessary. This mode of computing the excentric anomaly is derived from the equation,

$$m = c + e s, c$$

which equation follows from the equable description of areas.

From this equation it is evident that the error of the assumed value of  $c$  differs from the error of the computed value of  $m$ , only by a quantity to which  $c$  has always a greater ratio than  $1 : e$ . Therefore, regarding the value of  $e$  in all the planets, the excentric anomaly by repeating the operations, rapidly converges to its true value. The  
excentric

\* Kepler de Motu Stellæ Martis, p. 300.

† Kep. Epitome, Ast. p. 695.

excentric anomaly being found, the true anomaly is had by a well known theorem.

This solution of Kepler's is perhaps, in practical value, little inferior to any that has been since given; it obviously requires only two improvements, a near approximation to begin the computation, and also at once from the error of the computed mean anomaly, to derive the correction of the first assumed excentric anomaly. The second Cassini\* has given a rule for the former, and applying this rule of Cassini's to a method given by Sir Isaac Newton,† a correction is at once obtained, which will give the excentric anomaly, true to less than a second in all the planets, as is hereafter shewn.

*On Boulliald's first Hypothesis and its simplification by Seth Ward, commonly known by the name of the simple elliptic Hypothesis.*

Kepler's discoveries rested simply on observations, and on observations, which, from the necessary imperfection of instruments, were liable to errors within certain limits. Any other hypotheses which would agree with observations within these limits, were considered as equally entitled to notice, as the laws of Kepler. Accordingly, Ismael Boulliald, one of the greatest mathematicians of his time, adopted only the elliptic orbit, and not the equable description of areas. Desirous of deriving the inequable motion in the orbit, from an equable motion, he supposed " the ellipse, in which the planet moved to be a section of a " certain cone, the axis of which passed through the higher focus, and " in which ellipse, the motion was so regulated by some physical cause, " that

\* Mem. Acad. 1719, † Math. Prin. Nat. Phil. Lib. 1. Sect. 6. Schol.

“ that the line joining the planet and vertex of the cone moved with  
“ an equable motion.”

This complex hypothesis Seth Ward shewed\* to be precisely the same with regard to the motion in the ellipse, as an equable motion about the higher focus. At the same time he gave two methods of computing the true from the mean anomaly on this hypothesis. One of them was furnished by Neil, who is celebrated as the first that ever exhibited a right line equal to a curve. This rule of Neil's is the elegant and simple one now so well known, viz. “ As the Aphelion distance : Perhelion distance :: tang. of half the mean anomaly : tang. of half the true anomaly.” Ward afterwards assumes, in his *Astronomia Geometrica*, this as the law of a planet's motion, and states himself indebted to Boulliaud for the hints that led him to the discovery. Boulliaud is one of those to whom he dedicates his *Astr. Geo.* in that dedication he says, “ magna certè illius laudis pars in teipsum redundabit, quì  
“ astronomià philolaicà me ad hanc rem excitasti, promovisti, atque motus  
“ æqualitatem ad axem Coni adeoque (uti in inquisitione nostrà ex  
“ principiis tuis ostendimus) ad umbilicum alterum ellipseos referendo ad-  
“ juvisti.”† This appears surprizing, when it is considered that the ancients conceived an equable motion, about a point within the circular orbit, equally distant from the centre as the earth was. The transition from this to the upper focus of the ellipse was obvious. Kepler himself remarks it more than once;‡ but did not attempt to shew its connection with the equable description of areas. Ward, which is still more remarkable, considers‡ himself as having solved the problem proposed by Kepler. How could it escape him that the problem he had solved was not the problem proposed by Kepler, unless it had been shewn that the equable motion about the higher focus resulted from the equable description of areas?

The method of Ward must however, always be considered as an elegant and useful, although not a near approximation, except when the orbit

\* Inquisitio in Astr. Boull.

† Epit. p. 673, 681.

‡ Præf. ad Astr. Geom.

orbit is of small excentricity. It cannot, nevertheless, be denied that Ward has obtained more merit than his share in it deserved.

Let us proceed to enquire its exact value ; for this purpose the following theorem is necessary, which will also afterwards be referred to, and may be of use in other enquiries.

*Theorem.*

In a plane triangle, let half the base be  $e$ , and half the sum of the sides be unity, and one of the exterior angles at the base =  $m$  (rad. unity,) then the opposite interior angle will =

$$m - \frac{2es}{1}, m + \frac{2e^2 s}{2}, 2m - \frac{2e^3 s}{3}, 3m + \frac{2e^4 s}{4}, 4m - \&c. \text{ when } e \text{ is less than } 1.$$

Demonstration. Let  $a$  = the interior opposite angle, then by Plane Trig.  $1+e : 1-e :: t, \frac{1}{2}m : t, \frac{1}{2}a$

therefore  $\log. t, \frac{1}{2}a = \log. t, \frac{1}{2}m - \log. 1+e + \log. 1-e$ , or making

$$e \text{ and } a \text{ vary } \frac{1}{2} \dot{a} = \frac{2e}{1-e^2} \text{ or } a \times 1-e^2 = -2es, a.$$

$$t, \frac{1}{2}a \times \cos^2, \frac{1}{2}a \quad 1-e^2$$

In order to find, from this equation, the value of  $a$  corresponding to any values of  $e$  and  $m$ , in a series ascending by the powers of  $e$ , let the successive fluxions of this equation be taken per Saltum,\* making  $e = 0$ , and  $a = m$ .

$$\text{then } \dot{a} = 2eacs, m \text{ or } \frac{2e^2 s}{2}, 2m, \text{ when } \dot{e} = e$$

$$a - 2e \dot{a} = -2es, a \text{ or } \frac{2e^3 s}{1.2.3}, 3m$$

\* See Transf. R. Irish Academy, vol. 7. Mem. p. 321. Prob. 2. & 3.

$$a - 3e^2 a = -2es, a \text{ or } \frac{a^4}{1.4} = 2e^4 s, 4m$$

$$a - 12e^3 a = -2es, a \text{ or } \frac{a^5}{1.5} = -2e^5 s, 5m$$

$\mathcal{E}^2 c. \qquad \mathcal{E}^3 c. \qquad \mathcal{E}^4 c.$

$$\text{Hence } a = m + \frac{a^2}{2} + \frac{a^4}{4} + \&c. = m - \frac{2es}{1} + \frac{2e^2 s}{2} - \frac{2e^3 s}{3} + \&c.$$

Q. E. D.

Observation. It is well known that

$\sqrt{1+e} : \sqrt{1-e} :: t, \frac{1}{2}c : t, \frac{1}{2}a, a \mathcal{E}^2 c$  being the true and excentric anomaly of a Planet.

or  $t, \frac{1}{2}a = t, \frac{1}{2}c \sqrt{\frac{1+e}{1-e}}$

now if for  $\sqrt{\frac{1+e}{1-e}}$  be substituted  $\frac{1+e'}{1-e'}$  and the flux. of the equat. taken.

$a \times \frac{1+e'}{1-e'} = -2e's, a$  which equat. is precisely of the same form as that from which the series in the above theorem was derived and therefore in the same manner we have

$$a = c - \frac{2e'^1 s}{1}, c + \frac{2e'^2 s}{2}, 2c - \frac{2e'^3 s}{3}, 3c + \frac{2e'^4 s}{4}, 4c - \&c.$$

and, because  $\sqrt{1+e} = \frac{1+e'}{1-e'}, e' = \frac{e}{1+\sqrt{1-e^2}}$ . This is the same conclusion as Laplace has deduced\* by a very ingenious use of impossible quantities.

From the above theorem it immediately follows that the anomaly computed by Seth Ward's method.

$$= m - 2es, m + \frac{2e^2 s}{2}, 2m - \frac{2e^3 s}{3}, 3m + \frac{2e^4 s}{4} - \&c.$$

comparing this with the true anomaly,

$m -$

\* Mécanique céleste, tome I. p. 170.



Fig. 1.

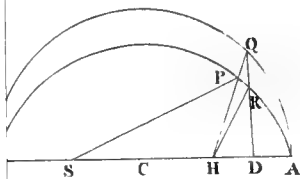


Fig. 3.

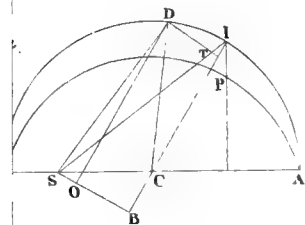
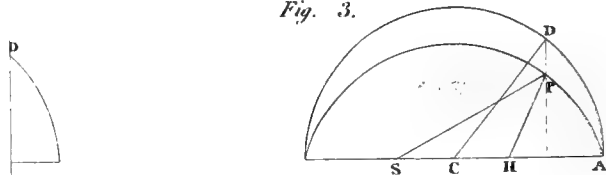


Fig. 5. 2.

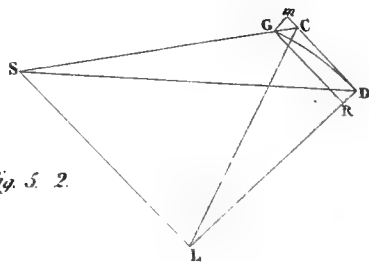


Fig 1

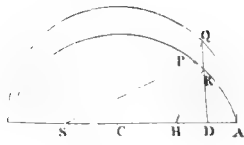


Fig 2



Fig. 3.



Fig 1



Fig 5 1

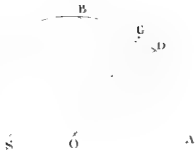


Fig 5 2



$$m - 2es, m + \frac{1}{2}e^2s, 2m + \frac{1}{4}e^3s, m \left. \vphantom{m} \right\} e^3 - \frac{1}{24}e^3s, 2m \left. \vphantom{m} \right\} e^4 \&c.$$

$$- \frac{1}{12}e^3s, 3m \left. \vphantom{m} \right\} + \frac{1}{96}e^3s, 4m \left. \vphantom{m} \right\}$$

the correction to be applied to Seth Ward's anomaly appears to be

$$\frac{1}{4}e^2s, 2m + \frac{1}{4}e^3s, m \left. \vphantom{m} \right\} e^3 - \frac{1}{24}e^3s, 2m \left. \vphantom{m} \right\} e^4 \&c.$$

$$- \frac{1}{12}e^3s, 3m \left. \vphantom{m} \right\} + \frac{1}{96}e^3s, 4m \left. \vphantom{m} \right\}$$

The maximum of this correction in the orbit of Mercury, amounts to '33 nearly. In the orbit of Mars to nearly '7½, a quantity readily detected by the observations of Tycho Brahe; and hence this hypothesis was justly disregarded by Kepler.

*On Boulliald's correction of Seth Ward's Hypothesis.*

Boulliald, displeas'd at the treatment he had received from Ward, in return shew'd that the hypothesis of equable motion about the higher focus, would not give the places of Mars agreeably to observation, and propos'd the following construction, for determining the place of a planet. A construction admitting of an easy calculation.

Make the angle A H R = mean anomaly (*m*), H being the higher focus, draw D R Q parallel to the axis minor, and meeting the circle in Q, and draw Q P H intersecting the orbit in B, which will be the place of the planet. Fig. 1.

To compare the anomaly so determined with the true anomaly, the value of P S H (*a*) is to be obtained in a series ascending by the powers of the excentricity.

Let Q H A = *z*, then

tang. *z* : tang. *m* :: 1 :  $\sqrt{1 - e^2}$  or log. *t*, *z* = log. *t*,  $m - \frac{1}{2} \log. \frac{1 - e^2}{1 + e^2}$

from which equation, by taking the successive fluxions per Saltum, *z* will be obtained. When *e* = 0 and *z* = *m* and *e* is constant.

1.  $\ddot{z} = 0$

2.  $\ddot{z} = \frac{1}{2}e^2 s, 2m$        $\ddot{z} = \frac{e^2}{2} s, 2m$   
 $\frac{2}{4}$

3.  $\overset{3}{\underset{4}{z}} = 0$

4.  $\overset{2}{z} = -2.3e^2 z = 3e^2 s, 2z$  OR  $\overset{2}{z} = -\frac{1}{32}e^4 s, 4m$  &c.

Therefore  $z = m + \frac{1}{2}e^2 s, 2m - \frac{1}{3}e^4 s, 4m$  &c.

and from thence  $s, z = s, m + \frac{1}{8}e^2 s, 3m + s, m$

$s, 2z = s, 2m + \frac{1}{4}e^2 s, 2m$

$s, 3z = s, 3m$

$s, 4z = s, 4m$

$\&c. \quad \&c.$

But by the above theorem

The  $\langle PSH = z - \frac{2e^2 s}{1}, z + \frac{2e^2 s}{2}, 2z - \&c.$

in which by substituting for  $z = s, z$  &c.

The  $\langle PSH$  or Boulliald's anomaly

$= m - 2es, m + \frac{1}{4}e^2 s, 2m - \frac{1}{4}e^4 s, m \left. \vphantom{= m - 2es} \right\} e^3 + \frac{1}{8}e^5 s, 2m \left. \vphantom{= m - 2es} \right\} e^4$  &c.

comparing this with the true anomaly, its correction will be found to be

$-\frac{1}{8}e^3 s, m \left. \vphantom{-\frac{1}{8}e^3 s} \right\} e^3 - \frac{7}{16}e^5 s, 2m \left. \vphantom{-\frac{1}{8}e^3 s} \right\} e^4$  &c.

The maximum of this correction in the orbit of Mercury, is nearly 20'; in that of Mars nearly 2', a quantity scarcely discoverable by the observations of Tycho Brahe. In the orbit of Jupiter the greatest error is nearly 16'', in the earth 0''. So that this method of computing the anomaly, was, in respect to the observations by which Boulliald examined his hypothesis, sufficiently accurate for all the planets except Mercury. It appears also, from what has been done, that the maximum of error,

in

in Ward's hypothesis : max. of error in Boulliald's :: 3 : 8e nearly when  $e$  is small. Hence, for all the planets the hypothesis of Boulliald is more accurate than that of Ward, and by no means deserves the censure that has been passed upon it, by some authors. Emerson observes,\* the correction of Seth Ward's hypothesis given by Boulliald, only mends it in some places, and in others makes it worse. Simpson, as I observed, mistook this correction. He supposed † Q H A to be the mean anomaly, and R the place of the planet. On this supposition he found the error much the same as the error of Seth Ward's anomaly. Montucla ‡ says, that Boulliald's hypothesis "ne vaut pas mieux."

Indeed, it is remarkable how much Boulliald has been misrepresented.

Adam Smith, in his History of Astronomy † says "Thus Boulliald, who censured this hypothesis of Ward, invented another of the same kind, infinitely more whimsical and capricious." Then he proceeds to give, not the second hypothesis of Boulliald, but the first hypothesis to which Ward had shewn his own hypothesis equivalent.

### *Of Mercator's Hypothesis.*

Mercator, not satisfied with either of the hypotheses above mentioned, invented what he calls his new hypothesis, which he considered as more accurate than any preceding one. With what justice, I shall proceed to examine, by comparing his anomaly with the true anomaly. He himself compared it with forty-two places of Mars observed by Tycho Brahe.

His hypothesis was as follows,

N 2

Let

\* Emerson's Astron. p. 208.

† Essays, p. 48.

‡ Hist. Math. Tom. 2. Edit. 2, page 340.

Fig. 2. Let the distance between the foci be divided in extreme and mean ratio, about the dividing point, (nearer the higher focus) let a circle be described with a radius, equal the femiaxis major; from the upper focus draw a line intersecting the circle and making with the axis major an angle = the mean anomaly; and join the point of intersection, and the lower focus by a line, which will cut the ellipse in the place of the planet, according to Mercator.\*

Now if M be the point of division, let  $MH = \sqrt{(3 - \sqrt{5}) \times e} = ne$ .

Let  $DSH = a$ , and  $MDH = x$

then 1.  $s, x = nes, m$

and  $s, H : s, SDH :: SD : SH$

$s, DSH : s, HMD :: MD : SD$

Therefore  $s, m \times s, a : s, \sqrt{m - a} \times s, \sqrt{m - x} :: 1 : 2e$

or 2.  $s, \sqrt{m - a} \times s, \sqrt{m - x} = 2es, m \times s, a$

Let the successive fluxions of these equations be taken *per Saltum*.

When  $a = m, x = 0, e = 0$  and  $\dot{e}$  is constant we have

$$\begin{aligned}
 1. \quad \dot{x} = nes, m & \quad -\dot{a} = 2es, m \\
 2. \quad \ddot{x} = 0 & \quad -\ddot{a}, m + 2\dot{a}xcs, m = 2sm \times 2\dot{a}ecs, m \\
 3. \quad \&c. & \quad -\dot{a} + \dot{a}^3 + 3\dot{a}xcs, m + 3\dot{a}x^2s, m = \\
 & \quad = 2.3\dot{e}as, m \times cs, m - 2\dot{e}a^2s^2, m
 \end{aligned}$$

Hence,

\* Montucla, Hist. Math. Tom. 2, p. 340, has stated this hypothesis very imperfectly and inaccurately: his words are, "Nicoles Mercator y fit dans le suite, une correction. Il partagea la distance entre les foyers de l'ellipse in moyenne et extrême raifon, de forte que le point de section tombât au delà du centre á l'égard du foyer occupé par la planète centrale, et ce fut ce point qu'il prit pour centre du mouvement moyen."

Hence reducing these equations,

$$a = m + \frac{a}{1.2} + \frac{a}{2} + \&c.$$

$$= m - 2esm + 1,23607e^2 s, 2m + 0,79837e^3 s, m - 1,28407e^3 s, 3m \&c.$$

$$\text{but true anom.} = m - 2esm + 1,25e^2 s, 2m + 0,25e^3 s, m - 1,08333e^3 s, 3m \&c$$

Therefore the error of Mercator's anomaly

$$= -0,1393e^2 s, 2m + 0,54837e^3 s, m - 0,20137e^3 s, 3m \&c.$$

The greatest error in the orbit of Mercury will be  $22\frac{1}{2}$  nearly, and in the orbit of Mars  $2' 7''$ . Hence this hypothesis of Mercator gives the place of a planet somewhat less accurately than Boulliald's correction of Ward's hypothesis.

The following Table shews nearly the maxima of the errors of the three hypotheses of Ward, Boulliald and Mercator, for all the planets.

	Mercur.	Venus	Earth	Mars	Ceres	Pallas	Jupit.	Saturn	Georg.
Ward	33.	"	"	$7\frac{1}{4}$	$5\frac{1}{4}$	57	2	$2\frac{1}{2}$	2
Boulliald	20	0	1	1. 52	1. 8	39. 49	16	24	14
Mercator	$22\frac{1}{2}$	0	1	2. 7	1. 19	45	19	29	16

The mean anomalies, when the respective errors of these hypotheses are greatest, may be found sufficiently near as follows. The errors deduced will in Mercury and Pallas, differ a few seconds from the truth. In Seth Ward's hypothesis  $m = 7854 + \frac{3}{2}e + \frac{1}{3}e^2$ . In Boulliald's  $m = 90^\circ$  and in Mercators, the cosine of  $m = -\frac{2\sqrt{2}}{e} - \frac{3}{0,117}$ . This last expression evidently will not apply to the Earth and Venus. For them, strictly, the solution of a cubic equation is necessary, but the limit of the error is otherwise obvious.

On

*On Newton's two practical methods of solving Kepler's Problem.*

Both these methods\* are given without demonstration. The former consists in obtaining successive approximations to the excentric anomaly. Keil has given a demonstration† of it, but has not assigned the rate of convergence of the Newtonian series, from which arises the great value of this method.

It may be explained and demonstrated from the consideration of the equation  $c = m - e s, c$  by which the rate of converging will be pointed out.

Let a near assumed value of  $c$  be  $c'$  and let  $c = c' + c''$

let also  $c'' = m - e s, c'$

then because  $c' + c'' = m - e s, c' + c''$

we have  $c' + c'' - c'' = e \times s, c' - s, c' + c''$

now  $s, c' + c'' = s, c' \times c s, c' + c s, c' \times s, c'$

but  $c s, c = 1 - \frac{1}{2} c^2 + \&c.$  and  $s, c = c - \frac{1}{2} c^3 + \&c.$

Therefore  $c' + c'' - c'' = e c \times c s, c - \frac{1}{2} c s, c'$  not regarding  $c^3$  &c.

$$\text{or } c'' = \frac{c' - c}{1 + e \times c s c - \frac{1}{2} c s c} = \frac{c' - c}{1 + e c s, c} \text{ nearly.}$$

Newton's

\* Prin. Math. Nat. Phil. Lib. 1. Sect. 6, Schol.

† Phil. Tranf. Keil's Ast. 25 Sect. Horley's Newt. vol. 2, page 133.



Newton's first approximation is  $c = \frac{c-c}{1+ecs}$ , or rather

$c : c-c :: \frac{1}{e} : \frac{1}{e} + esc$ , as will appear by a reference to his rule and if instead of

$c, c+c$  thus computed be used, and then  $c = \frac{c-c-c}{1+ecs, c+c}$

be computed  $c+c+c$  will be a nearer approximation to  $c$ , which may be continued at pleasure.

With respect to the rate of convergency of the quantities

$c+c, c+c+c, \&c.$  to  $c$ .

$$\frac{c-c}{1+esc} \approx \frac{1}{2}esc$$

We have  $c = \frac{c-c}{1+esc} \times 1 - \frac{1}{2}esc$  Now if the error of  $c$  be of the same or-

der as the first power of the excentricity, the quantity  $\frac{c-c}{1+esc}$  may be of the

$$\frac{c-c}{1+esc} \approx \frac{1}{2}esc$$

same order and  $\therefore$  the error in  $c$  arising from neglecting  $\frac{c-c}{1+esc} \times \frac{1}{2}esc$  may

be of the order of the third power, because  $c$  and  $e$  are of the first power.

Hence assuming the excentric anomaly = the mean anomaly, the error after the first Newtonian operation cannot be of a higher order than the third power of the excentricity, because the difference between the mean and excentric anomaly =  $es, c$ . By the same reasoning, if the excentric anomaly

anomaly corrected by the first operation, be used, the error in the second corrected excentric anomaly will be of the same order as the  $3 + 3 + 1 = 7$ th power of the excentricity. The error of the next will be of the 15th, &c.

Hence supposing the error of  $c$  of the order of the first power of excentricity the error of  $c+c$  will be of the order of 3d. power.

of  $c+c+c$  of 7th.

of  $c+c+c+c$  of 15th.

of  $c+c+c+c+c$  of 31st.

Hence this method is general for any elliptic orbit, however excentric, as Keil justly observes.\*

*On Newton's second Method.*

This method consists in finding the quantity to be applied to the mean anomaly, to find the angle at the higher focus, which being known, the angle at the sun is had by the common proportion. The two corrections given by Newton, are of the orders of the second and third powers of the excentricity, and the higher powers are neglected; consequently this method will not be sufficient for the orbit of Mercury, and to correct it farther, by extending the terms, would require the same trouble as computing directly by the series, the true from the mean anomaly; so that this method offers nothing to be particularly remarked.

However,

\* Newton's Anomaly is reckoned from Perihelion.

However, as commentators have laboured much in investigating\* Newton's correction, it may not be improper to give the following easy method of deriving terms equivalent to the terms of the Newtonian series, which may, at the same time, serve to shew that the investigation of the angle at the higher focus must be as tedious as the direct method of finding the angle at the sun.

Let the angle sought  $AHP = w$ ,  $DCA = c$ , the mean anomaly  $= m$ , Fig. 3.  $AC = 1$  and  $CH = e$ . Then from the equable description of areas,

$$m = c + es, \quad c$$

Also by the well known theorem for finding the true from the excentric anomaly.

$$\sqrt{1+e} : \sqrt{1-e} :: \text{tang. } \frac{1}{2}SCD : \text{tang. } \frac{1}{2}SHP$$

$$\text{But tang. } \frac{1}{2}SCD = \text{tang. } 180 - DCA = \text{co-tang. } \frac{1}{2}DCA$$

$$\text{and tang. } \frac{1}{2}SHP = \text{co-tang. } \frac{1}{2}PHA$$

$$\text{Therefore } \sqrt{1+e} : \sqrt{1-e} :: \text{co-tan. } \frac{1}{2}c : \text{co-tan. } \frac{1}{2}w :: \text{ta. } \frac{1}{2}w : \text{ta. } \frac{1}{2}c$$

$$\text{or log. tang. } \frac{1}{2}w = \text{log. tang. } \frac{1}{2}c + \frac{1}{2} \log. \frac{1+e}{1-e}$$

Taking the fluxions of the equations thus obtained, making only  $e, c$  and  $w$  variable, we have

$$\left. \begin{array}{l} \dot{c} + e\dot{s}, \quad c=0 \\ \dot{w} = \frac{\dot{c}}{s} - \frac{\dot{e}}{1-e} \end{array} \right\}$$

From which equations the respective values of  $w, \dot{w}, \ddot{w}$ , &c. are to be obtained when  $e=0$  and  $c=w=m$  by taking the successive fluxions of these equations per Saltum.

$$\left. \begin{array}{l} \text{I. } \dot{c} + e\dot{s}, \quad m=0 \\ \dot{w} = \frac{\dot{c}}{s} - \frac{\dot{e}}{1-e} \end{array} \right\} \text{therefore } \dot{c} = -esm \text{ and } \dot{w} = 0$$

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\* Simpson's Tracts, pag. 49. Horsley's Newton, vol. 2. p. 135. Emerson's Comment. Le Sœur & Jacquier.

$$\left. \begin{aligned}
 2. \quad c + 2eccs, m=0 \\
 \omega = c - c \frac{e^2 sm}{s, m}
 \end{aligned} \right\} \text{therefore } c = e^2 s, 2m \text{ and } \omega = \frac{1}{2} e^2 s, 2m$$

$$\left. \begin{aligned}
 3. \quad c + 3e^3ccs, m - c s, m=0 \\
 \omega = c - \frac{3cccs m - c + 2e^3 cs, m}{s, m}
 \end{aligned} \right\} \text{therefore } \omega = 4e^3 s m = 3sm - s, 3me$$

Hence  $\omega = m + \frac{1}{2} e^2 s, 2m + \frac{1}{3} e^3 \cdot s, m - \frac{1}{3} s, 3m + \&c.$   
 which terms are equivalent to the two corrections applied by Sir Isaac Newton.

*On the second Cassini's method.\**

The method of Cassini, now in order to be examined, is perhaps both the most elegant that has yet been invented, and the most readily deduced from the equable description of areas, and is also, in the planetary orbits, of very great practical value.

Let P be the place of the planet, and AI the excentric anomaly. SB perpendicular to CI. Let AD = the mean anomaly, and draw DT perpendicular, and DO parallel to CI. Then because DA is the mean anomaly, the area DCA = SAI = SIC + ICA, and therefore SCI = DCI consequently SB = the arch DI.

Hence three approximations are derived by Cassini. 1. SD is nearly parallel to CI, therefore if the angle SDC be computed, DCI will be found nearly, and consequently ACI the excentric anomaly.

2. SO = DI - DT. And therefore when the excentricity is not great, the measure of the angle SDO = DI - DT nearly. This latter quantity being taken from SDC, the angle DCI is obtained.

3. SD :

\* Mem. Acad. 1719. Cassini Elem. Astr. vol. I. p. 143.

3.  $SD : SO = DI - DT :: \text{rad} : s$ , SDO. Hence, by computing SD, a more accurate value of SDO will be had, and therefore a more accurate value of  $ODC = DCI$ .

TO obtain the second approximation, Caffini gives a table containing the difference of the arches and their fines for a few of the first degrees of the quadrant, a table which is easily extended.

The respective degrees of accuracy of these approximations may be investigated as follows.

$$1. \text{ We have } CD + SC : CD - SC :: t, \frac{1}{2} \angle DCA : t, \frac{\angle DSC - \angle SDC}{2}$$

$$\text{or } 1 + e : 1 - e :: t, \frac{1}{2} m : t, \frac{1}{2} w$$

which is the same proportion as that in the preceding theorem,

whence  $w = m - \frac{2}{3} e s, m + \frac{2}{3} e^2 s, 2m - \frac{2}{3} e^3 s, 3m + \&c.$

Indeed it is evident the angle  $\angle DSC - \angle SDC =$  Seth Ward's anomaly. For the triangle SCD is similar to the triangle formed by the distance between the foci and the axis major, including an angle equal to the mean anomaly according to Seth Ward's hypothesis.

$$\text{Hence } SDC = es, m - \frac{1}{2} e^2 s, 2m + \frac{1}{3} e^3 s, 3m - \&c.$$

But in Caffini's first approximation DCI is taken equal to SDC therefore according to that approximation ACI the excentric anomaly  $= m - es, m + \frac{1}{2} e s, 2m - \frac{1}{3} e^3 s, 3m + \&c.$  or the excentric anomaly  $= \frac{1}{2}$  the mean anomaly  $+ \frac{1}{2}$  Seth Ward's anomaly. Taking the difference between this and the true excentric anomaly we have the error of Caffini's first approximation  $= \frac{1}{2} e^3 \cdot \frac{3sm - s, 3m (\frac{1}{2} e^3 s^3, m) + e^4 \cdot \frac{1}{2} s, 4m - \frac{1}{6} s, 2m \&c.$  in which the third and higher powers of the excentricity only are concerned.

This quantity, when a maximum in the orbit of Mercury, is 5' nearly, in the orbit of Mars only 20" &c.

The facility with which this near approximation may be obtained, renders it highly valuable, when combined with the method of extending at pleasure the approximation. It also deserves notice, from the

elegance of the construction so readily deduced from the equable description of areas.

2. If SDO could be accurately computed, DCI, and therefore the excentric anomaly, would be had directly. But SO is computed from taking  $SB-BO=DI-DT$ , when DCI is taken equal to SDC, and hence one source of error. Another source of error arises from taking  $SD=DC$ , and therefore SO for the measure of the angle SDO to the radius DC

The computed value therefore of SDO to radius  $CD=SO=SB-BO=DI$ —fine  $DI=\frac{DI^3}{2.3}$ —&c.  $=\frac{1}{2}e^3 s^3$ ,  $m-\frac{1}{4}e^4 s^2$ ,  $m \times s$ ,  $2m$  &c. consequently

the computed value of  $ACI=ACD-DCI=m-cs$ ,  $m+\frac{1}{2}e^2 s$ ,  $2m-e^3$ .  $\frac{3}{2}s$ ,  $3m-\frac{1}{6}s$ ,  $m+\frac{1}{6}s$ ,  $4m-\frac{1}{6}s$ ,  $2m$ —&c. this quantity is less than the excentric anomaly by  $e^4$ .  $\frac{1}{3}s$ ,  $4m-\frac{1}{3}s$ ,  $2m$  &c. The maximum of which is when  $m = 60^\circ$  or  $120^\circ$ , and therefore in the orbit of Mercury is, regarding only the fourth power of the excentricity, about  $20''$ . In the orbit of Mars, and all the planets except Pallas, less than a second.

This second approximation is almost as readily derived, as the first, considering how easily the arch equal to the difference between an arch and its sine may be obtained.

The true value of DS being used the error of SDV arises only from the error of SO. But because  $SO=\frac{DI^3}{2.3}$ —&c. and that the error of DI

depends only on the third and higher powers of the excentricity DI itself depending on the first power, it follows that the error of SO will depend only on the fifth and higher powers of the excentricity. In practice however, it is more convenient to use only the first or second approximation, and then if the excentricity of the orbit requires it, to obtain a farther correction, by the method hereafter pointed out.

*On Machin's Method.\**

The accuracy and convenience of the methods hitherto examined excepting the first method of Newton, depend on the small excentricity of the orbit; and therefore they are only applicable to the planets. They would be uselefs for the excentric ellipfes in which the comets move. But the problem is otherwise solved for the parts of the orbits in which the comets are visible to us. That a complete solution to Kepler's problem might be given, equally applicable to all orbits, Machin proposed his very ingenious method, which does not at all depend on the excentricity. For the planetary orbs indeed the method as given by the author, is not so convenient for practice as other methods. However his method may be rendered considerably more simple in practice, as is hereafter pointed at. In examining this method, the method itself is first briefly and somewhat more simply stated, than is done by the author in the Phil. Trans. a limit of the error of the first approximation is then shewn, and also the rate of convergency of the second approximation.

The first approximation may be explained as follows.

Let  $m$  = the mean anomaly (rad. 1),  $c$  = the excentric anomaly reckoned from perihelion, for a reason to be hereafter assigned, the semi-axis major = 1 and the excentricity =  $e$ .

Then  $m = c - es, c$ , let  $c = na$ ,  $a$  being an arch, the sine of which is  $s$  and  $n$  a number to be determined hereafter.

Then  $m = na - es, na$ .

Therefore by the series for the expressing the arch in terms of the sine, and by the series for expressing the sine of the multiple arch.

\* Phil. Trans. vol. 40. Abridg. vol. 8.

$$m = \begin{cases} nx : s + \frac{s^3}{2 \cdot 3} + \frac{3 \cdot 3 \cdot s^5}{2 \cdot 3 \cdot 4 \cdot 5} + \frac{1 \cdot 3 \cdot 3 \cdot 5 \cdot 5 \cdot s^7}{2 \cdot 3 \cdot \dots \cdot 7} + \&c. \\ enx : -s + \frac{n^2 - 1}{2 \cdot 3} s - \frac{n^2 - 1 \cdot n^2 - 3^2}{2 \cdot 3 \cdot 4 \cdot 5} s + \frac{n^2 - 1 \dots n^2 - 5^2}{2 \cdot 3 \cdot \dots \cdot 7} s + \&c. \end{cases}$$

If  $e \times n^2 - 1 \cdot n - 3^2 = 9$ , the co eff. of  $s^5 = 0$  and  $n = \sqrt{5 + \sqrt{9 + 16}}$

now as  $e$  cannot be greater than unity, this value of  $n$  can never be less than  $\sqrt{10}$  and therefore with it  $s (= \text{fine } \frac{c}{n})$  will be always so small that the above series will swiftly converge.

The equation becomes taking this value of  $n$ .

$$\frac{m}{n} = 1 - e s + \frac{n^2 - 1 \cdot e + 1}{2 \cdot 3} s + \frac{n^2}{560} s + \&c.$$

neglecting the terms after  $s^3$  the value of  $s$  is had nearly by the resolution of a cubic equation, and  $s$  being found  $na$  or  $c$  is thence computed for the first approximation.

Had the motion been reckoned from aphelion, the value of  $n$  would have been  $\sqrt{5 + \sqrt{9 - 16}}$ , and therefore would not have been generally possible.

To correct this approximated excentric anomaly *ad libitum*, Machin computes by it the mean anomaly corresponding, by Kepler's rule, and the error of the mean anomaly so computed, he divides by the planets distance from the sun, the quotient is the correction to be applied to the approximated excentric anomaly, to obtain a second approximation, &c.

The



III

The author shews by several examples that in orbits of great and small excentricity the first approximation is always sufficient to apply the second rule with advantage.

This will be seen generally by the following considerations by which a limit of the error of the first approximation is obtained for any value of  $c$ .

The two series above given each converge slowest for a given value of  $c$  when  $n$  is least, because then  $s (=s, \frac{c}{n})$  is greatest. The terms

omitted therefore bear a greater proportion to the terms retained, and consequently the error of the value of  $s$  determined from the cubic equation is then greatest for a given value of  $c$ . We derive then the general limit of the error of any value of  $c$ , by taking  $e=1$  and

therefore  $n=\sqrt{10}$ . The equation becomes  $m=\sqrt{10} \times \frac{10^3 s^7}{6} + \dots$

Now it will easily appear by considering the formation of the co-efficients

of the two series in the case of  $n=\sqrt{10}$  that the terms  $\frac{s^7}{56} + \dots$  are all posi-

tive and their co-efficients converging. Hence the sum of the terms

$\frac{s^7}{56} + \dots$  omitted is less than  $\frac{1}{56} \times \frac{s^7}{1-s^2}$ . But if the cubic equation

$m=\sqrt{10} \times \frac{10^3 s^7}{6}$  be varied by adding  $\frac{\sqrt{10} s^7}{56(1-s^2)}$  to the right hand side, the

variation of  $s$  will be nearly  $= \frac{1}{280} \times \frac{s^5}{1-s^2}$  and therefore of

$na = \frac{1}{280} \times \frac{s^5}{1-s^2} \times \frac{n}{cs, a} = \frac{\sqrt{10} s^2}{280} \times s \times t, a$ . This quantity then will be al-

ways

ways greater than the error of the first approximated excentric anomaly computed by the above method. When the mean anomaly is  $180^\circ$ ,  $s$  is greatest, and then this quantity =  $1^\circ 40'$  nearly. The actual error by computation appears to be  $1^\circ 13'$ . When the excentric anomaly is less than  $23^\circ$ , the above limit of the error will be less than a second; so that in every elliptic orbit, when the excentric anomaly is less than  $23^\circ$ , the above method will suffice, without further correction, to find the excentric anomaly to less than a second.\*

The demonstration of the rule for a farther correction *ad libitum*, the author has not given, nor shewn the convergency of the successive corrections.

To demonstrate the rule. Let  $\overset{\frown}{m}$  be the mean anomaly computed from the approximated excentric anomaly  $\overset{\frown}{c}$  let  $\overset{\frown}{m} + \overset{\frown}{m}$  and  $\overset{\frown}{c} + \overset{\frown}{c}$  be the accurate mean and excentric anomalies.

Then  $\overset{\frown}{m} + \overset{\frown}{m} = \overset{\frown}{c} + \overset{\frown}{c} - es$ ,  $\overset{\frown}{c} + \overset{\frown}{c}$  and  $\overset{\frown}{m} = \overset{\frown}{c} - es$ ,  $\overset{\frown}{c}$  therefore

$\overset{\frown}{m} = \overset{\frown}{c} - ecs$ ,  $\overset{\frown}{c} + \frac{1}{2}\overset{\frown}{c}^2 es$ ,  $\overset{\frown}{c}$  nearly, neglecting the powers of  $\overset{\frown}{c}$  above the second.

$$\text{Or } \overset{\frown}{c} = \frac{\overset{\frown}{m}}{1 - ecs} + \frac{\frac{1}{2}\overset{\frown}{c}^2 es}{1 - ecs} \text{ nearly or } \overset{\frown}{c} \equiv \frac{\overset{\frown}{m}}{1 - ecs}, \overset{\frown}{c}$$

distance from the sun. Hence Machin's rule. The error of  $\overset{\frown}{c}$  from neg-

lecting  $\frac{1}{2}\overset{\frown}{c}^2 es$ ,  $\overset{\frown}{c}$  must always be very small, because as was shewn above

$$\frac{\overset{\frown}{c}}{1 - ecs}, \overset{\frown}{c}$$

$\overset{\frown}{c}$  is

\* But it ought to be observed that a small error, in the excentric anomaly, occasions a great error in the true anomaly computed from thence, when the orbit is very excentric, and the body near perihelion.

$c$  is never greater than  $\frac{1,2}{57,2}$  and the errors after each operation will be nearly proportional to  $c^2, c^4, c^8, \&c.$  But the limit very nearly of the error of  $c$  after the first operation may be easily obtained. For the error of

$c$  is less than  $\frac{\sqrt{10}}{280} \times t^3, a$  therefore the limit of the error of

$$c = \frac{1}{56 \times 280} \times s^4 \times t^6, a \times \frac{s, c}{1 - cs, c} \text{ nearly. This quantity is a maximum when}$$

$c = 169^\circ$  nearly, in which case the quantity itself  $= .0000152 = 3''$  nearly. Actual computation shews the error in this case to be  $2''$  nearly.

Hence the following observations on Machin's solution of Kepler's problem.

1. His method of obtaining a first approximation is general for all elliptic orbits whatever, and will give the excentric anomaly always sufficiently near for correcting it by his second rule. The greatest error is  $1^\circ. 13\frac{1}{2}$ , viz. when the ellipse is evanescent, and the mean anomaly  $= 180^\circ$ . When the excentric anomaly is less than  $23^\circ$  the use of the second rule is unnecessary, for then the first approximation gives the excentric anomaly to less than a second.

2. It will be very rarely necessary to repeat the second rule, for the excentric anomaly found by one operation will never err more than  $2''$  from the truth, and that only in the extreme case, viz. when the ellipse is evanescent and the excentric anomaly  $169^\circ$ .

3. This solution, therefore, of Kepler's problem is complete, but the practice of it, particularly as given by the author, is not so convenient in the planetary orbs as other methods.

4. In the extreme case, viz. when  $e=1$  and therefore the ellipse is evanescent, this mode of solution becomes simpler than in any other case, for

then sine  $a = \frac{\sqrt[3]{6m}}{\sqrt{10}}$  and the first approximated excentric anomaly  $= a\sqrt{10}$

This method may be rendered much more convenient for practice in the following manner.

The cubic equation to be solved is

$$s^3 + \frac{6 \cdot \sqrt{1-e}}{n-1 \cdot e+1} s - \frac{6m}{n \cdot n-1 \cdot e+1} = 0$$

This equation is readily solved by logarithms (see page 57 of Dr. Makelynes excellent and useful introduction to Taylor's logarithms,) and the following practical rule deduced.

Compute  $\log. n (= \sqrt{5 + \sqrt{9+16}})$  which call A

the  $\log.$  of  $\frac{3\sqrt{n^2-1} \cdot e+1}{57, 296 n \cdot \sqrt{1-e}^{\frac{2}{3}}}$  which call B

the  $\log.$  of  $\sqrt{\frac{8 \cdot \sqrt{1-e}}{n^2-1 \cdot e+1}}$  which call C

These logarithms are constant for a given orbit and the computation of them will be facilitated by observing that  $n = \sqrt{5+4 \sec a}$   $a$  being an arc the cotangent of which is  $\sqrt{e}$  and  $\sqrt{n^2-1} \cdot e+1 = \sec b$ ,  $b$  being an arc the tangent of which is  $\sqrt{n^2-1} \cdot e$ .

Then  $m$  being the degrees in the mean anomaly.

$$\text{Log. } m + B + 10 = \log. t, z. \frac{\log. t, 45^\circ - \frac{1}{2}z + 20}{3} = \log. t, u.$$

$$\log. s (\text{sine } a) = C + \log. ct. 2u$$

$\log.$  approximated excentric anomaly  $= \log. a + A$ . Four places of logarithms will be sufficient and the arcs may be taken out to the nearest minute.

On Dr. Matthew Stewart's Method.

His first approximation is as before mentioned, the same as Caffini's. Let AD be the first approximated excentric anomaly, and AB the mean anomaly; then it readily appears that the area DSG = the segment BGD AC, being the excentric anomaly. Instead of double the former area, Stewart takes its near value DG × perpendicular let fall from S on the tangent at D, and thence deduces a correction to his first approximation, viz.

$$DG : BD - s, \quad BD : : t, \quad ODS : s, \quad BOD.$$

To find the error of DG resulting from this proportion. Draw DL and Gm perpendicular to the tangent DC, and SL and GR parallel to the same. Now the area DGS = DSC - GDC = LCD - GDC, and LCD =  $\frac{1}{2}LD \times CD = \frac{1}{2}LD \times \overline{GR - Cm}$ , but Cm = RD × t, mGc =  $\frac{1}{2}GD^2 \times t, mGc$  (AC

being unity) omitting the powers of GD above the second, also GR = GD omitting the powers of GD above the second. Therefore LCD =  $\frac{1}{2}LD \times GD - \frac{1}{2}LD \times \frac{1}{2}GD^2 \times t, mGc$ . The area GCD, as is easily shewn, depends upon the powers of GD above the second; hence, omitting the powers of GD above the second, DGS =  $\frac{1}{2}LD \times GD - \frac{1}{2}GD^2 \times t, mGc$ . Therefore instead of GD being found by the above proportion, the quantity GD -  $\frac{1}{2}GD^2 \times t, mGc$

is deduced. It has been shewn before that  $GD = \frac{1}{5}e^3 s^3, m + \&c$ . Hence it follows that the first term of the series expressing the error of DG will be

$\frac{e^5}{36} s, m \times t, mGc$ . It is easily shewn that the tangent of mGc may be of

the same order as  $e$ . Therefore the error of Stewart's corrected approximation depends only in the seventh and higher powers of the excentricity.

Hence this method gives the excentric anomaly with great precision for all the planets, and even for orbits more excentric; but the practice of the method is less simple than Cassini's first approximation corrected by Newton's first method, or by the method hereafter given. It also does not readily afford a farther approximation.

*\* On Simpson's practical Rule.*

Simpson having deduced a series for the equation, finds the sum of that series, as far as the third power of the excentricity inclusive, nearly equivalent to an arch, the sine of which is  $\frac{2es, m}{1 + \frac{5}{4}ecs, m}$  diminished

by  $\frac{1}{3}$  of the arch the sine of which is  $\frac{2es, m}{1 + \frac{5}{4}ecs, m}^3$ . The practical rule thence

arising is full as easy as the rule by the first approximation of Cassini; but then no convenient method offers itself for extending the approximation by Simpson's method. Simpson's anomaly computed by this rule, easily appears to be, regarding only the third power of the excentricity.

$$m - 2es, m + \frac{5}{4}e^2s, 2m - \frac{7}{32}e^3s, m + \frac{107}{96}e^3s, 3m$$

comparing this with the series for the true anomaly, the correction appears to be  $-\frac{1}{32}e^3s, m - \frac{1}{32}e^3s, 3m$ , which is a maximum when  $m = 35^\circ 16'$  nearly.

And therefore in the orbit of Mercury the error from this term when a max. is about  $57''$ , in the orbits of the other planets the errors are as the author rightly observes very small.

*On*

\* *Essays*, p. 47.

*On Lacaille's Method.\**

The indirect method used by Lacaille, and recommended by Lalande, is as follows.

A supposition is made for the true anomaly, with this supposed true anomaly the excentric anomaly is computed by the analogy.

$$\sqrt{1-e} : \sqrt{1+e} :: t, \frac{1}{2} \text{ anom.} : t, \frac{1}{2} \text{ excent. anom.}$$

From the excentric anomaly so deduced, the mean anomaly is computed by the equation  $m = c + es, c$ . The error of this mean anomaly is applied as a correction to the assumed anomaly, and the operation repeated till no error remains in the computed mean anomaly. The proper mode of estimating the value of this method seems to be to enquire how the repeated operations converge.

To ascertain the rate of convergency, we may make use of the equation  $a = m - 2es, m + \&c.$  Let  $m'$  be the mean anomaly, computed to the assumed anomaly  $a'$ , supposing  $a$  nearly equal  $a'$ .

Then

$$a - a' = m - m' - 2es, m - s, m \&c. = m - m' \times 1 - 2ecsm, \&c.$$

so that the error of  $a$  differs from the error of  $m'$

only by  $\frac{m - m' \times 2ecsm}{m}$ ,

Hence the convergency proceeds according to the simple power of the excentricity, and if the mean anomaly be the first assumption, the error of

\* Mem. Acad. 1750. Lalande's Afr. Lalande edit. Halley's Tab. vol. 2, 50.

of the computed mean anomaly is of the order of the first power of the excentricity. Therefore five or six operations may be necessary for Mercury or Pallas, and in orbits still more excentric a greater number. Nor should we gain much in point of brevity, by previously computing by Ward's or Boulliald's hypothesis, or even by Simpson's practical rule, the true anomaly, nearly for the first assumption. It must therefore be concluded that although this rule is very convenient and simple in practice, yet it yields to Cassini's method, even when corrected by Kepler's method. Both these methods in orbits of great excentricity converge slowly. The following practical method is free from that inconvenience.

*A convenient practical Method of Solution.*

It has been shewn that the error of Cassini's first approximation depends only on the third and higher powers of the excentricity. So that in orbits of small excentricity, the first approximated is very near the true excentric anomaly. If  $c$  be the error of this approximation and  $\hat{c}$  the approximated excentric anomaly itself, also  $m$  the mean anomaly computed with the excentric anomaly  $\hat{c}$ ; then as has been shewn

$c = \frac{m}{1+ecs, c}$  nearly and the error of  $c$  thus computed is nearly

$$\frac{1}{2}c^2es, c;$$

—therefore  $c$  depending only on the third power of the excentricity

city



city the error of  $c$  will depend only on the seventh &c. Hence in orbits of small excentricity the excentric anomaly is readily obtained. And even in orbits of the greatest excentricity, Caffini's first approximation is sufficient to apply the above formula for a further correction.

For taking the extreme case, viz. when  $e=1$ ;  $m+m=c+c+s$ ,  $c+c$   
 $m=c+s$ ,  $c$ . From whence is readily deduced

$$m=c+cs, c \times c - \frac{1}{2}c^2 + \&c. - s, c \times \frac{1}{2}c^2 - \frac{1}{2}c^2 + \&c.$$

Now the first approximated excentric anomaly with this excentricity is half the mean anomaly, and its greatest error will be when the mean

anomaly =  $180^\circ$ . In that case  $c = \frac{3,14159}{2} = 1,57079$ , with which value of  $c$  both the series  $1 - \frac{1}{2}c^2 + \&c.$   $\frac{1}{2}c - \frac{1}{2}c^3 + \&c.$  will converge

so that a near value of  $c$  may be derived from the equation  $m=c+ccs, c$

or from  $c = \frac{m}{1+cs, c}$ ; But when  $m=180^\circ$  the approximated excentric anomaly will continually approach to  $180^\circ$  also, and consequently the denominator  $1+cs, c$  become evanescent. In this extreme case the formula from the simple equation fails, but a formula might if it were worth while be here obtained

obtained from the quadratic equation  $m = c \times 1 + ecc - \frac{1}{2} e^2 s, c$ . In this manner, therefore, a complete solution of Kepler's problem may be obtained, and very conveniently, except when the ellipse is evanescent, and at the same time the mean anomaly nearly  $180^\circ$ \*

When the ellipse is very excentric or nearly evanescent, and the mean anomaly nearly  $180^\circ$ , a small error in the excentric anomaly occasions a great error in the true anomaly. Hence an inconveniency in this case, in deriving from the excentric anomaly, computed by *any method*, the true anomaly. This takes place with respect to comets, when they are near perihelion or are visible to us. And therefore, for them, when near perihelion, instead of using the following practical rule, the best method is to derive by a correction the true anomaly, reckoned from perihelion from the anomaly in a parabola, having the same perihelion distance.

The Log. of the multiplier  $\frac{1}{1 + ecc}$ , =  $20 - \log. 2 - 2 \log. cs \frac{1}{2} e$ ,

$\alpha$  being an arch the log. cosine of which is the Log.  $e + \text{Log. } cs, c$ . It appears to me rather more convenient in practice to compute previously a small table containing the logarithms of the above multipliers, which may be done very expeditiously for a given orbit. In the most excentric planetary orbits, if the table be computed to every five degrees of excentric anomaly, and the logarithms to five places of figures, it will be sufficient. That a comparison may be made of the practice of the method with, and without the tables, the table is subjoined for the new planet Pallas discovered by Dr. Olbers.

What has been said will, I think, sufficiently explain the convenience and extent of the following practical rule.

*Practical*

\* This reasoning may be easily applied to Newton's first solution, and in the examination of which it might have been inserted, but it was thought better to place it here, because Cassini's solution was posterior to Newton's.

## PRACTICAL RULE

FOR

## OBTAINING THE TRUE FROM THE MEAN ANOMALY.

1. Subtract the Log. of the aphelion from the Log. of the perihelion distance, and call the remainder B. B + the Log. tang. of  $\frac{1}{2}$  the mean anomaly = the Log. tang. of an arch, which being added to  $\frac{1}{2}$  the mean anomaly, the sum will be the approximate eccentric anomaly.

2. Add together the constant Log. 5.3144251, the Log. of the eccentricity and the Log. sine of the computed approximate eccentric anomaly: the sum diminished by 10 will be the Log. of a number of seconds to be added to the approximate eccentric anomaly, to obtain the corresponding mean anomaly.

3. Find the logarithm C either by a table previously constructed, or by computation, viz.  $C = 19.6989700 - 2 \text{ Log. cs } \frac{1}{2} \alpha$ ,  $\alpha$  being an arch the Log. cosine of which = Log. excent + Log. cs of the approximated eccentric anomaly. When the approximated eccentric anomaly is greater than  $90^\circ$   $\alpha$  is also greater than  $90^\circ$ .

3. Add the log. of the error of the computed mean anomaly to C, and the sum will be the logarithm of the error of the first approximated eccentric anomaly. This error has always the same sign as the error of the computed mean anomaly.

5. The sum of  $\frac{1}{2}$  B and Log. tang.  $\frac{1}{2}$  the correct eccentric anomaly is the Log. tang. of  $\frac{1}{2}$  the true anomaly.

Note, when the mean anomaly is greater than  $180^\circ$ . Take its supplement to  $360$ , and compute the corresponding true anomaly: its supplement to  $360$  will be the true anomaly required.

By the above operations, the true anomaly will be had to less than a second, for all the planets. In orbits more excentric, it may be necessary to repeat the second, third and fourth rules, using the corrected excentric anomaly instead of that first computed. And then using the second corrected excentric anomaly to obtain a third, and so on till no error remains. The successive corrected excentric anomalies will rapidly approximate to the true excentric anomaly, as has been before, shewn.

Although a second operation will never be necessary for the planets, yet as a second operation is very readily performed, it may be used for two reasons. 1. It serves as a check, to verify the corrected excentric anomaly, and 2. when the sine of the corrected excentric anomaly is taken out from the logarithmic tables, the cosine of the same may be taken out, which will readily give us the logarithm of the planet's distance from the sun, viz.  $2 \text{ Log. } \cos \frac{1}{2} \alpha - 19.698700$   $\alpha$  being the arch, the  $\text{Log. } \cos$  of which =  $\text{Log. excentricity} + \text{Log. } \cos$  corrected excentric anomaly.

TABLE FOR THE PLANET PALLAS,

Approx. Exc. An.	Log. = C	Approx. Exc. An.	Log. = C	Approx. Exc. An.	Log. = C
0°	$\overline{1.89997}$	65°	$\overline{1.95489}$	130	0. 07909
5	$\overline{1.90031}$	70	$\overline{1.96315}$	135	0. 08785
10	$\overline{1.90133}$	75	$\overline{1.97183}$	140	0. 09605
15	$\overline{1.90303}$	80	$\overline{1.98089}$	145	0. 10357
20	$\overline{1.90539}$	85	$\overline{1.99031}$	150	0. 11031
25	$\overline{1.90843}$	90	0. 00000	155	0. 11519
30	$\overline{1.91211}$	95	0. 00991	160	0. 12113
35	$\overline{1.91643}$	100	0. 01999	165	0. 12503
40	$\overline{1.92139}$	105	0. 03013	170	0. 12789
45	$\overline{1.92697}$	110	0. 04029	175	0. 12961
50	$\overline{1.93313}$	115	0. 05035	180	0. 13009
55	$\overline{1.93985}$	120	0. 06023		
60	$\overline{1.94711}$	125	0. 06985		

## EXAMPLE I.

To find the true Anomaly of Pallas, when the mean Anomaly =  $45^\circ$ , and also the Logarithm of the Planet's distance from the Sun.

The excentricity of the orbit of Pallas = 0, 259, the mean distance being unity. Log.

Log. per. dist. = ,741	<u>1. 8698182</u>	31552,4 =	<u>8. 45' 52", 4</u>
Log. aph. dist. = 1,259	<u>0. 1000257</u>		<u>36. 12. 3</u>
Log = B	1. 7697925	Comp <sup>a</sup> . m. anom.	<u>44. 57. 55, 4</u>
			<u>45</u>
Log. tang. $\frac{1}{2} 45^\circ = 22^\circ. 30'$	<u>-9. 6172243</u>	Error	<u>- 2. 4, 6</u>
Log. tang. $13. 42' 3", 3$	9. 3870168		<u>124, 6</u>
Add 22. 30			

Log. sine 36 12 3, 3	<u>9. 7713071</u>	Log. cs $36. 12. 3$	<u>9. 90685</u>
Log, 259	<u>1. 4132998</u>	Log, 259	<u>1. 41330</u>
Constant Log.	<u>5. 3144251</u>	Log. cs 77 56. 10	<u>9. 32015</u>
Log. 31552, 4	<u>4. 4990320</u>	Log. cs 38. 58. 5	<u>9. 89070</u>
			<u>2</u>
			<u>19. 78140</u>
Log. $124, 6$	<u>2. 09552</u>	Const. Log.	<u>19. 69897</u>
C	<u>1. 91762</u>	Log. = C	<u>1. 91757</u>

Log.  $103, 1$  2. 01314 Or by the Table C = 1. 91762

$36. 12. 3, 3$	
+ $1. 43, 1$	
<u>36. 13 46, 4</u>	Corrected excent. anom.
$\frac{1}{2} B$	<u>1. 8848962</u>
t. $18. 6. 53, 2$	<u>9. 5147282</u>
t. $14. 5. 19$	<u>9. 3996244</u>
	<u>2</u>

t. 28 10 38 true anomaly, of which the error is not

half a second.

Or

Or using a second operation, to serve as a check upon the computation ; and also, to investigate the accurate logarithm of the planet's distance from the sun.

Log. sine $36^{\circ} 13' 46'' 4$	9. 7716035	cs 9. 9066881
Log. 259	1. 4132998	1. 4132998
Const. log.	5. 3144251	9. 3199879
Log. $31573'' 9$ or $8^{\circ} 46' 13'' 9$	4. 4993284	cs $77^{\circ} 56' 26'' 5$
36. 13. 46, 4 mean anom.		38 5813,2

45 0. 0, 3 differing  $\frac{1}{15}$  from the truth.

cs $38^{\circ} 58' 13'' 2$	9. 8906846
	2
	19 7813692
	19. 6989700

Log. planet's dist. 0. 0823992

Example 2. The ellipse being evanescent, and the mean anomaly =  $150^{\circ}$ , required the excentric anomaly.

Here the perihelion distance being evanescent, by the rule the first approximated excentric anomaly =  $\frac{1}{2}$  the mean anomaly, or  $75^{\circ}$ .

The computation of C

Log. sine $75^{\circ}$	9. 98494
Const. Log.	5. 31442

Log. 199230	5. 29936
-------------	----------

= $55^{\circ} 20'$
$75$
130. 20
150

comp. mean anom.

19. 40. = 1180 Error

Log. cs $75^{\circ}$	9. 89947
	$\frac{2}{2}$

Const. log.	19. 79894
	19. 69897

C. 1. 90003

Log. 1180	3. 07188
-----------	----------

Log. 937	2. 97191
----------	----------

=  $15^{\circ} 37'$  cor<sup>n</sup>. ex. anom.  
 $75$

$2 | 90. 37$  1st. cor<sup>d</sup>. ex. anom.  
 $45. 18$

2d. Operation.

2d. Operation.

Log. sine $90.37^{\circ}$	9.99997	Log. cs $45.18^{\circ}$	9.84720
Const. log.	<u>5.31442</u>		<u>2</u>
Log. 206250	5.31439	Const. log.	<u>19.69440</u>
$= 57.17^{\circ}$			<u>19.69897</u>
90.37		Log. 126	C 0.00457
<u>147.54</u>		Log. 127	<u>2.10037</u>
150		$= 2.7^{\circ}$	<u>2.10494</u>
2.6 = 126 Error		90.37	
		<u>2   92.44</u>	2d. corr. ex. anom.
		46.22	

3d. Operation.

Log. sine 92.44	9.9995056	Log. cs 46.22	9.83887
Const. log.	<u>5.3144251</u>		<u>2</u>
Log. 206030	5.3139307		<u>19.67774</u>
$= 57.13.50$			<u>19.69897</u>
92.44		C	0.02123
<u>149.57.50</u>		Log. 130	<u>2.11394</u>
150		Log. 136	<u>2.13517</u>
2.10 = 130 Error		$= 2.16^{\circ}$	
		<u>9.44</u>	
		92.46.16	3d corr. ex. anom.

This last corrected excentric anomaly is true to a second.

The



The preceding example is not given as one that can occur in practice, or as the shortest method, in this case, \* of finding the excentric anomaly, but merely to shew, that in the extreme case of excentricity the method holds. It only fails, as was observed, when the ellipse is nearly evanescent, and at the same time the mean anomaly nearly  $180^{\circ}$ . Machin's method gives, in that instance, the excentric anomaly with very great precision. But, as was before remarked, in very excentric orbits, when the body is near perihelion, it is very inconvenient to investigate the true anomaly by means of the excentric anomaly, because a small error in the excentric anomaly occasions a great error in the true anomaly. And, although Machin's method furnishes us with the excentric anomaly, in that case, with as great a degree of accuracy as can be desired, yet the common tables of logarithms are not extended to a sufficient number of places to use them for that purpose.

The best method of solving this case, which is that of the planets when visible to us, is to deduce the true anomaly measured from perihelion, from the corresponding anomaly in a parabola, having the same perihelion distance.

I had not intended to notice this method farther; but as the following solution appears to be as simple as can be desired, also readily admits of being extended to any degree of accuracy, and at the same time affords another striking illustration of the convenience of the method of deriving series above alluded to, I have been induced to add it. T. Simpson and Laplace are the only authors I have met with who have solved this problem.† Their solutions give only the first term of the correction to be applied to the anomaly in the parabola. In the following, two terms of the correction are given, and more might be easily deduced, if necessary.

*Prob.* Having given the anomaly in a parabola reckoned from perihelion, to deduce from thence the corresponding anomaly in an excentric ellipse, hav-

\* In and near the case of extreme excentricity, the common tables of natural sines and circular arcs will readily furnish, by mere inspection, the excentric anomaly true to the nearest degree; and then two operations will find it true to a second.

† P. 58, 60. Misc. Tracts.—Mécannique céleste, Tom. i. p. 183, 186.

ing the same perihelion distance. The anomalies are called corresponding, when the times from perihelion in each orbit are the same.

Solution. Let  $a = \frac{1}{2}$  the true anomaly in the ellipse to radius unity  $A = \frac{1}{2}$  the corresponding anomaly in the parabola, the perihelion distance = 1 and the femi axis major of the ellipse =  $a$  Then the fluxion

$$\begin{aligned} \text{of the elliptic area from perihelion} &= \dot{a} \times \text{dist.}^2 = \dot{a} \times \frac{2a-1}{a+a-1cs,2a} \\ &= \frac{\dot{a} \times 2-n}{1+cs,2a} \times \frac{1}{1-\frac{1}{n cs, 2a}} \left( \text{putting } n = \frac{1}{a} \right) = \dot{a} \times \frac{2-n}{2cs,a} \\ &\times \frac{1}{1-n+\frac{n}{2cs,^2a}} = \dot{a} \times \frac{2-n}{2-2n} \times \frac{1}{cs,^4a} - \frac{2}{2} \times \frac{n}{1-n} \times \frac{1}{cs,^6a} + \frac{3}{4} \times \\ &\frac{n}{1-n} \times \frac{1}{cs,^8a} \text{ \&c. Also, the fluxion of the parabolic area} = \frac{\dot{A}}{cs,^4A} \end{aligned}$$

Now the ratio of the area in the ellipse, to the cotemporaneous area in the parabola, is the subduplicate ratio of the parameters, or of  $\sqrt{2-n}$  :  $\sqrt{2}$ .\*

$$\begin{aligned} \text{Hence, } \frac{1}{1-n} \times \frac{1}{1-\frac{1}{2}n}^{-\frac{3}{2}} \times fl. \frac{\dot{A}}{cs,^4A} &= fl. \frac{\dot{a}}{cs,^4a} - \frac{n}{1-n} \times \frac{2}{2} \times fl. \frac{\dot{a}}{cs,^6a} + \\ \frac{n}{1-n} \times \frac{3}{4} fl. \frac{\dot{a}}{cs,^8a} &\text{ \&c.} \end{aligned}$$

Let the successive fluxions of this equation be taken *per Saltum*, making  $n$  flow uniformly,  $a = A$  and  $n = 0$ :

1.

\* Newtoni Prin. Prop. 14. Lib. 1.

$$1. \quad -\frac{5}{4} n \times fl. \frac{\dot{A}}{cs,^4 A} = \frac{\dot{a}}{cs,^4 A} - n fl. \frac{\dot{A}}{cs,^6 A}$$

$$2. \quad -\frac{1}{16} n^2 \times fl. \frac{\dot{A}}{cs,^4 A} = \frac{\ddot{a}}{cs,^4 A} + \frac{4\dot{a}^2 s, A}{cs,^5 A} - \frac{2n\ddot{a}}{cs,^6 A} - 2n fl. \frac{\dot{A}}{cs,^6 A}$$

$$+ \frac{3}{2} n^2 fl. \frac{\dot{A}}{cs,^8 A} \text{ \&c. \&c.}$$

The fl.  $\frac{\dot{A}}{cs,^4 A} = \frac{s, A}{3cs,^3 A} + \frac{2s, A}{3cs, A}$

$$fl. \frac{\dot{A}}{cs,^6 A} = \frac{s, A}{5cs,^5 A} + \frac{4s, A}{5 \cdot 3cs,^3 A} + \frac{4 \cdot 2s, A}{5 \cdot 3cs, A}$$

$$fl. \frac{\dot{A}}{cs,^8 A} = \frac{s, A}{7cs,^7 A} + \frac{6s, A}{7 \cdot 5cs,^5 A} + \frac{6 \cdot 4s, A}{7 \cdot 5 \cdot 3cs,^3 A} + \frac{6 \cdot 4 \cdot 2s, A}{7 \cdot 5 \cdot 3cs, A}$$

Whence, from the above equations we readily deduce  $2a$  (the anomaly in

the ellipse) =  $2A + 2 \times a + \frac{t, A}{2} = 2A + \frac{t, A}{10} \times 4 - 3cs,^2 A - 6cs,^2 A \times n + \frac{t, A}{2800cs,^2 A}$

$\times 408 - 160cs,^2 A - 1100cs,^4 A - 425cs,^6 A + 252cs,^8 A \times n^2$ . It may be observed, that if the axis major of the ellipse be unity, and the excentricity =  $e$ ,  $n = 1 - e$  the perihelion distance. The co-efficient of  $n$  is precisely the same as that found by Laplace,\* by a very different method. Q. E. I.

\* Mécanique Céleste Tom. 1. p. 186

What has been done in this essay has been principally done with a view of comparing different solutions of Kepler's Problem. That comparison has led me to point out what I consider as the best practical solution of the problem, particularly applicable to the planets. This solution is formed by a combination of the solutions of Kepler, Newton, and Cassini. The very small share I claim in it is from having recommended that combination of solutions. The solutions of the two latter have been separately recommended by writers on astronomy. Cassini has not always been referred to as the author of his method, and Newton rarely. The merit of Cassini's method is derived from its simplicity, and ready application to the planetary orbits. Newton's solution was the first that was applicable to orbits of every degree of excentricity.

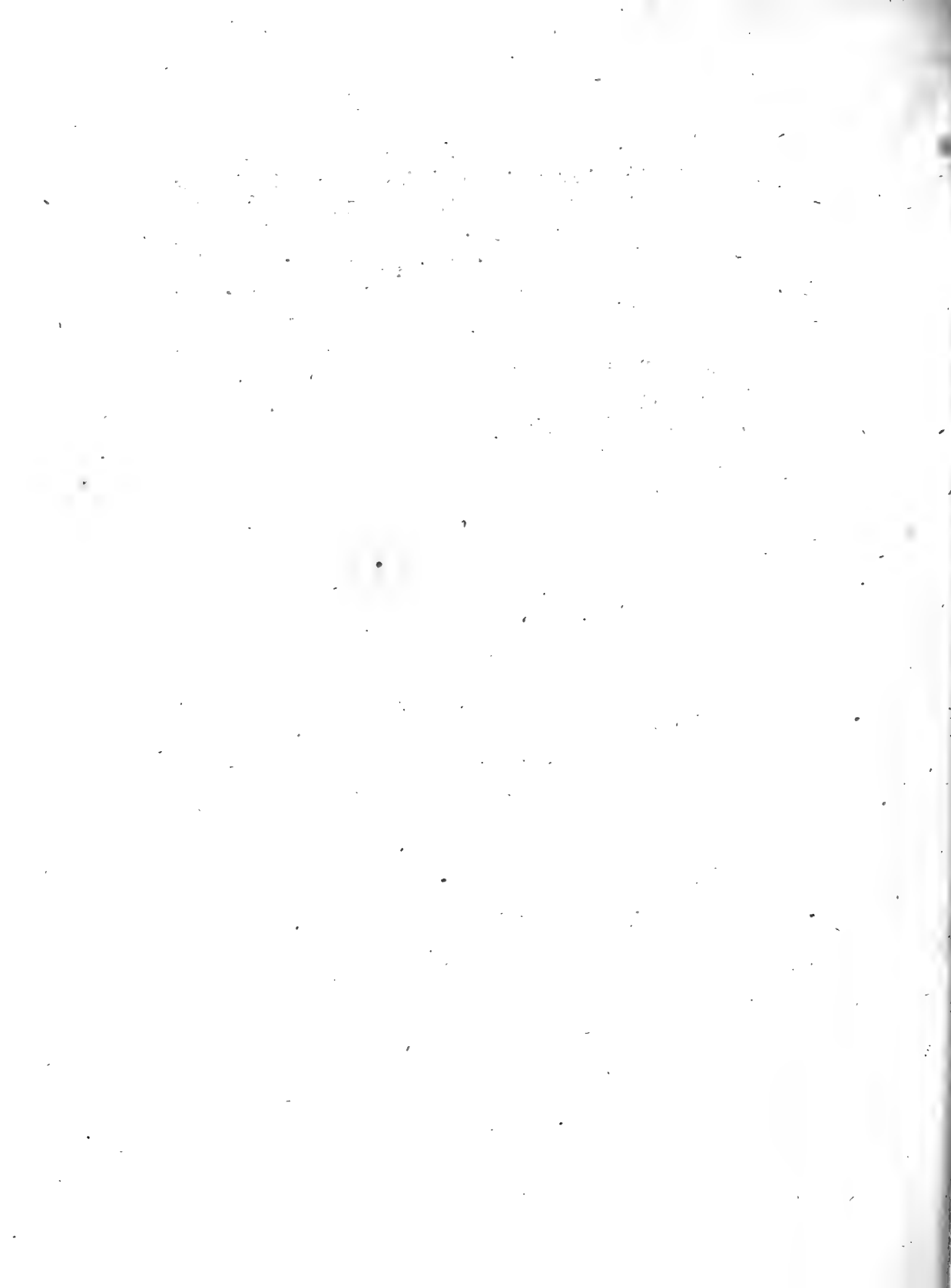
In addition to the solutions that have been mentioned, it is necessary consistently with my plan, to notice two others. The one given by Herman, in 1725,\* and the other by Mr. Ivory.†

The solution of M. Herman had, through inadvertency, escaped my notice, although referred to by several authors. And is given in the same memoir, together with a construction of the problem. It is in substance the same as the solution of Dr. Matthew Stewart, that has been examined, and therefore what has been said of that may suffice for Herman's solution. The solutions only differ by Stewart taking  $D \times$  perpend. from S on the tang. at  $D =$  twice the area DSG, and by Herman's taking  $SD \times$  perpend. from  $G$  on SD for the same area. Herman uses Cassini's approximation without reference, although he had mentioned that solution in the beginning of his memoir. D'Alembert, also, in the Encyclopédie, justly commending Herman's Solution, does not notice that the most valuable part of it was due to Cassini.

I had not an opportunity of seeing the solution of Mr. Ivory till this essay was nearly printed. It is not, however, necessary for me to enter into a minute examination of it; as the ingenious author has very fully explained

plained the principles and extent of his method. With regard to its practical value for the planetary orbits, it yields to several of the methods that have been mentioned, and with respect to elliptical orbits in general, it certainly yields to Newton's method, and perhaps to Machin's, Mr. Ivory remarks the same inconvenience in his method as was observed above with respect to Newton's; the computation of the excentric anomaly in orbits very excentric, when the body is near perihelion. This inconvenience does not exist in Machin's solution; in that part of the orbit his first approximation is as exact as can be desired. In the extreme case when the ellipse is evanescent, the solution derived from Newton's method is much more simple than that of Mr. Ivory. And also, in that case, Machin's solution is more commodious than that in the Edinburgh Transactions. It is with concern I have made these remarks on the labours of a person who has\* merited so much by his most elegant and useful solution of a problem connected with physical astronomy. A problem on which the eminent mathematicians of Europe had necessarily exerted their ingenuity for nearly half a century; and whose solutions have all been surpassed by that of Mr. Ivory. In his solution of Kepler's problem, he has added the method of deriving the place of a comet, moving in an excentric ellipse from the place in a parabola having the same perihelion distance. He considers the problem as new, although, beside Simpson and Laplace above referred to, Lalande mentions the problem. Mr. Ivory has given two terms of the series derived by his method.

\* Edinb. Transactions, Vol. 4. 1798.



*Journal of the Thermometer, Hygrometer, Barometer, Winds, and Rain; kept at Windsor, Nova-Scotia, by the Rev. W. Cochran, President of King's-College: Communicated by the Rev. Dr. Kearney, Provost of Trinity-College; Dublin.*

1794 Jan.							Febru- ary.							March						
Ther.	Hygro.	Barom.	Winds.	Rain.	Ther.	Hygro.	Barom.	Winds.	Rain.	Ther.	Hygro.	Barom.	Winds.	Rain.						
1	30	52	29.69	W		1	19	59½	29.75	W		1	39	57	30.15	WSW				
2	16½	54½	30.15	W		2	17½	58½	29.97	NW		2	33	55½	30.46	S	.79			
3	29½	57	30.26			3	33	59	30.11	SW		3	50	68	29.85	S	1.333			
4	45	60½	29.92	SW	.562	4	22	58½	30.12	N		4	17	60	29.88	N				
5	39½	59½	30.05	SW	.037	5	24	59	30.14	NNE		5	8½	58½	30.86	NW				
6	22	56½	30.24	NW		6	21	59	30.66	N		6	29	59	30.93	SSW				
7	7½	55½	30.64	NW		7	32	57½	30.45	SE		7	44	63½	29.92	N	.111			
8	18	57	30.61	W		8	24½	57½	30.38	NNE		8	38	61	29.85	W				
9	41	61	30.41	SW		9	23	56	30.5	NNE		9	35	58	30.1	W				
10	57	66	30.24	SW	.5	10	35	57	30.44	NE		10	38	56	30.5	N				
11	31½	61	30.09	NE	.156	11	36	52	30.28	NE		11	46	57	30.52	SSW				
12	20	61	30.06	N		12	38	58½	29.99	W		12	50	55	30.33	N				
13	20	60	30.7	SW		13	32	55½	29.95	NW		13	21½	53½	30.75	NNE				
14	45	73½	29.83	S	.543	14	30	52	30.2	SSW		14	40½	54	30.65	S				
15	23	59	30.47	E		15	41	56½	30.	ESE	.143	15	54	58½	30.41	SW				
16	22	57	30.35	NW		16	19	55	30.	N		16	63½	62½	30.38	SW				
17	15½	54½	30.76	SW		17	12	53	29.86	N		17	52	55	30.2	WSW				
18	36	63	30.41	NE		18	28	57	29.89	NW		18	42	47½	30.25	NW				
19	37	60	30.21	SW		19	20	53	30.16	W		19	47½	43	30.64	NNW				
20	37	61½	30.28	N		20	25	50½	30.31	N	.875	20	50	43½	30.53	N				
21	27	59	30.55	NE		21	49	65½	29.4	SSE		21	37	43	30.83	NNW				
22	39	61½	30.29	SW		22	27	60	29.76	W		22	47	49	30.58	SSW	.044			
23	51	65	30.	ESE	.318	23	28	60	30.39	N		23	55	53	30.23	NE				
24	41	63	29.61	SSE		24	43½	63½	29.57	SSW	.125	24	52	47	29.97	NW				
25	33	60	29.61	NNW		25	32	59	29.45	W		25	41	44	30.	ESE				
26	18	58	29.6	W		26	29	57	30.15	NW		26	39	47	30.16	NNW				
27	19	59	29.64	WSW		27	27	54½	3.04	WSW		27	39½	49	30.39	N				
28	12	58	29.7	WNW		28	34	57	30.16	W		28	47½	46½	30.57	NW				
29	17½	60	29.99	W								29	53	46	30.49	E				
30	32	61	29.5	ESE	.031							30	33	47	29.75	N	.400			
31	27	62	29.55	WSW								31	33	52½	30.2	N				

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April.						May.						June.					
Ther.	Hygro.	Barom.	Winds	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds	Rain.	
1	45	53	29.65	NE		1	60	46	30.54	SW	.155	1	75	49	30.25	N	
2	34	52½	29.85	NW		2	51	47	30.58	NW		2	82	49	30.29	S	
3	41	49	30.08	NW		3	56	45½	30.45	S		3	72	48½	30.31	SSE	.222
4	35	50	29.71	N		4	76	50	30.29	SSE		4	84	50	30.26	SE	
5	40	51	29.95	NE		5	44	46	30.45	NE		5	75½	52	30.3	NNW	
6	46	50½	30.	NE		6	53½	47½	30.45	NNE		6	70	52½	30.39	ESE	.388
7	40	49½	30.25	NNE		7	59	50	30.12	SE	.500	7	61½	53	30.37	E	
8	44½	49	30.31	W		8	63½	50	30.09	WNW		8	70	54½	30.48	SE	.022
9	42	45	30.48	W		9	54	47	30.38	WSW		9	69½	53½	30.51	NNW	
10	36	46½	30.5	N		10	70	46	30.55	SSW		10	66	53	30.45	E	.721
11	37½	47	30.77	N		11	60	45½	30.4	SW	.677	11	79	57	30.14	S	
12	48	44	30.72	W		12	52	49½	30.62	NNE		12	67	56	30.14	N	
13	52	46	30.77	N		13	34	47½	30.55	S	.055	13	82	55	30.35	SSE	.573
14	64	42½	30.7	WNW		14	58	49½	30.12	NNE		14	80	57	30.08	SW	.555
15	73	43	30.28	WSW		15	67	48	30.14	N		15	54	50	30.09	N	
16	45	40	30.72	NNW		16	43	46	30.16	NNE	.711	16	54	47	30.26	NNW	
17	54	41	30.76	NNE		17	42	46	30.3	N	.444	17	59	48	30.13	N	.055
18	64½	41½	30.58	NNE		18	45	47	30.52	NNW		18	57½	49	30.21	NNW	
19	71	43	30.5	NW		19	59	46	30.46	N		19	69	51½	30.19	S	
20	69	41½	30.51	NNW		20	64	49	30.46	N		20	63	50	29.81	NW	
21	62	41	30.56	N		21	66	47½	30.45	SSW	.433	21	59	47	30.1	NW	
22	67	38	30.56	NNW		22	64	51	30.05	SW	.055	22	66	42	30.9	W	
23	68	40	30.55	NNW		23	61	48	30.18	NNW		23	65	41	30.21	NNW	
24	65	39	30.64	S		24	69	46	30.4	SSE		24	75	42	30.32	NW	
25	67	46	30.59	S		25	66	45½	30.57	NE		25	72	30½	30.41	NNE	
26	66	47	30.51	SE	.222	26	70	47½	30.45	ENE		26	77	43	30.17	S	.022
27	72	43½	30.49	S		27	74	48	30.44	NW		27	67½	45	30.46	NNE	
28	68	41	30.56	SE		28	79	49	30.45	ESE		28	80	45½	30.31	WSW	
29	64	45½	30.3	SSE	.722	29	69	47	30.55	NNW		29	72	42	30.5	NNW	
30	61	46½	30.22	WNW		30	71½	47½	30.41	NE		30	74½	42	30.48	SW	
						31	70	45	30.4	SSW	.111						



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July.							Aug.							Sept.						
	Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.			
1	65½	42	30.36	NNE	.044	1	62	52	30.3	N		1	77	53	30.35	W				
2	74	47	30.6	NW		2	67	51	30.2	N		2	74	50	30.51	NW				
3	82	52½	30.31	SSW	.055	3	70	49	30.28	N		3	78	53½	30.42	S	.722			
4	82	54	30.14	SW		4	60	50½	30.25	SSE	.677	4	79	54	30.3	SW				
5	68	43	30.27	NW		5	71	54½	30.19	N		5	74	53	30.02	WNW				
6	61½	42	30.35	NNW		6	66	51½	30.09	N		6	61	47½	30.49	N				
7	66	42½	30.6	N		7	66	48	30.37	NNE		7	67	47	30.43	S				
8	74½	43	30.54	W		8	67	47	30.56	N		8	59	51	30.15	N				
9	75	41½	30.48	SW		9	67	47	30.58	N		9	54	44	30.42	NW				
10	72	47	30.49	N		10	70	49	30.56	SE		10	72	49	30.45	W				
11	78	44	30.6	N		11	68	53	30.3	S	.244	11	76½	48	30.5	W				
12	81	40½	30.65	W		12	65	52½	30.26	NE		12	73	47	30.56	N				
13	81	51	30.37	SSE		13	67½	50	30.41	N		13	70	48	30.51	NW				
14	77	50	30.35	S		14	75	50½	30.57	E		14	68	51	30.43	N				
15	84	52	30.3	SW		15	80	49½	30.6	S		15	69	54	30.46	N				
16	79	44½	30.5	NNE		16	79	50½	30.36	W		16	69	51	30.35	SE				
17	85	43½	30.5	WSW		17	83	50½	30.3	SW	.544	17	75	56	30.05	S	.200			
18	87	48½	30.35	W		18	70½	55	30.2	NW		18	66	47	29.93	W				
19	82	49	30.26	N		19	65½	50½	30.45	N		19	63	44	30.17	W				
20	78	49	30.16	SW	.377	20	66	48½	30.7	E		20	65½	47½	30.26	SW	.333			
21	73½	50	30.28	N		21	70	52	30.59	SSE	.766	21	62	52½	29.45	S				
22	79	44	30.3	WNW		22	82	55	30.48	W		22	49½	46½	30.08	WNW	.055			
23	80	47	30.25	NE		23	75	52½	30.54	N		23	52	49	30.	W				
24	83	47½	30.38	W		24	77	48	30.46	N		24	49	51	30.00	N				
25	82½	47	30.36	N		25	79½	52½	30.33	SW		25	60	49	30.09	W:W				
26	80	48½	30.36	SE		26	77	49½	30.42	SSW		26	53½	49½	30.06	NW				
27	75	50	30.55	E	.222	27	81	49	30.23	W		27	55	49	30.19	W				
28	78	53	30.58	N		28	73	49½	30.41	SW		28	59	48½	30.24	W				
29	68	48	30.15	NNE	.700	29	68	49	30.58	NE		29	62	48	30.4	SW				
30	56	51	30.52	NE		30	69	48½	30.63	NNE		30	64	50½	29.58	WNW	.100			
31	63	53½	30.4	N		31	78	48	30.59	SSE										

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<i>Oct.</i>	Ther.	Hygro.	Barom.	Winds.	Rain.	<i>Nov.</i>	Ther.	Hygro.	Barom.	Winds.	Rain.	<i>Decem.</i>	Ther.	Hygro.	Barom.	Winds.	Rain.
1	50	47½	30.8	NNE		1	54	56½	30.59	S		1	31½	57	30.45	SSE	.444
2	52	48	30.66	N		2	55	58	30.51	N		2	37	60	29.82	NNW	
3	63	51	30.32	W		3	53	57½	30.65	N	1.44	3	55	57½	30.05	N	
4	58	53	30.32	N	.188	4	62	55	30.42	SE	.555	4	37	58	30.07	NW	
5	54½	52	30.43	N		5	52	52	30.01	NW		5	32	56	30.5	W	
6	51	50	30.56	N		6	46	53	29.96	NW	.300	6	43	61	30.52	SSW	
7	54½	50	30.63	NNW		7	42	57	30.15	N	.200	7	50	57	30.42	SW	
8	49	56½	30.85	SSE		8	42½	57	30.08	S		8	55	58½	30.1	SE	
9	57½	51	30.36	N E		9	40	55½	30.01	NW		9	34	53	30.	NW	
10	52	52	29.83	SW	1.155	10	34	53	30.35	N		10	30	52½	30.	NNE	
11	52	51½	30.2	W		11	34	53	30.17	SE		11	22½	51	30.66	N	
12	64	51	30.9	W		12	37	55	29.95	WNW		12	46	61	30.31	S	
13	64	50	30.2	SSW		13	36	54	29.99	W		13	38	55	30.42	WSW	
14	59½	51½	30.19	N		14	33	54	30.27	W		14	27½	52½	30.43	NW	
15	47	48	30.3	N		15	33	55½	30.	N	.266	15	41	56	30.4	W	
16	50	49	30.2	W		16	40	57	29.91	SW		16	51	62	30.4	SSW	
17	36½	46	30.48	NW		17	36	55	30.18	W		17	61½	61	30.44	SW	
18	52	47	30.6	SSW		18	34	54	30.6	W		18	49	52½	30.65	ENE	.055
19	64	51	30.33	SW		19	48	56	30.71	SW		19	50	59	30.55	ENE	.055
20	50	47	30.73	SSE		20	53	58	30.03	S		20	50	57	30.31	ESE	
21	64	62	30.2	S	.677	21	58	65	30.07	SW	.400	21	62	60	30.2	S	.044
22	41½	51½	30.33	W		22	26	55	30.75	NW		22	44	58	29.66	N	.656
23	52	54	30.2	SSW		23	24	54½	30.54	SSW		23	31	54½	30.15	NNW	
24	39½	52½	30.44	NW		24	35	56	30.32	W		24	33½	55	30.25	NNW	
25	45	51½	30.79	NNE		25	30½	55	30.26	NE		25	42	57	30.15	WNW	
26	50	53	30.7	NE		26	28	56	29.94	WNW		26	40	57½	30.16	SSE	.722
27	52	55	30.25	NE	.200	27	16	53½	30.65	WSW		27	44	58	30.02	W	
28	54	57½	29.61	N	.055	28	40	61	30.52	N		28	45	60	29.63	S	
29	47½	53	29.78	W		29	28	56½	30.51	ENE	.266	29	32	57½	29.88	W	
30	49	52	30.12	NE		30	29	56	30.	NW		30	30½	56	30.25	WSW	
31	46	55	30.35	N								31	30	56½	30.21	NE	

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1795 Jan.						February.						March					
	Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.
1	25	56	30.09	N		1	24	58½	30.	N		1	25	55	29.9	WNW	
2	22	55½	30.15	N		2	19	57½	30.28	W		2	35	56½	30.15	N	
3	21	55	30.25	N		3	43	61	30.16	NW	.706	3	38	57	30.0	S	
4	22	56	30.29	SE		4	43	63	29.9	SW		4	36	56	29.9	WSW	
5	32	59½	29.6	N		5	37	61½	29.7	N	.150	5	28	51½	29.97	W	
6	26	56½	30.27	NW		6	34	61	29.83	NE		6	31	52	30.15	N	
7	28	56	30.21	SW	.277	7	32	61½	30.21	NNE		7	38	52	30.51	NW	
8	32	54	30.05	NNW		8	30	60½	30.3	N		8	48	57	30.18	SE	.600
9	28	50½	30.49	NNE		9	36	60½	30.38	NE		9	37	60½	29.94	W	
10	36	55½	30.13	NNE		10	33½	60	30.43	NW		10	33	56	30.07	W	
11	20	54½	30.1	W		11	28	58½	30.51	NW		11	40	58½	30.38	WNW	
12	13	53½	30.21	N		12	29	58	30.32	NW		12	40	58½	30.55	SSW	
13	8	54	30.39	W		13	28	58½	30.05	N		13	31	59	30.12	ESE	
14	11	53½	30.5	NNW		14	22	59	29.97	N		14	40	61	29.65	SW	.310
15	34	62	30.14	SSE	.088	15	16	59	30.21	N		15	40	57	29.7	WSW	
16	12½	56½	30.37	N		16	17	58	30.35	NNE		16	36½	57	30.06	SW	
17	7	55½	30.72	NE		17	17	57½	30.25	NNE		17	32	57	30.04	N	
18	23	58	30.16	N		18	21	58½	29.96	NNE		18	38	56½	30.23	S	
19	25	61	30.01	N		19	22	56½	30.09	NNW		19	48	64	29.7	SSE	.468
20	30	61	29.85	N	.133	20	31	58½	30.2	SW		20	34	55½	30.15	W	
21	37	63½	30.05	NE		21	39	58½	30.05	W		21	33	52	30.66	WSW	
22	31	62	30.48	NNE		22	30	54	30.4	N		22	41	58	30.64	S	
23	30	61½	30.52	NNE		23	19	56½	30.28	NNW		23	47	61	30.65	N	
24	30	61	30.48	NNE		24	14½	56	30.2	ENE	.050	24	50	61½	30.51	NNE	
25	31	61	30.35	N		25	29	58	29.64	WSW		25	49	60	30.55	SE	
26	32	60½	30.35	NNE		26	16	54½	29.67	W		26	59	67	30.21	S	.490
27	29	59	30.39	NNW		27	16	53	29.52	SW		27	21	53	30.67	N	
28	26½	59	30.46	NNE		28	25	56	29.6	NW		28	35	55½	30.88	NE	.600
29	24	57	30.51	NNE								29	53	66	29.96	S	.200
30	38	62½	30.	ESE	.777							30	45	60	30.34	W	
31	33	62½	29.65	SSW								31	44	61	30.26	W	

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April.							May.							June.						
	Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.			
1	47	58½	30.3	NNW		1	44	47	30.34	NW		1	72	53	30.32	SE	.668			
2	44	59	30.45	N		2	48	48	30.58	N		2	69	52	30.11	S				
3	46	59	30.29	SE		3	59	47	30.58	N		3	54	52	30.14	NE	.268			
4	46	61	30.22	N		4	38	51	30.	NNE	1.000	4	66	55	30.27	NNE				
5	44	60	30.45	NE	.480	5	46	55	30.35	N		5	66	54	30.34	N				
6	41	60½	30.41	N		6	57	53	30.56	NW		6	68	50½	30.24	N				
7	42	56	30.9	N	.657	7	67	51	30.37	S		7	51	45	30.22	N				
8	45	57	29.97	N		8	65	53½	30.34	N		8	53	44	30.32	N				
9	48	56½	29.91	SSW		9	64	48	30.1	WNW		9	66	43½	30.44	SSW				
10	30	54½	29.91	WSW		10	48	39	30.24	WNW		10	67	49	30.28	N	.424			
11	23	51½	29.92	NNW		11	58	34	30.3	N		11	62	51½	30.55	N				
12	48	48½	30.1	W		12	60	36	30.3	N		12	60	47½	30.7	N				
13	55	50½	30.4	NE		13	64	39	30.3	S		13	40	50	30.58	N				
14	45	55	30.02	SE		14	61	48½	30.1	N	.250	14	61	54½	30.42	N				
15	48	55	30.2	WNW		15	56	40	30.34	NNW		15	67½	54	30.35	NE	.312			
16	63	55	30.56	SSE		16	56	38½	30.28	ESE	.537	16	50	53	30.23	N	.200			
17	64	55½	30.24	SSE	.337	17	47½	45	30.18	N		17	67	53½	30.21	N				
18	55	57	30.08	SSE		18	45	45	30.4	NNE		18	71	53	30.24	N				
19	57½	57½	30.05	NE	.625	19	55½	45½	30.5	NNW		19	75	51½	30.2	N				
20	54	58	29.92	SSE		20	54	44	30.38	SSE	.256	20	73	46½	30.42	SSW				
21	51½	55½	30.11	SSW		21	66	47	30.22	N		21	79	50	30.46	SSW				
22	50	56	30.4	N		22	53	46½	30.35	N		22	83	50½	30.46	SSW	.244			
23	53	54	30.55	N		23	64	47½	30.4	E		23	80	54½	30.38	SSW				
24	56	53	30.65	SE		24	42	49½	30.1	N	2.466	24	79	49	30.45	SSE				
25	60	51½	30.56	NE		25	47	53	30.36	NNE		25	80	52	30.41	S				
26	65	54	30.15	SE	.250	26	57	51	30.4	NNE		26	62	53	30.33	N	.822			
27	66	58	30.22	S		27	73	48	30.45	S		27	72	51½	30.35	W				
28	62	61	30.1	SSE	.562	28	80	52½	30.45	W		28	80	49½	30.32	S				
29	54	55½	30.06	W	.143	29	83	46½	30.64	W		29	73	50½	30.35	NNE				
30	41.	50	30.2	W		30	73	45	30.55	S		30	76	49½	30.39	N				
						31	68	52	30.4	S										

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July.							Aug.							Sept.						
	Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.			
1	77	48½	30.4	N		1	85	49	30.6	SSW	.022	1	78	54½	30.31	S				
2	74½	49	30.42	N		2	85	50	30.5	N		2	68	57	30.29	NNW	1.044			
3	77	48	30.42	NE		3	85	50	30.4	SW		3	78	59½	30.26	SW				
4	83½	47	30.42	W		4	81	49	30.26	SE	.111	4	76	57	30.41	SSW				
5	77½	47	30.49	WSW		5	78	50½	30.16	N		5	74	54½	30.48	WNW				
6	80	49	30.23	S	.111	6	87	52	30.25	SSE		6	78	59½	30.26	NNW				
7	72	49	30.01	N		7	89	49½	30.22	NW		7	78	54	30.48	SW				
8	71	49	30.4	N		8	79	48	30.35	NNW		8	71	55	30.4	SSW	.099			
9	79	45½	30.39	W		9	79	50	30.3	SE	.366	9	75	55½	30.32	NE				
10	81	45½	30.25	NW		10	74	56	30.24	W		10	76	55½	30.37	ENE				
11	73½	46½	30.44	WNW		11	82	55	30.25	SE		11	79	53	30.21	WNW	.111			
12	70	46	30.4	N		12	84	50	30.4	SSW	.200	12	58	50	30.48	NNE				
13	74½	45	30.4	N <sup>o</sup>	.555	13	63	51	30.32	NE	.577	13	63½	50	30.56					
14	65	48	30.18	SSW		14	66	51	30.3	NNW		14	68	56	30.4	WSW				
15	70	50½	30.4	N		15	68	51	30.54	S		15	87	59½	30.27	W	.050			
16	80	48	30.5	SSW		16	68	52	30.5	N		16	66	53	30.4	NNE				
17	81	47	30.41	SSW		17	75	51½	30.35	W		17	52	52	30.56	E	.522			
18	78½	47	30.25	N		18	74	55	30.25	WSW	.012	18	76	57	30.23	SSW				
19	82	48	30.13	S		19	80	55	30.14	SSW		19	61	56	29.75	NNW	.977			
20	73	46	30.18	N		20	65	56	30.25	N	.400	20	69	53	30.2	SE				
21	73	45	30.23	N		21	68	50	30.51	N		21	65	55	30.2	SW				
22	69	42	30.1	NW		22	71	51	30.59	W		22	52	54	30.05	NNW				
23	67	43	30.1	NW		23	72	50	30.5	N		23	52	53	30.4	N	.111			
24	73	43	30.24	N		24	70	51	30.41	SW		24	54	53	30.69	W				
25	75	44	30.3	E		25	75	51	30.28	W		25	61	53½	30.45	SSW				
26	78½	43	30.46	S		26	67	49	30.56	NNE		26	62	54	30.51	N				
27	76	45	30.5	S		27	73	51	30.42	SSW		27	66	54	30.62	N				
28	72	51	30.25	S	.050	28	84½	53	30.35	SW		28	71	59	30.54	SSW				
29	80	49	30.45	W		29	89	54	30.3	E		29	74	61	30.33	SSW	.222			
30	80	45	30.6	NW		30	75½	51	30.41	NNW		30	54½	57	30.49	N				
31	79	46	30.7	NW	.038	31	70½	51	30.56	SSW										

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Octo. 6	Ther.	Hygro.	Barom.	Winds.	Rain.	Nov.	Ther.	Hygro.	Barom.	Winds.	Rain.	Decem.	Ther.	Hygro.	Barom.	Winds.	Rain.
1	60	56	30.64	NNE		1	39	56	29.58	NE	.544	1	41	55½	29.9	W	
2	52	55	30.89	N		2	33	54½	29.95	WNW		2	44	57	29.89	SE	173
3	57	54	30.93	SSW		3	35	55	30.4	NE		3	35	56½	29.8	NE	
4	69	58	30.56	WSW		4	36	54½	30.54	NNW		4	39	57	29.50	SE	
5	75	59	30.47	SSW		5	37	55	30.26	NNL		5	40	57	29.91	SW	
6	68	61	30.11	SSW	.322	6	31	53	30.7	NNE		6	35	56	30	NW	
7	55	56	30.35	NNE		7	51	56	30.3	SW		7	32	55½	30.53	NNE	
8	53	56½	30.38	ESE	.266	8	49½	57½	30.11	SE	.666	8	36	55½	30.55	ESE	.130
9	49	57	30.15	ENE	.200	9	64	59½	29.96	SSW		9	47	55	29.76	SE	
10	53	56½	30.41	NNE		10	44	59½	29.88	N		10	45	58	30.16	SW	.300
11	62	57½	30.5	NW	.400	11	41	57	30.54	W		11	44	58	29.98	W	
12	65	61	30.2	SW		12	41	56½	30.59	NNW		12	37½	55½	30.24	W	
13	61	57	30.32	W		13	36	56	30.8	NNE		13	34	56	30.17	NE	533
14	62	57	30.25	S		14	35	55	30.84	NNE		14	39	57	29.76	N	.346
15	51	57	30.26	NE	.444	15	36	55	30.62			15	29	56	29.44	W	
16	68	59	29.7	WSW		16	36	55	30.3	NNE		16	29½	56	29.6	W	
17	58	56	30.11	S	.444	17	45	56	30.24	NNE		17	22	55	29.64	W	
18	51	54	30.6	NNE		18	44	56½	30.26	NNE		18	28½	55½	29.8	NW	
19	45	54	30.36	WSW		19	44	56½	30.06	N		19	36	57	30.	NW	
20	42	54	30.38	N	.337	20	49	57	29.94	SW		20	36	56½	30.29	N	
21	46	56	30.2	NNW	.255	21	48	56	29.7	SW		21	28	56	30.16	ENE	
22	45	55	30.59	WNW		22	40	56	29.56	E	.222	22	25	55½	30.55	NE	
23	52	55	30.5	SW		23	45	57½	29.23	N		23	26	55½	30.63	WNW	
24	58	61	29.76	NNE	.777	24	39	57	29.7	N		24	40	57	30.22	SW	.244
25	53	58	29.95	SW		25	45	57	30.03	WNW	.155	25	40	55	30.52	WNW	
26	45	55½	30.43	W		26	27	55	30.09	WNW		26	36	56	30.61	SW	
27	41	53	30.75	W		27	31	55	30.1	WNW		27	29	56	29.95	NE	
28	50	55½	30.52	SW		28	33	55½	30.24	NNE		28	36	55½	30.	NNE	
29	57	57	30.35	WNW		29	32	55½	30.46	NE		29	23	56	30.29	N	
30	57	57	30.28	N		30	41	56½	29.92	ESE	.491	30	15	54	30.77	NW	
31	62	57	29.98	SW								31	40	57½	30.3	W	.444

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1796 Jan.	Ther.	Hygro.	Barom.	Winds.	Rain.	Febr- ary.	Ther.	Hygro.	Barom.	Winds.	Rain.	March.	Ther.	Hygro.	Barom.	Winds.	Rain.
1	45	59	29.95	WSW		1	25½	53	30.45	W		1	42	55	30.35	NNE	
2	28	56	30.56	W		2	25	54½	30.27	NNE		2	36	55½	30.55	E	
3	38	56	30.36	SW	.403	3	23½	54	30.31	S		3	37	55	30.5	E	.022
4	45	59	29.94	WNW		4	24	55	30.13	NNE		4	36	55½	30.19	NW	
5	36	57½	30.25	W		5	26	55	30.28	NNW		5	35	54	30.5	WNW	
6	35½	57	30.27	SSW		6	21½	54	30.34	NNE		6	42	54	30.26	SW	
7	38	58	29.42	E	.503	7	24	54½	30.2	N		7	45	55	30.19	E	
8	34	56	29.79	WSW		8	32	56½	30.17	NW		8	12	52	30.5	N	
9	23	55	29.9	W		9	30	55½	30.41	N		9	24	52½	30.35	WNW	
10	28	55½	30.13	NW		10	37	55	30.6	SSW		10	26	52½	30.36	WNW	
11	18	54½	30.41	N		11	40	57	29.9	SE	1.666	11	29	53	30.11	ENE	
12	37	56½	29.75	SE		12	43	58½	29.46	S		12	36	54	30.2	SW	
13	22	55	30.21	NW		13	25	56	29.86	W		13	36	53	30.33	S	
14	13	54½	30.67	NNW		14	36	56	30.9	S		14	28	54	30.4	N	
15	36	55½	30.14	SSE		15	25	56	29.68	NE		15	34	53½	30.23	ESE	
16	33	56	30.13	N		16	25	54	29.84	NW		16	48	55	29.72	E	.500
17	36	56	30	WNW		17	26	54	29.97	NW		17	49	56½	29.34	SSE	
18	32	56	29.92	N		18	31	53½	30.05	NW		18	28	55	29.83	NNE	
19	30	55	30.34	NW		19	26	54	30.04	N		19	23	54	30.18	NNE	
20	13½	54	30.54	NNE		20	24	54	30.21	NW		20	28	53	30.53	N	
21	23	54½	29.94	NE		21	30	53	30.14	SE		21	28	53	30.9	NE	
22	7	53½	30.24	WNW		22	29	53½	30.16	NW		22	38	53	30.9	N	
23	10	53½	30.5	W		23	36	54	30.03	SW		23	42	54	30.49	NNE	
24	40	56	30.13	W		24	33	53½	30.26	W		24	49	54	30.29	S	
25	8	55	30.64	NE		25	34	54	30.16	WSW		25	41	54	30.04	W	
26	26	55	29.93	SW		26	35	54	30.51	S		26	32	52	30.35	NW	
27	12	54½	30.46	NW		27	44	55	30.34	SE		27	41	53	30.45	SSW	
28	29	54½	30.32	SW		28	35½	55½	29.89	WNW	.111	28	43	53½	30.48	ESE	
29	29	55½	30.12	WNW		29	32	55	30.3	N		29	41	54	30.03	N	
30	1	53	30.4	NW								30	32	52½	30.54	N	
31	4	53	30.56	NW								31	32	52½	30	N	

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April.						May.						June.						
	Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.		Ther.	Hygro.	Barom.	Winds.	Rain.	
1	43	53	30.05	NW		1	56	49	29.96	SW		1	73	54½	30.25	N	.102	
2	40	53½	30.05	ESE	.211	2	49	49	30.09	NW		2	69	54	30.18	WNW		
3	49	54	30.31	W		3	53	47	30.5	NNE		3	61	53	30.2	SE		
4	49	53½	30.22	S		4	61	48	30.68	NNW		4	65	52	30.17	NE		
5	27	52	30.19	NW		5	64	47½	30.55	NNW		5	56	52	30.26	WSW		
6	38	50½	30.12	WNW		6	68	47½	30.46	NNW		6	60	52	30.4	NNW		
7	42	49	29.95	WSW		7	65	47½	30.45	ESE		7	66	52	30.5	N		
8	45	50½	29.94	NE	.044	8	65	47	30.39	ESE		8	70	52	30.6	SW		
9	28	51	30.13	NE		9	48	47	30.35	E	.340	9	77	54	30.5	SW		
10	38	51½	30.16	E		10	55	50	30.21	SE	.400	10	70	54½	30.35	SW		
11	40	52	29.86	WNW		11	58	49	30.24	SW		11	49	55	30.44	NNE	.1162	
12	43	53	29.94	NNW		12	61	50	30.22	SE	.111	12	53	54½	30.45	NE	1.700	
13	48	53	30.27	NNW		13	65	50½	30.03	W		13	64	58½	30.29	N	.528	
14	38	51½	30.42	WNW	.244	14	76½	49½	30.3	WSW		14	67	57	30.49	N		
15	48½	52	30.23	NNW		15	66	51	30.27	SE		15	75	55	30.6	N		
16	45	51½	30.55	NNW		16	65	51½	30.25	S		16	73	54	30.56	N		
17	54	51½	30.36	N		17	68	50½	30.28	NNE		17	63½	53½	30.34	ESE		
18	64½	51	30.38	NNE		18	62	50½	30.2	ENE	.761	18	76	60	30.2	SW		
19	77	50	30.41	SW		19	51	51½	29.73	NE		19	78½	53	30.24	S		
20	68	50	30.25	N		20	53	51	29.95	NE		20	78	53	30.44	NNW		
21	63	49	30.31	NNW		21	65	55	30.11	SE	.124	21	75	52	30.5	NNW		
22	58	48	30.29	S		22	68	51	30.31	WSW		22	80	51	30.56	N		
23	40	46	30.19	NNW		23	66	51½	30.31	S		23	77	51½	30.51	NW		
24	34	45½	30.38	NNW		24	60	52	30.36	NNW	.123	24	80	46	30.51	SW		
25	42½	45½	30.5	NW		25	67	51	30.6	NW		25	83	49	30.35	SSW		
26	58	47	30.56	NNW		26	70	50½	30.7	SSE		26	73	54	30.2	SW		
27	60	46½	30.5	WNW		27	72	53	30.61	S	.024	27	67	51	30.26	NNE		
28	68	48½	30.2	SE		28	71	55	30.43	S		28	72	45	30.35	NNW		
29	60	49	29.91	S	.083	29	72½	55	30.36	S		29	64½	51	30.02	SSW	.666	
30	51	48½	29.96	S		30	70	57	30.33	S		30	63	56	29.84	N		
						31	70	57	30.23	WSW	.255							



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July.	Ther.	Hygro.	Barom.	Winds.	Rain.	Aug.	Ther.	Hygro.	Barom.	Winds.	Rain.	Sept.	Ther.	Hygro.	Barom.	Winds.	Rain.
1	66	55	29.88	NW		1	78	60	30.22	SSW		1	71	53	30.37	WNW	
2	61	58	30.26	N	.133	2	76	51	30.19	WNW		2	76	52	30.45		
3	73	53½	30.41	S		3	74	45	30.26	W		3	72	56½	30.4	S	.782
4	83	51	30.4	WSW	.066	4	68	46½	30.39	W		4	75	59	30.28	S	.257
5	72	56	30.35	NW		5	70	49	30.46	W		5	58	56	30.36	NE	
6	69½	55	30.21	WNW		6	75	50	30.45	WSW		6	62½	54½	30.5	N	
7	80	46½	30.31	NW		7	80	50	30.43	SSE		7	73	50	30.55	WNW	
8	73	46½	30.15	NW		8	74	51	30.43	NW		8	73	50	30.64	W	
9	76	46	30.15	NW		9	73	53	30.45	NE	.250	9	77	51	30.48	W	.195
10	67	45	30.2	NW		10	79	52½	30.42	WNW		10	68	54	30.21	W	
11	71	45	30.45	W		11	84	49	30.38	W		11	72	55	30.31	W	
12	75	57	30.2	SW	.033	12	84	51½	30.25	W		12	76	53	30.27	W	.215
13	81½	61	30.3	W		13	85	48½	30.15	W		13	72	52	30.1	NW	
14	75	56½	30.42	W		14	69	47	30.2	NNW		14	75	53	30.31	N	
15	78	57	30.5	SW		15	62	47	30.48	N		15	73	57	30.21	S	.290
16	78	59½	30.42	SW	.150	16	68	48	30.69	N		16	66	54	30.11	SSW	.110
17	76	58	30.31	N		17	73	48½	30.73	W		17	64	51	30.06	W	
18	80	59½	30.32	WSW		18	79	51	30.53	W		18	65	55	29.75	SSW	.810
19	75	57	30.25	SSE		19	81	52½	30.42	N		19	59	54	29.73	SW	
20	80	52	30.26	WNW		20	79	53½	30.4	NNE		20	59½	52½	29.94	W	.020
21	71	54	30.27		.200	21	81	53	30.43	N		21	57½	52	30.35	NNW	
22	73	49	30.55	E		22	79	56½	30.59	NNE		22	64	52	30.46	SSE	.090
23	80	49	30.58	NNE		23	82	56	30.64	N		23	53½	52	30.24	SW	
24	57	54	30.35	NE	1.830	24	79	54	30.55	N		24	65	51½	30.24	W	
25	74	55	30.44	SE		25	73	56	30.47	SW	.105	25	68	52	29.93	SSW	
26	64½	55	30.35	S	.630	26	69	50	30.64	N		26	52	50	29.58	NW	.050
27	71	56	30.3	NE		27	74	50½	30.61	SSW	.045	27	65½	49	30.26	WNW	
28	81	57½	30.25	WSW		28	69	54½	30.46	SSE		28	65½	51	30.19	S	
29	83	60	30.25	SSW	.800	29	80½	61	30.25	SSW		29	65	56	30.04	S	1.565
30	81	60½	30.27			30	73	56½	30.23	N	.470	30	67	56½	30.24	N	
31	64	62	30.2	E	.885	31	54	54	30.35	N							

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Octob.							Nov.							Decem.						
Ther.	Hygro.	Barom.	Winds.	Rain.			Ther.	Hygro.	Barom.	Winds.	Rain.			Ther.	Hygro.	Barom.	Winds.	Rain.		
1	55	52	30.46	NW			1	42	51½	30.15	NNE			1	26½	54	29.53	W		
2	55	52	30.52	NNE			2	37	52	29.55	NNW	.865		2	24	54	29.6	WSW		
3	55	51½	30.72	NE			3	35	52½	29.35	WSW			3	24	54	29.77	WSW		
4	56	54½	30.26	NE	1.435		4	46	51½	30.02	W			4	36	54½	29.8			
5	61	55	30.15	SW	1.000		5	54	56	29.94	S	.055		5	31	54½	29.8	W		
6	66	55½	30.16	W			6	48	55	30.1	SSW	.445		6	34	54	30.03	W		
7	60	53½	30.34	W			7	44	54½	29.86	NNW			7	36	55	29.52	NE		
8	52	50½	30.71	W			8	57	52½	30.55	NW			8	27	55	29.53	N		
9	48	50½	30.9	W			9	46	54½	30.55	S	.225		9	24	53	29.81	W		
10	48	50½	30.95	E			10	52½	55½	30.41	W			10	22	53	30.16	NW		
11	56	52	30.83	E			11	48	53½	30.64	SSE			11	10	51½	30.22	NW		
12	61½	51½	30.71	NE			12	37	54	30.65	NW			12	19	52½	30.14	SW		
13	59	52	30.64	N			13	36½	52	30.84	SSW			13	33	54½	30.23	SSW		
14	61	51½	30.6	NNE			14	45	52	30.68	NNW			14	33	55	30.12	NE		
15	55	51½	30.88	NE			15	34	50	30.66		1.300		15	30	55	29.96	N		
16	61	52½	30.54	S	.355		16	40	50	29.91	WNW	.080		16	23	54	30.3	NW		
17	64	54	30.14	SW			17	23	50	30.54	NNW			17	14	52½	30.21	N		
18	44½	50	30.76	N			18	44	50	30.35	S	.225		18	20	53	30.36	N		
19	55	51	30.75	WSW			19	49½	54	30.38	NE			19	23	53	29.97	ENE		
20	48	52	30.82	NW			20	42	55	30.48				20	36	56½	29.55	N		
21	49	52	30.89	NE			21	47	54	30.3				21	32	55	29.78	NW		
22	49	52	30.84	NE			22	41	54½	30.3	NE			22	29	54½	29.66	WSW		
23	45	52	30.51	SSW	.145		23	49	56	29.89	SW	.165		23	26½	53	29.6	W		
24	46	53	30.6	NNE			24	23	53½	30.35	N			24	12	52½	29.92	W		
25	42½	51½	30.56	SSE	.270		25	30	53	30.36	N			25	18	53	29.95	SW		
26	41	52	30.86	E	.365		26	32½	53½	29.98	NNE			26	29	54	30.29	SSW		
27	40	52½	30.28	N	.125		27	32	54	30.13	SW			27	33½	53½	30.13			
28	33	52½	30.6	NNE			28	22	53	30.32	W			28	27½	53	30.25	W		
29	43	52½	30.32	NNE			29	28	54	30.27	N			29	27½	52	29.82	W		
30	39	53	30.07	N	.290		30	28	54½	29.47	WNW			30	12½	52	30.33	NW		
31	43	52½	30.15	W										31	28	53	29.65	NE		

The Barometer and Hygrometer registered in the foregoing journal, were made by Dollond of London: the Thermometer was compared with one made by the same artist, and was found not to differ from it materially: different Rain-gages were used, contrived by myself; the last, which proved the most convenient, is simply a square canister of tin, whose side is two inches broad, receiving a funnel whose area is ten times that of the canister's base; of course, the depth of rain-water in the gage always exceeds that which has fallen abroad in a decimal proportion.

The place where these instruments were kept, is situated about ten miles south from the bay of Fundy, in latitude 45. The elevation above high water-mark, until August 1795, was about 15 feet; after that period, about 65. The Thermometer was fastened on the outside of a window in the second story; the aspect north-westerly. The Hygrometer and Barometer were kept in a lower chamber, of the same exposure, but without fire.

The depth of snow was also observed, but as, on account of drifting winds, this could not often be taken with much precision, it is not here particularly transcribed. The total quantity, on an average of the three years, was 45 inches.

The several particulars were noted daily at noon.

## PROGRESS

## PROGRESS OF THE SEASONS IN 1795.

*Which may be taken as a mean to 1794 and 1796.*



Jan.	4.	First continuing snow fell.	
Mar.	18.	Snow disappeared.	
April	1.	The birds began to sing.	
	13.	The farmers began to plough.	
	16.	Gooseberry-bush in leaf.	
	23.	Farmers sowed wheat.	
	25.	Red-Currant-bush in leaf.	
	—	Lilac	do.
	26.	Willow	do.
May	2.	Apple-tree	do.
	—	Dandelion in blossom.	
	7.	Martins appeared.	
	9.	Strawberry, Gooseberry and Red-Currant in blossom.	
	16.	Plum-tree	do.
	21.	Cherry-tree, (Kentish)	do.
	30.	Apple-tree	do.
June	4.	Lilac	do.
	6.	Red Clover	do.
	9.	Hawthorn	do.
July	1.	Wild-Rose	do.
	7.	Farmers began to mow.	
Aug.	10.	Do. began to reap wheat.	
		N. B. The same that was sown April 23d.	

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A THEOREM for finding the Surface of an OBLIQUE CYLINDER, with its Geometrical Demonstration. Also, an Appendix, containing some Observations on the Methods of finding the Circumference of a very Eccentric Ellipse; including a Geometrical Demonstration of the remarkable Property of Elliptic Arcs discovered by Count Fagnani. By the REV. J. BRINKLEY, A. M. M. R. I. A. Andrews Professor of Astronomy in the University of Dublin.

Read Dec. 20, 1802.

DR. Barrow in his "Geometricæ Lectiones"\* remarks the difficulty of finding the surfaces of an oblique cylinder, and of an oblique cone, the base of which are circles. Mentioning the former, he speaks of, "insuperabilis illa difficultas, quâcum conflictantur, qui cylindricas obliquas superficies conantur dimetiri, seu cum cylindricis superficiebus rectis aliivse quadatenus cognitis superficiebus quoad proportionem comparare."—Having obtained a very neat and simple theorem for the surface of an oblique cylinder, which, if I am not mistaken, is new, I am induced to submit it to the Academy, the more particularly, as it admits a demonstration purely geometrical.

\* Lect. 2.

*“ The surface of an oblique Cylinder is equal to a rectangle contained by the diameter of its base and the circumference of an ellipse, the axes of which are the length and perpendicular height of the cylinder.”*

This Theorem is more readily investigated from fluxional principles than from considerations purely geometrical; yet I believe no author has hitherto communicated it even so derived. The geometrical demonstration is according to the method of the ancients by means of circumscribed and inscribed prisms.

As a necessary supplement for applying this theorem in practice, some observations on the methods of obtaining the circumference of a very excentric ellipse are given. The circumference of an ellipse approaching to a circle is readily found, but that of an ellipse very excentric requires much greater research. The best method perhaps of obtaining the circumference of such an ellipse is by the assistance of the theorem of Count Fagnani. This remarkable theorem has been investigated heretofore by the application of algebra and fluxions. But by help of a curious, and I believe, new property of the ellipse, it admits of a simple geometrical demonstration; and I am enabled to derive the following theorem.

*If that semi-diameter of an ellipse be taken, which is a mean proportional between the semi-axes, and be produced to meet the circumscribing circle; then the point, where the ordinate to the circle drawn from the point of intersection cuts the ellipse, divides the quadrantal arc of the ellipse into two parts, the difference of which is equal to the difference of the semi-axes.*

#### T H E O R E M.

The surface of an oblique cylinder is equal to a rectangle contained by the diameter of its base and the circumference of an ellipse, the axes of which are the slant side and height of the cylinder.

DEMON-

Fig. 2.

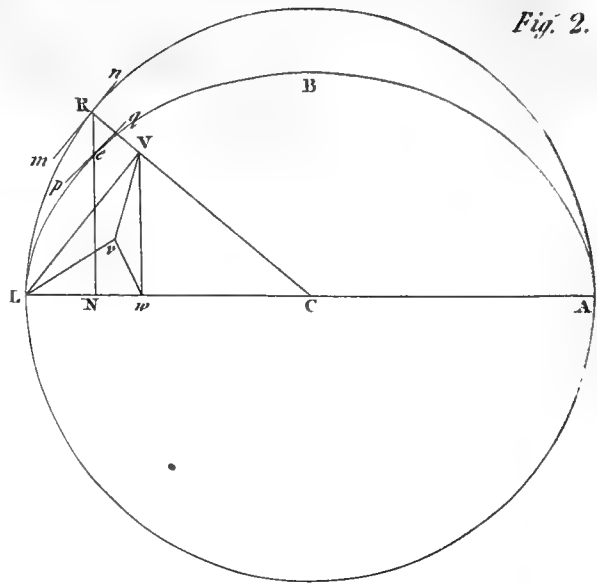
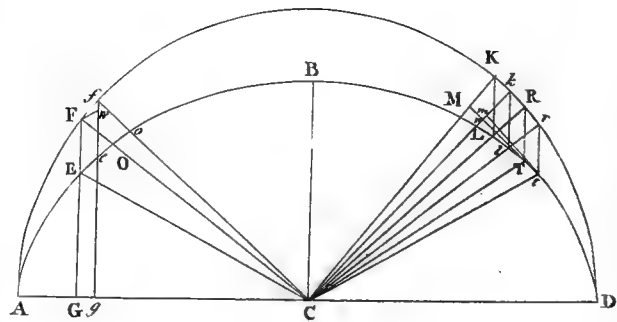


Fig. 3.



Fig. 4.



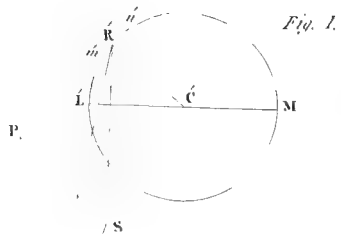


Fig. 1.

P.

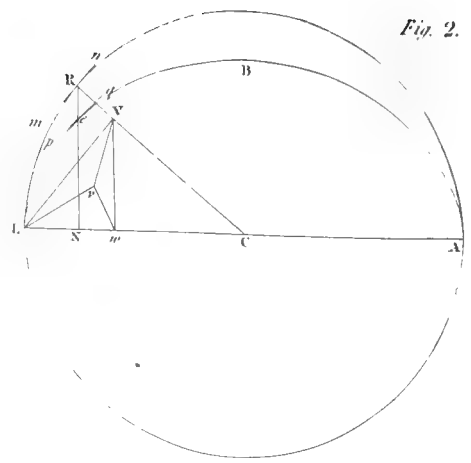


Fig. 2.

Q

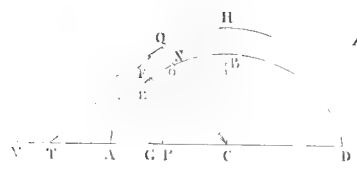


Fig. 3.

M



Fig. 4.

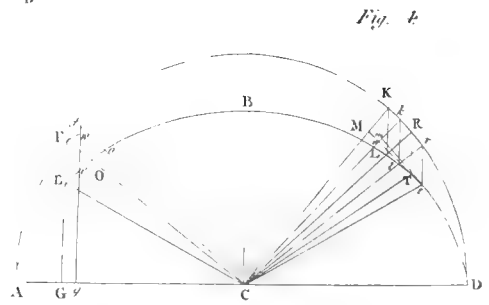


Fig. 5.



DEMONSTRATION.

Let the circle  $\overset{\cdot}{L} \overset{\cdot}{R} \overset{\cdot}{M} \overset{\cdot}{L}$  represent the base of the cylinder,  $\overset{\cdot}{Q} \overset{\cdot}{R}$  its flant Fig. 1  
 side, and  $\overset{\cdot}{Q} \overset{\cdot}{S}$  its perpend. height. Draw the diameter  $\overset{\cdot}{L} \overset{\cdot}{M}$  perpendicular  
 to  $\overset{\cdot}{R} \overset{\cdot}{S}$  also  $\overset{\cdot}{S} \overset{\cdot}{P}$  perpendicular to the tang.  $\overset{\cdot}{R} \overset{\cdot}{P}$ , and then  $\overset{\cdot}{Q} \overset{\cdot}{P}$  will be per-  
 pendicular to  $\overset{\cdot}{P} \overset{\cdot}{R}$ . Let the tangent  $\overset{\cdot}{m} \overset{\cdot}{R} \overset{\cdot}{n}$  be the side of a polygon  
 which is the base of a prism circumscribing the cylinder.

Let  $\overset{\cdot}{L} \overset{\cdot}{R} \overset{\cdot}{A}$  be a circle, the diameter of which is equal to  $\overset{\cdot}{Q} \overset{\cdot}{R}$  the flant Fig. 2  
 side. Conceive this circle inclined to the plane of its orthographical projec-  
 tion  $\overset{\cdot}{L} \overset{\cdot}{B} \overset{\cdot}{A}$  in an angle equal  $\overset{\cdot}{R} \overset{\cdot}{Q} \overset{\cdot}{S}$  the complement of the inclina-  
 tion of the cylinder. Take the angle  $\overset{\cdot}{L} \overset{\cdot}{C} \overset{\cdot}{R} = \overset{\cdot}{L} \overset{\cdot}{C} \overset{\cdot}{R}$ . Let  $\overset{\cdot}{m} \overset{\cdot}{n}$  be the  
 side of a polygon circumscribing the circle, similar and similarly situate to the  
 polygon of which  $\overset{\cdot}{m} \overset{\cdot}{n}$  is a side, and let  $\overset{\cdot}{p} \overset{\cdot}{q}$  be the projection of  $\overset{\cdot}{m} \overset{\cdot}{n}$ .  
 Draw  $\overset{\cdot}{L} \overset{\cdot}{V}$  parallel to the side of the polygon  $\overset{\cdot}{m} \overset{\cdot}{n}$ , also draw  $\overset{\cdot}{L} \overset{\cdot}{v}$  the pro-  
 jection of  $\overset{\cdot}{L} \overset{\cdot}{V}$ ,  $\overset{\cdot}{V} \overset{\cdot}{w}$  and  $\overset{\cdot}{R} \overset{\cdot}{N}$  perpendicular to  $\overset{\cdot}{C} \overset{\cdot}{L}$ , and join  $\overset{\cdot}{v} \overset{\cdot}{w}$ .

Then the right angled triangles  $\overset{\cdot}{V} \overset{\cdot}{v} \overset{\cdot}{w}$  and  $\overset{\cdot}{R} \overset{\cdot}{Q} \overset{\cdot}{S}$  are similar, because Fig. 1 and 2  
 $\overset{\cdot}{R} \overset{\cdot}{Q} \overset{\cdot}{S} = \overset{\cdot}{V} \overset{\cdot}{w} \overset{\cdot}{v}$  (by constr.): and also the right angled triangles  $\overset{\cdot}{P} \overset{\cdot}{R} \overset{\cdot}{S}$   
 and  $\overset{\cdot}{R} \overset{\cdot}{N} \overset{\cdot}{C}$  are equi-angular.

$$\text{Hence } \overset{\cdot}{V} \overset{\cdot}{v} : \overset{\cdot}{V} \overset{\cdot}{w} :: \overset{\cdot}{R} \overset{\cdot}{S} : \overset{\cdot}{R} \overset{\cdot}{Q}$$

$$\overset{\cdot}{V} \overset{\cdot}{w} : \overset{\cdot}{R} \overset{\cdot}{N} = \overset{\cdot}{L} \overset{\cdot}{V} :: \overset{\cdot}{C} \overset{\cdot}{V} = \overset{\cdot}{C} \overset{\cdot}{N} : \overset{\cdot}{R} \overset{\cdot}{C} :: \overset{\cdot}{P} \overset{\cdot}{R} : \overset{\cdot}{R} \overset{\cdot}{S}$$

$$\text{Therefore } \overset{\cdot}{V} \overset{\cdot}{v} : \overset{\cdot}{L} \overset{\cdot}{V} :: \overset{\cdot}{P} \overset{\cdot}{R} : \overset{\cdot}{R} \overset{\cdot}{Q}$$

( T 2 )

whence

whence, the angles  $V v L$  and  $Q P R$  being right angles, it follows that the triangles  $L v V$  and  $PQR$  are similar,

and that  $PQ : QR = AL :: Lv : LV :: pq : mn$

but  $AL : LM :: mn : m'n'$  by similar figures.

therefore  $PQ : LM :: pq : m'n'$  or rect.  $PQ \cdot mn = LM \cdot pq$ . or the side of the prism = rect.  $pq \cdot LM$  and consequently the whole surface of the circumscribing prism = rectangle  $LM \cdot \times$  the circumference of the polygon circumscribing the ellipse, which polygon is the projection of the polygon circumscribing the circle.

In the same manner it may be proved that the surface of a prism inscribed in the oblique cylinder is equal to the rectangle contained by  $LM$  and the circumference of the polygon inscribed in the ellipse.

And as this is true of any whatsoever circumscribed and inscribed prisms, it follows that the surface of the cylinder is also equal to the rectangle contained by the diameter of the base  $LM$  and the circumference of the ellipse which is the projection of the circle, for otherwise, as may be easily shewn, an absurdity might be deduced Q.E.D.

#### A P P E N D I X.

The quadrature of the surface of an oblique cylinder is reduced, as above, to the rectification of an ellipse. The circumference of an ellipse is, as is well known, equal to the circumference of the circumscribing circle

$$\times : 1 - \frac{e^2}{2 \cdot 2} - \frac{3e^4}{2 \cdot 2 \cdot 4 \cdot 4} - \frac{3 \cdot 3 \cdot 5e^6}{2 \cdot 2 \cdot 4 \cdot 4 \cdot 6 \cdot 6} * \&c. \quad e \text{ being the excentricity to}$$

the

\* A series converging much more rapidly when  $e$  is small, is given in Mr. Ivory's very ingenious Essay, Edinburgh Transactions, Vol. 4. 1798.

the semi-axis major 1. But when the excentricity is considerable, this series, converging slowly, ceases to be useful. Several geometers of the first rank have particularly considered this difficulty. The result of their researches being connected with the complete solution of the above problem, properly requires some notice here.

If  $x$  be the distance of an ordinate from the centre of the ellipse, the fluxion of the elliptic arc intercepted between the ordinate and extremity

of the axis minor is  $\frac{x}{\sqrt{1-x^2}} \times \sqrt{1-e^2 x^2}$ . This fluxion is easily re-

duced to the form  $\frac{Px}{\sqrt{a+bx+cx^2+dx^3+ex^4}}$  P being a rational function of

$x$ . The eminent mathematicians Euler, Lagrange, and Legendre, have employed themselves on this form. Lagrange has been particularly successful, and by a most ingenious process has shewn that it may in every case be transformed so that its fluent may be obtained by swiftly converging series. His memoir on this subject is to be found in the "Mem. Acad. des Sci. en. de Turin 1784, 1785," and his method is justly styled by Lacroix \* "La plus elegante peut etre qui soit sortie de la plume des analystes." However, in the case of the excentric ellipse this method does not furnish so simple a solution as may be otherwise derived. For in the application of Lagrange's method, a remarkable theorem offers itself, † by which the circumference of one ellipse may be derived from that of two others less excentric. The first discovery of this theorem is due to Legendre, and was given, derived by a different method, in the 2d of his two very ingenious essays on elliptic arcs. ‡ He had first discovered that the circumference of one ellipse may be derived from the circumference of another ellipse by means of partial differences, and afterwards combining this conclusion with a method

\* Traite du calcul. diff. et integral, vol. 2. p. 88.

† Lacroix. vol. 2. Art. 506, 507

‡ Mem. Acad. 1786.

method pointed out by Mr. Landen's discovery that an hyperbolic arc may be rectified by means of two elliptic arcs, he derived the above-mentioned conclusion. This theorem enables us to derive the circumference of a very excentric ellipse from the circumferences of two ellipses, the excentricities of which may be as small as we please.

Let  $b, b', b''$  &c. be the semi-axes minors of a series of ellipses, the semi-axes majors of which are unity; so that  $b' \cong \frac{4b}{1+b^2}$ ,  $b'' \cong \frac{4b'}{1+b'^2}$ , &c. Then

the rectification of two adjacent ellipses of this series being known, the rest are easily had by the above-mentioned theorem. Let  $E, E', E''$  represent quadrants of three adjacent ellipses of this series, the respective excentricities of which are  $e, e', e''$  then 
$$\frac{2E' - (1+e')E}{1-e'^2} = \frac{1+e''}{2} \cdot \frac{4E'' - 2(1+e'')E'}{1-e''^2}$$

The terms of the series  $b, b', b''$  rapidly approach to unity, so that the rectification of a very excentric ellipse, is reduced to the rectification of two of small excentricity to be performed by the common theorem.

But when the ellipse is very excentric, a series may be obtained of as easy application as the common series, and therefore is to be preferred to the above methods.

This series is given by Legendre, and is derived by him from an application of the remarkable and elegant theorem discovered by Count Fagnani. The methods Legendre used to obtain this series and its law are strikingly ingenious, and probably will not admit of improvement. For the method and law of the series I refer to the memoir.\*

The

\* Mem. Acad. 1786.

I learn from a very ingenious memoir of Mr. Wallace (Edinb. Transf. vol. 5 p. 267) in which the general rectification of the ellipse is particularly treated of, that Mr. Euler gave the same series in a work which I have not seen, entitled, "Animadversiones in rectificationem "ellipsidis." Mr. Wallace also, in his memoir, has given an elegant formula for the rectification of an ellipse.

The application of Fagnani's theorem arises from the following circumstance. While the series for the whole quadrantal arc of an excentric ellipse, is useless from its slow degree of convergency, a part of the quadrantal arc commencing at the extremity of the axis minor, may be found by a series sufficiently converging, and the remainder of the elliptic quadrant (the series for which would be diverging) may be obtained from its relation to the first arc, by that theorem.\*

Therefore, as connected with the above subject, I have subjoined a geometrical demonstration of Fagnani's theorem; which demonstration is derived from a property of the ellipse. which I believe to be new.

LEMMA.

Let AED be a semi-ellipse on the axis major AD, C the centre and AFD the circumscribing circle. Let also any ordinate GE be produced, to meet the circle in F. Draw FC intersecting the ellipse in O and QOP parallel to FG, then if QC be drawn intersecting the tangent EN in N, CN will be perpendicular to the tangent EN, and equal to CO.

*Demonstration.*

Draw the tangents FT and TE which intersect in a point T of CA produced. The triangles POC and FTG are similar, therefore  
TG

\* It may be proper to remark an error in a passage of the "Excerpta ex epistolis Newtoni" noticed, I believe, by none of the commentators. Two series are given for computing the length of an elliptic arc, and in finding the length of the quadrant, the semiaxis is directed to be bisected, and the arcs corresponding to the two abscissas to be found by the two series (Page 312, art. 7, vol. 1. Horsley's edit.) But the direction in this passage is, as may be readily shewn, entirely impracticable, whenever the ratio of the axis major to the axis minor exceeds the subduplicate ratio of 5 : 3. For then one of the series will be diverging. When the excentricity is considerable, no division of the semiaxis major will render the application of the Newtonian series useful, as the convergency of one or other will not be greater than that of the common theorem for the whole circumference of an ellipse.

$$TG : GF :: PO : PC$$

and  $GF : GE :: PQ : PO$  by the ellipse.

whence  $TG : GE :: PQ : PC$  and consequently the triangles  $TGE$  and  $PQC$  are equiangular, and the angle  $PCQ = TEG$ ; therefore the angles at  $G$  and  $N$  are together equal two right angles, and so the angle at  $N$  a right angle.

Now draw  $QV$  parallel to  $TN$ , and

$$CN : CQ :: CT : CV :: (\text{because } CV \times CP = CQ^2 = CF^2 = CG \times CT) \\ CP : CG :: CO : CF \text{ and therefore as } CQ = CF, CN = CO. \text{ Q.E.D.}$$

Cor. When  $CO$  is a mean proportional between  $AC$  and  $CB$ ,  $CE =$  the femi-conjugate to  $CO$ , and also  $EN = AC - CB$ .

*Demonstration.*

$CN \times CO = CO^2$  (by hypothesis)  $AC \times CB \therefore CO =$  the femi-conjugate to  $CE$ : and therefore  $AC^2 + CB^2 - 2AC \times CB = CE^2 - CN^2 = EN^2$  and therefore  $EN = AC - CB = Q. E. D.$

THEOREM.

Fig. 4.  $AEOBD$  is an ellipse, the axis major of which is  $AD$ . Produce any ordinate  $GE$  to meet the circumference of the circumscribing circle in  $F$ . Draw  $COF$  and  $CT$  a femiconjugate to  $CO$ , and also the tangent  $TM$  meeting the perpendicular  $CM$  in  $M$ : then arc  $BT =$  arc  $AE = TM$ .

*Demonstration.*

Draw  $fg$  indefinitely near to  $FG$ . Let  $Ct$  be femiconjugate to  $Co$  and draw  $TR$ ,  $tr$  parallel to the axis minor  $BC$ . Let also  $CR$ ,  $Cr$  meet the ellipse in  $L, l$ . Draw  $LK$ ,  $lk$  parallel to the axis minor, join  $K, M$ ;  $k, C$  and draw the tang.  $tm$  meeting  $k, C$ , which intersects  $TM$  in

in  $v$ . Then by the lemma it easily appears that  $K, M, C$  are in one right line, and also that  $m$  is a right angle.

Because  $FCK$  and  $fCk$  are each right angles, therefore  $Ff = Kk$ . Also if  $Fw$  be drawn parallel to the tangent at  $E$ , the triangle  $Ffw$  is ultimately similar to the triangle  $CLK$ ; for  $CL$  is parallel to the tangent at  $E$ , because  $FCK$  is a right angle, and therefore  $CE$  and  $CL$  are conjugate to each other; and also  $CK$  is parallel to a tang. Fig. 4. at  $F$ .

Therefore ultimo  $Ff = Kk :: Fw :: CK : CL = CM$  by lemma.

Also ultimo  $Mv : Kk :: CM : CK$

consequently ultimo  $Mv = Fw$ . But ultimo

$Mv^* = TM - tm + \text{arc } Tt$  and  $Fw = Ee$ , therefore

ultimo  $Tt - Ee = tm - MT$  or ultimo the increment of  $BT$  — increment of  $AE =$  increment of tang.  $MT$ . Therefore as these magnitudes begin together the arc  $BT - \text{arc } AE = TM$ . Q. E. D.

Cor. If  $CO$  be taken a mean proportional between  $AC$  and  $CB$ , and be produced to meet the circle in  $F$ , then drawing the ordinate  $FG$ , the point of intersection  $E$  will divide the elliptic quadrant, so that  $BE - AE = AC - BC$ .

#### *Demonstration.*

By this construction  $CE =$  the femiconjugate to  $CO$  (cor. to lemma) and therefore  $CE = CT$ , and therefore  $BE = BT$ . Whence  $TM = \text{tang. at } E =$  (by cor. lemma)  $AC - BC$ . Consequently by the theorem, arc  $BE - \text{arc } AE = AC - BC$ . Q. E. D.

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\* Let the tang.  $TM, tm$  intersect in  $n$ . Then  $Mv = MT - vT = MT + Tn - vn$ . Fig. 5. But ultimo  $vn = mn = tm - tn$  therefore ultimo  $Mv = TM - tm + Tn + nt =$  ultimo  $TM - tm + \text{arc } Tt$ .

It may appear strange after all that has been written upon the method of prime and ultimate ratios (or perhaps more properly speaking of limits) that with respect to a demonstration in which that method is used, more should be deemed necessary than merely a reference to it, as already established upon logical principles. However of late, eminent mathematicians both at home and abroad have again called in question the principles of the doctrine, and rather than use a method so admirably adapted to the purposes intended by the illustrious inventor, compendium of invention and demonstration, have had recourse to methods which fall little short of the tedious demonstrations of the ancients. From hence it should seem that its principles have not been put by its defenders, and commentators in that clear light in which they ought to be placed; at least, judging from the eminence of its present opponents. Without acceding to such an opinion, there can, I think, be no impropriety in endeavouring to shew that a demonstration in which that method is used, is unimpaired thereby. Principally with this intention the following summary of the doctrine is given, in which is more particularly noted that part of it introduced into the above demonstration. The whole is contained in effect in the first section of the Principia. But the great author, pressing forward to more important matters, did not stop to give that precision to the doctrine which has been since required by its opponents. He was satisfied with anticipating some objections, and giving some cautions, which, if fully attended to, will enable any one to place the method on the most solid foundations.

It being granted that the doctrine is founded upon logical principles, no objection can be made to its use in demonstrations either purely geometrical or analytical.

The superiority it possesses over other methods whether ancient or modern, with respect to facility of invention and demonstration, appears most satisfactorily by comparing the processes instituted according to the respective methods.

This superiority I consider as a sufficient apology for introducing the controversy respecting its principles. It is not convenient here to enquire particularly how the opponents of the doctrine have understood those points, which they conceive are unanswerable objections. If I do not deceive myself, the method as deduced from what the illustrious author has left us, is capable of the most logical proof. What is here given is by no means intended as a complete summary. If it serves to shew that the above application of the method is logical, and also in any degree to shew, that the general principles of the method are neither obscure nor inaccurate, the purpose is answered. Not that I can flatter myself with the hope of advancing much new illustration, but as the old objections have again been brought forward in another shape, I think it incumbent upon those, who imagine a method so important to be logically founded, to endeavour, if they cannot advance new defences, to bring forward the old ones, in a manner likely to be most effectual.

The method of limits may be considered as reducible to the following heads.

I. The



1. The definition of a limit. 2. Problems, by which limits so defined are obtained. 3. Properties of those limits. 4. Application of those properties to geometrical demonstrations, to algebraical processes, and to the translation of physical relations into mathematical ones.

1. *Definition* A limit of a variable quantity, whether a simple magnitude or the magnitude of a ratio is that quantity to which the variable quantity may so approach as to differ from it in magnitude by less than any assigned or stated quantity.

1. A variable secant drawn from a given point without a circle, may be drawn, so as to differ from the tangent in magnitude, less than by any magnitude that can be assigned. For, assign a difference, then the position of the secant is determined, and therefore between the secant and tangent another secant can be drawn. The magnitude of the tangent is a *limit* of the magnitude of the secant. But the secant is not said to become the tangent.

2. A limit of the quantity  $\frac{x^2 - a^2}{x - a}$  where  $x$  is greater than  $a$  is  $2a$  for  $\frac{x^2 - a^2}{x - a}$  may be made to differ from  $2a$  by a less magnitude than any assigned one. But  $2a$  cannot with propriety be said to be one of the values of  $\frac{x^2 - a^2}{x - a}$  or to be equal to  $\frac{0}{0}$ .

3. The limiting ratio of the increment of the abscissa of a curve to the increment of the ordinate is equal to the ratio of the subtangent to the ordinate. The ratio of the increments themselves is never equal to the ratio of the subtangent to the ordinate.

II. *Prob.* It is therefore a mathematical problem to find a limit so defined, of a variable quantity, when it admits of one. The solution of the problem is evidently had if the variable quantity or its equal can be expressed by the sum or difference of two quantities one fixed and the other variable, the variable one admitting a less value than any assigned one. The fixed quantity is a limit.

1. Supposing  $x$  any magnitude greater than  $a$ , and a limit of  $\frac{x^2 - a^2}{x - a}$  be required.

Because  $\frac{x^2 - a^2}{x - a} = x + a = 2a + e$  (putting  $x = a + e$ ). Therefore as  $e$  may be less than any assigned magnitude  $2a$  is the limit required.

To determine the limiting ratio of increment of the abscissa to the increment of the ordinate. The incr. of the abscissa : increm. ordinate : : subtangent  $+ v$  : ordinate, by similar triangles. As the ordinates may approach so that  $v$  may become less than any assigned quantity, the limit of the latter, and therefore of the former ratio is the ratio of the subtangent to the ordinate. This method is frequently applicable when the terms of the proposed ratio are both variable. A ratio is found equal to the given ratio, one of the terms of which is fixed and the other variable. A limit of the variable term is then found, and thence the limit of the proposed ratio is had.

In this manner Sir Isaac Newton investigated the limiting ratio of the arc to the chord, tang. &c. In this way also the limiting ratio of the increments of the algebraical quantities  $x$  and  $x^n$  is had. Let  $o$  be the increment of  $x$ , and  $n x^{n-1} o + n \frac{n-2}{2} x^{n-2} o^2 + \&c.$  is the increment of  $x^n$ ; the general ratio then of these increments is equal to the ratio  $1 : n x^{n-1} + n \frac{n-1}{2} x^{n-2} o + \&c.$  In this series it may readily be shewn that  $o$  may be taken so small that the sum of the terms after the first may be less than any quantity that can be assigned; so that, according to the definition  $1 : n x^{n-1}$  is the limiting ratio required.

Here is no shifting of the question, as it has been termed, by first taking  $o$  a real magnitude and then no magnitude, nor any introduction of infinitesimal quantities. The question is concerning the limit of the ratio of the increments not concerning the ratio itself; the general ratio of the increments is equivalent to a ratio, one term of which is fixed, and the other composed of a fixed, and variable quantity; this variable quantity being susceptible of a less value than any that can be assigned, the ratio of the fixed quantities is by the definition the limiting ratio.

2. For the ready solution of the problem, the following proposition is often of the greatest importance, and is one of the principal sources of compendium derived from this doctrine.

*Prop. A.* In deducing a limit of a variable quantity, depending upon other variable quantities, the limits of these variable quantities may be used instead of the quantities themselves in any part of the process.

Let  $L$  be the limit of any variable quantity  $M$  involved in the process; then in any of the steps  $L$  may be used for  $M$ , and the conclusion will be true. For let  $e = M - L$  express the general relation between  $L$  and  $M$ , then, without considering the limit, in the conclusion will be found instead of  $L$ ,  $L + e$ .

But to obtain the limit required, the limits of the variable quantities must be used, and therefore now  $L$  substituted for  $L + e$ .

This proposition relates both to geometrical magnitudes and analytical quantities.

Any steps, which we can demonstrate will lead us to a true conclusion, must be considered with a reference to that conclusion, as logical. Such are the steps in which we substitute limits for the quantities themselves, although the quantities are never accurately equal to their limits. By subjoining the word *ultimò* to such steps we refer to the general conclusion, and intend these steps are only true with a reference to that. From being thus enabled to shorten the steps of a demonstration arises much of the value of the method, whether it be applied to geometrical demonstration or analytical processes.

This

This proposition is assumed in the third cor. of the 7th, and in the cor. of the 8th lemma, 1st Book of the Principia.

III. From the properties of limits, the three following may be selected, as frequently used; of which the second, as being more connected with the above theorem, is particularly considered. The others easily follow from the definition of a limit.

1. Quantities which are the same limits of the same variable quantity, are equal to one another.

2. Prop. B. If the limiting ratio of the corresponding increments of two magnitudes commencing together, be always a ratio of equality; the magnitudes themselves are in a ratio of equality.

For: Let  $M$  and  $N$  be the two magnitudes, and let  $M$  be divided into any number  $n$  of equal parts  $p$ , and let also  $N$  be divided into the same number of corresponding parts  $q, r, s, t, \&c.$  Then the parts of  $N$  are all equal to each other, or some of them are unequal.

If they are always all equal  $M : N : p : q$ , and the limiting ratio of the increments must be the same as the constant ratio of the increments themselves, and therefore  $M : N$  is the ratio of equality.

If the parts of  $N$  are not equal to each other, one of them must be greatest and one of them must be least; therefore, taking  $n$  any number, if  $q$  be greatest, and  $r$  least,  $nq$  is greater than  $N$ , and  $nr$  less. If  $M : N$  be not the ratio of equality, let it differ from the ratio of equality by the ratio  $e : f$ . Now the ratio of  $M : N$  is between the ratios  $np : nq$ , or  $p : q$  and  $nr : nr$  or  $p : r$ , consequently one of them must differ from the ratio of equality by a ratio greater than the ratio  $e : f$ ; but by hypothesis the ratios  $p : q, p : r, \&c.$  may be nearer the ratio of equality than by any assigned ratio. Hence the ratio  $M : N$  cannot differ from a ratio of equality. (Vid. cor. 4 Lemma Prin. Math.)

3. If an equation exists between the corresponding variable quantities  $L + e, L' + e', \&c.$  where  $e, e' \&c.$  may be less than any assigned magnitude, however small,  $L, L' \&c.$  being fixed, and therefore the limits of these quantities; then, if in that equation  $L, L' \&c.$  be substituted for  $L + e, L' + e', \&c.$  an equation will be had between the limits.

IV. The following instances will serve for illustrating the application of these principles.

1. In the demonstration of the above geometrical theorem, the limiting ratio of the increment of the difference of the elliptic arcs to the increment of the tangent is deduced by the application of the principles of prop. A. From the limiting ratio of these increments, the ratio of the difference of the arcs to the tangent is deduced by prop. B; not from the ratio of the evanescent increments, but from the limiting ratio of the increments.

2. The following method of finding the sine in terms of the arc, shews the applications in an algebraic process.

Let  $s$  = the sine of arc  $a$  to rad. 1, and let sine  $\frac{a}{n} = \frac{a}{n} - e, n$  representing any assigned number, however great. Then by a well known theorem for the sign of a multiple arc

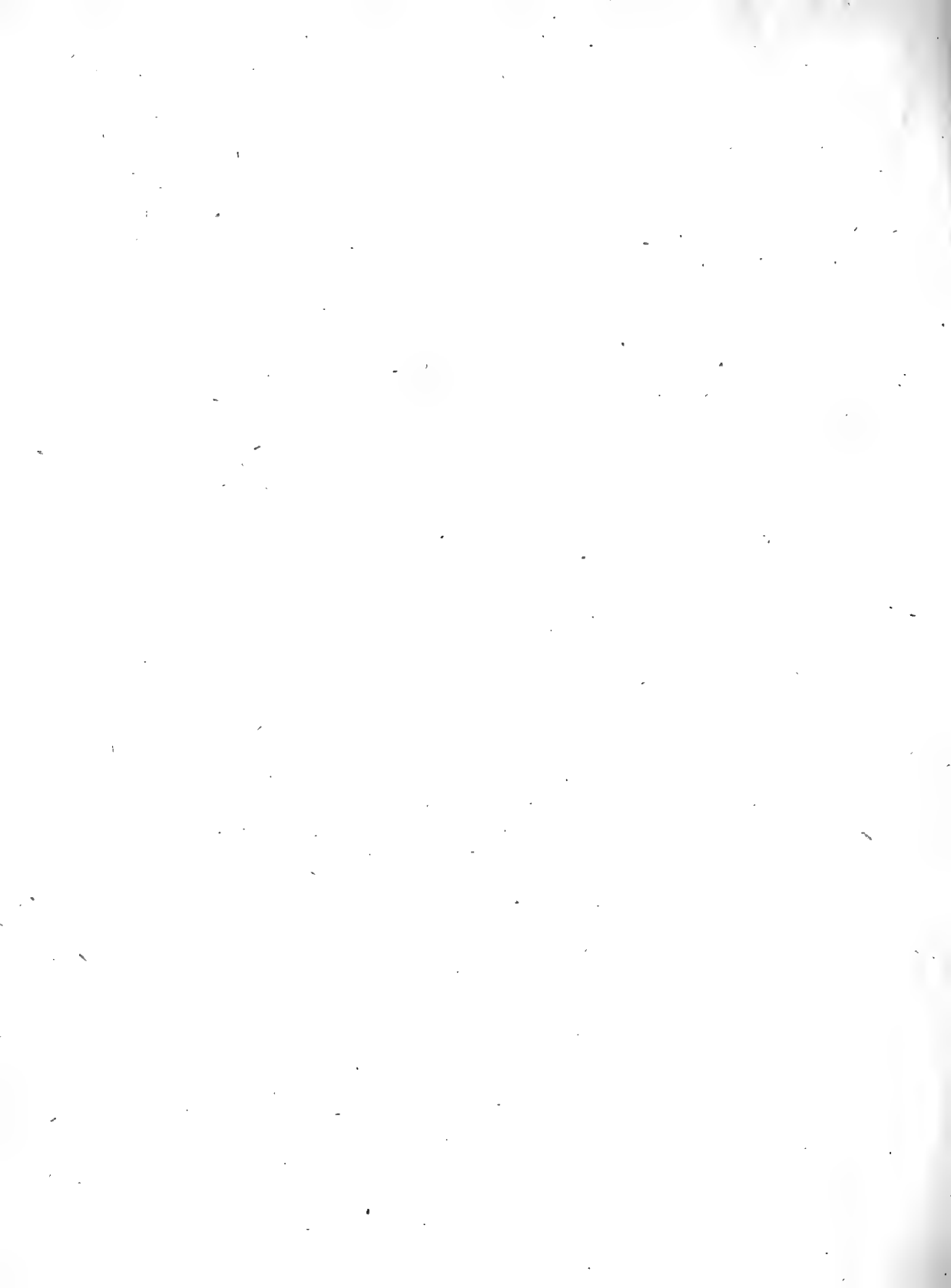
$s = n \cdot \frac{a}{n} - e - \frac{n \cdot n^2 - 1}{2 \cdot 3} \cdot \frac{a}{n} - e^3 \&c. = a - ne - 1 - \frac{1}{n^2} \cdot \frac{a - ne}{2 \cdot 3} + \&c.$  Now the limit of  $a - ne$  is  $a$  for the limiting ratio of  $\frac{a}{n} : \frac{a}{n} - e$  (limiting ratio of arc to sine) is the ratio of equality, therefore the limit of the equal ratio  $a : a - ne$  is the ratio of equality, that is as  $a$  is fixed, the limit of  $a - ne$  is  $a$ . Hence it readily appears, taking the limits of the terms of the above series,  $s = a - \frac{a^3}{2 \cdot 3} \&c.$

This equation is not deduced by neglecting quantities as infinitely small; but because the first equation is true when  $n$  is any assigned number however great, the last must necessarily be true also for otherwise it is easily shewn, that the first could not be generally true, when  $n$  is any assigned number however great.

3. The ratio of the centripetal force in two points of a curve is the limiting ratio of the sagittæ. The limiting ratio of the sagittæ in the ellipse, the force tending to the focus, is the inverse duplicate ratio of the distances. And as the ratios which are the limits of the same variable ratio must be equal to each other, the ratio of the forces is equal to the inverse duplicate ratio of the distance.

The application of limits to physical enquiries strikingly illustrate the value of the method. The beautiful instances in the Principia Mathematica of Newton are too well known to dwell upon. The slightest comparison will in those instances, shew the superiority of this method over those that have lately been brought forward.





E S S A Y

ON

THE NATURAL ADVANTAGES

OF

*IRELAND,*

THE MANUFACTURES TO WHICH

THEY ARE ADAPTED

AND

THE BEST MEANS OF IMPROVING

*THOSE MANUFACTURES.*



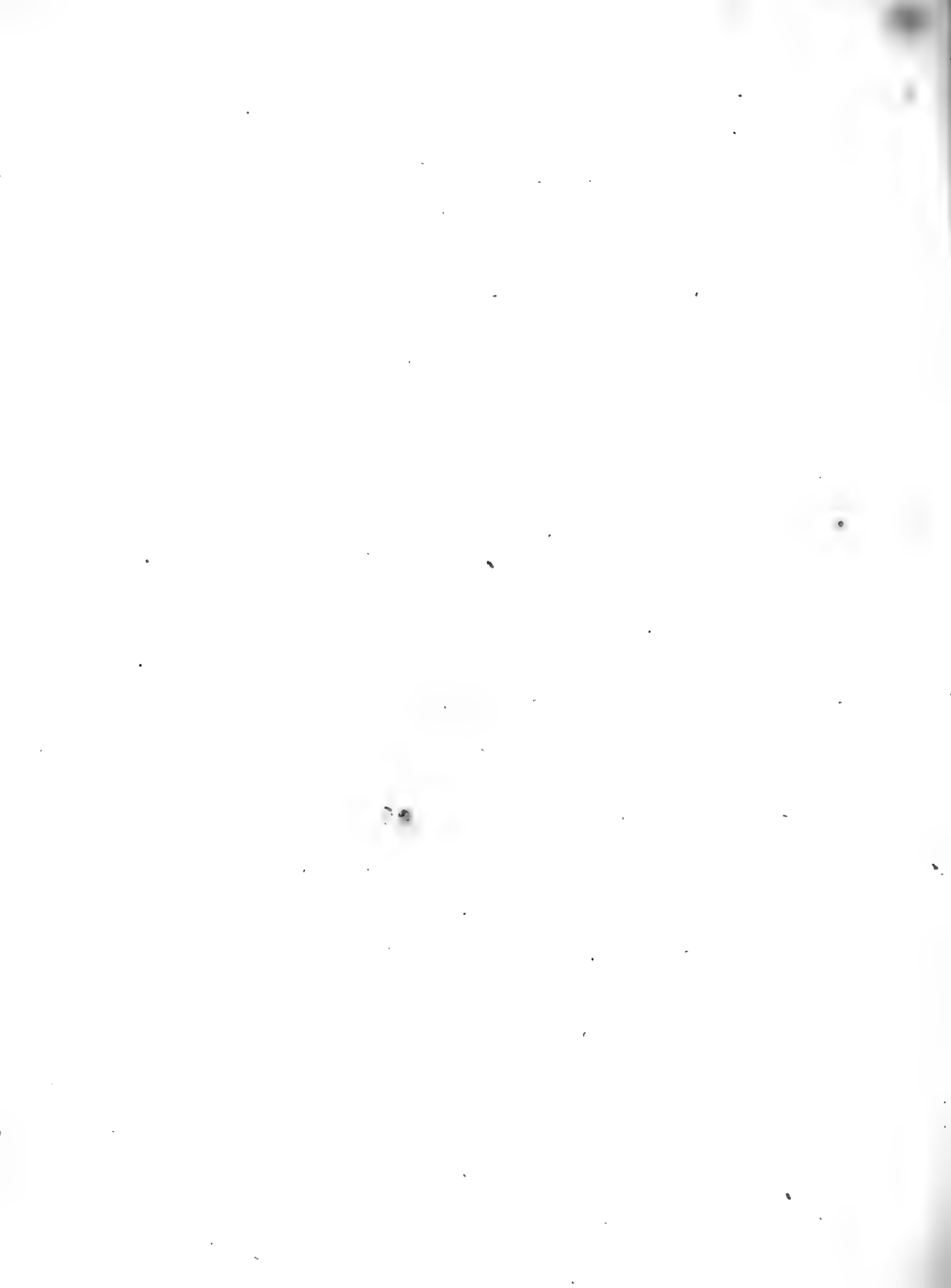
THE LOT IS FALLEN UNTO ME IN A FAIR LAND.

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BY WILLIAM PRESTON, ESQ.

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*Presented to the R. I. Academy, September the 29th, 1796.*





## TO THE READER.



THE Essay, which is contained in the following pages, was originally presented to the Royal Irish Academy, some years ago, as a prize Essay, and honoured by that Body with the proposed reward. It might have appeared earlier in the Transactions of the learned Society, before whom it was read; but on account of its extraordinary length, some objections at first arose to its admission; as it might occupy too great a proportion of their volume; the author was unwilling to press its publication, while it might operate to the exclusion of any other essay of merit. By the change in the form of the pages of the present volume, the printer is enabled to comprise nearly a double quantity of matter, in the same number of sheets. By this means some spare room has been gained,

and the author was emboldened to ask a place for a production on an interesting subject, and which he had the vanity to hope might be of some little use to the public.

The reader will have the goodness to recollect, that full six years have elapsed since the present essay was written. Some most important events have occurred since that time, in every part of Europe, and particularly in Ireland, which have materially affected, and essentially changed both the intrinsic and relative state of the country, hence, some of the positions laid down by me, may not appear so strictly just, some of the topics discussed not altogether so apposite as they would have done, had they been offered to the public, before the great and stupendous events, to which I allude, took place. It will readily be seen how much the political changes in Europe, will bear on commercial questions.

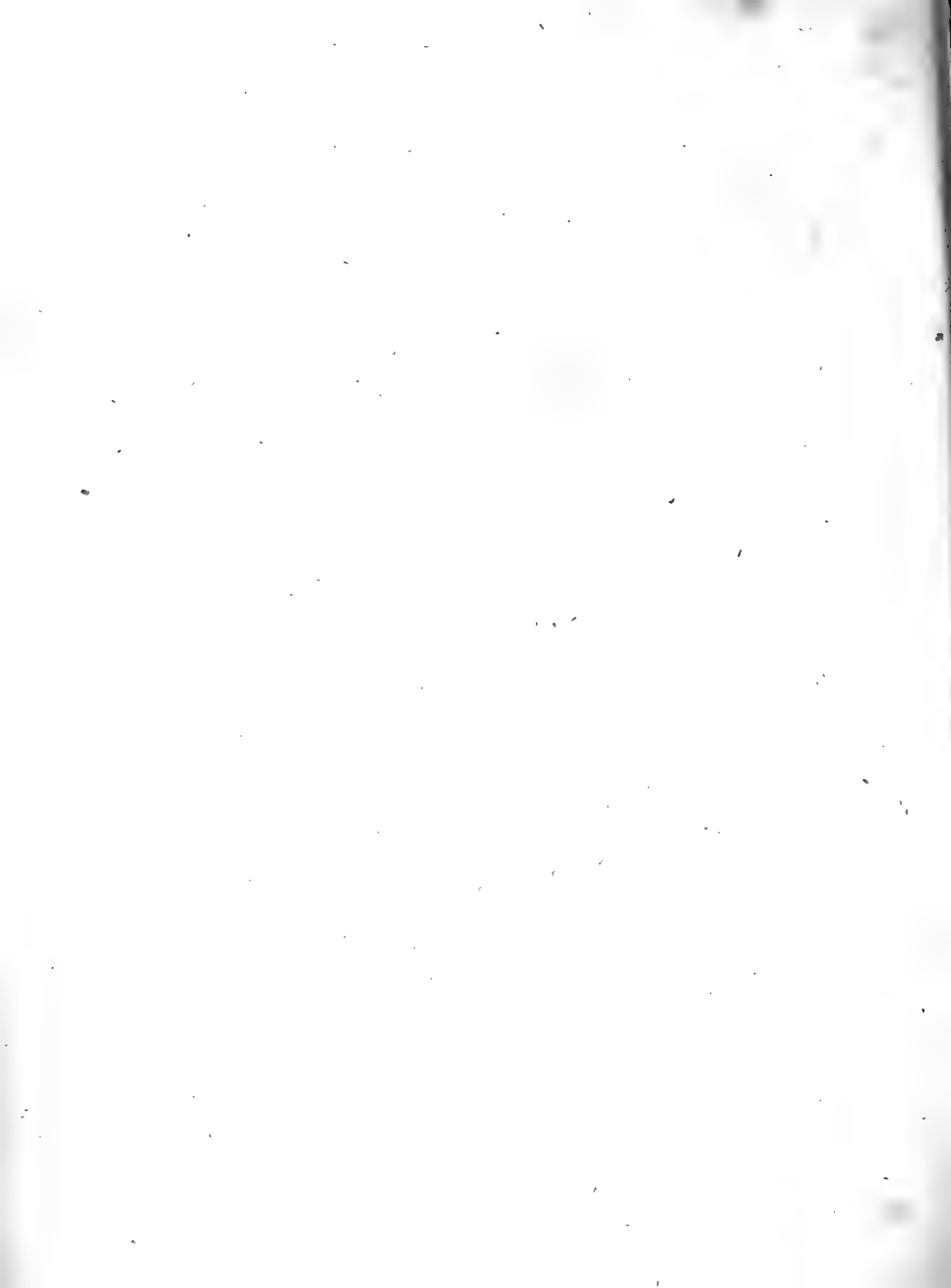
The author frankly confesses, that the prospect of his deriving any credit from the following speculations, is very much diminished by the delay of this publication.

*Pereant, qui ante nos nostra dixerunt!*

is the pathetic exclamation of a writer. Many of the observations

servations in the following tract, which may now appear trite, would probably have had something of novelty to recommend them; had they appeared six or seven years ago. This, the writer hopes, will plead his excuse with the candid public, should some of the observations in the following tract appear to be common place and unseasonable.

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## CHAP. I.

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## INTRODUCTION.



EVERY attempt to ameliorate the condition of the labouring poor, is laudable at all times, but is peculiarly seasonable at a juncture, when it must be confessed, great discontents prevail, among the lower classes of the people; and although the general prosperity of the country may be progressive, many and galling grievances subsist, much severe and encreasing misery is felt in many quarters, and discontent and famine too frequently pervade the habitation of the peasant and the manufacturer.

Whence the murmurs and dissatisfaction of all the labouring poor, and the local misery of too many among them proceed, it is not the business of the present essay to enquire.

Various concurring causes have given some severe stabs, to the manufactures of this country; and it will require every art of healing, to

cure the wounds they have made. The scars it is to be feared will long remain.

Non tamen omne malam miseris, nec funditus omnes,  
 Corporeæ excedunt pestes : penitusque necesse est,  
 Mula diu concreta modis inolescere miris.

Yet, we should not despair of the republic, or yield to a supercilious dependency, which treats with contempt, as wild and chimerical, every scheme of reformation and improvement. Ireland includes in herself the means of great prosperity. By an uncommon innate force, and vigour, she has survived the deadly wounds aimed at her noble parts; and the confuming maladies, that preyed on her vitals. She now requires only wholesome regimen to establish her in perfect health. She requires only, to have her energies awakened, by proper motives; to have a just direction impressed on her industry, by a salutary mixture of encouragement and restraint.

While the population of England is decreasing, (which, it appears, from calculations founded on the returns of the collectors of the window-tax, and other documents, to have rapidly done, since the end of the last, or the beginning of this century;) the population of this country, on a retrospect through the same period, appears to have increased, in a surprising proportion. The late Mr. *Bulbe* has investigated the subject of the population of Ireland, as it stood in the year 1788, by calculations founded on the returns of houses, made by the collectors of hearth-money, and finds the amount for that date to be considerably

rably more than four millions. Sir *William Petty*, from similar data and computations, makes the population of Ireland, in the year 1672, no more than one million one hundred thousand; thus has the population of this country been more than trebled, in a period of one hundred and sixteen years.

A benevolent and patriotic mind must contemplate this subject with pleasure. The consideration of it affords powerful incentives, to stimulate those, who possess talents, to suggest, or means, and activity to forward plans of national improvement. It shows, how much may be done, with a moderate degree of attention to the agriculture and manufactures of *Ireland*. These fair appearances, if duly weighed, ought to induce the legislature in its collective capacity, and powerful or wealthy individuals, each, within the sphere of his own influence, to exert themselves, for the improvement of a country, which displays such promising capabilities.

It is plain, that *Ireland* is far from being fully cultivated, or peopled, at present. A vast number of commons are unenclosed, a prodigious quantity of reclaimable moor, and mountain lies useless and unprofitable. Were our waste lands reclaimed and ameliorated; were manufactures, suited to the means, the natural situation, and political relations of the country, generally diffused; it is not easy to define the extent of population and prosperity to which the country might attain.

Whatever *Ireland* has done, was accomplished by her, under a variety of disadvantages, oppressions, and calamities partly accidental, partly induced

induced by the mistaken and cruel policy of *England*. Her progress has been that of a generous and spirited courser carrying weight nearly beyond his strength. Not to speak of the events of the preceding century, civil wars, pestilence, and famine;—a mistaken policy annihilating foreign trade, and domestic manufacture, a burthenfome and expensive establishment, and a profuse government, with their inseparable concomitants heavy taxes, a constant drain of the wealth of the land, and a systematic oppression of its peasantry by the iron hands of an immense body of absentees, conspired to plunge *Ireland* in an abyss, from which it seemed scarce possible that a nation should emerge.

This country, at no very distant period, was dependent, for a supply of corn, on *England* and *America*; at this, on the contrary, she exports large quantities of grain, and some bread and starch. Were landlords duly attentive, to the encouragement of resident and improving tenants, were an end put to the destructive practice of land-jobbing, and parliamentary assistance given, to the reclaiming of waste and barren land; this country would surpass most others in cultivation. In the year 1778, when Young wrote, he states that *Ireland* was more cultivated than *England*, having less waste land, in proportion to the size of the two countries. Since that time, a variety of causes, particularly the salutary operation of the code of corn laws, have contributed to improve the face of the soil; and, I believe, it may be stated, that without any exaggeration, the tillage of *Ireland* has been doubled within the last thirty years. Much of the praise of this may be ascribed to the industry of the people, which, whatever may be said to the contrary

contrary, wants only moderate encouragement, to draw from it the most active and laudable exertions.

It is a favourable omen for the advancement of manufactures, that the cultivation of the soil has made such progress in this country. The agricultural and commercial systems ought to go hand in hand. Sir *William Temple* imputes the want of trade in *Ireland* to the want of people; the increase of agriculture, while it multiplies the inhabitants of a country, becomes one of the most effectual means of establishing manufactures on a permanent base, by procuring for the workmen a cheap and plentiful supply of provisions. "The laws and customs," says Dr. Smith, "so favourable to yeomanry, have perhaps contributed more to the grandeur of *England*, than all the boasted regulations of commerce taken together. What has brought the American colonies, (adds he) to their present state of prosperity, but agriculture?"

The foregoing observations are more nearly connected with the subject of manufactures, than, at first sight, may appear. It is impossible to separate the different provinces and exertions of industry; they must concur, in a regular and well organized whole; in a systematical and harmonious co-operations, to produce national prosperity. To excite a partial, a limited, or local exertion, in some particular department of industry, or branch of manufacture, without attending to this integrity of plan, must prove a futile, or even a pernicious attempt. If there is not a general disposition to labour, a sober and permanent spirit of industry diffused over the country, maintained and assisted by frugality  
and

and habits of sobriety, all the fits and starts of exertion, in favourite branches of manufacture, according to the caprice of speculation, and giddy theories of the moment, will fade, "like the baseless fabric of a vision, nor leave a wreck behind." It was a saying of one of the emperors of China, "that, if any man was idle, in his dominions, some "one must go worse clothed, and worse fed;" the emperor was in the right, for though the idleness of one man does not directly tear the coat off the back of another; the sum total of the consuming or accumulating powers must be diminished in the same ratio.

If much yet remains to be done in the country, we may enter with confidence, on the task of improvement; since we know, that the evils which we must encounter and subdue, are not natural and inherent, but accidental and adventitious. The native qualities of the soil and its inhabitants are truly excellent; remove the obstacles that prevent their full effect and the work is done. Could we attribute the backward state of *Ireland* in many particulars, to the situation, soil, or climate of the land, or the national character of the people, the case would be desperate; but when we refer our backwardness or deficiency to obvious causes, removable without difficulty, by the hands of wisdom and patriotism, the prospect of our past and present evils becomes a lesson of encouragement and exertion.

It is observable, that the *Irish*, in every country but their own, advance with equal firmness and address, and distinguish themselves, in arts, in commerce, in war and letters; while the meagre encouragement

ment allowed to native merit drives them from the unnatural bosom of the parent soil. In fact it appears, that when due encouragement is given to the exertions of the *Irish*, neither genius nor industry are wanting. An excellent judge, Count *Rumford*, has declared that he found no artists more intelligent than those of *Ireland*; how criminal then is the cant of some people, who affect to decry every thing that is the production of this country?

To procure information concerning the state of the labouring poor, to suggest the means of ameliorating their condition, of augmenting the stock of national industry, and with it the stock of national virtue and comfort—to promote these is so great and so good a work, that he, who but applies a hand, to move them forward, however feeble his effort, and inconsiderable his strength, may flatter himself that he has done once in his life a praise-worthy act. All disquisitions on statistical subjects, though in themselves they may not be profound, ingenious, or fraught with novelty, answer a profitable end. They are to the public, what habits of self-examination are to the individual, they turn the political, like the mental eye inward, they rouse from the trance of apathy, they impress a knowledge of secret faults and weaknesses, and frequently suggest the means of reformation. What pleasure can be greater, to the benevolent mind, than the consciousness of having co-operated in plans for the happiness of myriads? Whether such plans succeed or fail, their authors and promoters must find a solid reward in their own feelings,

Inventas qui vitam excoluere per artes,  
 Quique sui memores alios fecere merendo.

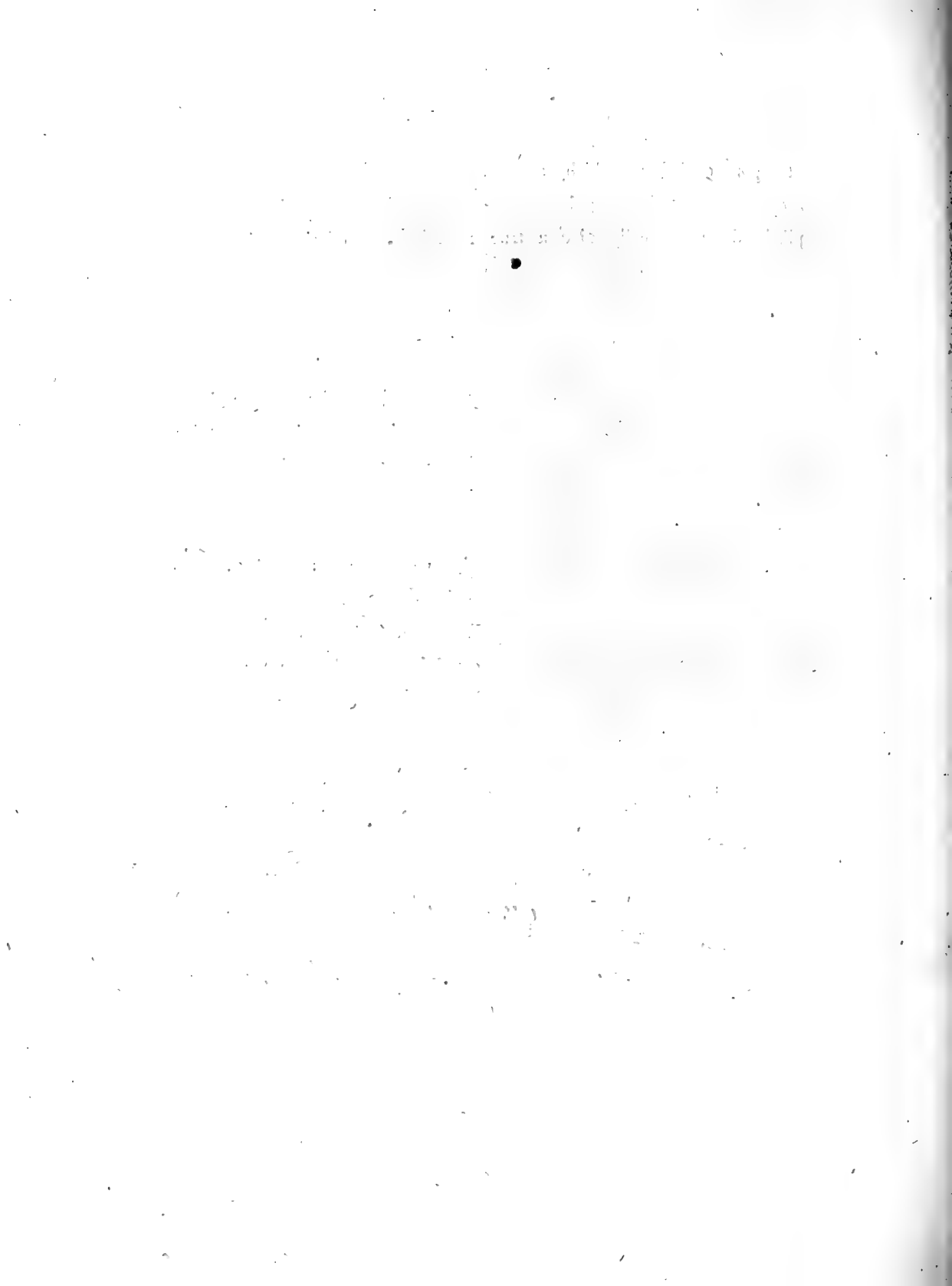
I shall conclude with observing, that systems are of small utility in politics, they deal too much in generals; they suppose an impossibility; they proceed, as if the state and all its establishments, were in a kind of fusion, fitted to be new cast, and moulded by the speculator. Systems gratify the vanity of those who wish to think themselves wise, without the trouble of much meditation, or any research beyond a bookfeller's shop. They fill the heads of men, with general affirmations and abstract principles, without examining the data on which they are supposed to be founded, or proving their practical application to purposes of utility. Men, by retailing the reveries of *Young*, for instance, may appear to the ignorant, (and there are learned, as well as vulgar ignorants) able theorists on agricultural subjects; and may raise a credit for skill in political economy, by drawing largely from *Smith's Wealth of Nations*.

It would have been easy to have swelled those pages with columns of figures, from the custom-house returns and public accounts. Such things would have only cost the writer the trouble of transcribing them. They give an imposing aspect of research and knowledge to a book, but too frequently they fail of presenting any useful information to the reader. It is ever the spirit of minute detail to grasp at the shadow and miss the substance; one good sound philosophical principle, is worth a thousand tables of figures. Besides, it is well known to persons who are conversant in the subject, that custom-house returns  
 of



of export or import, which are formed upon the merchants entries, are frequently fallacious; because the entries from which they are compiled, do not actually give a true representation of the real amount of export and import, for, as it is well known, merchants are in the habit of making their entries larger than the truth.

I have carefully endeavoured to avoid those pernicious paradoxes, which are too frequent in the hasty productions of modern writers, and which proceed from the rage for advancing something new. This rage has its source in vanity, a mistaken vanity, for novelty is not always the character of superior knowledge, nor is bold assertion always talent. Many positions have been neglected for their absurdity, by the good sense of times past, and reserved, to give the writers of the present hour, who are not ashamed to hazard any thing, the praise of novelty. Thus, for instance, I have known it to be asserted, by a writer on economics, that agriculture may be too much pursued; that a country may be too highly cultivated.



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ESSAY on the natural Advantages of IRELAND, the MANUFACTURES to which they are adapted, and the best means of improving those MANUFACTURES.



B O O K I.

CHAP. I. Section 1.

THE natural advantages of every country may be considered,—with respect to the internal comfort, easy subsistence, and opulence, the health and longevity of the inhabitants, and the consequent encrease of population;—or with regard to foreign relations, to the extension of trade and commerce, and enjoyment of peace and security.

Under the first head are comprehended a mild and salubrious climate, a fertile soil, capable of nourishing, in abundance, all the useful domestic animals, and productive of all the articles of the first necessity, —a copious supply of valuable minerals, or of those natural productions, which either in a crude state, or with more or less preparation, are useful, in home consumption, furnish a profitable export, or become the *prima* of manufactures.—An extent of coast, and seas well supplied with fish, are a source of plenty and opulence to a country, by feeding the inhabitants, and furnishing them, in the surplus, over what they can consume, with a valuable object of export, unfailling and independent of caprice and fashion. Add to these a number of streams and rivers, intersecting and watering the face of the country;—these irrigate

irrigate and fertilize the soil,—they facilitate the communication of the inhabitants, with each other, the transportation of heavy and bulky commodities, from place to place ; and become the means of carrying on various manufactures, to which a free supply, and constant command of water are necessary, both for the purpose of working mills and machinery, and for the use of various other operations, which occur, in the progress of different fabrics and manufactures to a state of perfection.

The natural advantages of a country, with regard to foreign relations, are—an insular situation, which (*ceteris paribus*) promises peace and security to the inhabitants, and affords great commercial advantages,—a considerable extent of coast deeply indented with bays—a number of safe and capacious harbours : these endowments of a country dispose its inhabitants, in the first instance, to the occupation of fishing, whereby they are fitted, to become stout and experienced mariners ; in the next place, the possession of these naval advantages affording a ready intercourse with every quarter of the globe, stimulates the people to maritime adventures, awakens among them a commercial spirit, and diffuses the sea-faring character.

It is an unspeakable advantage to a country, in regard to its foreign relations, if it shall have been so placed by nature, as to become an emporium, for the carrying on of some considerable branch of commerce—a resting place, in the prosecution of some long but necessary or highly lucrative voyage—a *depot* for the materials of some very profitable or extensive commercial intercourse.

The natural situation of that country is advantageous, which either has in its immediate neighbourhood, or possesses ready means of communicating with, those countries, which produce the necessaries of life and the *prima* of manufactures, which she herself wants, or which, being populous, from indolence, from employment of capital, in some other branch of industry, which they find or think more gainful, do not exercise the same manufactures, which she carries on, and are disposed to become her customers for them.

In considering the natural advantages of any country, it is scarcely possible to separate that consideration, from a view of its acquired advantages. Some countries, it is true, there are, most happily circumstanced, and highly favoured by nature, which nevertheless possess very few acquired advantages; but such instances may obviously be referred to some radical vice, in the form of government, or gross corruption in the administration on the other hand. Through the operation of freedom and good government, some countries, with very few natural, have attained to very great, and many acquired advantages; but, if all other circumstances are alike, that country will possess the greatest acquired, which has been the most highly gifted with natural advantages.

That country may be said, to have improved its natural advantages, to the utmost; and to possess acquired advantages, in the highest perfection, where agriculture and manufactures proceed, hand in hand, with even and harmonized pace; and where a regular intercourse with foreign nations ensures a constant exchange of its superfluities, (whether necessaries and luxuries of life, or the *prime* productions for the use of manufacture) for other necessaries of life, for the crude materials of profitable manufactures, or for money.

## SECT. 2.

### *Of the natural Advantages of Ireland in particular.*

The climate of Ireland is mild, temperate, and salubrious, perhaps equally so, with that of any other country in the world. Its chief peculiarity is a predominance of moisture, but this does not appear to be in any degree injurious to health, and may be productive of some advantages, as we shall have occasion to remark, in the progress of this essay.

According to *Young's* opinion, the natural fertility of *Ireland* is, acre for acre, superior, to that of *England*. The greatest singularity of the island, says that attentive observer, is the rockiness of the soil, but these rocks are clothed with grass. Those of lime-stone, with a  
thin

thin covering of mold, have the most beautiful verdure; sheep-walks seem to be pointed out by nature, as the proper destination for a great portion of the soil of this island.

The abundance of excellent limestone, that is found in most parts of *Ireland* is not only eminently fertile, but affords with a considerable inequality of surface, a great variety of soil, so as to be capable of furnishing a correspondent variety of natural productions; the greatest part of the surface of *Ireland* is adapted to every operation of tillage, yet particular parts are applicable, with superior advantage, to particular destinations.

There are vast tracts of rocky and mountainous ground, these are best adapted for rearing and breeding numbers of black cattle; which are expeditiously fattened, in the rich and moist plains below; and furnish a number of articles for export, which are of great value, and in constant demand; and the mountains and plains, which in concurrence breed fat cattle, that yield all these, could not be tilled, with equal advantage, by the husbandman. Where the soil is both thin and light, on the extensive downs, numerous flocks of sheep may be raised and maintained, and the sheep of *Ireland* afford wool of a peculiar good quality. This country yields an abundance of excellent grain of every kind. The hop plant seems to be indigenous, and grows wild in all our hedges, and may be cultivated here, with the greatest success; so might liquorice, saffron, madder, woad. Rape is actually extensively cultivated in *Ireland*, and returns a large profit to the farmer. It is known that the tobacco plant might be successfully cultivated in this country.

As to flax, which is a plant that requires a rich loam, the success with which it is cultivated, in every part of *Ireland*, shows how well the soil, whose prevailing characteristic is luxuriant fertility, is calculated for its production. A similar soil rendered *Egypt* so famous, of old, for her fine linens.

The deep and boggy tracts of country, which occur so frequently in this island, are chiefly allotted to the production of rape, but would produce inexhaustible stores of excellent hemp, a plant which requires

a deep

a deep and rich earth, and greatly exhausts the soil. Large tracts of ground, which, now, lie wholly waste, and unprofitable, and are a disgrace and deformity to the country, might, were the culture of this important vegetable properly encouraged, produce rich and luxuriant crops; and supply a large proportion of the consumption of the *British* dominions.

Few countries are watered, in an equal degree with *Ireland*. She boasts a multitude of rivers, many of them navigable, and streams innumerable; which wandering over every part of the country, while they refresh the soil, and embellish the rural scene, invite the hand of industry, to lay out bleach greens, establish manufactures, and erect mills, and machinery on the banks.

From her lakes, and number of rivers, which thus intersect the face of the country, in every quarter, *Ireland* derives the most happy capabilities of inland navigation, and were some further assistance lent by art, in opening communications, by cuts and canals, she would afford a cheap and commodious intercourse of all parts of the kingdom with each other, and possess the means of transporting, by water, goods of a bulky and ponderous kind, particularly fuel, which, at present, is a great desideratum in many parts of the country.

Such are the advantages, which the surface of the country offers, nor are the bowels of the earth deficient, in the hidden treasures of the mineral kingdom. Its mines of copper, in the counties, of *Kerry* and *Wicklow*, have long been known, and worked, in a greater or less degree; the same may be said of the rich and extensive lead mines in the county of *Tipperary*. A very rich and exceedingly promising lead mine\* is extensively worked in the county of *Wicklow*, at little more than twenty miles distance from *Dublin*, which is likely to surpass in value, the mines of the county of *Tipperary*. Of the lately discovered gold mine I shall not speak, as its extent and value are

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still

\* Near the glen of Ismail. The disturbances in the county of *Wicklow* put a stop to these works.

still unascertained. Most parts of *Ireland* abound in iron ore, and several mines of that metal were formerly successfully wrought, until the undertakers were compelled to desist by the scarcity of timber. At present a rich mine is successfully worked, at *Arigna* on *Lough Allin*, in the county of *Leitrim*, where, fortunately, iron ore and coals are found in contiguity.

What is of infinitely more utility to the inhabitants, than veins of the most precious metals, *Ireland*, in different quarters, produces culm and coals, more than sufficient for the consumption of the country, were the mines worked with spirit, and the conveyance of this necessary article facilitated, by the completion of canals, to cross the country and connect the lakes and navigable rivers. The collieries for stone coal, in the *Queen's-County*, and county of *Kilkenny*, are well known and extensively worked; so are the collieries of pit coal in the county of *Tyrone*, and at *Ballycastle* in the county of *Antrim*, besides those at *Lough Allin* in the county of *Leitrim*, and several collieries in the county of *Cork*, which yield the common pit or caking coal, in great abundance of excellent quality, particularly the coal pits of the county of *Leitrim*.

There are a variety of mineral substances, which to an indolent and unenlightened people appear of no value, that rightly used may become the *prima* of considerable manufactures, or prove ancillary, in no common degree, to their perfection; and many of these abound in *Ireland*. Ochres are produced, in places without number; a mine of cobalt, a mineral of great use in the manufactures of glass and earthen ware, is said to have been discovered near *Killarny*. *Smith*, who explored the natural history of this country, with some care, asserts that fullers earth and pipe-clay, may be found, in many parts of *Ireland*. He is also of opinion that the *Irish* slate abounds in vitriol, and that copperas and alum works might be advantageously established, in many parts of the island.

*Ireland* possesses inexhaustible quarries of marble, of distinguished beauty, it affords abundance of excellent building stone, lime for cement, and

in



in short, all the materials of architecture, wood only excepted, in the greatest profusion.

Such are the climate, soil, and natural productions of this island—mean-time, her extended shores are deeply indented, with innumerable creeks, and bays; while the immense quantities of fish, which swarm on her coasts, powerfully excite the industry of the people to maritime exertion, by the opulence which they offer to the fisherman, and the profusion of delicious, cheap, and nutritive provisions, which they present to the inhabitants, in general.

Let us now turn to the natural advantages of *Ireland*, with respect to foreign relations and commerce.—Her situation is peculiarly favourable to the encouragement of industry, and advancement of productive labours; placed, as it were, between the new and the old world; communicating readily with all parts of the former, contiguous to the shores of the richest districts of the latter, it seems destined by nature, to enjoy a considerable portion of the commerce between both. The local circumstances of an insular situation—a multitude of commodious harbour opening on every side of the island—numerous rivers—navigable or capable of being rendered navigable, combine with the advantages of its relative position, to favour the industry and commerce of *Ireland*. Add to this, that the ports of *Ireland* are never frozen up, in winter; and that she possesses capacious and safe harbours, opening immediately on the Atlantic ocean, without the difficulty, danger and delay of a channel navigation. An advantage this, which no other country of *Europe* possesses, *France* and *Spain* excepted.

*Ireland*, from her peculiar situation, should be the great depot of provisions and manufactures, for the *West Indian* colonies, which occupied by their lucrative agriculture, (an agriculture, which affords few, if any of the necessaries of life) and the subsequent preparation of the valuable commodities, which they send to us, require to be fed and clothed, by the old world; and depend, not only for most of the luxuries and comforts, but even for most of the simplest necessaries of life, on the parent country.

A somewhat similar statement may be made, with respect to the extensive shores, and numerous population of the *American* republic. On that vast continent, manufactures are yet in their infancy, and likely to continue in that state, a long time; partly, on account of the enormous high price of labour, particularly that of artificans; partly, because agriculture, at present, holds out the most certain rewards to industry, and the *Americans* find it most profitable to employ their whole capital, in clearing the lands, in cultivating the earth, and in exporting the produce; instead of turning any part aside, to speculate in manufactures. Satisfied with the employment of capital, in that mode, which they conceive, and wisely conceive, to be the most advantageous; they are content, to depend for a time, and that time will most probably prove a very long one, for their supply of manufactures, on foreign countries.

With respect to the old world, the situation of *Ireland* is equally favourable to an intercourse with the northern and the southern parts of *Europe*; from the former she draws timber, iron, naval stores, some part of the *prima* of the flaxen and hempen manufactures, or the means of bringing them to greater perfection, such, for instance, are barrilla, silk, cotton, and Spanish wool; and she maintains a considerable commercial intercourse of export with those countries, particularly in provisions, and her linen fabricks.

The commercial prosperity of *Ireland*, and extension of her manufactures are particularly favoured by the vicinity of *Spain*, and the facility of intercourse with that country—a country languishing in indolence, where the spirit of commercial enterprize has been extinguished by the paralytic state of the government; where manufactures, arts, and industry of every kind have been suffered to decay, and are, with few exceptions, annihilated, notwithstanding some feeble and ill-directed efforts to revive them. *Spain*, thus destitute of manufactures in herself, has vast empires annexed to her, under the denomination of colonies, all access to which she guards, with the most jealous care, while the

she endeavours to confine to herself the business of supplying them with various manufactures of the old world, which the new is unable, or unwilling to fabricate for herself; and which old *Spain* is equally unable to produce. This situation of *Spain*, and her colonies affords room for a most profitable commercial intercourse of *Ireland* with that country. In fact, these opportunities have not been wholly neglected; and of late years, in addition to a considerable export of provisions, a very advantageous traffic has been opened, in the manufactures of this country; particularly white linens, of which *Ireland* at present, sends large quantities to *Spain*, for the consumption of her colonies; and unless some unfortunate misunderstanding should take place between the *British* and *Spanish* governments, this trade promises to be permanent, and to become still more extensive.\*

Such are the natural advantages of *Ireland*; and so great are they, that, in the year 1634 the exported commodities of the country are stated, to have been twice as much as the imports; and her shipping is said to have increased an hundred fold. After the restoration, for many years, even down to the year 1688, *Ireland* continued in a very prosperous condition, and was considered as the most improved, and improving spot of ground in *Europe*.

### SECTION 3.

#### *Of certain Disadvantages, under which Ireland labours.*

Before we pass, from the natural advantages of this country, to the manufactures, of which they seem most susceptible; it may be proper, to turn the reverse of the medal, and take a cursory view of some disadvantages of nature, under which this country at present labours. The most prominent are, want of timber, and want of fuel.

What

Want of timber aggravates the expence of building, and, of course, enhances the rent of houses. It encreases, also, the price of machinery, and of all utensils in which wood is employed. This augmentation of price in the habitations of man, in workshops, warehouses, mills, machines, and utensils of trade, must prove an obstacle to the progress of manufactures, and a discouragement of industry, by operating as a tax on the manufacturer. Want of timber operates, also, as an impediment to every sort of industry (agriculture not excepted) by encreasing the price, and consequently acting as a tax, not only on ploughs, harrows, and all instruments of rustic labour, but on all carriages, and machines for the transportation of commodities from place to place. But one of the most serious lights in which the scarcity of timber can be viewed, is with respect to the construction of ships, and its prejudicial influence, both on the commerce, and external defence of a country.

The necessary consequences of the scarcity of timber must be, that fewer ships, boats, and other machines for water carriage, will be constructed, and such as are built will stand the proprietor in greater sums. This will tend, in a double respect, to raise the price of freight; both, by lessening the number of ships, and by encreasing the first cost of shipping. The encreased price of freight acts, as a tax, on commerce and manufactures, in a two-fold capacity; (and both its actions are accumulated to the detriment of industry)—it increases the charge of importing the raw materials of manufactures, for which we depend on foreign countries; and it encreases the charge of carrying our manufactured produce to the foreign market. It lays on the industry of the manufacturer, a tax equal to the accumulated encrease of freight, both for the import of the raw material, and the export of the manufactured commodity; and it subjects him to a disadvantage in the foreign market, proportionable to the full amount of the tax on his industry, and in the home market, proportionable to the encreased price of the raw material.

The

The want of oak woods in *Ireland* not only operates to the prejudice of land and naval architecture, but, the consequent scarcity and dearth of oak bark, (for a supply of which we chiefly depend on foreign countries) are very ruinous to the various manufactures of leather in this country, and too generally lay the people under a necessity, of exporting the hides of their cattle raw, and importing tanned leather.

I may reckon among the disadvantages under which *Ireland*, at present, labours, The spirit of insubordination, the temper of agitation and ferment, the working leaven of revolution, disposing men to wish and look for change and innovation; and, to visionary expectations of sudden opulence, without previous labour, which are highly injurious to the spirit of patient and honest industry. Hence have arisen those outrageous and illegal combinations to enhance the prices of labour, which are a reproach to a country, and must prove the bane of commerce and manufacture. No sooner does an increased demand arise for any branch of manufacture, or any particular kind of commodity, which requires labour in the preparation, but, instantly, the workmen concerned in it combine to extort higher wages. This disposition is most fatal, to the interests of the country at large, and even to the peculiar interests of the wretched men, who blindly sacrifice permanent prospects, and a sense of duty and deference to the laws, to a brief present gain, and indulgence in licence and intemperance. The consequences are, that the country will thus be thrown out of the possession of foreign markets, which are only to be secured, by the cheapness and goodness of manufactures. They discourage master manufacturers from commencing new works, or extending those already established: and, it must be remembered, that the exorbitant price of labour falls with a severe re-action on those who enhance it, and makes them pay dearer, in proportion to their own extortion, for every necessary of life. If the Mason, the Slater, the Carpenter, combine to exact enormous wages from their employers; the Taylor, the Shoemaker, the Hatter, the Weaver, the rustic Labourer will do the same; and thus these foolish and wicked men make their crime its own punishment

nishment, since they became the cause of raising on themselves the price of every article of food and cloathing they consume, of every tool they employ in their respective trades. Let not, then, the combining tradesman, or labourer, vainly imagine, that he shall become richer, or increase his comforts by extorting encreased wages from his employer; nothing can be farther from the truth: for if he gains, on the wages of the one trade exercised by himself, he is sure to lose, in proportion, on all the trades and callings, exercised by all other labouring men in the community: for, to every one of them he will find occasion to resort, in the course of the year, by purchasing some thing or other which it produces. He will find himself obliged to pay dearer, than he otherwise would, for his bread, his beer, his potatoes, his meat;—the hat, the coat, the shirt, the shoes he wears;—for the apparel of his wife and children;—for the room which he inhabits;—the very bench or stool on which he sits, and the tool, or instrument, with which he executes his labour. Thus, by the destructive spirit of combination, the labouring poor are, without being sensible of it themselves, engaged in a cruel intestine warfare of exaction, and eagerly employed, to distress and impoverish each other.

There are two great causes which promote the spirit of unlawful combination by a sort of authority, and the prospect of impunity. The existence of corporate privileges, tending to raise an improvident and impolitic monopoly of employment; and the deficiency of the laws, as they now stand, which do not sufficiently provide for a cheap and summary mode of redress, in all cases, against the violence and outrage of the combining manufacturer. It is a melancholy truth, that, the labouring people, particularly, in the metropolis of *Ireland*, where many manufactures are carried on, and many improvements in buildings are projected, have, with one consent, entered into combinations to raise the price of labour, in their respective departments, to an exorbitancy wholly inconsistent with the prosperity of the country, and destructive of the extension and improvement of manufactures.

But

But the grand desideratum of *Ireland*, with regard to the progress of all manufactures, is fuel. Abstracted from a consideration of the health and comfort of the mere individual, in which point of view, firing must be considered as a most important necessary of life; there is no manufacture, or trade, in which fire is not requisite. In most it is an active instrument, either through the whole, or in some particular part of the process.

Not to speak of glass and potter's ware, of iron works, founderies, and the various branches of hard ware, that work on metallic substances; of breweries, distilleries, and the manufactures of soap and candles; in all of which fire is obviously a chief agent. Quantities of fire are necessary to the linen manufacture;—without fire the spinster cannot spin;—the weaver cannot weave in frosty weather;—machinery cannot be kept in order without *fire*. The boiler, the hot calendar, for glazing linens, diapers, and cottons, require large quantities of fuel. Fire also is employed, in a great degree, in many parts of the cotton manufacture, particularly in finishing velverets, corduroys, and other goods of that kind, some of which are dressed in a very intense heat over hot plates of iron. In the woollen manufacture, the operation of pressing cloaths requires a strong heat, the dyer's vat requires a large supply of fuel. Copper-plate printing through all its branches, requires the assistance of fire. Even carpenters, and cabinet-makers require the assistance of fire, in many parts of their work. Shoe-makers cannot work in frosty weather, without the help of fire to preserve their leather pliable, and their wax of a proper temper. Book-binders, gilders, and many other artists and manufacturers, who might be enumerated in this place, employ fire in almost every process of their trades; and against all these the scarcity of fuel operates, as a heavy tax on the exertion of their industry, and an obstinate impediment, to the progress of their manufactures. But what are these to the ruinous influence of an host of absentees warring against their prosperity?

I hope I shall be excused this digression. The desiderata, and disadvantages of a country ought to be taken into account, as well as

its endowment and advantages; that we may the better judge what manufactures can be profitably pursued, what should be relinquished, as desperate, and where the principal force, of legislative encouragement, or relief ought to be applied.

#### SECT. 4.

*General sketch of Manufactures to which the natural Advantages of Ireland might be supposed to lead her Inhabitants.*

Industry may bring to perfection, may combine, modify, and employ in different productions of art, the productions of nature; she cannot change their essence. Nature is liberal to those who cultivate her; but, it is for man, to follow and embellish, not to force, to violate, or counteract her. Taking nature for our guide, the industry of the country must be various, as the face of nature, in different regions. It must wear one form on the coast, another in the inland province, one among the mountain crags, another in the rich loamy vale. The deep and inexhaustible soil of *Russia* is favourable to the production of hemp; the mountains pregnant with iron, and the vast forests supplying timber to smelt the ore, lead the hardy natives of *Sweden*, to turn up the flinty entrails of the soil. The abundance of the murex on their coasts, formerly led the industrious *Tyrians* to establish manufactories of that precious dye, so famous in the history of ancient commerce.

General fertility of soil, affording an abundant supply of provisions, seems, at first view, equally propitious to every kind of manufactures; as it facilitates the support of all those whose labour is productive, though they do not cultivate the earth. But the nature of the soil, and the kind of husbandry, to which it necessarily leads the intelligent farmer, must have a considerable connection, with the prevalence of one species of manufacture, with which they are connected.

For



For instance, a smooth turf on hills of moderate ascent; a lime-stone rock lightly covered with earth, and producing short and sweet herbage, naturally lead the proprietor of such ground to rear a breed of sheep. The fresh and juicy herbage pours health through the veins of the animal, and improves the quality of his fleece, both as to fineness, and delicacy of thread, and length of staple. The breeding of sheep, and the excellence of their wool, will be still more favoured in a mild and temperate climate, where the air is pure and moderately warm, and the sea-breezes allay the heat of summer, and moderate the cold of winter. In such a climate, the flocks are not scorched or incommoded in summer, nor is the shepherd obliged to house them in the severity of winter. Such happy circumstances of soil and climate naturally lead to an introduction of the woollen manufacture. Such is the climate, and such a considerable part of the soil of *Ireland*.

The soil of *Ireland* is, in many places, as I have already observed, so well adapted to the growth of flax and hemp, that the husbandman must find the cultivation of those useful plants a most productive species of agriculture; and the natives of the country, being supplied with abundance of the raw material, of the best quality, and on cheap terms, must naturally be led, to the extension and improvement of the linen and hempen manufactures.

The natural advantages of *Ireland* disposing the farmers, in many parts of the country, to fatten large herds of black cattle, on rich and rank pasture grounds, which could not be so profitably employed, for any other purpose. The people must be led to slaughter vast numbers of them, and to embark deeply in the trade of saving and exporting provisions; add to this, that the mildness of the winters in *Ireland* is peculiarly favourable to the operation of curing or saving salted meat; in which respect this island has prodigious advantages over *America*, *Holland*, *Holstein*, and other countries, which are led, by the abundance of black cattle, to trade in provisions. This trade, independent of the business of curing and coopering the provisions, introduces a variety of trades and manufactures, which are, in some shape or other,

dependent on, or connected with it; either by supplying them with the raw materials, from whence they are formed, or by proving ancillary to them, in some stage or other of their operation; by certain substances which it affords. Such are the trades of tanners, shoe-makers, saddlers, coach-makers, harness-makers, upholsterers, glovers, bookbinders, parchment-makers, in short, all those artists, who are employed in preparing the hides of oxen, and skins of other animals, and forming them into various utensils, of use or luxury, into different parts of the wearing apparel of men or women, and applying them to various other purposes of life.

Where abundance of cattle are slaughtered, not only for domestic consumption, but for exportation; extensive manufactures of candles and soap may be established. The woollen manufacture also derives considerable advantage from this circumstance. Large quantities of grease and animal oil are furnished for the use of several wool-combers. Even the bones and offal of animals are applied to many useful purposes, and become the foundations of very important manufactures; for instance, glue, which is produced from the feet of sheep and oxen, and shreds of their skins. As to the bones, they are applicable to a variety of uses. Hartshorn is extracted from them; cutlers and turners employ them, in knife-handles, and a variety of instruments and toys. The bones of animals, and the inside of the horns, with the hoofs of oxen, employ a number of people in making molds; a considerable object of industry, trifling as the article, at first glance, may appear. The very blood of cattle has its use and value; being necessary for the process of refining sugar. Blood, together with the bones and hoofs of animals, are applicable to the manufacture of sal ammoniac, and Prussian blue,\* and some other chemical preparations. The transparent part of horn is employed in a variety of manufactures, which it is not necessary here to enumerate. The foregoing catalogue, which is a tolerable long one, may serve to shew, in what various

\* Prussian blue is made of the dried blood, horns, hoofs, bones, and tendons.

rious shapes an abundance of cattle may be the parent of manufactures, or ancillary to them. And to every such manufacture the natural advantages of *Ireland* are adapted.

In proportion, as *Ireland* abounds in metals, and other mineral substances, her natural advantages are favourable to manufactures of every kind, in which those metals, or mineral substances may be employed. The same may be asserted, with respect to the manufacture of salt, and erection of salt-works, to which, we might suppose, the extent of sea-coast would dispose the people of *Ireland*.

So much for the native materials of manufactures. As to the arts and manufactures, whose basis rests on imported substances, *Ireland*, by her excellent situation for trade, and the goodness of her harbours, is equally favourable to all such; and her happy situation for commerce favouring export, is equally favourable, to every species of manufacture.

The number of streams and rivers in *Ireland* is a natural advantage, adapted to every manufacture, without distinction, in which mills or machinery worked by water, may be employed, or where a command of that element is necessary. The abundance and cheapness of provisions is not more favourable, to one manufacture than another; but is propitious, in general, to all.\*

\* The statistical accounts which are coming in from every county of *Ireland*, will have an excellent effect, in bringing the people acquainted with the internal resources of *Ireland*.

## CHAP. II.

*General Observations, on the preference of one Manufacture to another.*

## SECT. I.

*A limited Capital should not embrace too many Objects at once.*

To attempt prematurely, without a sufficient capital, to carry on agriculture, manufactures, and exports, all at once, is not the shortest way, for a society, any more than individual, to acquire opulence. The capital of all the individuals in a nation has limits, in the same manner as that of a single individual; and is capable of executing only certain purposes. The capital of all is increased, in the same manner, with that of a single person, by the accumulation of savings. It is likely to increase faster, when employed in that way, which yields the greatest revenue to all the individuals of the country. The principal cause of the rapid progress of the American colonies, to wealth and greatness, is, that almost the whole capitals have been hitherto employed in agriculture.

When we talk of plans for the improvement of manufactures, and the encouragement of industry; we ought to consider, as well the wants and deficiencies, as the natural advantages and resources of the country. A striking deficiency under which *Ireland*, at present labours, is the want of *capital*, \* a want, which should teach the political economist, to be moderate in his speculations, and to proceed with caution  
to

\* I was much surprised to find a late writer on the manufactures of *Ireland* assert that want of capital is not one of the disadvantages of *Ireland*; this is a new discovery.

to the extension of manufactures. Where the capital of a country is confined, it is obvious, that agriculture ought to be the first and great object, in which it should be employed. Having attended sufficiently to the interests of agriculture, we proceed, in the next place, to the advancement of arts and manufactures. In the present limited state of capital, in this country, it would be perfect madness to embark, at once, in all the manufactures, of which its natural advantages are susceptible; it would prove the certain means of succeeding in none.

Although the opening of new sources of effectual and productive industry gives new nerves to the collective strength of the country, and must, of necessity, be a great object of political economy; we should guard ourselves from the delusion of sanguine or dishonest projectors, deceived, or deceiving, who dazzle us with their magnificent speculations, and detail their plans for public works, commercial undertakings, and the establishment of new manufactures, without regarding the first principles of commerce, or adverting to those rules of plain common sense, which ought to guide every exertion of industry. Nothing is more injurious to the political, as well as the natural frame, than exertions beyond its strength. The natural effect of such exertions will be debility and paralytic disease. To preserve ourselves from such unhappy consequences, we should beware of false opinions of our own strength, whether they proceed from others, or from our own hopes and imaginations.

Many manufactures will at once present themselves to consideration, and contend for a preference. Different manufactures may possess different merits, and found their pretensions on various grounds; it will be necessary to compare them, with each other, and in forming this comparison, the legislator must govern himself, by taking a compound ratio, of merits and demerits. Political economy requires, more than, perhaps, any other branch of science clear ideas, and accurate distinctions; and there is no subject, in which the speculatist is more liable to confusion and inaccuracy, or where they produce more injurious consequences. We see this particularly exemplified, with respect to manufactures.

factures. Few people discriminate sufficiently; when they project the establishment of new manufactures, they are too apt to imagine, that all sorts are equally beneficial to the state; or have no rule to govern them, but the proportional value of the manufactures, that may be worked up in a given time.

Where the means of a country are not sufficient to give activity to the whole range of manufactures, to which the natural advantages of such a country may be adapted; a wise legislator will enquire to what manufactures his attention may be directed with the greatest assurance of consulting public utility. To direct him in making this enquiry, he will consider, not merely the intrinsic excellence and value of the manufacture abstractedly considered. He will weigh other motives of a moral and political nature, resulting from the state of society; the temper and habits of the people, the progress of agriculture, the diffusion of science and industry, the pecuniary resources, the popular prejudices, the form of government, and the foreign relations of a country for all these must have more or less influence, on the prosperity of particular manufactures.

## SECT. 2.

### *Manufactures considered on the ground of intrinsic Excellence and Value.*

Manufactures are to be considered—with regard to the wants and comforts of human creatures in society—the quantity of labour of individuals, or productive industry, that they employ—or the quantity of a pital, that is requisite, to carry them on, with effect. Some manufactures are necessary to the protection of the individual, from the inclemency of the elements—to his subsistence, health, ease, and comfort.—These (to a certain degree) *must* be procured; and of course the arts which

which supply them, must be cultivated, in every country.—Habitations—aliment—cloathing; and the utensils, for obtaining and preparing necessaries of life, among which the most important, perhaps, are the instruments of husbandry—all these, in a superior or inferior degree, in a more rude or perfect form; may be found, among the most barbarous people; for they depend only on the natural wants of man. To these we may add the manufacture of armour, or weapons, for defence, and offence, of which no tribe or nation has been found wholly destitute. Other productions of human labour, depend on the artificial wants, the luxury, the caprice of man, in a more advanced and polished state of society. Productions of the first kind, which I have mentioned, we may call articles of *prime* and *original necessity*, and the manufactures which produce them, manufactures of *prime* or *original utility*. The latter class we may call articles of the *second* or *derivative necessity*, and the manufactures, that produce them, manufactures of *subordinate* or *derivative utility*.

Productions of the first class, will, at all times and seasons, afford a source of employment, to productive labour. The latter class of productions furnishes employment more fluctuating and variable, according to the refinement, luxury, and opulence, of the people; and subject to a thousand changes of fashion and caprice. This distinction ought to engage the serious attention of the legislature; when it comes to consider the various objects of national industry, and to apportion the measure of encouragement due to the various exertions of labour, and the different productions of art, or to consider them as objects of taxation. With respect to the quantity of labour and skill, which may have been employed, in the production of any commodity, and how far it is changed from the rude state of existence, as a *primum* or raw material, the manufacture which, *ceteris paribus*, employs most productive labour, is *ceteris paribus*, most advantageous to the community and legislature.—Butter, for instance, flour, malt, bread, beer, common salt, kelp, pig, and bar iron, and a thousand other objects of commerce re-

quire much less productive labour, to prepare them for the market, than the same iron, when wrought into cutlery and hardware; than pottery, glass, paper, and linen or woollen cloth. With respect to this distinction, we may call the former class articles of *rude*, the latter articles of *consummate* industry. Productions of the first kind are, at the same time, finished manufactures, inasmuch as they have employed some distinct class, or classes of manufacturers, and are in a fit state, for being brought to market; and raw materials, inasmuch as they require to be prepared, for the uses of life and accommodation of man, by other and more exquisite operations of industry, thus, tanned leather is formed into shoes, iron into knives, linen or woollen-yarn into webs of cloth.

There is yet a further distinction, with reference to the intrinsic value of the *primum* or crude material. The labour of man is sometimes employed, on a costly *primum*, of great original intrinsic value. Sometimes, the *primum* is cheap, and of small intrinsic use or estimation, in itself, and the labour of man is all in all. The former is strikingly the case, in the manufactures of jewellery, gold and silver. It is also the case, in a subordinate degree, with regard to the linen, the woollen, the cotton, or above all, the silk manufactures. In the manufactures of watches, of the highly finished kinds of hardware, and toys; of many chemical preparations, for luxury, or medicine; of various ingenious and complicated machines, of considerable price, for different purposes; of mathematical and philosophical instruments; and of arms, of every kind; the *primum* or materials, from whence these different articles are fabricated or constructed, are of small, indeed, comparatively speaking, of no value; the adventitious value of human exertion, in skill and labour, is, as I have said above, all in all. There are yet other fabrics, of a mixed nature, where, though the *primum* itself, is comparatively of little or no value, the manufacture requires an expensive apparatus of machinery, buildings, and offices, costly in the erection, expensive in the repairs, or liable to heavy rent. Here, the various



various matters, necessary for the production of the commodity, must be taken into account, and considered, as a stock in trade, in addition to the supply of *primum*. Such are the manufactures, of linen, wool, and cotton, of paper, glass, of bricks, tiles, and potters-ware, with breweries and distilleries. With respect to this distinction; manufactures may be divided into two classes—articles of *original*, and articles of *adventitious* value.

Articles of *adventitious* value ought to be preferred, to those of original value, for they set in motion an equal quantity of productive labour, at an inferior expence; in other words, unequal capitals produce equal profits; and the return from the manufacture of adventitious value, is much greater, in proportion to what is advanced out of the fixed capital of the nation, on the credit of the manufacture.

There may be circumstances, that, on a comparison of different manufactures, and combination of these principles with each other, may vary the conclusions, that would result, on a first view of the foregoing premises, and from a consideration of manufactures, abstractedly and individually taken.

It may be wise, to encourage the production of an article of *rude* and *inchoate* industry, and great original value, if it is, at the same time, an article of the first necessity; for the wants of the people will require a constant supply, and ensure a ready market; and thus, the smallness of the return will be counterbalanced, by its certainty and quickness.

Where the productions of a manufacture are in such constant demand, for the common purposes of life, that, to procure them from foreign artists, would occasion a great drain of specie, or exchangeable commodities, from the country; and, in consequence of it, a general poverty, which would end in the ruin of all industry, and manufacture; it may be wise to postpone the more lucrative manufactures to such as are more necessary.

It may, at times, be expedient to encourage manufactures of *secondary utility*; if they are either manufactures of *consummate industry*, or

of such small original, and large derivative value, that the stock of national produce, or the capital of the country, will acquire more, by the cultivation of these manufactures, with a preference, than it can lose, by resorting to other countries, for articles of the *first necessity*. It is on these principles that a country, which has brought to perfection a variety of curious and elaborate manufactures, may find it contribute most to public prosperity, to employ its productive hands, in manufactures, and to resort to its neighbours, for a supply of corn; rather than it should employ them, in the cultivation of the soil. On the other hand, if the country yields any productions of the earth, that are of great value, and in general demand, the inhabitants may find it a measure of prudence, to relinquish the general detail of manufacture, to countries less favoured by nature; and attach themselves to husbandry, which offers such advantages, to the branches of manufactures, which are necessarily dependent on it, or with which it is intimately connected.\*

In estimating the comparative excellence of manufactures, or the degree of encouragement, which one may deserve from the legislature, in preference to another, where the natural advantages of the country are equally favourable to many; there is another point of view, in which manufactures may be considered; namely, with respect to agriculture, and their tendency to promote it. Such manufactures as have the greatest tendency to promote agriculture have (*cæteris paribus*) the fairest claim to encouragement from the legislature. The capital, that is acquired to any country, by manufactures and commerce, is all a precarious and insecure possession, till some part of it has been secured, and realized, in the cultivation of lands:

When

\* This is obviously the case in the *West Indies*; the people of the American states also, find it prudent, to employ the whole capital of the country in agriculture, and import the manufactures of which they stand in need. Of late years, however, the political economy of *America* has undergone some change; and, were they not checked by the exorbitant price of labour, the United States would make a considerable progress in manufactures; as it is, they have applied themselves, with much spirit, to the manufactures of cotton, and of paper.

When the capital of a country is not sufficient for all the purposes of productive labour: in proportion, as a greater share is employed in agriculture, the greater will be the quantity of productive labour, which it sets in motion in the country; as will, likewise, be the value, which its employment adds to the annual value of the land, and labour of the society. Capital, employed in the support of manufactures, must, of course, put into motion the greatest possible quantity of productive labour, that a capital employed in manufacture can do; when it supports a manufacture, that, at the same time, promotes, by a necessary influence, the cultivation of land.

Where the manufacture necessarily requires the aid of machinery, in a great degree; or stands in need of shelter for the operators, so as to require the erection of extensive buildings, before it can be properly carried on; or where those, who practise it, must necessarily serve an apprenticeship, before they can acquire a proper knowledge; the establishment of such manufactures must be considered as beneficial to the interests of agriculture.

When such manufactures as these are established in a country, by convening a number of people in one place, who must all be fed by the farmer, they establish a ready market, for the produce of his ground, and that at his very door; and save him the additional expence and labour of sending to a distance, in quest of purchasers, thus, these manufactures, by furnishing the husbandman with a constant supply of ready money, and augmenting his profits, will give energy to his exertions, in the cultivation of his farm.

It is also to be observed, that some manufactures, not only employ directly a number of productive hands, in their immediate object; but also employ a considerable quantity of productive labour, in providing the instruments and apparatus requisite to the commencement of the manufacture. Thus, a large preliminary establishment, in buildings, various tools, and complicated machinery, will employ the brick-maker, the stone-cutter, the lime-burner, the mason, the slater, the smith, the  
carpenter,

carpenter, the joiner, the mill-wright, the rope-maker—these may be stiled manufactures of ramifying or electrical industry, and, from their extensive influence, in diffusing productive labour, particularly deserve the encouragement of the legislature.

I shall conclude this section, with observing, that, as the population of a country constitutes its strength, and population is (*cæteris paribus*) proportionable to the number of people, for whom the agriculture, manufactures, and foreign commerce of the country, can find employment, whereby they are supplied with the necessaries of life; those manufactures, will, if other circumstances are on an equality, most deserve the encouragement of the legislature, which, in the process of their respective fabrics, to perfection, employ the greatest number of individuals; and are most favourable to general industry. But let not this assertion be understood to militate against the introduction of useful machinery, or compendious processes, which abridge the labour of the human hand in any particular branch of manufacture; these though, at first, they seem to have a tendency to diminish the number of persons employed, have a contrary effect.

### SECT. 3.

*Manufactures still further examined on the ground of their intrinsic Excellence and Value.*

When we shall come to apply the principles contained in the preceding section, by making a choice of manufactures; those will deserve, *cæteris paribus*, to be most cherished, which afford the fairest prospect of a constant and regular demand, for the fabrics which they produce. Manufactures, which furnish articles of the first necessity, and have their foundation, in the uniform wants, and feelings of men; are to be preferred to others; (though of a more perfect and elaborate character,

character) which minister to luxury, and are under the dominion of vanity and caprice, though the latter may be productive of greater present profit, as, indeed, is most commonly the case. Luxury is wholly governed by fashion: what it likes to-day it loathes to-morrow.

Where the demand for any fabric is apt to vary; the poor artisan will often be destitute of employment; a circumstance, which is always attended with the most distressful consequences to society.—Intemperance—dissolute manners—robbery and other crimes, the progeny of a fatal marriage between misery and temptation,—formidable riots,—in short, all forms of ill, to which mingled idleness and despair, relaxing every mental faculty, can lead unhappy mortals.

When a manufacture affords a regular and unfailling source of employment; it is not only favourable to public prosperity, but also to private morality. Continual gains, however small, lead the manufacturer to views of accumulation; and the accumulation of capital, in the whole, is made up, by the several accumulations of individuals. Thus is regular employment favourable to public prosperity. With respect to private morality, constant industry, with its attendant gain, will act as a corrective of manners, among the lower classes. In them, the love of gain, to a certain degree, being necessary not only to their own maintenance, but to the preservation of a number of helpless beings, who look to them for subsistence, is not only in itself a virtue, but leads to sobriety, temperance, and all the other negative virtues.

On the contrary, where manufactures are of a fluctuating and capricious kind, like the idle and worthless consumers of them; at one time exhibiting a rapid sale and importunate demand, which can hardly be satisfied, by the utmost exertions of the workman; at another time, languishing, in almost total neglect; at one time producing a return of profit, both to the maker and vender, infinitely surpassing the just proportion of the first cost of materials, and the labour bestowed on them; at another time unfashionable, and despised, rejected in the market, a source of disappointment and despair to the miserable artisans, who took

to them for subsistence; the character of the workman is influenced by the nature of his manufacture.

The great and unexpected gains attending such factories, in their prosperity, often intoxicate and mislead the mind of the manufacturer. He flatters himself, that thus it will always be. He disposes himself to expence and luxury, beyond his situation and means; and adapted to the large gains of the present hour; not to the average of his probable regular earnings. All this produces in him, an increase of artificial wants, and creates a number of false appetites, that render his state more completely wretched, when his evil hour comes, when the manufacture languishes, and the stagnation of demand reduces him to poverty.

The manufacturer seeing these fluctuations of the trade, reflects, on the vicissitude of human things, and determines to make the most of the present moment. He sees the extravagant profits, which his employer and the retailers again, who are supplied by his employer, extort from their customers. He determines to have his share of the contribution, which is levied on folly and fashion. He demands exorbitant increase of wages; if his employer refuses to comply, combination to raise the price of labour, riots, and outrage of every kind succeed.

*Anderson* has a sensible observation, applicable to the comparison of manufactures with each other. "The most necessary study (says he\*) for those who wish to promote manufactures, is to discover what kinds of them can most easily and readily be established, among the people." To those, which possess this qualification, the attention of the legislature ought to be particularly directed. Some of the foregoing observations will be found useful, in the solution of this problem. We may say, in general, that those manufactures may be the most easily established in any country, which minister most immediately to the natural

\* Letters on Scotland.

tural wants, and necessities, of mankind, and that, as the expediency of introducing manufactures of luxury is doubtful, so also is the difficulty of their first introduction.—Great manufactures may still further be considered, with regard to their influence on the health and comfort of the individuals who exercise them, and their tendency to prove noxious and injurious, or offensive to the community at large.

There may be also, perhaps, some trades among the various forms of industry, into which the invention and the avarice of man branches out his labour, which exhibit human nature in a state of debasement, and furnish an offensive and humiliating spectacle. Such manufactures should not, any where, or on any account, be encouraged by the legislature; the commodities should rather be imported.

Some arts and manufactures are injurious to the manufacturer, by the confined and unwholesome posture, in which his work must be performed, or the sedentary habits of life, to which he must confine himself. Others, again, are conversant, about deleterious substances, or induce a necessity, of encountering noxious effluvia. Weaving is a manufacture of the first kind; the preparation of some dye-stuffs, painters' colours, painting, gilding, refining metals, all arts and trades, in which quicksilver is employed, are of the second. The manufactures of lime, of bricks, of tiles, of soap and candles, of glue, of sal armoniac, of musical strings or catgut, are of the third description.\*

With respect to all such trades or manufactures as are strikingly injurious to the health of individuals, or offensive to the public; they are less deserving of encouragement from the legislature than others, many of them are actually necessary, to the existence or accommodation of man, and must be carried on, by some persons or other;

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but

\* They are manufactured from the entrails of animals, drawn out and twisted; I recollect the trial of a presentment, in *Dublin*, against some people, who had commenced a manufacture from the same materials, of the skins or envelopes for *Bologna sausages*; part of the process was, by leaving the subject matters in a putrescent state, till the coats of the intestines were separated. The presentment was allowed.

out, there is no danger of their being abandoned, or of the public wanting the necessaries, or conveniences, which they can supply. There will always be found willing and self-devoted victims of avarice, who will be tempted, by the prospect of gain, from constant employment, superior wages, or the monopoly of a manufacture disagreeable or formidable to the generality. We always find persons ready to volunteer on the forlorn hope of manufactures and industry; and to undertake the most loathsome and dangerous tasks for hire. The painter's colic, or the paralytic attacks, that threaten gilders, do not deter numbers of people from pursuing those walks of industry. All that can be expected from the legislature, with reference to noxious and offensive, but necessary manufactures, is, if possible, to devise, and to establish by law, certain methods, and precautions for rendering the process, and different operations in them less injurious to the individuals, who carry them on, and less offensive to the community. Should that be impossible, the mischief and danger attending these noxious trades should be confined and restricted, as much as possible; and care should be taken, that those only, who gain, should be annoyed and endangered by them. This may be effected, by confining the manufactories of them to lonely situations, far from the vicinity of large towns.

#### SECT. 4.

*Manufactures considered with respect to the political Circumstances, the domestic Habits, and foreign relations of the Country.*

When we come to consider manufactures, with respect to moral causes, of their prosperity and decline, or political motives, that should guide a legislator, in the giving a preference to one manufacture over another,—we must attend to the population of a country,—its capital,—the  
primum,



primum, on which the manufacture operates, whether domestic produce or foreign,—the manufacturing habits, of a country, and whether the manufacture is wholly new and unknown, or already established, and understood. Whether it remains for the people, to establish a character, and gain possession of a market for the manufacture—or whether they have already formed a manufacturing character, and fixed themselves in a market;—whether the productions of a manufacture have a probability of becoming considerable objects of export; whether the manufactures in question, are likely to excite the jealousy, or to suffer, from the rivalry of other countries.

The population of a country, by furnishing abundance of labourers, must render labour cheap, and prove favourable to the extension of manufactures, in general, but the advantages of a full population, and the disadvantages of the contrary situation of a country, will be particularly felt; should the legislature, or an individual, have it in contemplation, to establish a new manufacture. It is an undertaking of some difficulty, (as we shall more fully perceive hereafter) to establish a new manufacture, of any sort. It is long before the inhabitants of a country can be brought to perform the several operations, with such ease, and dexterity, as are necessary for the bringing it to perfection. In a populous district, where the inhabitants are crowded together, so as to be immediately under the inspection of those who may instruct them, the inconveniences are less sensibly felt; but, in a region, where the population is scanty, the people can hardly be brought together in any considerable number, to receive instruction.

The difficulty will be increased, if the crude materials, on which the manufacturer is to work, are not the home produce of the district, but brought from a distance, at considerable expence. No master manufacturer would willingly entrust materials of much value to inexperienced operators, at a distance from himself. He cannot here, as in a more populous district, give a little at a time, so as to be no great loser if the tasks are not altogether well done: for the expence of carry-

ing away the raw materials, and bringing back the manufactured goods, would be more than he could support. On this account, master manufacturers are deterred from settling and establishing new manufactures, in thinly inhabited regions; and the inhabitants, even were they willing to be instructed, are deprived of the knowledge of the new arts.

It appears, that there is still a want of capital in this country; were not this the case, the interest of money in *Ireland* would fall, from the present high rate. It appears, that the market for money, is overstocked with customers, and understocked with the commodity; in other words, that the quantity of money to be lent is comparatively small, when considered, with a reference to the number of persons, who want to borrow. The capital, being thus confined, must be employed, in the way, which will yield the greatest revenue to all the individuals of the country. For a country, in such a low state of capital, to attempt the establishment of all manufactures, at once, within herself; and to prohibit the manufactures of other countries, instead of advancing her progress, towards real wealth and greatness, would retard it; perhaps, precipitate her into ruin. A country, which is conscious to herself of a want of capital, should consider her own deficiency, and be cautious, how she embarks in new, and problematical speculations. Undertakings, that are hazardous, in their first commencement, and require an extensive and elaborate machinery, and costly apparatus, are ill suited to the state and condition of such a country.

Manufactures, which operate on a *primum*, which is the produce of the country, are (*ceteris paribus*) entitled to precedence. In the first place, it is to be considered, that such a manufacture not only sets in motion, the industry or productive labour, of the workmen immediately engaged in the manufacture, but also of the persons, who are employed in raising or preparing the *primum*, on which it operates. The linen manufacture, in addition to those, who spin the yarn, weave the web, whiten it on the bleach-green, and finish it at the calendar, gives employment, to the farmer, who raises the flax, and to a variety of persons

sons, who dress and prepare it for the spinning wheel. So, the woolen manufacture, in addition to the persons employed in its numerous branches, sets in motion the industry of the farmer and his servants, who tend the sheep, and shear the fleece.

The manufacture of shoes not only sets in motion the industry of the shoe-maker, but also of the tanner, who prepares the leather, and in some measure of the farmer, who feeds the ox. The manufactures of hardware and cutlery, not only set in motion the industry of the smith, and of the cutler, but also of the miner, who raises the ore, the refiner, who smelts and prepares it, and of those, who provide fuel, for the various operations on the metal, in its progress to the cutler's shop. Where a manufacture is conversant about an imported material, all this derivative encouragement is lost to the native country, and employed, to excite the industry of a foreign, perhaps, a hostile nation.

In the second place, when a manufacturer depends on a foreign state, for the materials of his manufacture, he is in the power of that state; which, by stopping the supply of those materials, by throwing the manufacturers out of employment, and reducing them to beggary and ruin, may excite tumult, and insurrection, and endanger the safety and happiness of the whole community.

In the third place, an imported primum must be dearer, in proportion to the intrinsic value, than one, which is the native growth of the country. Where the materials are bulky, and the country, which produces them distant, the expence of freight, commission, duties, carriage, and other charges, that attend the conveyance of the material, from a distance, become so high, that it is impossible for the distant manufacturer to sustain a competition, in the foreign market, with those, who find the raw material nearer home. The success, depends on the stupidity and indolence of the nation, that produces the raw material;—a precarious dependence, for the happiness and prosperity of a people. Add

to

to all these, the profit of the importer, which must come out of the pocket of the manufacturer.

A very slight acquaintance with commercial history, may convince us, of the precarious and transitory nature of manufactures, that depend on foreign countries, for their *prima*. *Venice*, and the other *Italian* states, carried on the woollen manufacture, when the rest of *Europe* remained ignorant and uncivilized; but, when other countries, that produced wool, began to manufacture their own materials, the *Italian* manufactures declined. The *Flemings* first perceived their advantages, for a commercial intercourse with the north of *Europe*; and, though they were without wool of their own, yet, being nearer, than the *Italians*, to the countries that produced it, particularly *England*, they were enabled to procure the raw material, on cheaper terms; and, in a short time, to undersell their rivals; and supersede them in the foreign market.\*

The spirit of commerce began to develop itself in *England*, under *Henry the seventh*. His son and successor continued to protect, with all his power, the arts and commerce of the country; the same policy was adopted by *Elizabeth*, and the succeeding princes.—Detailed regulations were established, both, to prevent the degradation of the manufactures in wool, and to promote their advancement, to a state of perfection; and the exportation of the raw material, which for a long time had been the principal export of the country, was restrained by law. When the *English* began thus to direct their industry, to the manufacture of their own wool, they not only were soon able, to supply themselves, but gradually got possession of a great part of the foreign market. Thus, the *Flemings*, not having wool of their own, were unable to bear a competition, with the *English*, when they learned to work up their own raw materials; and lost the manufacture for which they had been so famous.

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\* Wool was for several centuries, the principal and most valuable part of the *English* exports.

It is to be considered, that, in proportion, as the manufacture which imports its primum, flourishes, the demand for the raw material will encrease, and the venders of the latter will enhance their price.— Thus, the prosperity of a manufacture will bring with it a tax, on its own encrease. *Anderfon*\* observes, that, when he wrote, Dutch flax was an hundred per cent. dearer in *Great Britain*, than it had been, twenty or thirty years before that period, when the linen manufactures of *England* and *Scotland* were in their infancy.

When the materials are of home production, the inhabitants being supplied with them, at inconsiderable expence, may make small essays of their skill, in manufacturing them; and being always certain of receiving a price from the merchant, proportionate to the value of their manufactures, they will be encouraged to go on in their attempts. They will produce goods, more and more valuable; and imperceptibly arrive at perfection. The legislature will have an additional inducement, to prefer the manufactures, which employ the raw materials of the country, if the country happens to produce any particular primum, in great abundance, or of distinguished excellence; such were antiently the *flax* and *papyrus* of *Egypt*, such the wool of *Spain*, and such are the wool and flax of *Ireland*.

Suppose equal capitals embarked in two manufactures; one of which operates on domestic, the other, on imported raw materials; the sum employed in the former, will, at all events, set in motion more productive labour, in the country, than that engaged in the latter; and the difference of the quantities of productive labour to be set in motion, will be proportioned, to the sum, which must be sent out of the country, for the first cost, and incident charges of the raw material with interest and a profit on that sum. But, this is not all, the manufacture

\* Letters on Scotland, vol. 1st, page 36. Quere as to the truth of the statement in the extent he mentions?—But though the rise in price may not be so great, as he states, any rise in it, supports the argument.

nufacture which is convertant, about a domestic *primum*, replaces not only more quickly, but more certainly, whatever has been drawn, for its support, from the capital stock, of the society. Materials, produced on the spot, may be purchased, the moment they are produced. They may be purchased, fresh and fresh, as they are wanted. Thus, the money which is to be paid for them need not be idle, or unproductive a single moment, either in the hands of the manufacturer, who uses, the farmer, or other person, who grows, or in any manner produces the commodity, or of the third person, who perhaps negotiates between them, and carries on the business, of transporting the commodity from one place to another.

Indeed, the intervention of a third person, between the grower, or producer of a home material, and the manufacturer is frequently dispensed with. The case is far different, in regard to the foreign *primum*. It must, at all events, remain wholly inert, and unproductive, both on its passage, from the country, where it is produced, to the country where it is to be employed; and also, during the time it continues, in the warehouses of the exporting and importing merchants. Add to this, that it often happens, that foreign productions can only be purchased at certain times and seasons, as where there are great stated fairs and markets, for the commodity; in such case, it may be necessary for the importing merchant, to purchase the article, which he wants, a considerable time, before he has any opportunity of conveying it to the place of its destination. Here is an additional time, during which the commodity, or rather the value of it, to be deducted from the capital of the country, remains inert and unproductive. But this is not all; it is not merely, that a certain portion of the capital of the society, amounting to the first cost and incident charges, with interest and profits of the imported commodity, is kept in prison, and fails of setting in motion productive labour proportionable to its amount. There is yet another evil; the imported commodity, as I have observed, necessarily remains some time inert. During  
this

this time, the importing merchant, who has advanced his money for the first cost, and incident charges, receives no return for it. On whom, then, does this loss of interest, for the period, fall? Not on the merchant;—for, in addition to the sum advanced by him, and a profit for his risk and trouble, he will enhance the price proportionably, and the manufacturer must have the commodity at any rate. The whole loss, therefore, of the interest for this period falls on the manufacturer, and operates for so much, as a further tax on his industry.

Anderfon observes, \* “ If the manufacture is of such a nature, as to admit of being carried on in separate, detached houses, in the country; and may be practised, by any single person, independent of others, it must invariably happen, that the whole of the money that is paid for the working up these foreign materials, flows directly into the hands of the lower ranks of people, often into those of young women and children, who becoming giddy and vain, usually lay out the greatest part of the money that is thus gained, in buying new clothes, and other gewgaws, that catch their idle fancies; and as these are almost always the produce of other countries, the greatest part of this money flows out of the country, again, by innumerable channels, almost as quickly as it arrives. So, that the benefit that results to the community in this case, is far from being so considerable as a superficial observer would, at first sight, imagine.” Thus, the industry employed in working up foreign materials, is too often a strenuous idleness, which, instead of replacing what has been advanced, from the capital of the society, for the purchase of the *primum*, occasions a constant drain of the circulating capital, for the purchase of foreign luxuries, particularly tea, sugar, and spirituous liquors. The foregoing observation of Anderfon, applies particularly to the silk manufacture, several branches of which, as, the winding, the making of lace, of ribbands, and other trimmings, are carried on by children and women, who too often employ their earnings in a manner, neither advantageous to themselves, nor profitable to the community.

\* Letters on Scotland, Vol. 1st, page 38.

## SECT. 5.

*The Comparison of Manufactures with respect to the peculiar Circumstances of the Country continued.*

It should be considered, whether a country has long exercised a manufacture, so as to have acquired, with superior skill, a considerable degree of attachment to it. Where a manufacture has long prevailed, and parents, from generation to generation, have been in the habits of training up their children, to the knowledge of their own art; it is natural for these people to become partial to what seems to have been a sort of hereditary possession in their families. Where a manufacture has been long established in a country, the people must mechanically, and imperceptibly, have acquired more than ordinary skill and dexterity in the different processes, and operations, so as to make their fabricks of superior excellence, and value. They may, even, by long experience, have discovered secrets, by which the process may be shortened, or the fabric rendered more perfect, in point of beauty, durability, or other essential requisites. It will be much better policy, to employ the capital of the country in arts, like these, which are already well understood, and have been successfully practised; and where the produced advantages are already known and ascertained; than, from a spirit of innovation; and on a calculation, probably fallacious, of superior gains, from a new manufacture, to withdraw the capital and labour of the country, from old established fabricks; and set the people, to learn, and exercise new manufactures.

Much



Much time and materials will be lost, in the establishment of a new manufacture. The undertaker will be discouraged; (if his capital is small, wholly disabled;) from the prosecution of his design, by those expensive trials, and probationary losses, that are incident to every new speculation. If, in the prosecution of his scheme, he depends on his own knowledge of the art, and ventures to employ unskilful or unexperienced workmen; his views will be counteracted, his materials wasted and destroyed, by their ignorance and awkwardness. Perpetually thwarted and tormented, by their obstinacy and unskilfulness, he will relinquish the undertaking, in disgust.—Should he import skilful and experienced workmen, from the country where the manufacture is best understood; he will be perpetually defrauded by them, or if this should not be the case, yet, he will be completely in their power, and subject to all their insolence, and exaction. He will fear to exasperate them, lest they should abandon him, after all his expence, in building storehouses, and workshops, erecting machinery, and providing materials. If, wearied out, with their turbulence and extortions, he should return to his original design; and attempt to train young persons, in the art, who are as yet ignorant; in this he will be opposed, by the malignity and jealousy of the old workmen; and he will be driven, at the same time, to contend with the awkwardness and ignorance of the new. He will be discountenanced and discouraged, by the prejudices of the public, inseparable attendants on new undertakings. It will be long, before the workmen will acquire skill, celerity, and address, so, as to expedite their work, in the complete manner, that is necessary to cheapness, and consequently to the possession of a market; and it will be yet longer, before the manufacture will have acquired the superior polish, and accurate manner of finishing, which bespeak the masterly workman, and are the result of innumerable essays, in the course of much time, and experience, forming the eye and hand of the manufacturer, to just precision, and neatness of execution. What I have said in the foregoing paragraphs is, on the supposition, that the capital of the country is inadequate to the support of the old, and the establishment of the new manufacture. In which case,

as I have said, a decided preference is due to the tenant in possession, (so I may call the old manufacture) of the capital of the country.

Supposing even, that the manufacture should not have attained a full maturity and perfection, and yet should have taken root so generally, as to be, in some measure, familiar to the people at large; and to exhibit certain stamina, or even wild shoots, that serve to manifest a disposition in the inhabitants, towards that particular branch of manufacture; and to furnish certain seminal or vital principles, which are capable of being nurtured or ripened into an established manufacture. As, for example, where the country people generally manufacture linen cloth, however coarse, frizes, flannels, stockings, felts, though of inferior quality, and only for their own use; I would chuse rather to engraft a manufacture, on this parent stock, which I see shows life and vigour, than to run the hazard of introducing and planting a manufacture, which is wholly new and exotic. Just so it is, in the cultivation of plants; if we see them grow wild in the hedges, and flourish spontaneously in the fields; we may expect to cultivate them, with success, in the garden; and conclude, that they are indigenous to the country, or well adapted, at least, to the soil and climate.

Another point to be considered is, not only whether a country has acquired skill in a manufacture; but also, whether that skill is known and acknowledged; and the excellence of the country in any branch of manufacture, is clearly established, and so generally promulgated, that its productions are sought, with a preference, in the foreign market. This character, of superior quality in manufactures, is not always perfectly well founded. It must, indeed, be well founded at the outset, and can only be acquired by industry and superior skill. The character may subsist,  
long

\* For instance, English serges bore a particular price, and were in superior estimation in the Dutch market. The criterion of the buyer is a particular manner of folding and packing. Great quantities of *Irish* serges used to be sent to England; they were there new folded and packed, by the *English* factors, who received so much per cent for their trouble, and exported to the Dutch market, under the denomination of *English* serges. Something similar has been done in the making up of white linens for the Spanish market, a considerable house in *Dublin* dealt extensively in that way.

long after the excellence, by which it was first obtained, has become ideal, and a mere name. Whether well or ill founded, such a character is of the utmost importance, in the market; both, as to the rapidity of sale, and as to the prices, which the fabric will bring to the manufacturer. Fine white linens took their very denomination from *Holland*;—*Spanish* fire-arms;—*Norwich* crapes;—*Irish* poplins;—*French* black cloths. The denominations still remain; the superior excellence is probably become ideal. Where a country has once established a manufacturing character, of this decided kind, it should never lose sight of the fabric; it should hold it fast, it should grasp it, as a precious jewel, a national treasure.

There is another consideration, material in estimating the preference, which is due to one manufacture, in comparison with another. It may become a question, whether it would be wise, to divert the capital of a country, or any part of it, to the cultivation of manufactures, in which we are liable to an opposition from superior capital, and superior skill. Are we not bound (*cæteris paribus*) to give a preference to that, which brings with it least danger of rivalry, from richer or more industrious neighbours? Is one country to commit its own ignorance, poverty, fickleness, and despondency, with the wealth, the skill, the perseverance, the established reputation, and the wakeful jealousy of another?—The people of this country are so much inferior to the *English* in point of capital, that they have little prospect of succeeding in any manufacture, where *England* shall oppose their progress. This must be particularly the case, in all manufactures, that are susceptible of much division, and subdivision of labour; or, which may require extensive works, and a costly apparatus of machinery. Large capital, also, comes to the market for the raw material, with superior advantages. As it is able to deal much more extensively, as well as to pay more punctually; it both gets the first choice of the *primum*, and gets it cheaper. So that, procuring the raw materials of a manufacture, of prime quality, and on better terms, than those which the country with a small capital pays for worse goods; the great will be able to under-

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derfell the small capital; and will also drive it out of the foreign market, by the superior excellence of its fabrics.

It is to be observed, too, that superior capital is the parent of superior skill. A small capital will shrink from any loss. It will be intent only on an immediate return. It will not venture to make experiments. On the contrary, the manufacturer of large capital will extend his views; he will not be deterred by present losses, he will make various experiments; the consequence must be the greater perfection of his manufacture.

We must observe, also, that the larger the capital of the manufacturer, and more extensive his dealings are, the more moderate will he be, in his demands of profit. But the smaller the profits with which he contents himself, the better will he be enabled to underfell his competitors, in the market; and he will be able to do this, in so great a degree, that, if any violent competition should arise, the manufacturer with the larger capital, will not only be able to underfell his rival, in the foreign mart, but will endeavour, and often with success endeavour, to dispossess him of his own home market; partly, by giving longer credits; partly, by underfelling the manufacturers even at their own doors; to effectuate which, these rich manufacturers will submit, without hesitation, to temporary losses, provided, that, by so doing, they may discourage and ruin their rivals.

This has been plainly seen in the pains, which the *English*, and *Scotch*, have taken, to introduce the cottons, the calicoes, the fustians, and other cotton fabrics of *Manchester*, the muslins, the gauzes, the kentings of Paisley. Even, under the considerable charges, to which imported muslins and calicoes are liable, the *British* contrive to underfell the manufacturers of *Ireland*, in their own market.

I do not lay it down, as an universal position; that the fear of rivalry, ought, in every case, to deter a country from the prosecution of a particular manufacture. There may be some peculiar circumstances of the country, so favourable, as to counterbalance all the inconveniences of a rivalry. The utility of a manufacture may be so great, the demand for it so constant, or the profits accruing from it so large, that people are encouraged to persevere

severe in it, notwithstanding all the discouraging and baneful effects of a jealous competition. I say, merely, that, where we have rich and powerful rivals, the prospect of success in any manufacture becomes problematical, and the pursuit of it hazardous, and it may be prudent in us, to attach ourselves to other manufactures, where we may find less danger, of competition.

I would be understood to speak only of a competition, with superior capital, and superior skill, which give a decided superiority. There may be a degree of rivalry, which will be far from proving injurious. When the strength of two contending manufactures is fairly matched, the one is a check on the other; and the mutual jealousy only excludes supineness and fraud, the common effects of monopoly; and invigorates the exertions of industry, on both sides. When the manufacture of one country has no more chance in the contest, with the manufacture of another, than a small frigate, engaging a line of battle ship; is it not folly in the legislature of a country to prolong such a fruitless struggle, by the dint of bounties and protecting duties?

Manufactures must be considered, also, with regard to the reception, which, independent of rivalry, they are likely to find in foreign markets; and the return which they promise to bring, either in specie, in the raw materials of their own, or of other manufactures, or, in a quantity of the necessaries not produced in the country, which exercises the manufactures in question. Thus the people of *Lyonns*, in contemplation of the Levant trade carried on extensively a peculiar branch of the woollen manufacture, adapted for composing the turbans of the Islamites.

## CHAPTER III.

*Certain Manufactures considered in Detail, with a reference to the natural and political Situation of Ireland.*

Having laid down some general principles; it now remains, that I should apply them, by considering the principal manufactures of *Ireland*, in detail; and endeavouring to determine, which of them are best adapted, to the natural and political situation of the country.

## SECT. I.

*Of the Linen Manufacture.*

The linen trade replaces three distinct capitals which had been employed, in productive labour; the capital of the farmer, who sowed the seed (supposing Irish flax seed was used,) and produced the flax; the capital of the master manufacturer, who employed a number of laborious hands on the *primum*, in its progress to the perfect state of a linen web at market, and the capital of the bleacher who finishes it for consumption, at the bleach green. In whatsoever point of view we consider *Ireland*; it will appear, that nature, her habits of industry, her peculiar circumstances, her political relations, all concur, in pointing out the linen manufacture, as the prime object of her exertions.

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A circumstance of peculiar excellence, in the linen manufacture, is its intimate connection with agriculture. It not only employs the people actually engaged, in the manufacture itself, but also, the husbandman in raising the *primum*, about which it is conversant. Much of good husbandry consists, in a certain rotation, or interchange of crops; one species of tillage prepares the ground, for the reception of another. Some productions exhaust, some ameliorate the land. A judicious farmer will consider this, and introduce a succession of crops. Among these, flax naturally takes its turn.

The cultivation of flax is attended with very considerable profit; \* indeed, were it not so, we should not see it prevail so generally as it does, in every part of *Ireland*; but as it is a crop, which exhausts the land, it cannot uniformly be continued; other crops (of potatoes for instance) must be substituted; thus the cultivation of flax will lead to a general cultivation of land, and a production of the necessaries of life, in abundance.

In addition to the great quantity of productive labour employed, in the operations of agriculture, to produce crops of flax, vast numbers, of women and children, are busied in gathering, and drying the flax, saving the seed, in steeping the flax to separate it from the oil, and dressing it, to prepare it for the wheel. The circumstance of employing women and children, who might otherwise be a helpless burden on the community, must particularly recommend any manufactures to the protection of the legislature.

The more we consider the linen manufacture of *Ireland*, the more we shall be convinced, that the industry of the country never ought to lose sight of it. Bounties and protecting duties, may enable other manufactures, to keep up a frail existence, and supply a part, perhaps, a small one, of the home consumption: They will never enable them,

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\* Young makes the average expence for rent, labour, and seed, of cultivating an acre of flax, £8. 15s. 2d. and the average value of the crop he makes £15. 8s. 1d.—So the net average profit of the husbandman is near £7.

to gain possession of the foreign market, with the effect and eclat, that attend our linens. The present astonishing prosperity of the linen manufacture should encourage our perseverance, in this branch of industry.

The legislature has, no doubt, exerted itself, in an uncommon degree, and through a long period of time, for the protection of the linen manufacture. Large sums of public money have been expended on bounties and premiums for its improvement; and on the distribution of wheels, and other utensils, for the encouragement of industry. It has endeavoured to bring the manufacture to perfection, and to give it a reputation in the foreign market, by salutary regulations to prevent and punish frauds, and enforce a fair and workmanlike manner of making up the different linen fabrics. It has appointed active inspectors to superintend the observance of those regulations; and it has given a credit and authenticity to the manufacture in every market, by affixing a seal or stamp to each piece, as a test of its having been duly manufactured, and an assurance of its being free from defect in quantity or quality. This public expence, and public care, have produced abundant fruit, and fully answered the benevolent purposes of the legislature.

To shew the vast importance of the linen manufacture, I shall state an extract from the public accounts of Ireland. They make the average yearly value of linen cloth and yarn exported from *Ireland* during thirty years, beginning with the year 1748, and ending with the year 1778, £ 1,228,148—they make the average yearly quantity of linen cloth exported from this country during seven years, ending with the year 1777—20,252,239 yards. They make the average yearly quantity of yarn exported during the same period, 31,475; Cwt. and during those periods the manufacture was almost entirely confined to the province of Ulster.

I have laid it down as a principle, that a manufacture is entitled to distinguished preference, which may be fabricated wholly, or for the most part from domestic materials. This praise is peculiarly due to the linen manufacture. If we except the money, which goes out of the country for flax seed; (great part, or all, of which, might be retained at home, if the  
farmers



farmers would apply themselves to raise flax for the seed) and some of the articles necessary for bleaching, for which, also, equivalents might be found in the country;\* all the money advanced from the capital of the society, to set in motion the linen manufacture, circulates within the society itself. From the very moment of the seed being first put into the ground, to the very time of its being exhibited in the market, (after its passing through innumerable hands, and undergoing various operations, and multiplied changes,) in the form of a piece of white linen, every thing is the native growth of the soil, every thing the productive labour of the inhabitants of the country.

The linen manufacture possesses another excellence; it carries the productive labour of the workman to the highest pitch of value. The acquired, or artificial, value, which the skill and exertion of the manufacturer bestow, in the progress of the manufacture, is greater, in proportion to the intrinsic value of the raw materials in the linen manufacture, than in most others. The same parcel of flax may be made into a piece of common linen, worth two shillings the yard, or into a piece of cambric of twelve times the value; merely, by different exertions of the spinners and the weavers. Where a manufacture, being capable of such progressive excellence, offers superior advantages to superior industry and skill; good policy points it out, as an object deserving peculiar encouragement.

It is to be considered, that, the fountain head of power, and the seat of imperial government are fixed in *Britain*. Superior wealth, more forward civilization, more advanced knowledge; all these concur to give the neighbour country such decided advantages, as leave to *Ireland* small hopes of success, in a struggle for a share of those manufactures, which *England*, may wish to reserve to herself. Fortunately, by the compact which took place, when the woollen manufacture was proscribed in this country, the linen manufacture was not only suffered, but encouraged to grow and encrease; and now, it has taken such deep root,

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\* By a due attention to modern improvements in chemistry, it is probable we might supply ourselves with bleaching materials.

and attained to such vigour, that it is not in the power of *England*, were it in her will, to shake its stability. As to the linen manufactures of *England*, or *Scotland*, they do not seem to be such favourite objects of industrious exertion as some others; and were they to become such, we have already so far outstript the neighbour countries, in this walk, that it will be impossible for them to overtake us. The linen manufacture, therefore, is the only one, in which we stand wholly clear of the rivalship of *Britain*.

As to the rivalship of the *Dutch*, the *Flemings*, and *French*, they may surpass us in the more elaborate, or costly linen fabricks; damask table linen, lawns, and cambrics; to which we may add, fine thread laces, the manufacture of which they possess almost exclusively. They cannot come into competition with us, as to that kind of fine white linen, which is adapted to common use, as a part of wearing apparel, and is, indeed, an absolute necessary of life, to all people in the superior, and even in the middle ranks of life, in most parts of the world. As to delicacy of texture, and dazzling whiteness of hue, the fine linens of *Ireland* stand unrivalled. The people of France, and of the Netherlands, manufacture linens firm and durable, but they fall short of the *Irish* linens, as I have said, in beauty. The northern parts of *Germany* may perhaps excel, in the manufacture of sail cloth, and of other coarse linens, that may be equal if not preferable to those of *Ireland* for particular purposes.—The sheeting of soldiers and sailors, the trowsers of the latter, tents, the shirts and jackets of negro slaves;—but these linens are of too coarse and harsh a texture, to enter into competition with those of *Ireland*, as to the purpose of their being worn about the persons of the delicate, and opulent. The number of streams and rivers in *Ireland* are peculiarly favourable to the linen manufacture, in many respects. In the first place, all flax abounds in a certain oil, which, if it were suffered to remain in it, would always render the thread of a dark dusky hue, and make it impossible to bleach it. And this oil abounds most in flax of the best quality: an access to water, therefore, is necessary to prepare flax, before it can be manufactured; for it is only by maceration in water that it can be separated from

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its oil. But in this respect *Ireland* is particularly favoured by nature. Scarce a farm, scarce a field is destitute of water. The number of streams, and the command of water are favourable also to the establishment of bleach greens, and the erection of mills and machinery, for the purpose of finishing the linen fabricks.

I have already remarked, that the atmosphere of *Ireland* is considerably moister than that of *Britain*, and of most other countries; and that more rain falls in this island, than in most other places. These circumstances may render the climate of this country less pleasurable,—perhaps, less apt, for the perfection of certain manufactures; but they are certainly favourable to the linen manufacture. The moisture of the air, in general; the heavy dews, and frequent showers must very considerably facilitate the process of bleaching. Linen is so necessary an article of wearing apparel; its lightness, its soft, and smooth texture, its durability, its property of bearing to be washed incessantly, while it lasts, without undergoing any very perceptible change in its dimensions, or other properties.—All these qualities render it peculiarly fit for under garments.

That linen has been an article, not only of luxury, but of comfort, from the oldest time appears from the History of Commerce. We know in what esteem the fine linens of *Egypt* were held. At the revival of commerce the linens of *Holland* and *Flanders*, were in equal repute; and the fine linens of *Ireland*, at present, are not inferior in repute or demand. The linen manufacture, therefore, is one which can never decline, or be subject to the caprice and vicissitudes of fashion. The demand, it is true, may vary\* in some degree, from the influence of war, and other causes. For instance, a rupture with Spain, which now takes a large quantity of our linens, both for home consumption, and for the use of her colonies, would occasion a considerable decrease in the export of our linens. Yet the home consumption, the *English* market, the extensive continent of *North America*, which now affords a large and regular demand for our linens; the direct exportation from this country to the *British* colonies in the *West Indies*; all these united must produce such

\* At present it is to be lamented that the linen manufacture seems rather to have declined.

an extensive circulation, as scarcely any other single manufacture ever did, or now can boast, and, notwithstanding some slight variations, must maintain the linen trade of *Ireland*, in a state of unexampled prosperity.

I cannot subscribe to an observation, which I find adopted by the late ingenious Dr. Crump; from Mr. Hutchesons pamphlet, on the *commercial restraints of Ireland*.—He reprobates the idea of making the linen manufacture general, throughout this kingdom, and lays it down, as an axiom, that no populous and commercial country, ever subsisted on one manufacture alone.—The example of ancient *Egypt*, should lead us, to question the soundness of this maxim. *Egypt* carried on but one manufacture, that of fine linen, with which she supplied the whole world, in those days; or if we should think that of *Papyrus*, sufficiently important to be taken into account; she subsisted on two manufactures, and no more, in addition to her agriculture; and subsisted in great wealth, strength, and glory. It may be doubted, indeed, whether *Egypt* was strictly a commercial country, as she did not export her own productions, the *Egyptians* having a superstitious abhorrence of the sea, but *Egypt* was certainly a most flourishing and populous country, and carried on a great export of her productions, in foreign bottoms. I think therefore, her example sufficient, to prove the assertion ill founded. I am apt to think that *Ireland* by the fertility of her soil, and the bent and habits of industry now settled in her people; is not only qualified, but *inclined to become the Egypt, of modern commerce*.—The linen manufacture is making a rapid progress in the province of Connaught; in one county—Mayo,—there are already three great linen marts, namely, Westport, Castlebar, and Ballinrobe.—In Munster, great quantities of coarse linens are made.—So far was the legislature of *Ireland* from acting on such ideas, as influenced these writers, that they have endeavoured, to diffuse the linen manufacture, as widely as possible, and establish it generally throughout the kingdom—for this purpose a law\* passed; “that when a convenient piece of ground could be procured, in the shire or county town, of any county, in the provinces of Leinster, Munster,

\* 19. Geo. 2d. cap 6. § 32.

“ Munster, and Connaught, and should be duly assigned, or conveyed, with one approbation of the grand jury, for that county; such grand jury, may then present money for building a public ware-house, or market-house, in which flax, or hemp, or flaxen, or hempen yarn, may be lodged, and exposed to sale; and also the sums in question are appointed, to be levied from the county.” Their amount\* might prove inadequate to the end proposed, but the law serves to show the sentiments of the legislature. There is another clause†, in the same statute, equally expressive of their opinion; by it—“ no toll, custom, or duty, shall be paid for linen, or hempen cloth, linen or hempen yarn, hemp seed, flax seed, hemp, flax, potash, looms, wheels, or hatchels, for, or by reason of their being brought to any market, or fair, or by reason of their passing over any bridge, or thro’ any town, or place, turn-pike gates excepted.” Indeed, the fertility of soil in many parts of Munster, and Connaught, and the advantage of excellent harbours for the exportation of the manufactured fabrics seem, to point out these provinces for the favourite abodes of this great, and most improveable manufacture.

It is to be observed, that the position of *Ireland*, in the map of the world, is such, as should lead her, to an intercourse, with *Spain*, *America*, and the *West-Indies*: and in fact, such an intercourse prevails, *Ireland*, therefore, should apply herself to the production of such commodities, as will the most readily find a sale, in those countries; in which point of view the linen manufacture, thro’ its different members clearly holds the first place.

*Ireland*, has been near a century, in the habits of carrying on the linen manufacture, thro’ its various branches; she has acquired consummate skill in its different operations, established an high character,‡ for the excellence of her productions, and is in possession of great regular markets

\* £500 for building the market-house, £15 per annum for the salary of the officer.

† § 37.

‡ Some late injudicious experiments in bleaching have somewhat shaken it.

markets, for the sale of them. *Ireland* being most auspiciously circumstanced in these respects; it should be her study, to maintain herself in such golden advantages, by uniform exertions of industry and care. She should beware of deserting or even cramping a manufacture so firmly established, and endowed with such capabilities; for airy and problematical speculations.

I shall conclude this section, with a quotation, from Sir William Temple.\*

“ The soil produces flax, kindly and well; and fine too, answerable to the care used in the choice of seed, and exercise of husbandry, and much land is fit for it here, which is not so for corn. The manufacture of it, in gathering and beating, is of *little toil and application*; and so the *fitter for the natives of the country*. Besides, no women are apter to spin it well, than the *Irish*, who, labouring little, in any kind, with their hands, have their fingers more supple and soft, than other women of the poorer condition among us. And this may certainly be advanced, into a great manufacture of linen, so as to beat down the trade of both *France* and *Holland*, and draw much of the money, which goes from *England* to those parts, on this occasion, into the hands of his majesty’s subjects of *Ireland*, without crossing any interest of *England*; for, besides what has been said of flax and spinning, the soil and climate are proper for whitening, both, by the frequency of brooks, and also of winds in this country.”

Notwithstanding the great degree of importance which is justly ascribed to the linen manufacture, its universality and value are not, even now, appreciated as highly, as they deserve. I have heard it asserted,—I have seen the assertion in print, that the linen manufacture is confined to one province—*Ulster*,—or, at least, is cultivated to a very trifling degree, in other parts of the kingdom. This is a very gross mistake—for instance, the linen manufacture is greatly extended, and flourishes in a very high degree, in the province of *Connaught*, where it may

\* See the octavo edition of his works, vol. 3, page 14.

may now be considered as completely established, since in that province there are now three great regular markets for unbleached linens, and many considerable bleach-greens. In *Munster*, too, the linen manufacture is very generally prosecuted, and great quantities of flax are raised.—Almost every farmer manufactures linen, for his own consumption, and large quantities of coarse linen are constantly to be seen for sale in every market-town. In the county of *Kerry*, in particular, there is a great and general manufacture of that species of coarse linen, called *dowlafs*, and large quantities are exported thence to *Lisbon*, from the port of *Dingle*.—The linen of this description made in *Munster*, is vastly superior in quality, to that which is produced in the *North of Ireland*, because as it is said, in the latter province they employ only the refuse of their flax, in the coarser fabrics; whereas the contrary is the practice in *Munster*.

## SECT. 2.

### *Of the woollen manufacture.*

It has been proved in an interesting essay, by the excellent President of this academy,\* that *Ireland* was possessed of an extensive trade, and had arrived at great excellence, in woollen fabricks, at a very early period; and long before this manufacture became an article of export, from *England*. Indeed, the nature of the soil and the climate of *Ireland*, are peculiarly adapted, to the woollen manufacture. The fine herbage of her sheep-walks, her mild winters, and moderate summers, tempered by breezes, from the sea, are calculated to produce wool of the very best quality, and formerly *Ireland* produced great quantities of excellent wool, though the quantity of Irish wool is now small, and the quality deteriorated.

The maintenance of sheep has one advantage, over most other species of farming, that, while the wool, and flesh of this useful animal afford

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\* This Essay was written, while the late lamented Earl of *Charlemont* was living, and President of the Royal Irish Academy.

an immediate return of profit, there is no more speedy or effectual means of ameliorating a poor and barren soil, than the depasturing it with sheep—The dung of sheep is esteemed a more fertilizing manure than that of any other domestic animal, so that if they be folded in proper places, in the neighbourhood of their pasture ground, these spots will be so much enriched, as to be capable of producing abundant crops of grain; and if these spots are laid down to grass again, before they are too much exhausted, they will ever after continue to carry more grass than formerly. This would render the same field capable of nourishing an additional number of sheep, which would yield a proportionably greater quantity of manure, and so the improvement of the soil might go forward *in infinitum*. Nor are the improvements of this kind of husbandry confined to arable land; the mountainous country, that does not admit tillage, experiences it, and land thus improved, ever after produces more grass.

The most mountainous part of *Ireland* will maintain sheep. Many districts, particularly the counties of *Wicklow* and *Kerry*, and considerable parts of the counties of *Clare* and *Galway*, are particularly fitted for breeding and nourishing large flocks of sheep. In fact, a great part of the land of *Ireland* would make excellent sheep-walk, were it not in many places more profitably employed. Add to this, that the mildness of the climate renders it unnecessary to house the sheep in winter. From these concurring causes, it results, that *Ireland* produces\* the primum of the woollen manufacture of the most excellent quality, in the greatest abundance. In such high estimation was the wool of *Ireland*, and so productive was the country, of this valuable commodity, that, during a long period of time, notwithstanding the most strict and prohibitory laws, and the utmost vigilance of government, vast quantities of Irish wool were constantly exported to *France*, by stealth, and ample fortunes were

\* Or may produce. I have heard it asserted, that the number of sheep, in *Ireland*, is much diminished, and I believe the fact to be so.



were accumulated, particularly in the western parts of *Ireland*, by that illicit commerce.

In addition to these advantages of soil and climate, every part of this island abounds in rivers and streams. These not only facilitate the operations of washing the sheep, and cleansing their fleeces; but also the erection of fulling-mills, and other machinery, worked by water, necessary in the business of a clothier. Not to mention that there are other processes, in the course of the manufacture, which require a command of water, *Ireland* would, with proper cultivation, produce those vegetable substances—woad and madder, which are chiefly used in dyeing woollens, particularly the cheaper fabrics; and the number of cattle slaughtered in this country, is so great, that the wool-comber is constantly supplied with abundance of animal oil, so necessary to his part as the manufacture. We are also assured by naturalists, who have explored the mineral productions of *Ireland*, that it produces fuller's earth, and pipe-clay, were the industry of the inhabitants properly exerted, to obtain those useful substances.

The woollen manufacture is one (if we except the finest kinds of cloth, manufactured either wholly, or for the most part of Spanish wool,) in which the primum, at least in the numerous branches, which do not require dye-stuffs, is entirely of domestic growth; and, on this account, it is entitled to a preference over others, that import their prima; particularly in a poor country, like *Ireland*.

Another advantage of the woollen manufacture is, that it admits a division of labour almost infinite. It is also applicable to an endless variety of purposes; it assumes a boundless variety of forms, and branches out into a boundless diversity of trades, employing multitudes of people, and among these a great proportion of women and children.

Another advantage of the woollen manufacture is, that it gives great scope to the industry and skill of the workman, and is capable of great progressive excellence; so that the value of the finished fabric, in proportion to the first cost of the raw materials, may be rendered greater,

in the woollen, than in most other manufactures. It is also applicable to so many different purposes of life, assumes such a variety of forms, as I have said, and puts forth so many different ramifications from each of its branches, that there is endless scope for the inventive genius and skill, of the intelligent workman.

The different kinds of excellence, at which the woollen manufacture may aim, are almost as varied and numerous as the branches of the manufacture.—Softness—lightness—warmth—firmness of texture—durability—brilliance of dye—according to the various purposes, for which the manufacture is intended. A philosophic observer will be struck with astonishment and delight, when he considers the woollen manufacture; for there is none, in which the ingenuity of the commercial spirit, in which the triumphant industry of man appears so conspicuous.

The woollen manufacture, though it sometimes sacrifices to fashion, and ministers to vanity, deals, for the most part, in articles of the first necessity; indispensable requisites of wearing apparel for both sexes, of household furniture, as blankets, carpets, curtains, hangings, and many other things, the linings and trimmings of carriages; such things, as in every part of the world, in all changes of times, and variations in the manners of men, must be in universal demand,

The boundless capabilities and incalculable value of this manufacture appear, from what it has effectuated in *England* and *France*: and the jealous solicitude of the former country, to engross it to herself, was such that she considered it as a more valuable object, in itself, than the linen manufacture, as may be collected, from the address of the English House of Commons, on the subject, to King *William*; and from her suffering *Ireland* to retain possession of the latter manufacture, by compact. To the beneficial effects of this manufacture, we may chiefly attribute the prosperous situation of *Ireland*, at the time of the revolution, and for some years after; which was such, that in the year 1698, the balance of import and export was 419,442*l.* in favour of *Ireland*—a great sum in those days!

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\* See the able and useful pamphlet of the late Provost *Hutchinson*, on the commercial restraints of *Ireland*.

The prohibitory laws\* of William the Third, were meant to give a death wound, to the woollen manufacture of *Ireland*; and nearly accomplished the cruel and mistaken purpose. The keenest misery overwhelmed the land; numbers of its most useful inhabitants were at one stroke, deprived of the means of subsistence; and left, to perish by famine; or rescue themselves from that sad destiny, by voluntary exile. It is observed, that the history of no fruitful country, enjoying peace, and not visited by pestilence and famine, during eighty years, can produce so many instances of wretchedness, as appeared in *Ireland*, during a period of that length, which succeeded the proscription of her woollen trade. During this whole time, *England*, with a full possession of the monopoly, combined all the exertions of superior capital, and superior skill. The deliberate and continued injuries of *Britain* at length roused the suffering nation; and the commercial restraints of *Ireland* were removed; but the cordial, as far as respected the woollen manufacture, nearly came too late, the patient, exhausted under a series of cruelties, merely struggled for a sickly and precarious existence.

Yet, though such pains were taken, with a jealous and murderous severity, and that during most part of the present century, to eradicate the woollen manufacture of this country; it had taken such deep root, that some stocks and suckers are every where to be found; and serve at once, to show its past flourishing state, and give hopes of its renovation. Branches of the woollen manufacture, some, more rude, some more perfect—woollen yarn, frizes—flannels—rugs—blankets—serges—hose—felts—carpets are fabricated, in various degrees, in most parts of the island; some of them to a large amount, and the people are generally initiated in the rudiments of those arts, that operate on wool. There are parts of *Ireland*, in which this manufacture must be considered

\* An act 10 and 11 William 3d, Sec. c. 10—3d Geo. 1, c. 21—4 Geo. 1 c. 11. 6 Geo. c. 21. 5 Geo. 2. c. 21.—making it penal to export any wool or woollen drapery from *Ireland*, to any place except *England*; or to put the same in any vessel, with an intent to export them; and enforcing these restrictions, by a variety of penalties and regulations.

dered as in a thriving state. *Kilkenny* produces a considerable quantity of blankets, and this manufacture might be extended to such a degree, as to supersede the necessity of importation. The carpets of a coarser kind made in *Ireland* (and the quantity is very considerable, particularly in *Dublin* and *Cork*) are much superior, in quality to those of the same kind, which are fabricated in *Scotland*. The town of *Carrick-on-Suir* carries on the clothing branch of the woollen business, with some spirit; a good deal is done, in the same branch, both in the city of *Cork*, and in other parts of that county; and I have seen specimens of superfine cloths produced by manufacturers in *Ireland*, not inferior to those of *England*. The manufactures of flannel, and other coarse fabrics, which are wholly composed of native wool, are in a most flourishing state in the county of *Wicklow*, and the woollen market of *Rathdrum* is already become a regular and well established mart.\*

Where rural and domestic manufactures of any fabric become general, through a country; they diffuse a knowledge of the art, and serve as a kind of schools, in which the people are trained up, in the rudiments of the manufacture. ¶ This renders it much more easy to form large establishments, for the production of the fabrics in question. The village and agricultural artificers acquire such a knowledge of the trade, as, at least, fits them to receive the instructions of the finished master manufacturer, with profit, and such a competent degree of skill, that the wholesale employer may venture, to entrust them with his materials, without incurring the danger of their being spoiled. Such is the present state of the woollen manufacture in this country. I think, therefore, that although it is far, very far, from being at present, what we may call, on the whole, a flourishing manufacture, it must be considered, in

\* In speaking of the county of *Wicklow*, it would be injustice to pass over the exertions of the *Allens*, who have established in that county a manufactory, which employs a vast number of persons, and promises to vie with the great undertakings of a similar kind in *England*. The reader will readily perceive, that the whole of this Essay was written long previous, to the late lamentable disturbances, which convulsed this country.—What *Ireland* may hereafter become, it is hard to say.

in the light of a manufacture well established in the country; and in which the people have acquired competent skill, from their having exercised it a long time. Strong motives these, to induce the legislature to view it with favourable eyes, and bestow on it some portion of their care, and some degree of encouragement.

It must not be concealed, however, that the woollen manufacture labours under serious disadvantages; and has formidable difficulties to encounter, in its progress to perfection and prosperity. It has been deprived of its reputation, that immediate jewel of a manufacture, as well as of a mind. It has been cast down, from its station of eminence, and no longer possesses that good name, which is such an imposing passport to the foreign mart; and now the powerful rivalry of *France* and *England* make it very difficult, for the woollens of *Ireland* to find a place in the markets, which are preoccupied by the superior skill and capital of the neighbouring countries.\*

The want of capital in *Ireland*, is a dead weight, that hangs on the woollen manufacture, as well as on many others, and retards all advances to improvement and prosperity. The finer branches of this manufacture require large store-houses, extensive tenter-fields, great ranges of buildings, for the different operations of the manufacture—workshops—drying lofts—dyeing houses—vast quantities of materials must be accumulated, a variety of complete and expensive machinery must be erected. To provide all establishments on such a large scale, as alone makes a manufacture profitable, a considerable capital is requisite. Add to this, that the important and costly materials, Spanish wool, and dye-stuffs are had at the worst hand.

The want of fuel, which prevails in many parts of *Ireland*, must operate, to prevent this manufacture from becoming as general, as it might otherwise prove; both by rendering the country less populous in the districts, which labour under this inconvenience; and by the increase of expence, which it necessarily induces, in several processes, as the

\* Notwithstanding the distracted state of *France*, the woollen manufactures at *Abbeville* and elsewhere, are said to be in a flourishing state.

the dying, the pressing, &c. of the woollen fabricks, for which a considerable application of fire is necessary.

But the grand disadvantage is the superior price and scarcity of wool in this country, and the present inferior quality of the Irish fleece, to whatever cause we must ascribe the change. *Young*, in his tour makes the average price of wool in *Ireland* 13s. 8d. while its average price in *England* is but 9s. 3d. the stone; a difference of 47 per cent. What an influence this must have on the price of the manufacture is obvious. In fact, it is such an advantage, in favour of the *English* manufacturer, as must nearly if not fully countervail those, which the artisans of *Ireland* enjoy, in the cheapness of provisions, and lightness of taxes. But still worse, our wool is not now fit for the manufacture of broad-cloths.\*

Another disadvantage under which *Ireland* labours, is a deplorable deficiency, in many branches of useful knowledge, which might be made subservient to the prosperity of the woollen manufacture. The science of mechanics is in an imperfect state here, compared with what it is in *England*. Chemistry is little studied, and its principles are known to few in this country; yet both these parts of science may be employed to the most important purposes, in the woollen manufacture; by the application of the mechanic powers in machinery; and by improving the art of dying, through an examination of colours, their properties and effects.

\* Yet *Ireland* is fitted by nature, to produce excellent wool. The scarcity of the commodity may be explained, from the great quantity of sheep-walk now turned into tillage; the bad quality of the wool, from inattention or error in the breeders of sheep, who consider the shambles, not the workshop.

## SECT. 3.

*Of the Cotton Manufacture.*

I come now to the cotton manufacture, which has already obtained considerable footing in *Ireland*; and employs a large portion of productive capital, and useful industry. The astonishing progress of the cotton manufacture is partly to be ascribed, to a great and general revolution of fashion in the furniture of houses, and the wearing apparel of persons of both sexes, which has substituted the light, cheap, and elegant fabrics of this manufacture, for the more costly and cumbersome trappings of silk and woollen-velvets, sattins, the silk damask, and heavy flowered silks, for wearing apparel, velvets, silk, and stuff damasks, paragon and morines for furniture, which were formerly in universal use.

The progress of this manufacture in *Great Britain* is something almost miraculous.\* In the year 1768, the cotton trade of that island did not return to the country more than 200,000*l.* for the raw materials, combined with the labour of the people; and at that period, and before the introduction of water-machines, and hand-engines, the power of the single wheel did not exceed 50,000 spindles employed, in spinning the cotton wool into yarn. In a little more than twenty years, from that period, the power of spindles thus employed exceeded two millions, the gross returns, for the raw materials and labour exceeded seven millions.

It was about the year 1784, that the expiration of Sir Richard Arkwright's patent caused the establishment of water-machines, for the

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spinning

\* See Aikin's history of *Manchester*, and a pamphlet on the subject, written in the year 1787. Since that year its population is much increased, and the number of engines is daily increasing.

spinning of cotton warps, in all parts of the country; with which the hand-engines for the spinning of weft, have kept proportion. In the year 1788, an accurate writer, who considered this subject, stated the machines employed in this manufacture as follows.

Water-mills or machines,	- - - - -	143
Mule-jennies or machines of 90 spindles each	- -	550
Hand-jennies of 80 spindles each,	- - - - -	20,070

Of the water-machines 124 were in England, 19 in Scotland, those in England were disposed thus—

Lancashire	41	Cheshire	8
Derbyshire	22	Staffordshire	7
Nottinghamshire	17	Westmorland	5
Yorkshire	11	Flintshire	3

These establishments, when in full work, are estimated, to give employment to 26,000 men, 31,000 women, and 53,000 children; and in all the subsequent stages of this manufacture, the number of persons employed is estimated, at 133,000 men, 59,000 women, and 48,000 children; being an aggregate of 159,000 men, 90,000 women, and 101,000 children, in all 350,000 persons employed in this manufacture! who manufacture twenty-two millions of pounds weight of the raw material!\*

Thus, in twenty years 200,000*l.* becomes seven millions, and 50,000 spindles employed in the manufacture become two millions. Such are the magic effects of industry, and such the wonderful progress of the cotton manufacture. In *Ireland*, its progress has been less rapid, in proportion to the capabilities of this manufacture; yet, much has been done; and fair hopes of success, in this branch of industry, may be entertained, and the legislature of the country has shown a laudable solicitude to encourage and protect, in the infancy, the cotton fabrics of the country. Though the first attempts in this department were less successful, than might be wished and expected; they have received the support and encouragement of the legislature, which has endeavoured

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\* It must be recollected, too, how many years ago this calculation was made, and the manufacture has increased wonderfully since.



to secure to the cotton manufactures of the country the possession, at least of our own home market, by duties imposed on the importation of all muslins and calicoes, except of the manufacture of *Britain*, and a duty of one shilling per yard on calicoes painted or stained, without exception.\*

It may be proper, with respect to the cotton manufacture, to state the disadvantages, under which it labours, and indeed must continue to labour, in this country; as I have done with respect to the woollen manufacture.—The *primum* of this manufacture is not only the produce of foreign regions, but all those regions are far remote—the *Levant*—the *West Indies*—*South America*. This, in the very first instance, adds a considerable charge for carriage, to the first cost of the commodity. In addition to its being the growth of distant countries, cotton is an article of very great bulk, it requires a vast deal of room for stowage, a circumstance that still further enhances the price of freight, and storage. To crown all, the first cost of cotton, on the spot where it is produced, is very considerable; so that when this comes to be added to the freight, and all the other expences incident to the importation, together with the profit of the merchant importer;—a very large sum, (most part of which goes out of the country, often to return no more) is drawn from the manufacturer, for the raw materials of his art; before he can set his people to work.

The supply of *primum* depending on such distant regions, must become very precarious, in the event of a foreign war. The charges of insurance and increased price of freight will, at any rate, injure the prosperity of the manufacture; by rendering the *primum* both scarce and dear; but if the supply, by the capture of ships, or their being prevented from sailing by the enemies' cruisers, should totally fail; a numerous body of workmen will be entirely thrown out of employment, and left with their families, a prey to famine.

It may be objected to the cotton manufacture, that most of its branches minister almost entirely to luxury, either in finery or furniture;

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\* It must be remembered all along that this tract was written long prior to the Union of this country with *Great Britain*.

ture; and that there are few of its fabricks, which may not be spared from common use, without much inconvenience, or for which a sufficient succedaneum may not be found, in the productions of some other manufacture\*. This manufacture also, is very much under the dominion of fashion, and perpetually varying. It was only introduced of late years, since, by the help of *Arkwright's* inventions, the *British* workmen were enabled, to make cotton warps, and manufacture muslins, and fine callicoes. It has now become the chief compotent part of the drefs of females; and an important part of drefs, to men, who study that object, with a female care. But, as the cotton manufacture arose on the ruins of the silk manufacture, which after being equally predominant for a time, was superfed by it; the now exploded silk manufacture, may again revive; and assume the sway, to the exclusion of cotton fabricks.

The cotton manufacture is but ill calculated, for the meridian of a poor country; not only, by reason, but its producing chiefly manufactures of luxury; but also, on account of the large capital, which is requisite, to the extensive and effectual prosecution of it; the raw material being a commodity of great price, and brought from far; the country or individual, which possesses the best capital, will be able to procure it, of the best quality, and on the best terms; but the grand expence is in the erection of machinery, and the establishment of the necessary apparatus, for making and finishing the various fabricks of cotton; and this is so heavy, as should deter any person of moderate means, from attempting this manufacture.

This is a manufacture, which *Great Britain*, has wrought up to the utmost perfection. She has laid out the national energies upon it; much of her productive capital is embarked in it, and she views it, with a partial fondness, the consequence of success. Here, therefore, we must expect to encounter from *Britain*, the whole force of her rivalry, aided by all the advantages,

\* Either of fine linen or woollen, which would produce fabricks, equally convenient for Men, and Women's wear, and House furniture.

advantages, that superior capital, and superior skill can add, on our part.— We have nothing, but the lightness of taxes, the comparative cheapness of provisions, and a country abounding in streams, and favourable to the creation of machinery. A country with superior capital, will find various means, of supplanting her rival, in the market,—by the activity, and industry of her agents, by giving long credits, to the foreign merchants, that import, or shopkeepers, that vend the fabricks, in question; and even, by selling her manufactured goods, for a time, at a certain loss, if the former measure, should prove insufficient. Should the legislature of the country, which suffers by these measures attempt to traverse them, by the imposition of protecting duties, and even by enactment of prohibitory clauses; they will endeavour, to disarm the laws of their force, and withdraw their fabricks from their operation, by some change in the form, and denomination. Thus, for instance, the *British* manufacturers contended that *Ginghams*\* were not included in the act, imposing a duty on calicoes printed, or stained. They may enter them under wrong denominations, to avoid the payment of higher duties; or they may violate these laws altogether, and introduce their manufactures, by the illicit method of smuggling†.

To give some idea of the difficulties, which our cotton manufactures must encounter, from the powerful rivalry of *Britain*; it is sufficient to mention that

\* *Ginghams*, are a striped fabrick. and the colours are given to the yarn before it is woven, on which pretence, it was contended that they were not included in the description of calicoes *printed*, or *stained*, where the colours are supposed to be given to the piece after it is woven. This quibble was overruled at the custom-house. *Corderoys*, and other fabricks of that kind were entered as fustians, on the duty assigned in the book of rates, but being seized as for a false entry; the owners of the goods brought an action at law; there was a judicial determination in favour of the seizure, and such goods have since paid a duty *ad valorem*. In like manner the cotton manufacture of thread, which is employed in making stockings, and is called hosier's twist, was attempted to be entered as cotton yarn, on the duty fixed for that article in the book of rates, but this attempt failed, and the commodity pays a duty *ad valorem*. I mention these instances to show how artful and industrious, the *British* manufacturer and their agents are to take every advantage in the introduction of their fabricks into this country.

† Some late curious accounts of the great fair of Leipzig, which may be found in the Monthly Magazine, will serve to give some idea of the extraordinary activity and ability of the *British* manufacturers.

that though cotton weft, and warp for weaver's use, were liable to a duty of about two pence per pound, on importation into *Ireland*, as cotton yarn, under which denomination, a right of entering cotton warps\* had been established, the *English* manufacturer paid this duty, together with the charges of freight, carriage, storage, and factorage; and notwithstanding all this, underfold the *Irish* manufacturers and proprietors of machinery, in their own market†. We are not to suppose, however, that the *English* manufacturers have obtained this decided superiority, without great exertions of industry and

\* A small parcel of cotton warp was seized; for the expressed purpose of trying the question, whether the commodity, ought to pay duty *ad valorem*, or should be admitted to entry, as cotton yarn, on payment of a duty of about two pence per pound, under the old book of rates. It was contended, by the *Irish* manufacturers, and the officers of the customs, that the book of rates was made near a century and half ago, when no cotton yarn was known, except what was spun by the hand, from distaffs, or common spinning wheels; that the fabric in question could not have been in the contemplation of the legislature, an hundred years and upwards, before its invention; that the books of rates valued cotton yarn, at two shillings the pound, and no more, whereas, it appeared, in evidence, that cotton warps might be made of the value of five pounds sterling the pound, that cotton warps were not only spun, by new invented machinery, in a manner wholly different, from that which was known, when the book of rates was framed; but underwent certain operations, to fit it for becoming *warp*, to which the cotton yarn, or *weft*, was not subjected, being passed thro' rollers, which compress the filaments, and give the material, a wiry hardness and firmness, from whence, the aptitude to become *warp* arises; that the material called *warp*, not only derives new properties, from the operation of new machinery, but takes a new denomination, from the purpose to which it is rendered applicable, and gives birth to new manufactures, British muslins and calicoes; which were wholly unknown, in these countries, till *Arkwright's* invention of water machines and rollers, enabled the manufacturer to make cotton *warps*; this dispute has been settled by the legislature in conformity, with the representation of the *Irish* manufacturer; and, among other alterations in the book of rates, cotton *warps*, or *twist* are made liable, by express words, to pay a duty *ad valorem*.

† See the journals of the house of commons, for the petition of the proprietors of cotton machinery, and mills, to parliament, on this subject; praying an increase of duty, on the importation of cotton *warps*.

and skill; and uncommon strength, of capital, and pecuniary expence.—It appears, from a review of the state of the cotton manufacture, in the year 1787; that nearly two thirds of the then existing cotton mills and machines, had been erected, within the last seven years; and that above a million of money had been expended, within that period, on the erection of mills, hand-engines, and other machinery, including the purchase of ground, and construction of houses, and other necessary buildings for the cotton works.

Such is the superiority of *Britain*. It is observable that her superiority is chiefly palpable and striking, in those operations on the raw material, which precede its coming into the hands of the weaver; that is to say, in the operations, which require great capital, and are performed by extensive and costly machinery. It will do infinite honour to the perseverance and industry of our manufacturers, if, undismayed by the formidable rivalship of *Britain*, and her present superiority, they proceed to combat the many disadvantages under which they at present labour, and succeed in establishing the cotton manufactures of this country, on a footing of equality with those of *Britain*. At present, the fact is, that vast quantities, of cotton warp, and west must, of necessity, be imported into this country, to answer the demand of the looms that are employed, in all the various kinds of cotton fabrics, from muslins and calicoes, down to thicksets. For, the water-machines, and mules, and jennies as yet erected in this country, with their best exertions, are able to supply but a small proportion of the current consumption of spun cotton, for different purposes of manufacture.\*

Notwithstanding the unfavourable circumstances, I have stated, the industry of *Ireland* is not wholly left without motives of incitement.—In  
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\* See the journals of the house of commons, for a petition from the weavers of cotton fabrics, and others of opposition to the petition, from the proprietors of machinery, and spinners of cotton, which called for an additional duty on spun cotton, imported.

the first place, the demand for spun cotton, which is, as it were, the *primum* of an infinite variety of fabrics, for wearing apparel, and furniture, proceeding from the loom, exclusive of that of stockings. Candlewick, which employs the coarser parts of the cotton wool in general, and cotton wool of inferior quality, is an article in very extensive demand; and large quantities of it, are, at present imported into this country.

In the next place, the natural advantages of this island are highly flattering; the noble situations which a country so well watered as *Ireland*, every where offers for the erection of machinery, must captivate the eye of speculation; and gradually may lead the manufacturer of cotton, in the web, as he encreases his capital; to sink a part of it in mills, and machinery, and supply himself with spun cotton whether weft or warp, which is to him as a raw material, and which he now imports from *Britain*. Thus, the number of water-mills, and other machines may encrease, until, in process of time, this country may become able to furnish the home market, with every part of the cotton manufacture, that machinery can produce.

A third and most important consideration is, that, although the prime cost of the raw material is very considerable, the derivative or adventitious value of cotton manufactures is very great, so that few exertions of industry and productive labour propose higher rewards to the skill and application of the workman. A pound of raw cotton wool may be worth from two to three shillings per lb. weight. The same weight of cotton warp, or twist produced from *Arkwright's* water machine may rise in value to five pounds sterling. Such an astonishing return for the employment of capital, and exertion of industry, must prove a most powerful incentive indeed, to the prosecution of a manufacture.

It is, however, worthy of remark, that large establishments for the prosecution of the cotton manufacture have been injurious to the morals and health of young people.

## SECT. 4.

*Comparison of the linen, woollen, and cotton Manufacture.*

Next to the prosecution of agriculture, and as subsidiary to its prosperity and encrease, the three manufactures, which have been the subject of the preceding sections, ought to be the great objects of industry in this country. They are all, in some degree, established; the natives have already acquired greater or less skill, in all; and in the linen manufacture, they have attained to unrivalled excellence. These manufactures, in common, require a copious supply of water, and are, in that particular well adapted to this country. They have also a degree of connection or affinity with each other.

There should be a kind of system and method, in the encouragement of industry, in order to promote it, to the best advantage. A new and solitary manufacture not connected with, or dependent on one already known and established, cannot so soon take root, or so speedily bear fruit, in a country, as one that is in a different predicament. The knowledge of the art of weaving, which is every where diffused, in a greater or less degree, by the general prevalence of the linen manufacture, and of the coarser branches of the woollen, must render the establishment and diffusion of the cotton manufacture less difficult, than that of many other new arts and trades, wholly different from, and unconnected with the business of spinning and weaving. So far, these manufactures harmoniously combine, and seem to draw together.—But, suppose, their interests should, on any occasion, diverge, and a question of preference arise respecting them,—then, we must consider, both the intrinsic merits of these manufactures—and their relative merits, which consist in an

aptitude for being successfully carried on, in a country circumstanced like *Ireland*.

This comparison must be instituted, on the principles laid down in the foregoing sections. I shall briefly revert to some of them—in point of intrinsic utility, of universality and stability of demand, independent of the empire of fashion, the linen manufacture seems to hold the first place,—the woollen comes next—the fabrics of cotton are decidedly inferior to them both.

With respect to circulation and foreign demand, the linen manufacture of *Ireland* claims a proud pre-eminence, and disdains all comparison. Our exports of woollens and cottons are, at present, trifling; our linen manufacture is, in truth, a magnificent branch of trade, sufficient, in itself, to employ a nation, and enrich a country. The export of wool manufactured from this country, is nearly confined to yarn, the export of the finished woollen fabrics, though trifling at present, is yet rather progressive, than otherwise; and capable of great extension.—Considered with respect to demand, whether arising from the home consumption or foreign market, I think, the cotton manufacture has less capabilities of extension and profit, than either the woollen or the linen, and I think this country has less prospect of carrying the capabilities of the cotton manufacture, as far as they will bear, than it has of improving on those of the woollen, and the linen. Yet, certainly, in the coarser kind of cotton fabrics, we have now attained an equality with *England*.

With respect to the *prima*, or raw materials, the manufacture of cotton, is infinitely inferior, in merit, to those both of flax and wool; the raw materials, which are worked up in the cotton manufacture, are almost entirely foreign; the raw materials of the principal part of the woollen manufacture, and almost entirely of the linen manufacture are, or might be domestic. If we except reeds, *Spanish* wool, fuller's-earth, and some of the stuffs and materials used for dyeing,\* there is nothing  
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\* Many dyeing stuffs, and the materials for bleaching, might be obtained at home.



to be imported for the woollen manufacture. Flax seed, some of the materials of bleaching, and a very inconsiderable proportion of dying stuffs, are all that the linen manufactures ask from foreign countries, and even with most of those importations, particularly with the most considerable of all, that of flax-feed, ~~she~~ could well dispense.

From what has been already advanced, it appears, that the largest capital of all is requisite for the cotton manufacture, through all its branches; the next largest, for the woollen, and that the linen requires the smallest capital of any, in the individual, who undertakes it. On this account, the latter is the manufacture, which is best adapted to a country like *Ireland*, which does not abound in capital; and may best be carried on, in a small way, by industrious individuals, in their own habitations.

In regard to the number of persons, to whom these different manufactures can give employment, in order to produce fabrics of a determinate value, the linen manufacture holds the first place, the woollen comes next, and that of cotton ranks the last. More persons, beyond all comparison are employed in cultivating forty acres of flax, to produce the *primum* of linen, than in tending and shearing sheep, on forty acres of grass. As to the cotton manufacture, the *primum* comes to the manufacturer ready prepared for being spun; but on the other hand, to counterbalance, in some measure, the numbers of people employed in husbandry, to provide the *primum* for the linen and woollen manufactures; the cotton manufacture employs more manufacturers and mechanics, in the construction of its apparatus of buildings and machinery, than the woollen. The woollen employs more persons of that description, than the linen. In what is properly to be called the manufacture of the commodity, that is to say, in the several operations of spinning, weaving, and finishing the respective fabrics, by a number of processes of various kinds, till they are fit for the market; the linen and woollen manufactures, as I apprehend, employ nearly the same numbers, the advantage is rather on the side of the woollen, the cotton manufacture fewer, in proportion, as its extensive machinery causes a great saving of labour. The three manufactures

have one great advantage, in common, that of employing numbers of women and children.

As to the effects of labour and skill, creating a value, and adding it to the *primum*, or in other words, as to the relative advantages, which result to the individual, and the community, from the exercise of these different manufactures, it is computed, that the people employed in the linen manufacture, earn in a given time, one third more than those in the woollen. If we consider what may be added to the stock of the community, by a given quantity of land,—one stone of wool is the produce of an acre of grass land, which feeds two and a half, or three sheep; this wool, in its raw state, is equal to a third of its value, when manufactured. This, at twelve shillings the stone, makes the gross produce, by working up the *primum*, from an acre of land one pound sixteen. Flax, at eight hundred weight to the acre, made into the worst linen, produces a gross return nearly eight times greater. The cotton manufacture is perhaps capable of carrying the adventitious, or derivative value, which results from workmanship, or operations on the raw material, to a higher pitch, in its department, than either of the others; but much of this excellence is to be attributed to machinery; little, in comparison, to the individual excellence of the artisan.\* The marked distinction of excellence in execution, and the certainty of reward to superior merit, in the artisan, is favourable to the progress of industry, and advancement of the arts, as far as they arise from the exertions of individuals. This we may call the progress of manufactures *a posteriori*. The power and levelling principle of machinery, is more favourable to the progress of industry, and the advancement of arts, as far as they depend, on the employment of capital; this we may call the progress of industry *a priori*.

With respect to the replacing of the capital, advanced by the country, for the support of these manufactures, together with a profit; in other words,

\* Yet much of the value of stamped or painted cottons depends on the workman.

words, as to the tendency of these manufactures, respectively, to enrich the country that exercises them; it must be considered, that this capital is made up of the capital of all the individuals in the country; this being the case, it follows, that, with regard to the augmentation of the national wealth, the linen manufacture holds the first place, the woollen the second, and the third is due to that of cotton.

We come, in the last place, to compare these manufactures with a reference to the danger of competition. Our linen manufacture stands fearless, and triumphant, in maturity of skill and reputation, despising rivalship. Not so the woollen and the cotton; the two great markets of the *Levant*, and *Portugal* have been pre-occupied, the former by *France*, the latter by *Britain*.\* No country has applied itself, with greater application or success, to the cultivation and improvement of the woollen manufacture than *France*; nor has she been inattentive to that of cotton, or unfortunate in her attentions. Her attention has been particularly directed to the theory and practice of dying; and her superior skill and excellence in that art, so necessary to the perfection of the fabricks of wool and cotton stand universally acknowledged. The present misfortunes and distractions of *France*, may, for a time, retard the progress of manufactures, or even cause them to become retrograde, for a season, yet, when peace shall return, with settled freedom in her train, the arts and industry of the country will return in new glory. Be that as it may, it is from the rivalship of *Britain*, that our manufactures of wool and cotton must encounter the chief obstacles to their prosperity and extension. *Britain* possesses superior capital and superior skill, and the operation and influence of these immense advantages will be powerfully seconded by the constant exertions of active jealousy, and vigilant policy.

SECT.

\* By means of the *Methuen* treaty a great source of the opulence of *Britain*, she possesses the monopoly of cloathing *Portugal*. Such was the case, when this Essay was written; the late treaty of peace between *France* and *Portugal* puts matters on a different footing.

## SECT. 5.

*Of the Silk Manufacture.*

The silk manufacture was formerly of much greater extent and dignity, than it is at present; yet, still it is respectable, even in decay. Many of its productions are still in constant use, and though the consumption of filken fabrics is wonderfully diminished, it affords employment to a large number of persons. Of those persons many are women and children, a circumstance which must always entitle a manufacture to the consideration and support of an enlightened legislature.

Hose of silk, ribbands, laces, edgings, and fringes, sattins and velvets are still in general use; but the consumption of silk and velvet, for the garments of men and women, is not a thousandth part, of what it was, in former times. Even, in the capital of this island, the silk manufacture was formerly a considerable object, and vast numbers of looms were constantly at work, in the fabrication of velvets, sattins, silk handkerchiefs; not to mention lustrings, persians, modes, damasks for garments, and furniture of rooms; fancy silks, of various colours, and patterns, for garments. At that time, velvet was universally worn, in dress suits, by persons of fashion, of both sexes. It was used by women of inferior condition, in cloaks, hoods, and masks; and caps of velvet were then fashionable, not only among boys but grown men; (our round hats have long since superseded the general use of caps.) The very manufacture of silk handkerchiefs was then a very considerable article, as the use of them in the pocket was general. Of late years, handkerchiefs of lawn or muslin have usurped their place; and this branch of the manufacture has fallen into decay;\* on the other hand, the demand for silk stockings has encreased; the case is the same with respect to ribbands; and there is a considerable demand for farcenets, peelings, and the species of silk called mode.

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\* Very lately some attempts have been made to revive the use of minor branches of the silk manufacture, in the dress of men and women.

The silk manufacture deals more in the fabricks of luxury and superfluity, than the linen, the woollen, or even than that of cotton. In our own days, we have witnessed it retaining much of its ancient prosperity, and have since beheld its rapid decline to a state of comparative insignificance. This great change has chiefly taken place, since Arkwright's invention of cylinders and water-machines have enabled the *British* manufacturer to produce cotton warps, and those of any degree of fineness, by the help of which, the weaver is enabled to produce *British* muslins and calicoes, little inferior in quality, to those of *India*, and at prices infinitely reduced. The fabricks of cotton are so light, so cheap, and at the same time so ornamental; and the grand advantage which they, in common with linens possess, of being susceptible of washing over and over again, without detriment, is so favourable both to cleanliness and show; that we cannot wonder at this revolution, in favour of cotton, to the detriment of silken fabricks.

The silk manufacture being so much the creature of fashion, which exercises a despotic and capricious tyranny over what yet remains of it; much of its merit and success must depend on fancy, taste, the newness of the pattern, the seizure of the fugitive glance of fashion. It should therefore seat itself in a capital, or some place, where government is fixed, where a court is held, and fashions\* originate; that it may mark and catch the fluctuations of vanity, living as they rise, and thrive on the expences and follies of the rich and luxurious. This necessity of being carried on in a capital is a strong objection, to a manufacture. Artists residing in great cities are commonly more dissipated and vicious, and more disposed to riot and combination, than any others. If this should not be the case, notwithstanding the high price of labour, they will be more poor and wretched, than other labourers; both, on account of the advanced price of all necessaries of life, and of the injuries which their health must sustain, from the noxious air  
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\* See Dr. Smith's Wealth of Nations.

they inhale, crowded into miserable hovels, in narrow lanes and alleys, where the cheering sun and invigorating breeze never gain admittance. Add to this, that the fluctuations of fashion, and other causes, such as a general mourning, the capture of a few ships laden with the raw material, may suddenly put a total stop to the manufacture; and leave the wretched artisan, whose subsistence must be derived from it, wholly destitute.

I do not hold it good policy, to make great exertions, in directing the capital of a country to a manufacture, like that of silk, which is subject to rapid fluctuation, and sudden declension. The last generation studied formal dignity and expensive grandeur, more than becoming elegance, graceful economy, or individual accommodation. Houses, in general, were loaded with superfluous ornaments, without;—inconvenient and gloomy within.—The furniture was answerable, massy, large, and immoveable; the chairs enormous, the tables round. Large perukes, immense hoops, vast cuffs and flounces, stiff brocades, velvets and embroideries seemed to announce the dignity, or at least the self-importance of the wearers, by the burthens with which they encumbered themselves. In those times of expensive finery and gaudy parade, the silk manufacture was in its zenith.—When the light and ornamental began to supersede the rich and stately. A thousand different manufactures of linen, wool, and cotton came into esteem; and the pompous brocades and velvets of *other times* sunk into disuse; and fled to the antiquarian wardrobes, and repositories, of old maids and batchelors, for refuge from general contempt, and from the claws of the cast-clothes man.

It is further to be considered, that the *primum* of the silk manufacture is imported,—comes from regions, at a considerable distance, and is more costly,—than the raw materials of the linen, the woollen, or the cotton manufacture; another motive this, to render us less sanguine, in the prosecution of the silk, than of any of the foregoing manufactures. Where the charge of freight and carriage is heavy,  
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and the first cost of the *primum* great, the risque of losses, from the failure of speculations will be proportionably great; on which account, the silk manufacture does not seem well adapted to the means of a country, which possesses but small capital. The reason, why countries in that predicament, are at all induced to engage in it, is, that many of its branches, as the manufactures of stockings, lace, ribbands, requires but little capital, to commence them, in a small way, though the country may require great capital, to carry on the manufacture, at large, or collectively, with advantage; the apparatus for the manufacture of the branches in question, being cheap, and easily to be procured.\*

This is a manufacture, which, perhaps, we can the least of any expect to carry on, to a great extent, so as to make its fabrics an object of export, or even to supply our own home consumption; in opposition to the rivalry of *England*; and that rivalry we must be sure to encounter. In this manufacture, in addition to superior skill, superior capital, and all the advantages, that these, aided by a jealous policy, can bestow, *Britain* possesses one circumstance of superiority, which must exclude all competition: the seat of government is there, the wealth of the *British* dominions returns to *London*, as to the heart, the seat of life, and from thence emanates all courtly state, all luxury in dress, and furniture, all imperial splendor! By the possession of superior capital, *Britain* will have the *primum* of this manufacture, the first cost of which is great, on cheaper terms, and of better quality, for the wealthiest dealer always has the choice of the market, and is able to take advantage of particular times and contingencies; and being in possession of the first debut of fashion, in a manufacture, where fashion bears sovereign sway, her fabrics will always take the lead in the *Irish* mar-

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\* The subjects of the *British* empire will be laid, in future, under great difficulties, in procuring the *primum* of the silk manufacture, by the late extensions of *French* dominion and influence.

ket, recommended, as they will be, by the gloss of novelty, and the stamp of vanity; while the imitations of our native artificers, will lag behind; and always be a fashion in arrear, with the demands of luxury.

The late rise in price and scarcity of silk, from the capture of the *Mediterranean* convoy, the subjugation of *Piedmont* and *Lombardy*, by the *French*, and expulsion of the *English* from *Leghorn*, may teach us the precarious nature of all manufactures, that depend on this *primum*, and show, how frail and fallacious we ought to account that portion of public wealth, and prosperity, which arises from an employment of capital in the silk manufacture.

The Dublin Society, with great perseverance, and well-meaning, but I think, grossly mistaken zeal, exerted itself, to encourage and protect the silk manufacture of this country; and promote the sale of its fabrics. It opened a warehouse, for the purpose of receiving and vending fabrics of silk, by wholesale and retail. It proposed a premium of three per cent. on all wrought silk, bought by wholesale, at their warehouse, to be sold again by retail. These efforts have produced little effect; *Young* observes, that when he wrote, which was about eight years ago, the wholesale demand cost the society but six hundred pounds yearly, on account of the premium, of three per cent. on goods, making the amount, in value, of such goods something less than twenty thousand pounds. During the last eight years, the silk manufactures have still farther declined, and are, now, in a truly feeble and languishing state in *Ireland*.

*Young* has some sensible observations, though given in his usual pert manner, on the exertions of the Dublin Society, in favour of the silk manufactures. He says truly, with respect to their premium of three per cent. on fabrics bought, to be retailed, and its small amount; “that it only tends to ascertain the insignificance of the whole *Irish* silk manufacture, and that, if the mercers have not a demand for silks,  
this



“ this premium will not make them buy ; if they have, they will buy  
 “ without the premium.”\*—“ Of all the fabricks, says *Young*, this (of silk)  
 “ is the least proper for *Ireland*, and for any dependant country. It is  
 “ an absolute manufacture of taste, fancy, and fashion. The seat of  
 “ empire will always command these, and if *Dublin* made superior silks,  
 they would be despised, in comparison with those of *London*. “ We feel  
 “ something of this kind, in *England*, with respect to *France*. To  
 “ force a silk manufacture in *Ireland*, is to strive against whim, ca-  
 “ price, fashion, the prejudices of mankind ; instead of which, it is these  
 “ that become the support of a manufacture, when it is wisely set  
 “ up.—No linens are fashionable in *England*, but those of *Ireland*, yet  
 “ those of *Holland* are stronger.—Should not the *Irish* try to drive the  
 “ nail that will go, instead of plaguing themselves, with one that never  
 “ will.”

## SECT. 6.

*Of Hardware, and other Manufactures, where Fire is a principal Agent.*

There is a manufacture, which in *England* has attained such a degree of prosperity, that it may enter into competition with any of the foregoing. I mean that of hardware ; to which the founderies, and the fabrication of arms are appendant. Theorists, in discussing the relative merits of manufactures, may be dazzled, by observing the astonishing progress of the sister country in this branch ; the multitudes, who find employment ; and the vast treasures, which flow into the country by means of it ; but, when we debate, on the establishment of any given manufacture, in a given country, we should consider not only the intrinsic merit and utility of the manufacture itself, but the means

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of

\* It scarcely amounts to three pence per yard on an average.

of carrying it on, with which, the country, in question, may be furnished.

Few manufactures possess greater intrinsic recommendations than those of hardware. Many of the productions of art, from metallic substances, particularly from iron, are commodities of the first necessity; instruments, and utensils, highly necessary, for the subsistence and comfort of man, the decencies, and elegancies of life; the protection of the country, the exercise of every art, manufacture, and form of industry. The productions of these manufactures stand wholly clear of the dominion of caprice and fashion, and are less liable, than any others, to fall into disuse. The demand for them must be co-extensive with the civilization of man; co-existent with the duration of society. They are objects of export to the most savage tribes, on the remotest shores.

It may be added, in praise of most of the manufactures of hardware, that they do or might operate, on a domestic *primum*, (I speak with respect to *Ireland*) since this country abounds in mines of almost every kind of metal. It is rich, in those, which are most useful, lead, copper, and iron.

These are, perhaps, the most favourable of all manufactures, to the encouragement of industry, the progress of labour and skill. There are none, perhaps, that admit such minute and subtle divisions, and subdivisions of labour; of course, there are none, in which the workmen can be expected to attain to such perfection, both for dexterity, celerity, and neatness of execution in the particular things, about which they are occupied. There are no manufactures, that carry to so great an extent the adventitious value, resulting from the labour and skill employed by the workman, on the crude material; consequently, there are none that offer higher rewards, to the exertions of industry. The values of the raw or crude materials of hardware are, as nothing, compared with that of the finished fabricks. The workman, from a mass of iron, but a few pence in value, will produce a sword hilt, scissars, knives, or razors, that may be worth as many pounds. How inconsiderable is the first cost of the materials employed in a watch worth  
fifty

fifty pounds! The same may be said, of various manufactures, in tin, papier machee, copper, ivory, and even in silver and gold. The workmanship is nearly all in all; but, in this respect, as well as in extent and utility, the fabrics of steel have a distinguished pre-eminence.

The manufactures of hardware in this country are, at present, in a low and contracted state. Far from being able to enter into competition with *Britain*, much less to obtain a superiority over her, in the foreign market, in the fabrication of arms, cutlery, the finer kinds of hardware, watches, toys, enamelled work, and what we call the manufactures of gallantry; our productions of those kinds fall very short of supplying the demand of the home market, and for a supply of the deficiency we depend on *Britain*. It is not, so much, in the superior quality of the commodities, that the superiority of the *English* manufacturer appears. We produce various articles of cutlery, watches, locks, fire-arms, toys, manufactures of gallantry, various instruments and utensils, for the use of arts, sciences, manufactures, and husbandry, in short all fabricks, which can be wrought out of metal, of a quality, which would not disgrace the best *English* artists. It is in the unequal prices of fabricks of the same kind, and equal quality produced by *British* and *Irish* workmen, and the great advantage, in point of cheapness, on the side of *British* manufacture, that the overbearing irresistible power of superior capital and superior skill appears.

Indeed, I think, the superiority of *Britain* is no where so evident, as in the department of hardware. The manufactures of *Sheffield* and *Birmingham* are sold in *Ireland* infinitely cheaper, than articles of a like quality, fabricated by native workmen, can be afforded, on the spot where they are made. Yet, these goods must be conveyed, a considerable distance, from the place where they are made, to the port where they are to be shipped for *Ireland*; in fact, they are conveyed almost invariably by means of the inland navigation to *Liverpool*, from whence they are forwarded to this country. For the transportation of these goods to *Ireland*, freight, sometimes, insurance must be paid; the commodities

modities are subject to different duties of import and excise, on their entry in the ports of this kingdom; then come the charges, for the carriage from the Custom-house quay, for storage, and factorage; (for most of the trade in hardware between *Britain* and this country is managed by factors.) It is a fact, that most of the arms, if not the whole of them, which are required for the use of the troops, on this establishment, are furnished from *Birmingham* and *Sheffield*. This cannot be attributed wholly to the want of manufacturers in the country, were the contractors for government disposed to employ them; much less would I suppose the ungenerous design of giving a preference to the sister country, at our expence; in the very crisis, when *Ireland* is straining every nerve to assist her.—It must be attributed, to the more prosperous state of the *British* manufactures, which enables the workmen, to supply us, with their fabricks, on cheaper terms.

Much of this difference in price may be attributed to the superiority of capital, by which the master manufacturer is enabled, to divide and subdivide labour, by employing a very great number of workmen; so that less time is expended in the fabrication of any given article of the manufacture. Much of the first cost of a manufacture arising from the price of labour or hire of workmen, it is obvious, that, in proportion as the time requisite to produce any given fabrick is diminished, the first cost of the things in question, must be lessened. Add to this, what I have observed more than once, that a large capital acquires *primum* of the best quality, on the cheapest terms; lastly, it is to be considered, that the manufacturer, with the greatest capital, will content himself with the smallest profits. The extent and multiplicity of his dealings will counterbalance the smallness in any individual dealing. Great capital must overlook petty details, and proceed on an enlarged scale. The manufacturer will readily perceive, that the accumulation of wealth must rather depend, on the quick return of so large a capital, that it may again become more productive, than on  
 partial,

partial and disjointed profits, however large, in proportion to the share of his capital, which they arise, making in the aggregate, but a flow and scattered return of the whole.

But it is not, merely, from superiority of skill and great strength of capital, that *Britain* derives her superiority, in the manufactures of hardware. In my mind, the abundance and cheapness of fuel is the greatest cause of the cheapness of her fabricks, in this branch of industry. In the division of labour, in the construction of mills and machinery, to facilitate or improve the operations of those, who work in metals; or to encrease and multiply the powers of the human hand, we might easily emulate the *British* artist, or even sustain a competition, with him. The scarcity and high price of fuel, which, at present, embarrasses industry in most parts of this kingdom, are what most powerfully discourage the judicious adventurer; and must render it doubtful, whether *Ireland* can, by any exertions of her own industry, or the most flattering encouragement of the legislature, be brought to rival *Britain*, in any of the metallic fabricks; until this grand desideratum shall have been supplied.

Firing—which term comprehends not only coals, timber, and peat, but also coak and charcoal, is so necessary to be provided, in large quantities, for the preliminary operations of smelting and assaying; as well as for the use of founderies in brass and iron; of smiths, cutlers, gilders, enamellers, silver-smiths; and a multitude of other artists connected with these, that we must consider fuel, as in some degree, a *primum* necessary to those manufactures; and this being supposed, *Ireland* with respect to all the productions of such manufactures, must be considered as a country, which brings her *primum* from afar; and, in fact, she must add the freight, duty, carriage, and factorage, of the coals she consumes, in the fabricks in question, to the first cost of this important article. While this is the case, with what prospect of success, can she contend with a country, that finds this *primum* or essential requisite at home?

From

From the foregoing observations it will appear, how improvidently we acted, with respect to the intended settlement of *Genevese* emigrants, in this country. We incurred heavy expence, in preparing a town, for the reception of persons, who were to have been employed in the manufactures of hardware; without previously considering, whether the natural and acquired advantages of this country, were well adapted to the prosecution of those manufactures; or enquiring, whether the contracted state of metallic fabricks, in this country, was owing to the paucity of workmen, or to the want of other requisites.

Whatever hopes might have been entertained, at one time, from the settlement of the *Genevese* in this country; we may calculate, with more certainty, on the progress of the arigna works in iron; and predict more great and certain advantages to *Ireland*, from their prosperity and extension. There, an abundant supply of coal is united with a rich vein of ore; and, in process of time, we may expect to find the whole consumption of the kingdom supplied, from thence, with the coarser species of iron *fabrics*; as the irons necessary for buildings, machines, and carriages; the various utensils of domestic economy; the instruments of husbandry. There, also, with proper national encouragement, founderies for cannon, and manufactories of small arms, might be established. We might also engraft on these more gross and gigantic fabrics, the manufactures of cutlery, and the cheaper and more useful kinds of hardware. But I doubt much, whether *Ireland* will, by any exertions, be brought to rival *Britain*, in the finer works of polished steel. Has not Nature herself imposed insuperable obstacles to her progress, in this department, by the extraordinary humidity of the climate; which must incessantly counteract the labour of the artist; and take off much of the brilliancy of their finishing, from works of polished steel? Be that as it may, it is time to hasten to other manufactures.

The transition from the metallic manufactures is easy, to other fabrics, in the formation of which, fire is the principal agent; such, in the first place, are potteries, and the glass manufacture. These are a great source  
of

of wealth to *England*, employ a multitude of persons, and disperse their productions into every part of the civilized world. Vast sums of money are annually drawn out of this country, in particular, for them. We learn, from *Young*, what general circulation they had obtained in *France*. At the same time, he informs us, that they had begun to make in that country, rude imitations of the *Staffordshire* ware. Had peace remained, and the commercial treaty subsisted; it might have been wiser for the *French* nation, as I believe it is wiser for the *Irish*, at present, to pay tribute, in that department, to the superior industry and skill of *England*; than to suffer her exertions to be diverted, to subjects of new speculation, from objects of solid and tried importance.

Nevertheless, if we except the scarcity of fuel; nature has not been unfavourable to *Ireland*, in this respect. Veins of potters clay are found in many parts of the country. We formerly attempted some things, in the walk of pottery, in *Dublin*, and, if I mistake not, in *Cork*. A manufacture of stained or painted ware, in imitation of *Delft*, or rather of *Rouen*, was carried on successfully for a time, and came into very general circulation; but this manufacture, after languishing for a considerable time, has long since died a natural death.

Glass is a substance susceptible of such an unbounded variety of uses and forms; it is capable of being wrought up to such a surprising degree of brilliancy; it not only contributes so much to the embellishment of our houses and tables, but is so necessary, in an infinite variety of applications, to the comfort and convenience, the cleanliness and health of man; that it must quickly become an object of great consideration, in every country, where industry resides. Consider the prodigious advantages of glazed windows, in our climate, where the sun is seldom so powerful, that we should wish to exclude him, and where the object of the architect must be, to transmit as much light as possible, and, at the same time, to exclude the damp air. Consider the variety of useful vessels, for common purposes, that are formed of this substance; consider its important services to science; particularly, in chemistry, optics, and electricity.—It is no wonder, therefore,

fore, that every country should feel the value of this manufacture, and wish to exercise the arts of producing its fabrics. In fact, the exertions of *Ireland* have been directed to this branch of industry; and her essays, as far as they have extended, have been more successful, than in most other manufactures, and reflected equal credit on the taste and application of our workmen.

Specimens of the manufacture, in question, have been produced, both from the *Waterford* glass-house, and from some of the manufactories in *Dublin*, not inferior in execution to any thing imported. We have already obtained a considerable share of our home market; and have even arrived at the exportation of some articles, particularly glass bottles, to *America* chiefly; but the amount of this exportation is, as yet, inconsiderable. Enough, however, has been done, to shew, that our manufacturers want neither perseverance, nor skill, to carry it on successfully. It is one of those few, in my humble opinion, which have taken such deep root, and sent up such fair shoots, as make them worthy of the cultivating hand of the legislator.

A mine of *cobalt* is said to have been lately discovered, in the county of *Kerry*. Should this prove to be the case, it would be a fortunate discovery, for the glass manufactures of this country; and for potteries, if they should be hereafter carried on; for *cobalt* is the substance, which is employed to give their beautiful blue colour to many fabrics of the glass manufacture; and to earthen ware.

There are but two obstacles, to the general progress and prosperity of the glass manufacture, in this country; want of capital, and want of fuel. The crude materials of the glass manufacture are not costly; but the necessary apparatus, particularly, the buildings for carrying it on, highly so; and the consumption of fuel great and incessant. Were we on a par with *England*, in respect to capital, and to the cheapness and abundance of fuel, I do not think that our glass manufacture would yield, in any respect, to that of the neighbouring country. The former inconvenience, time, industry, and frugality may remove. Much of the latter might be remedied, by a judicious attention to  
improve



improve the inland navigation of the country, and to open a communication, by canals, with those parts of *Ireland*, (and there are many) which produce coals, so necessary to the prosperity of the glass manufacture.

In this cursory notice of mechanical arts, wherein fire is the chief agent, it may be proper to glance at breweries and distilleries. These are manufactures, which require large spaces of ground, and the erection of various expensive buildings, when they are carried on extensively; and consume great quantities of fuel. Of course, this country, from its want of fuel, labours under peculiar disadvantages. To these we must add an obstacle, more powerful, than both the former united, a severe and oppressive code of revenue laws. This is the more to be lamented, as the fertility of soil, in this country, affords a superfluity of grain, after feeding the inhabitants; and the situation of the country, watered, as it every where is, by streams and rivers, is favourable to the establishments of breweries and distilleries. The employment of capital, in these branches of industry, deserves particular encouragement, both, as they contribute to the advancement of agriculture, by affording a ready market, and constant demand, for grain; and as they defray a considerable part of the national expences, by a heavy excise. Prodigious sums of money are yearly drawn out of this kingdom, for porter, and other malt liquors; most, if not the whole of which, might be retained in it, were the breweries of *Ireland* properly regulated and encouraged.\* As for the distilleries;—I am far from being an advocate of drunkenness; I am far from wishing, to remove the restraints and discouragements, from those who sell spirits, by retail; at the same time, I cannot join in the cry, of those declaimers on sobriety, who would willingly annihilate the distilleries of the country. Such people are unable, or unwilling, to examine the state of *Ireland*, and acquire a knowledge of its true interests. It is to be observed, that the distillers of *Ireland* have acquired consummate

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\* Since this Tract was first written, the case has altered materially, in favour of this country; and porter, and home-made spirits of malt are become an object of exportation.

mate skill in their art; infomuch, that some ingenious persons of an experimental turn, who are engaged in this business, are able to produce a spirit from grain not to be distinguished from brandy, by the best judges; and that considerable quantities of this spirit have been sold as brandy, since the intercourse with *France* has been interrupted. It is also observable, that the malt spirits of this country begin to be an article of export. Be that as it may, it is time to dismiss the present class of manufactures, and hasten, onward, in my proposed task.

SECT. 7.

*Miscellaneous Observations on other Manufactures.*

The manufacture of hats, of the coarser kinds, deserves to be a favourite of the legislature, both, as producing an article of the first necessity, a most useful and convenient part of apparel, for the lower sort of people; and employing domestic raw materials; the wool of lambs chiefly in felts, and the fur of rabbits, or both materials combined, in hats of a superior kind. In these branches we are tolerably successful; the manufacture of coarse hats is universally diffused, and the consumption of the lower classes in *Ireland*, is almost entirely supplied by the industry of their countrymen. I need not dwell on these branches, they are, in some degree, to be considered as appertaining to the woollen manufacture. As to the finer kinds of hats, We are vastly inferior to the *English*. They are both able to produce hats superior in quality, to any manufactured in *Ireland*; and they are also able to undersell us, by a very great proportion, in our own market. This superiority is to attributed, no doubt, in some degree,

to

to superior capital, which enables them to take the first choice of the market, and procure the fur of the beaver, which is the raw material of fine hats, of the first quality, and on the most reasonable terms. This is, no doubt, a great advantage; but much of the present superiority of *English* hats, in cheapness, and quality, must be ascribed to the excellence and skill of *English* workmen. We ought, not, however, to be so much afraid of a competition with *England*, in this, as in many other manufactures.—It is one, which has already taken extensive possession of the country, and diffused the knowledge of itself very generally; and it is one, which requires less apparatus, and extent of capital, to carry it on, with credit and success, than any others.

Formerly, the manufacture of shoes, was an object of considerable importance in Dublin; and large quantities of the fabric were exported to *America*. Of late years the manufacture has declined. This decline may, I believe, be attributed, in some measure, to the scarcity of oak bark. The want of this material, so necessary in the progress of manufacturing leather, was so severely felt in this country, that the *Dublin* Society, with a laudable sollicitude, directed their attention towards the provision of some substitute for bark, which might alleviate the inconvenience. Different astringent vegetable substances\* have been tried; but with no very flattering success. Of late, some judicious manufacturers have wisely turned their thoughts, to mineral substances, which are more powerful agents. It is by the use of mineral substances, that the *French* manufacturers have been able to accelerate the operation of tanning, and they are said to have succeeded in this, in so high a degree, as to be able to prepare a raw hide for use, in the course of a few days.

However that may be, in consequence of the scarcity of bark in this country, raw hides and calves skins are daily exported, in great quantities; and tanned leather and dressed calves skins are constantly imported, to supply the consumption of the country; and so it must be continued, until, by the encouragement of plantations of oak (a  
remote

\* There are forty or fifty different vegetable substances, which contain the tanning principle, in a greater or lesser degree.

remote prospect that!) or by the invention of some substitute for oak bark, the people of *Ireland* may be enabled to manufacture their own leather. Should that desirable change take place, the manufactures of leather, shoes, saddles, bridles, harnesses, and accoutrements for soldiers may become a considerable article of export from this country.

The manufactures in leather deserve the encouragement and protection of the legislature, both, as producing articles of the first necessity, and as operating on a domestic *primun*, and being such as do not require, in their commencement, a very great capital. On this account, the present tax on leather, independent of its apparent cruelty, in seeming to be a tax on the comforts or necessities of the poor, appears to me to be an injudicious one, imposed in opposition to all the principles of political economy. Indeed, considering the immense difficulties under which the manufactures of leather in this country labour, from want of bark, it would have been wiser policy, in the legislature, to have come forward, and afforded them some material assistance, than to have loaded them, with a tax, at a juncture when they were merely struggling for existence, and this too, a tax, which must affect every branch of industry, in the country; agriculture, arts, trades,—no remission,—no exception;—inasmuch as it must be felt chiefly by labouring poor, and falls on an article of such necessity, that it cannot be retrenched.

The manufacture of paper seems to have been somehow connected, from the very beginning, with that of linen; for though its materials were not then of linen, *Egypt*, formerly the most famous country in the world for fine linens, invented the manufacture of paper; which soon became an object of commerce, with all parts of the world, and continued to encrease, and to flourish there, to the time of the decline of the Roman Empire. *Holland* and *France*, countries equally celebrated, in modern days, for fine linen fabrics, have also attained to great excellence, in the manufacture of paper. There was no obvious

vious connection between the manufactures of linen and paper, in ancient *Egypt*; the raw material was not the same in both. With respect to linen, and paper as now manufactured, from rags and shreds of linen, there is a close and necessary connection, and alliance between them. Where an abundance of linen is made, and consumed, and fine linen is in general use, the shreds and fragments, that remain from the sempstresses and the milliner, and the quantity of decayed linen, inapplicable to any other use but that of making paper, will constantly supply the manufacturer, with this *primum* of the best quality, and on the cheapest terms; for the supply of linen rags in a country where linen abounds, will cost the manufacturer little more than the expence of collecting them.

The manufacture of paper has many advantages. It supplies an article of the first necessity. To it we are indebted, not only, for the diffusion of science, and the improvement of religion and morals, by the multiplication of writings and books.—The intercourse of social life is hourly indebted to it; it is become necessary to the security and transfer of property; to the operations of finance, of mercantile dealing, and exchange, the arts of printing, of music, and engraving, depend upon it; and the arts of drawing and painting derive much service from it. Add to this a variety of elegant and useful inventions, for the decorations and furniture of our habitations; as paper-hangings, screens, and other contrivances, of the same kind. Next to linen and woollen cloths, there is perhaps, no manufacture, in such general demand, and of such extensive utility; and this is a demand, which, instead of fluctuating with the caprice of fashion, will endure to the end of time; and constantly encrease, with the encrease of population, and progress of refinement and knowledge. It employs a multitude of hands, and gives bread to the aged, the infirm, and the infant, in its various departments. The paper manufacture employs both domestic *primum*, and turns to a profitable purpose materials, which would otherwise be wholly useless, and unproductive,

unproductive, and must absolutely run to waste, if they were not thus employed. Add to this, that the paper manufacture is capable of more improvement, in texture, beauty, and value, by the exertion of skill and industry, than almost any other. There are papers not worth more than five or six shillings the ream; and there may be drawing paper worth twenty guineas the ream. The paper of some of the most ancient editions of the classics, those of *Aldus* in particular,—the paper of *Baskerville* and some others in *England*, that, employed in the publications of *Bodoni* at *Parma*, and of *Didot* at *Paris*, show, to what an high degree of perfection the fabrication of paper may be carried; and the encrease of price is proportionable to the improvement of quality; so that there is no manufacture, that is susceptible of greater exertions, on the part of the workman, or that rewards them, with more liberality. The paper manufactory also produces many articles of necessary use, either to the fabrication of other commodities, or the sale of them; as wrapping, blotting, and marble paper, cards, and paste board.

The principal expence of a paper manufacture, consists in rent, for it occupies a large space of ground, the first cost of buildings, and apparatus, repairs, and workmen's wages;—the materials in addition, to linen rags, are shreds of parchment, or vellum, for the purpose of making size, vitriol, and roche allum. To these we add oxygen, which is now employed, in whitening the macerated mafs of linen, and smalts, or some other blue colour, which is generally used in the composition of writing papers; although this ingredient might better be omitted, in the fabrication of all sorts of paper.

This is a manufacture, to which the natural advantages of *Ireland* seem particularly to lead her; the number of pure streams, and of the finest water, which every where abounds, in this country, are particularly favourable to the erection of paper works. The manufacture has already made some proficiency amongst us; and the manufacturers have acquired competent skill. The manufacture at present, is certainly very inadequate to the consumption of the country; yet

yet, I think, it must be considered, as one which is in a prosperous and promising state.

An extensive pursuit and intimate knowledge of the linen manufacture may probably suggest many experiments, and observations, that may be serviceable in the fabrication of paper; either to improve the quality of the commodity, to shorten the process, or to reduce the expence of making it. For instance, the same materials and operations which are employed in the bleaching of linen, may be used, for the purpose of cleansing and whitening the linen rags for paper before they come to be macerated for the vat. The use of oxygenated muriatic acid, for the purpose of bleaching linen, and whitening the crude material for paper was first discovered by Monsieur *Berthollet*, and improved, and extended, by the celebrated *Lavoisier*, and other French chymists, it has been happily applied, in practice, in *England*, by those ingenious manufacturers, Messrs. *Clement*, and *J. Taylor* of *Maidstone*.

Is not the operation of hot pressing paper, to give it a gloss somewhat resembling that of vellum; analogous to the process of the calendar, in smoothing and glazing linens, diapers, and calicoes.

The superiority of *French* paper to that of all other countries is acknowledged. It not only excels in beauty, but, in durability, and aptitude for the operations of printing, engraving, and drawing. Such is the strength and toughness of texture in *French* paper, that if you fold up a sheet of it, and pass it through the ring of an half hundred weight, you may raise the weight, and wield it round your head, without any other hold. A degree of strength, which is not to be found in the paper of any other country.

The advantages of this firmness and continuity of texture, are great, when the paper comes to be moistened, and subjected to the action of types, and copper plates in the operations of printing or engraving. I need scarcely say, that the paper, being moistened, to make it fit for receiving the intended impressions is thus rendered weak, and susceptible of injury from the sharp points of the types and indented lines of the plates which inflict on its enfeebled texture so many wounds. In proportion

as the intrinsic strength of the paper is great, the less will it suffer under the combined severities, of wetting, and working it, in the printing, or rolling press.

It would be useful to advert to the causes of this superiority, they seem to be chiefly these two. The peculiar structure of the wheel in the *French* machinery, which mashes, or triturates the stuff, in the vat, or receptacle. The cogs, or rather the ribs of the cylinders, by which this operation is performed being more distant from each other, the material is cut and broken into longer filaments, which, when they come to be combined in paper, wrap over, or intertwine and embrace each other, with more strength and tenacity, forming by their length an aggregate of greater durability.

A new cause of strength, may be the rejection of smalt, and other blue materials, from the composition of *French* paper. Such substances evaporate, in process of time, and consequently leave, by their absence, many pores and interstices in the paper, whereby its strength is impaired, and it becomes daily more and more exposed, to the action of external air, the great destroyer of most productions of art. Perhaps also there is a peculiar nicety, in the degree of trituration of the rags, which hitting the medium between too much and too little, may contribute to the strength and goodness of paper. To ascertain this, if possible, by experiments, and to observe it in practice, should be the care of the attentive manufacturer. It is certain, that if trituration is continued until the material becomes greasy, it is too much.

It is also a matter of great importance, to attend particularly to the careful assortment, of the rags, with respect to firmness and fineness, so as to have the whole heap intended for each particular class or species of paper as nearly as possible of the same quality.

Some of the eminent *French* chymists, who have studied to make philosophy useful, by a practical application to arts and manufactures, have, as I have said, taught the use and importance of the muriatic acid, for detarging and whitening the rags for papers. It is said that  
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late experiments in *France* have shown the practicability of clearing or whitening written and printed papers, and fitting them for being returned to the mill, as the material for white paper. This circumstance might deserve the attention and enquiries of the intelligent manufacturer. Much nicety and care are requisite with respect to the steeping, and fermentation of the rags, before they are subjected to the action of the mill; for if this operation is continued too long, and the fermentation and putrefaction become violent, the texture of the paper, to be made from the rags, will be proportionably weak. In this and other particulars, were the manufacture duly encouraged, and in a flourishing state, a considerable capital, and extensive experience, guided, by a degree of commercial vigour, and prudent enterprize, might make many experiments and improvements.

The ingenuity of manufacturers might discover many new objects, to which macerated linen might be applied. For instance, hats, and bonnets, for womens wear are formed of paper, which, for lightness, neatness, and durability, are not inferior, to those of straw, and chips. Perhaps also, paper of a peculiar texture, and greater aptitude for certain uses, (as, for instance, bank notes) might be formed by varying the material of paper, and employing silk or cotton, in the place of linen.

Though, not only the *English*, but the *French* and *Dutch* are our rivals, in this manufacture of paper; there is none, in which we have a fairer prospect of contending successfully, and equalling, if not surpassing our rivals. The *English* surpass us only in capital and skill; in all other respects, this country is the more advantageously circumstanced of the two, and it should inspire us with confidence, that our deficiencies are such as time and industry may cure.

The manufacture of hats is one, which particularly deserves the attention of the *Irish* nation, on many grounds. It is a manufacture of general use and prime necessity; little subject to the variations of fashion—it employs domestic produce—namely wool—or the fur of hares

and rabbits, exclusively, or mixed with beaver or silk, as the stuff which forms the texture of the hat. It is a species of industry, which may be carried on, by the manufacturer in his own habitation, at a distance from large cities.—The apparatus is not very complicated or costly; nor does it require any great weight of capital, to commence this manufacture—it is a manufacture generally established, and well understood in this country, though undoubtedly we are far inferior to the *British* workman.—With due encouragement, many improvements might be made, and the manufacture might be extended, to such a degree as to supersede the necessity of importing hats from other countries.

It may be said, that beaver fur, which, either in part, or in the whole, furnishes the texture of fine hats, is a *primum* imported from a far distant country, and of great price. Perhaps, a sufficient substitute for beaver fur might be found. Silk has of late been successfully employed in the fabric of fine hats. Were the use of this material in hats to become general; great improvements, doubtless, might be made; both in the manner of preparing the silk, and in ascertaining the just proportion, in which it should be mixed with wool, or other materials, so as best to answer the purposes of beauty and durability.

But, as all manufactures are rather supported by the consumption of the populace, than by that of the rich and refined, the principal strength and utility of this fabric must consist in the manufacture of the cheaper and coarser kind of hats, for the use of the multitude, in which every part of the materials (if we except the dyeing ingredients) is domestic. I am convinced, very great improvements might be made, in that kind of hats, called felts, which is composed entirely of wool, by improvements in the manner of preparing and dressing the stuff, of which the hat is wrought, and by due attention to the breed of sheep, so as to approach the fineness of *Spanish* wool; and by care in selecting and sorting the parcels of wool.

BOOK

\* It seems to have been done in *England*, to evade the tax on hats.

## B O O K II.

*On the encouragement of Manufactures in Ireland.*

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*Introduction.*

It remains to be enquired, by the pursuit of what measures we may the most effectually avail ourselves of the natural advantages of the country, in the extension of industry, the improvement of manufactures and increase of national prosperity.

The measures to be pursued, for the attainment of these great objects are of two kinds,—*general*, which apply to the advancement of all manufactures, without distinction, on comprehensive grounds of political economy; and *particular*, which apply in detail, to the production of some given fabrick.—Philosophy—agriculture—frugality—morals—education,—these are undoubtedly propitious, in the highest degree, to the extension and improvement of every form of national industry.—There are other general methods of promoting manufactures, which have, from time to time, been suggested by theorists, and are more questionable, in their principle, or more doubtful, in their operation,—such are chartered companies, monopolies, foundations, bounties and protecting duties.

I shall endeavour to consider, in their order, the means of promoting industry, and the arts in general, and the measures which may be advisable, for the improvement of particular manufactures. Some

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of these subjects I shall treat more at large, some, in a cursory manner; not so much regulating myself, by their intrinsic importance, as by the means of information I possess, or the leisure I may have found for considering them.

It may not be improper, in an essay of this kind, to premise, in one view, the general obstacles to the prosperity of trade and manufactures, in any country;—they are,

First,—war foreign or domestic.

Secondly, want of toleration, or persecution. Thus, the expulsion of the *Moors* gave a blow to the industry and prosperity of *Spain*, which the country feels, at this day. The revocation of the edict of *Nantz* was fatally injurious to the *French* nation—and the severity of the popery laws in this country, shackled and discouraged the industry of the Roman Catholics in *Ireland*, and drove many of them, to emigrate with their property.

Thirdly, laws indiscreetly meddling, and interfering, to confine, or vex the manufacturer, in his operations.—The excise laws, it is to be feared, do this in some instances, with respect to the manufactures of tobacco, and of malt, and with respect to the breweries, the distilleries, the manufactures of leather, and of salt.

Fourthly, taxes, that directly or indirectly check the consumption of a manufacture—as that on leather.

Fifthly, multiplied festivals, raising the value of the labour of the remaining days, and leading to excess.

Sixthly, prejudices respecting usury, tending to keep money out of circulation, to the disadvantage of the borrower.

Seventhly, luxury among manufacturers, consuming their capital, and cramping their operations.

Whether all or any of these prevail in this country, it is not for me to decide; suffice it to say, that where these evils do exist, the removal of them is the most effectual method of promoting industry.

In treating the subject of manufactures, it cannot be expected, that I should enter into minute details, of their different mechanical operations;

rations; these must be left to artists, by profession. It will prove sufficient, as I apprehend, for me, to suggest some general principles, and comprehensive views, which may, perhaps, deserve the notice of the legislature, and prove the means of exciting men of wealth and influence, to extend pecuniary aid, to the encouragement of industry and arts; and to employ the force of their authority and example, for the same salutary purpose. Much of the encouragement of manufactures must depend on the operations of moral causes, it would not be very difficult, to fill volumes, with minute details of mechanical operations, and with tables and calculations, which would have little influence on the main question. Man has been too much considered, as a mere machine, actuated only by physical impulses; and thus have most economical writers endeavoured to reduce his exertions, his value and political importance, to abstract calculations and arithmetical tables. Figures only expressing quantities can be applied only to objects, which are susceptible of addition and subtraction; but when numbers are employed, to calculate, with exactness national prosperity, when they are applied to develop the secrets of government, and the springs of human action, on which national industry and exertion depend, they lead to the most absurd consequences. It is much to be lamented, that politicians and legislators do not attend sufficiently to the force of moral causes.—The consideration of their operation and value, should, in particular, have great weight, with those who pretend to discuss the subject of rational industry.

## C H A P. I.

*On general methods, of promoting industry and arts, of unequivocal utility, and certainty in their Operations.*

## SECT. I.

*Application of Philosophy and Science to Manufactures.*

The improvements of mere manufacturers, in their respective departments, are generally suggested, at first, by accident. The discoveries which are presented, by chance, are seldom pushed on, in any consecutive order, or pursued up, through all the consequences of which they are capable. Thus, the experiments, of the practical mechanic, are too frequently unconnected facts, rather technical notices, than scientific data. Illiterate men, confined in their views, by want of education, dispirited in their aims, by want of encouragement, cannot be supposed to have the time, the means, or the disposition, to make deliberate, and regular experiments; but, supposing them to possess all these, they could not be expected, to make experiments with effect.

It is in the lap of opulence and encouragement, not, in the bosom of penury and despair, that we must expect to find the enlightened manufacturer—a *Clement Taylor*,—an *Onesiphorus Paul*—an *Arkwright*—or a *Wedgewood*.—Manufactures may be expected, to attain the most perfect maturity, when reason and philosophy, stooping to the purposes of common life, take the manufacturer by the hand, and lead him through  
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the temple of science. Then, method is added to research, and principle to experiment. One discovery becomes the parent of another; and scientific truths and commercial advantages proceed, with equable march, and sisterly affection.—The construction of machinery; the chemical compositions and resolutions, on which depend the brightness and permanency of colours, in the art of dying; the relative durability and eligible qualities of materials, for the various purposes, of buildings and machinery; the properties of metals; the various preparations of various substances, which may answer one and the same end in manufacture; all these are disquisitions, in which, the light of science will serve to guide the artist, to superior excellence and superior wealth.

It were to be wished, that men of science, in this country, could be induced, to apply their researches to the improvement of manufactures. The *French*, with all their wild extravagance, are capable of affording useful lessons to the world, in many respects, and, in particular, as to the application of physical knowledge to practical purposes, even in the meanest manufactures; their public institutions, their dictionaries des arts, et metiers, the various elaborate articles in their *Encyclopedies*, may convince us, with what anxious care the learned men of *France* have pursued this important object; and how happily they have divested themselves, of the false pride, and mistaken dignity, that sometimes, lead the philosopher, to consider the humble, though nice, and important details of a manufacture as beneath his care.

There are what the vulgar call the secrets of manufactures: these are the niceties, to be observed in certain processes, the time of continuing certain operations; the mixture and proportion of ingredients; the preliminary preparation of materials; the greater or lesser intensity of heat; the form and capacity of utensils; the application of the mechanic powers; all these particulars may be learned, accidentally, at once; or be the result of frequent trials; but they are reduced to a certainty,

by philosophy, comparing a set of experiments, and generalizing principles.

We should endeavour, by every motive of reward and honour, to draw the man of science from his retreat; and lead him, to devote his talents, and researches, to the practical purposes of human life.

Geometry, duly applied, will contribute to complete and perfect the mechanical arts; it will find the just proportions of things; and will ensure that precision of execution, in which, consists perfection. *Maggellan* and *Drake* were, without doubt, great navigators, long before the true figure of the earth was ascertained; yet, the art of navigation has been brought to greater perfection; since geometry has discovered, that the earth is not a sphere, but a spheroid, and corrected our charts, according to that figure.

Naturalists may examine various substances of the animal, vegetable, and mineral kingdoms; and point out their use and application, in the cultivation of land, in the purposes of domestic life, in the construction of buildings, or machines, in the process of manufactures.—The naturalist, for instance, examining the nature, and properties, of wood and stone, may furnish aids to architecture, in the choice of materials, in the manner of working, and using them.

Philosophy, having established principles, and shown both the superior excellence, of one mechanical operation, or process, compared with another, and the reasons, and grounds, on which the superiority is founded;—*that* becomes general, and the fruit of design and forethought, which before was held to be casual, and the offspring of accident and luck. It can be demonstrated, that an arch of the catenarian curve is more strong, to support a superincumbent weight, than a circular one—an architect may, at first, adopt the catenarian curve, by accident; but finding, its properties demonstrated, by geometry, he will, afterwards, employ it uniformly, and on principle. Chemistry may discover secret modes, of producing stronger degrees of heat. A similar discovery may result from accident.



In fact, the mathematician extends his aid to most of the practical objects of human industry. Terrestrial, and naval architecture invoke his hand; the farmer looks to him, for improvements, in the utensils of husbandry; every artisan and manufacturer expects, from him, machines, that will facilitate and abridge his labours; or enable him to perform his work, with more accuracy and perfection. Much, I am persuaded, might yet be done, by profound knowledge of mechanic powers, in the construction, both of spinning machines, and looms, for the amelioration, both of the thread and the web.

A member of this academy, who directs the researches of profound science, guided by distinguished talents, to the most useful objects, has shown how practical chemistry and philosophy may combine, to aid the husbandman, in the cultivation of his fields; by showing him the particular manure adapted to each peculiarity of soil. Chemistry takes the range of most arts and manufactures, and makes, in its circuit, some useful present to each. It taught the *French*, as I have before observed, to abridge the process of tanning leather, and to dispense with the use of bark, in that operation. It has improved the art of bleaching; it examines the philosophy of permanent colours; it explores the operations of fire, its power to fix or to transform; the causes and compositions of dyes and pigments; it furnishes the painter and the dyer, with new substances, of use in their respective arts; and teaches them, to prepare known substances, in a more cheap and commodious manner.

Near a century and half ago the process of dying, and the art of fixing colours, appeared to be of so much importance, that they engaged the attention of the Royal Society in *England*, who, properly impressed with the utility of the investigation, earnestly recommended these subjects, to the experimental philosophers of the time, *Boyle* and *Hook*. In *France*, *Colbert*, anxious to extend the commerce and manufactures of the country, turned his attention particularly to the art of dying; with a view to amend and improve the practice, as well

as to obviate frauds in it. For these purposes an "*Instruction generale pour la teinture des laines, et manufactures de laine, de toutes nuances et pour la culture de drogues ou ingredients qu'on emploie,*"—was prepared under his immediate direction, and published in 1672.—The result answered his cares. We see, to what perfection, particularly with respect to the dye, the woollen manufactures of *France* have attained.

From many substances to select the most useful; of many modes of performing the same mechanical or chemical operation, to prescribe the most eligible, is the province of the natural philosopher, or the chemist. To attain these ends, the government of a country, which wishes to thrive by arts and manufactures, ought to imitate what has been successfully practised in *France*. It should both offer rewards for particular discoveries and improvements, especially in the arts of dying and bleaching; and it should engage the man of science, by every possible incentive, to turn his attention to the manual arts.

Chemistry produces new substances, of use in manufactures. It develops the latent qualities of substances already known, and improves and heightens the known useful properties of known substances. It produces valuable substances, from the composition and resolution of new materials, of a more cheap and common kind, than that heretofore employed.

The industry and sagacity of the *French* nation were exerted in the present war, to discover the most sure and speedy mode of generating an abundant supply of salt-petre. The kingdom was divided into large districts, each of which was continually surveyed, by an inspector, skilful in arts and sciences. Under him was placed a former director of the national administration of salt-petre. It is stated, that sixteen millions of rough salt-petre were collected in one year. It was still necessary to refine salt-petre, for the purpose of making gun-powder. The former mode was too tedious and embarrassing, a new and more advantageous process, was invented by *Monsieur Carny*, which required  
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less time, consumed less fire, disposed the saltpetre to dry, more readily, required less room, and occasioned less waste of saltpetre.

The process of making powder, was also abridged, and the strength of the powder was carried to a degree before unknown. New methods were practised, for mixing and triturating the ingredients, rendering the composition more compact, and granulating it. The machines, and mechanical means were also entirely new. What was on the spur of the occasion, with respect to a particular manufacture, requisite for the defence of the country, might be accomplished, in other branches of manufacture, by a like combination of philosophical science, with the exertions of active industry.

There are certain problems, which active industry may propound to philosophy; and, on the due solution of them, much of the success of manufactures may depend.

By what means may the machines and instruments of the husbandman and farmer, the machinery and tools, employed in manufactures, be improved; either to save labour, or to perform the task, in a more perfect manner? To what operations of farming, and manufacture, which are now performed, by the mere labour of the hand, might the mechanic powers be successfully adapted?—What useful inventions, or practices can the observation of travellers supply, for the improvement of husbandry, and the arts;—to raise water—to irrigate lands, for instance?—Steam is an all-powerful agent; may not the use of it be extended, in manufactures?—In a brewery, the same engine may raise sacks into the ware-house—grind the malt, pump-water, for the use of the brewer, tun the liquor, and turn out the casks, from the ware-house. It may be employed to work bellows, in great founderies.—Industry has to enquire of chemistry,—if certain impediments may not be removed, by her aid; for example—whether an effectual substitute for charcoal, may be found in charred peat—whether coak may be made, of turf, for the purpose of smelting iron, when coak of pit-coal cannot be had,—the relative heats of charcoal, coak of pit-coal, and charred turf,—expedients for producing an intense heat, in glass houses, and furnaces,

furnaces, with a smaller quantity of fuel,—the force and application of pure air,—the properties and application of various other airs, in manufacture,—the use of manganese, and in what parts of the kingdom it may be found. Finally, science and philosophy should be invited, to take a comprehensive view of arts and manufactures, and to institute experimental enquiries, how the process, in each, might be shortened or simplified! How time and labour might be abridged,—how the expence of fuel might be diminished,—how the quantity of room, the extent of buildings, the complexity of apparatus requisite, at present, in the various operations of manufacture, may be contracted.

Vegetable alkaline salt is a material of prime importance, in the manufacture of soap, and in the process of many other manufactures; chemistry, analysing and comparing many vegetable substances, discovers, that wormwood yields the largest proportion of this salt. The farmer, under the direction of the chemist, and with the encouragement of the legislator, might be led, to cultivate extensively this useful vegetable, and taught to prepare the salt; and thus, large sums of money, which are now annually drawn off the country, for the purchase of *barilla*, might be retained at home.

No department of public utility, has been left unexplored, by science, in *France*. Under the direction of chemistry, a grand project was conceived, and has been executed to a considerable extent,—a subterranean mineralogical survey of the country, accompanied with subterranean maps or charts, illustrating the nature of the soil, and the mineral productions of the several districts. It is easy to see the importance of such surveys to medicine, to manufactures, and to agriculture.

Above all things, it would be of the utmost national utility, to turn the attention of philosophy, and direct the spirit of active research, to the discovery of that subterranean wealth, which, no doubt, is copiously stored, in the recesses of the earth; and particularly to the discovery

covery of mines of coal. Since every step towards the providing of a cheap, certain, and abundant supply of fuel, will be the greatest advance imaginable, towards the improvement of the country. To this great end, the mineralogical survey of such parts of the country, as seem, from their aspect, to promise metallic and fossile substances, should be directed.

The researches of the naturalists might discover a variety of valuable substances, in this country; *Ireland* is, by no means, deficient in minerals. An abundant source of wealth and prosperity, to a country; and a copious field of employment, for the labouring poor, are opened to us, in the pursuit of those treasures, which lie concealed in the earth. Yet, though mining speculations are highly profitable to the adventurers, and advantageous to the country, if undertaken with judgment; there are none, where projectors, of a sanguine temper, have more room, for flattering themselves to the last, or, where people are more liable to imposition, both, from others, and from their own hopes and imaginations. Here, natural science, and experiments in chemistry, must direct the researches and expectations of the projector; or they will end in disappointment and ruin.

It would be a measure of great national utility, were able mineralogists sent, at the public expence, through the country, to examine its mineral productions; their quality, and the facility or difficulty of obtaining them; with other particulars, of that kind, proper to guide the exertions of industry; and instructed, to combine their several discoveries, in something like a subterranean chart of the whole island.

By this means, we should, not only be enabled, to discover different metals, and mines of coal and culm; but ochres, and other substances, of use to painters and dyers.—Pipe-clay, and fuller's-earth are substances, of such importance, in the woollen manufacture, that they cannot be sought for, with too much diligence; and the industry of naturalists should be stimulated, by rewards, to discover veins of these substances.

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To this head, I may, properly enough, refer the arts of drawing and designing; which are of the utmost importance, in many trades, and manufactures where the exterior forms and embellishments of things, are often more considered, than the material or substance. *France* and *Flanders* would never have drawn so much money from *England*, for figured silks, damask linen, lace, and tapestry; had they not improved these manufactures, by their academies for design. We are told by *Young*,\* that taste was cultivated by the manufacturers of *Lyons*, with so much attention, that they employed more than an hundred pattern drawers, whose invention was ever on the stretch. Had we academies for design, with a particular reference and application to the different mechanical arts, and manufactures, which admit of ornament, and a display of taste; it would contribute very much to the perfection of a variety of fabricks, which are produced in this country—an institution of this kind, particularly calculated for the use of manufacturers, and directed to their improvement, might easily be engrafted, on the drawing school, which now subsists, under the patronage of the *Dublin Society*. Our manufactures of figured silks, our stamped and painted linens, cottons, and calicoes, our damask table-linen diapers, our paper hangings, our cabinet-makers work, and ornaments in stucco, would soon confess the beneficial effects of such an establishment, by the superior elegance of design.

SECT.

\* *Young's Tour in France.*

## SECT. 2.

*On the Abundance of Provisions, and Agriculture.*

I cannot forbear recommending, in the strongest terms, the encouragement of agriculture, as one of the means, of encouraging and promoting all the manufactures of the country. In the first place, it is a prime object, to secure to the manufacturer, an abundance of the best provisions, on the cheapest terms; and, for the attainment of this end, we must look to agriculture. Were I to enlarge on this topic, as its importance deserves, I should far exceed the bounds allotted to this paper. In the next place, it is to be observed; that we must look to the husbandman, and the shepherd, for the raw materials of our most important manufactures. The former supplies us with flax and hemp; the latter with wool. An abundant supply of food, for our manufacturers, is also offered by fisheries, which may be carried on, with great advantage, from all the shores of this kingdom. Every encouragement, therefore, which is given directly, to agriculture and fisheries, by encreasing the supply, and diminishing the price of food, is indirectly an encouragement to every branch of manufacture.

The alarming prospects of famine, to which this, and the neighbouring country, were lately exposed; should lead us, to the adoption of some measures, which might, if possible, deliver us from the apprehensions of such a national visitation, in future. Might it not be prudent, to establish public granaries, one in each county; where grain of all kinds might be stored up, when the market price should be low, for the purpose of being sold out to the poor, in times of scarcity; at a rate somewhat enhanced, so as to pay the interest of the first cost, and the charge of management. These depots might be so re-

gulated, as not to be opened for sale, of any particular kind of grain, until it should have risen in the markets adjoining, to a certain average price. What the buying and selling prices, for each species of grain, ought to be, I shall not attempt to ascertain, in this place.

Such an institution would be of the utmost utility, to the manufacturer, by securing for him an unfailing supply of bread, at a reasonable rate; and it would prove a great encouragement to agriculture, by securing to the husbandman, in times of great abundance, a regular home market for the produce, much more certain than the foreign demand. The late large exports of grain, from this country, are not to be depended on, as what will prove permanent; they proceeded from temporary causes, affecting other parts of *Europe*; when these causes no longer operate, the great demand for the grain of *Ireland* may cease; yet, our farmers have speculated on its continuance; and are likely to suffer disappointments, which may discourage the agriculture of a future season. Were public granaries established, this never could be the case; the leanths of one year, would eat up the superfluous fatness of another; the market would be regular, and keep the demand, and price of corn, nearly at one reasonable and uniform level.

The expediency of establishing granaries has been felt, in most countries, ancient and modern. By repositories properly constructed, grain, may be preserved, for a long space of time, as appears in the successful practice of *America*. Thus, the superabundance of one year balances the sterility of another; and, should the accumulation of grain greatly exceed the present consumption, or probable wants of the country, a vent may easily be found; in some foreign market.

There is another point of view, in which; the encouragement of agriculture, and fisheries, is of great importance, to the manufactures of a country; and must be considered, as affording them a bounty.— I mean, that the increase of these, by increasing the opulence of the labouring classes, increases their consumption, in the same ratio. In proportion, as the peasantry of a country become wealthy, their artificial wants will increase; they will be better clothed, and lodged, their  
habitations



habitations will be better furnished. A rich merchant, as he accumulates money, thinks of acquiring landed property; a peasant, as he accumulates part of his daily earnings, thinks of acquiring various utensils, and articles of household furniture, which he wanted before, or of purchasing superfluous wearing apparel; and this, to him, is realizing a property. It is easy to see, how this contributes to the improvement of manufactures. It is unnecessary, to enlarge on this subject; suffice it to say, that the constant and general consumption of the poor, contributes more to the support of home manufactures, than all the capricious and wanton luxury of the rich.

As a measure connected with agriculture, and abundance of provisions, I would recommend the enclosure, and division of commons, in this country.—To encourage the cultivation of the waste and mountainous, parts, I would propose to colonize them. This measure would be equally profitable, to the private proprietor, and to the community at large; sterility of soil vanishes, before industry; we see this exemplified, in the mountains of *Switzerland*. We see how the *United Netherlands* emerged from the bosom of the waters.

There is a measure, which, though, at first view, it may appear chimerical and visionary, like some of the preceding plans; would, I am confident, be found practicable, in the execution, and profitable in the effect,—the colonization of the waste and uncultivated parts of the country. There are vast tracts of mountain and morafs, at present, unprofitable to the private owner, and to the public at large, which might be rendered valuable and productive land.—That many of these tracts were formerly inhabited and cultivated, appears, from the remains of of houses, and places of worship, and from the marks of the plough, which may be traced out, in places, now deserted, wild, and waste. Poverty of soil, and disadvantage of situation would yield, to the industry of man, freely, and of course, chearfully labouring, with a certain prospect of advantage, to himself. We see this exemplified, as I have said, among the *Swiss* peasants; and in the *Dutch Netherlands*. The sad reverse is exhibited by *Egypt*, in its pre-

present state; what was formerly the most fruitful part of that country, when watered by numerous canals, and won, or preserved, by the hand of wakeful industry, from the encroachments of the shifting desert, has now degenerated into a sandy waste. Our bogs might, in general, be drained, and rendered highly profitable, by crops of rape, hemp, and kale. A great part of our mountains would maintain a small breed of sheep; whose wool approaches near to that of *Spain*, in the fineness of staple; and the increase of whose numbers would tend highly to the extension and improvement of the woollen manufacture.

Large tracts of mountain undoubtedly there are, so bleak in the exposure, and so savage and intractable in their nature, as to mock every meliorating art, every attempt at cultivation; but, by far the greatest part of our mountains is capable of being made useful. It is impossible for those, who have not seen it experimentally illustrated, to conceive, what may be effected, by the exertions of industry. This may be seen, in a striking manner, in the late accounts of *China*, that wonderful country; where not a plant or herb springs up in vain, or is past over in neglect; where even the waste of waters, is covered with the dwellings of man, and compelled to produce esculent vegetables, for his support. It is observable, that the wool of cold countries, is the finest; of *Cachemire*, for instance, and *Caramania*.

Suppose companies were formed, with the design of reclaiming and peopling, the deserted parts of the kingdom; and of establishing villages and markets, in regions, which are now uninhabited. The undertakers might divide the land, in shares, amongst industrious peasants, who should enjoy their respective allotments, during seven years, free from rent, tithes, or taxes, and subject only to a very small chief rent, during two lives, on condition of building a cottage, and residing on the premises. Thus, would the cultivation of the country be improved, and the proprietors, at the expiration of the terms granted, would be able to derive a large income, from lands, which, at present,  
yield,

yield little or no profit. Had some such measure been adopted, some some years ago, it might have proved the means, of retaining, in this country; large sums of money, and what is of more importance, multitudes of active and industrious individuals, who have fled from this island, with their families, and their property, to cultivate and enrich, the wilds of *America*. But measures of this nature must be left, to the prudential or patriotic consideration, of individuals. They cannot become an object of legislative interference. I shall only observe, that, to render the remote, mountainous parts of the kingdom productive, they must be made accessible, and intersected with roads, the want of which contributes very much to retard the progress of civilization, and industry, in *Ireland*.

### SECT. 3.

#### *Of Frugality, with a Glance at the Prodigality of Ireland.*

In considering the means, of advancing the prosperity of manufactures, frugality, and correctness, and simplicity of manners present themselves, in the foremost rank. Frugality is the nursing parent of all the exertions of industry.

The real wealth of a nation is in proportion, not to the gross, but to the net revenue, *i. e.* to what remains, after deducting the expence, of maintaining, first, the fixed, secondly, the circulating capital. If a nation is frugal, and makes the general expences, less than the nett revenue, the overplus goes to the augmentation of capital; and, in proportion as it is encreased, the productive powers of labour are encreased. Improved machinery, improved materials, a greater number of hands, must be the consequence; all that is laid out, on the fixed capital,

capital, is repaid, with very great profit, and increases the annual produce, by a much greater value, than that of the support, which such improvement requires.

“ The true and natural grounds of trade and riches,” says *Sir William Temple*,\* “ is the number of people, in proportion, to the compass of ground they inhabit; this makes all things, necessary to life, dear, and forces men to industry and parsimony. These customs, which grow, at first, from necessity, come with time, to be habitual to a country; and, wherever they are so, that country must grow great, in traffic and riches, if not disturbed by accidents.”†— “ By selling more in proportion, than they bought, the *English* were rich, in comparison of their neighbours. In *Edward the Third’s* time, when *England* maintained such mighty wars, in *France*, and carried her victorious arms into the heart of *Spain*,—in the 28th of that reign, the value of all exported commodities amounted to 294184*l.* 17*s.* 2*d.* that of imported, but to 38,970*l.* 3*s.* 6*d.* So there entered, that year, into the kingdom, in coin or bullion, or else grew a debt to the nation, 255,214*l.* 13*s.* 8*d.* Yet, they then carried out our wool unwrought, and brought in a great part of the cloathing of the people from *Flanders*.”

Parsimony is, not only serviceable to industry directly, in the quantity of productive labour it employs; it contributes not less to foreign commerce, than to domestic exertion. The less that is consumed, in a country, the more is exported abroad; they will, most readily, find a market, who can afford to sell cheapest. The industrious and parsimonious people can thrive, by prices, by which the lazy and expensive cannot live. It is a mistake, that the importation of luxuries, which are not purchased with money, but with native commodities, does not make a nation poorer. The native commodities, if they had not been expended, in the purchase of luxuries, would have reproduced

\* Vol. 3, page 6.

† Vol. 1, page 197.

duced themselves, with a profit; which return, again, would reproduce itself, with profit, *in infinitum*.—This return would have been made either in money, or in the crude materials of some manufacture. Never any country studied parsimony so much as *Holland*, and consumed so little; the *Dutch* furnish infinite materials to luxury, which they never practise; and traffic in pleasures, which they never taste.

There is no country, in which the lesson of frugality should be more strongly inculcated, than in *Ireland*; since, there is no country, to which habits of parsimony are more requisite, than one, which supports an incessant drain, in the sums perpetually extracted from her, by absentees,\* and a variety of other powerful exhausting causes. In fact, *Ireland* has been so long in a dependent state, that her ruling principle is the servile spirit of imitation; her arts, her notions, her fashions, her luxuries, her vices, are all imported, idleness and drunkenness excepted; these, indeed, are the native growth of the soil. She attempts, in every particular, to exhibit a poor caricatura, a feeble imitation of what is done in *England*, a country advanced a century, at least, before this, in true refinement and knowledge; and exceeding us, beyond all comparison, in industry, arts, and opulence.

The disproportionate expence, in superfluities, diffuses a system of splendid mendicity, and bankruptcy, through this island; the sums, which should be added, to the capital of the merchant, or employed by the proprietor of the soil, in the improvement of his estate, and the diffusion of industry, are dissipated in gaming, or lavished, in the expences of the table. The buildings, both public and private, (especially in the capital) are on a scale, vastly too large, for the means of the country, and of the individual. We see the mansions of private gentlemen abandoned, and the capital swelling to a preternatural and pernicious magnitude; the estates, of land-owners, groaning under a weight of debts, and among traders and manufacturers, prodigality and ruin the order of the day.

\* The annual sum, drawn from *Ireland*, by her absentees, is about two millions of money.

## SECT. 4.

*Subject of the Prodigality of Ireland continued.*

All *Ireland* is, in some degree, in the situation of a great capital, practising a luxury beyond its means, and exhibiting the varieties of unproductive labour. Its principal trade is the importation of foreign luxuries, and the drain, which this disadvantageous traffic, and a numerous band of absentees occasion is only supported, by the exuberant productions, of a most fertile soil, and the solitary aid of the linen manufacture. There are few countries, of the same size and population, where so many idlers are fed, with the bread of the industrious.

*Smith* has remarked, that none of the parliament towns, of *France*, *Rouen*, and *Bourdeaux* excepted, carried on any trade or manufacture. The same, with a few exceptions, may be said, of our county-towns; and, where these exceptions prevail, they may be accounted for, as in the case of *Rouen* and *Bourdeaux*, from local circumstances. *Smith* explains the phenomenon, on the principle, that the proportion between capital, and revenue, every where seems to regulate the proportion between industry and idleness; wherever capital predominates, industry prevails; wherever revenue has the superiority, the consequence is idleness. Every increase or diminution of capital naturally tends, to increase or diminish the real quantity of industry, the number of productive hands—the exchangeable value of the annual produce of the country. The riches, and as far as power depends on riches, the power of every country must be, in proportion, to the value of its  
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annual produce ; the fund, from which all taxes must ultimately be paid—but this annual produce must be, in proportion to the capital to be employed.

Capital in *England*, is great, in proportion to revenue ; in *Ireland*, revenue is enormously great, in proportion to capital. The number of unproductive hands, in this country is swelled by the operation of various causes. This island has all the forms of a distinct regal government ; a court ; and a civil establishment ; to this we may add, a large pension list. The collection of the revenue, managed in a most expensive way, feeds a swarm of unproductive people ; add to this, an immense military force, and ecclesiastical establishments, vastly too great for the means, and population of the country. The different sects, and various forms of worship, that prevail in *Ireland*, augment the number of ministers of religion, in a threefold or fourfold proportion ; for there is scarce a parish in the kingdom, which has not, in addition to the clergyman of the established church, its dissenting minister, or pastor, and Roman Catholic priest. The number of persons, who derive a subsistence, from the administration of justice, and the practice of the law, judges, officers of the courts, door-keepers, tipstaffs, barristers, and attornies, form a very numerous body ; and many of them accumulate great wealth, and become the most opulent part of the community. Consider, also, the unnecessary crowds of domestic servants, which are retained, and pampered, in *Ireland*, in idleness, and insolence, not for use, but show ; and the numbers of those noxious vermin, half-gentry, the spawn of land-jobbers, the peculiar pest of *Ireland* ; and you will perceive, that the exertions of the man of letters, and the artist, are the only kinds of unproductive labour, in which we do not abound.

Prodigality is the prevailing disposition of the *Irish* ; their apparel, their houses, their attendants, their tables, their equipages, all are in a style, respectively beyond their means. This, too generally begins, with the higher orders ; and goes on, in a regularly graduated scale, down to the lowest classes. Every one aspires to a rank, above his

own, and presses on the class beyond him, aping its manners, and vying with it, in dissipation. The country squire, tired of cultivating his demesne, and leading the life of unassuming ease and plenty, that his ancestors led before him; mortgages part of his estate, buys a seat in parliament; like a true Sir *Francis Wronghead*,\* brings his family on the pavè of *Dublin*; rigs himself out, in clumsy finery, and second-hand airs; haunts levees, like a ghost; besieges the doors of secretaries, and under-secretaries, like a catch-pole; and thinks himself well rewarded, with a place of five hundred a year, during the continuance of his parliamentary being.—Foolish man! he never stops, to consider, that the sum paid for his return for a borough, together, with what he might have accumulated by economy, and decent frugality, would have purchased the fee-simple, of an income as great, as that, for which he sacrifices his independence, his quiet, his character, and the morals of his family.

It must be confessed, and lamented; that, although *Ireland* has encreased enormously in luxury, and expence of living, in equipages, houses, and furniture; literature and the fine arts seem to have declined, among us. At least, our rapid strides, in pursuit of unmeaning and criminal luxury, render our deficiency in taste, and our general ignorance, the more glaring and offensive.—Formerly, we had a respectable exhibition of pictures—a permanent public concert—a private music meeting, on a grand scale—these innocent luxuries are no more. We had, two theatres, and excellent players, now, we have one, and—it is gilt and painted.

What does the merchant or shop-keeper?—He commences business, with, perhaps, two thousand pounds, which, (such is the scarcity of money, in this country) is considered, as a handsome capital. The whole, or most part, of this capital he expends, on the fine of a large house, and on furniture. His stock in trade, he obtains, on credit.

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\* The reader will see, that this essay was written, while Ireland had yet a parliament.



He keeps a pair of hunters, and a harlot. He indulges himself, in all the pleasures of the table. He frequents the gaming house. In short, he lives in the style of a man, who had already acquired an ample fortune. He flatters himself, that, by frequent entertainments, and conviviality, he shall acquire friends, and form useful connexions.—His credit totters,—he gets a wife, with some money; this wards off the evil day, for a season, only to return with greater certainty; for the wife is not less extravagant than the husband.—The man becomes a bankrupt; pays two and sixpence in the pound; and is happy, if, he can become a tide-waiter, a gauger, a hearth-money collector, or an ensign of militia. He dies, and leaves a race of idle, uneducated beggars, to burthen the community. Such is the history of many a merchant, and master manufacturer, in *Ireland*.

Squires, without estate; merchants and tradesmen, without capital; artificers, without morals, or industry, are vermin, more noxious than any that *St. Patrick* is fabled, to have expelled from *Ireland*; and unhappily, they abound too much in this country.

From a view of the habitations, furniture, and equipages, of the gentry; and of the houses, shops, and manner of living, of the merchants, and traders; a stranger might be induced, to suppose the opulence, and resources of the country greater, than, in truth, they are: And, I am convinced, that from hence, the means of the country have been falsely estimated.

A very brief examination will convince the judicious observer, that this appearance of opulence, in the overgrown, and disproportionate metropolis of the country, is false and hollow, like the feeble corpulency of a relaxed and diseased body. When he recollects, that the gentry flaunt, in unpaid-for splendor; that the merchant fills his warehouse with unpaid-for goods; he will not wonder, at the rapid succession of bankruptcies; at the ephemeral generations, of decorated shops and

warehouses, eternally opening, and shutting, in our streets, like gaudy flowers.

It may be said, that luxury, in houses, dress, and furniture, encourages manufactures, and circulates money. Quite the reverse; many of the articles of luxury are imported; and from those, which are the produce of the country, small benefit is derived, to the industrious manufacturer. Indeed, more frequently, distress and ruin are the result to him; as many of the articles of luxury, which are consumed by the prodigal, under a specious outside of opulence and credit, commonly remain unpaid for, to the total destruction of the industrious poor, that furnish them. On the bankruptcy, of a vain, luxurious merchant or tradesman, the stroke of calamity is communicated, by a fatal chain of magnetism, through a long gradation of traders and mechanics.

Prodigality not only prevails in *Ireland*, but it is a prodigality the meanest, in its pursuits, the most pernicious in its influence. “The revenue of the individual,” says *Smith*, “may be spent in things, which are consumed immediately, in which, one day’s expence can not alleviate that of another; or in things which are durable; and may be accumulated.—Thus, a man of fortune may spend his income, on a sumptuous table, a number of menials, a multitude of dogs and horses;—or, contenting himself with a frugal table, and few attendants, may lay out the greatest part, in buildings, furniture, books, pictures, statues, trinkets, clothes. The magnificence of him, whose expence is in durable commodities, daily encreases; that of the other, is no greater at the end, than the beginning. The former, too, is the richer man at the end; he has a stock of goods, of some kind or other; there is no trace remaining, of the expence of the latter; and as the mode of expence, which accumulates or is laid out, in durable things, is more favourable, to the opulence of the individual, than that which dissipates, so, is it, likewise, to that of the nation. The houses, the furniture, the clothes of the rich become useful, to the inferior and middle ranks.

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“ The expence, in durable things, is favourable, not only to accumulation, but even, in some degree, to frugality.”

It is plain, that the expence of the upper classes, and of those who are the upper classes, in *Ireland*, is an expence in consumable things, an expence, which dissipates, in a sumptuous table, in a number of menials, in a multitude of dogs and horses;—which leaves no trace of good behind. Meanwhile, the arts are little cultivated; such artists, and men of genius as the country produces, (notwithstanding the countenance of a few, who hold out, a bright example, but in vain, to the men of rank and fortune, in *Ireland*) are driven, by the meagre encouragement, which their native soil affords, to emigrate, for daily bread.—Even those arts, which minister to the more refined pleasures, and elegant luxuries; at how low, how deplorable an ebb, are they among us!

It may be said; this evil is sensibly felt by many, and must be lamented by all; but how is it to be remedied? The advantages of frugality are universally acknowledged, in theory; it is unnecessary to dwell on them; but, how shall the manners of the people be reformed? “ How shall frugality be enforced, in practice?—Sumptuary laws are, considered, as inconsistent with freedom, and unfriendly to trade. The only sumptuary law, consistent with our ideas and constitution, and with the present state of society, in these countries, is the law, in the breast of each individual, disposing him to regularity of conduct, and to the setting of an example of sobriety, prudence, and frugality, to his neighbour.”—Despondence is the bane of improvement,—much might be done, in various ways;—taxes might be laid, on superfluities and luxuries; on the false necessaries of life, which are only necessaries, to the rich, the profligate, the voluptuous, and the idle; on equipages, dogs, and horses for pleasure; on wine, and spirits; on the instruments of gaming, cards and dice; on all the imported paraphernalia of fashion, particularly man and woman’s mercery; on millinery, perfumery, cosmetics, and the long catalogue of female fripperies. All these articles  
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are more or less taxed, at present; but, I would impose an additional tax, so heavy, on the most of them, as should effectually restrain their immoderate use. Such taxes must still be paid, by the rich and dissipated; and they would prove salutary admonitions, to the lower orders of the community.

Still more might be done, were gentlemen of large property, and extensive influence; to exert themselves, among their neighbours and dependents; to promote a spirit of sobriety, good conduct, and economy; and were they to employ the sums, which are now lavished, in useless and pernicious expences, and vain magnificence, on the true magnificence of virtue, the magnificence of encouraging industry, and promoting useful undertakings. Were persons of rank and fortune, not too proud, or too indolent, to visit the humble habitations, and enquire into the little interests of the neglected beings, whose poverty and toil bring luxury, and ease to them; and who, in silence, contempt, and misery, wear themselves out, while they build the fabric of national prosperity; we should soon see a material change in the sentiments and conduct of those people. In addition, to instruction and reproof, where necessary; and praise and reward where deserved; the most powerful of all lessons, the lesson of example, should be added, in a strict performance of the duties of religion and morality. Those, who have exerted themselves, in the divine task, of reforming and assisting the poor, in their respective neighbourhoods, can assure us, that their seed has not been cast on stoney ground; nor yet, has it fallen, by the way side, for such merit is not common, or obvious. Some distinguished characters, in the neighbouring island, have exerted themselves much, in the encouragement of industry; and their example begins to operate in *Ireland*.

Gaming is a vice fatally prevalent, through all classes of people, in this country. This unhappy propensity being so general; it is much to be lamented, that the government of *Ireland* is obliged, by the exigencies of the country, to feed this canker of the state, and resort

to an annual lottery, for supply. Wherever you turn, in the vicinity of *Dublin*, you meet the villas and equipages of the obscene and dirty harpies, who have kept lottery offices, and enriched themselves, with the plunder of the poor. In every street, the shops of vice and perdition are announced, by festive illuminations, and pompous inscriptions.—The *Government Lottery Office*, as by Law established.—The *Military Lottery Office*.—The *Lion's Office*.—*Good Luck at Home*.—The *Repository of Cræsus*.—The *Temple of Fortune*.—See what squalid, famished throngs, are vomited forth from yon splendid saloon! It is a lottery office.—What multitudes of infatuated creatures croud these receptacles of folly and despair, forgetful of their families, and their country, relinquishing the means of honest subsistence, dissipating the property, which is not their own; and qualifying themselves, for an untimely end, by the sword of avenging justice.—Merciful God! all this is done, not only with the connivance, but even under the sanction of government! Individuals, who minister, for hire, to the depravity, and vices of mankind are deservedly branded with infamy, and become objects of contempt; but, what shall we say of the system of finance, which panders for the corruption of individuals, and endeavours to deprave the morals of the people, that it may make their very vices a source of revenue!

*Ireland* has been fated to suffer, not from prodigality alone, but, also, from misconduct. Almost all her schemes and speculations, the linen manufacture, excepted, have been misconceived, misconducted, and consequently, in some measure, have proved abortive. They have too frequently originated in ignorance, and misrepresentation, been carried on, by the very genius of speculation, prodigality, and incapacity; and ended, in disappointment, bankruptcy, and shame. The commercial history of *Ireland*, (says *Young*) is but the history of jobs; turn over the Journals of the House of Commons, for notices of canals, ports, piers, fisheries, mines, and manufactures; and you will find party spirit, eager rapacity, and unblushing knavery, going hand in hand, with

with honest credulity, and sanguine incapacity. The sums, lavished in this manner, would have been enough, with proper application, to have placed the manufactures of *Ireland*, on a footing of the highest respectability.

Is any public work to be carried on, in *Ireland*?—It is begun,—blundered,—deserted,—recommenced,—altered,—reformed, and, after many delays and interruptions, ill executed, at tenfold the expence, it would have cost a private individual.—Happy for the public, if, at last, it is found to answer any one end, but that of enriching projectors and contractors.

There is a certain character, of moderation and frugality, necessary to the success of commercial and manufacturing undertakings, especially in their infancy. A late writer, (*Faujas St. Fond* vol. 1. p. 136,) observes, on this head, with much good sense, “ this modest simplicity is of great advantage to the country; it encourages active and industrious men, to embark in trade, who would, otherwise, be unwilling to form large establishments, being deterred, by the expences which extensive works require, when executed on a magnificent scale.

“ It is a taste for pomp and grandeur, which, almost always ruins the manufactures of *France*, and prevents those new ones, which we want;—men are afraid to involve themselves in ruinous expence, for mere warehouses and workshops.

“ It must be acknowledged, that the *English* and *Dutch* are much more prudent, and exhibit examples, in this way, which we ought to imitate.”—This observation applies, with some force, to *Ireland*, where, instead of beginning new manufactures, and experimental undertakings, in an humble and unambitious manner, where the magnitude of the apparatus, the works and buildings, should be contracted, in proportion as the prospect of success is doubtful, and, leaving some fund in reserve, to meet unforeseen losses, from chance or ignorance;—the chief part of the capital is sunk at once, in parading and expensive works, stores, and other buildings; and the consequence is, that the  
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first miscarriage, through fire, or mistaken experiment, is ruin and bankruptcy.

SECT. 4.

*Of removing Manufactures from the Capital.*

I cannot prescribe any thing more efficacious, or immediate, for the interest of the manufacturer, than his removal from the dissipation and vices of a large city, which, joined to the impure air, relax and debilitate his frame, while they corrupt his mind. In rural situations, provision is made, for a long life, an healthful progeny, and vigorous old age. The manufacturer inhales a purer gale; and counteracts the fatal effects, of a sedentary trade, by an intermixture of rustic labours, in his garden, or his farm; at the same time, the temptations to riot, intemperance, and other kinds of misconduct, to which manufacturers, in great cities, are but too prone, are set at a distance.

I cannot, therefore, subscribe, to the opinion, that manufactures may be carried on, to more advantage, in large cities, and towns. *Young*, who defends this notion, says that agriculture is a loser, by the contrary practice; and dwells particularly, on the low state of agriculture, in the manufacturing counties, in the north of *Ireland*, where, as he asserts, the land is worse cultivated, than in any other part of the kingdom. He adds, that, the case is the same, in the manufacturing districts of *France*, where the same persons attempt to unite, the characters of farmer and manufacturer; so incompatible in his judgment.

The consequence of a removal of the manufacturer, into the country, must necessarily be a division of large farms, into small ones; this, also, is strongly reprobated, by *Young*, but here, as on some other occasions, he will be found, to disagree with himself. It is admitted,

by all political writers, that, whatsoever contributes to the encrease of population, must, on trial, have been found conducive, to the prosperity of the country. The encrease of population is, in fact, made by them, a criterion of encreasing prosperity. What, says *Young*? “the great populoufness of *France*, I attribute, very much, to the “division of lands, into small properties, of which, in *England*, we “have no conception.”

*Young* is for keeping the characters of farmer and manufacturer, wholly distinct. Yet, he admits, that industry is very generally diffused through *France*, where the contrary practice is established; and that the culture of flax and hemp, for home use, pervades every part of the country. National prosperity, being the united prosperity of individuals; if any particular form of industry is beneficial, to all the individuals separately, it cannot fail of being advantageous to the nation. It cannot fail of being beneficial, to a poor man’s family, to have the women and children industriously employed, in cloathing the whole, rather than to be obliged to buy such articles, at an expence, which many of them not being able to afford, they must either abridge themselves of other comforts, or be satisfied, to want the articles in question. By industry thus exerted, a poor family is rendered as independent, as its situation will admit. All of them, likewise, are warmer, and better cloathed, as far as linen and woollen are concerned, than if these matters were to be bought: for things that demand money, will be consumed, with more caution, than what is merely the result of labour. Thus, as I approve of making the manufacturer a farmer, so, I approve also of making the farmer a manufacturer.

Though *Young* contends for the propriety, of confining manufacturers to large towns, and quotes, in his favour, the example of *England*; he admits, that great luxury prevails, among the labouring poor of that country. The obvious cause of this, must be, their living in large towns; and to this same cause, must we chiefly ascribe the alarm-

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ming depopulation of the island, an evil, which has kept pace with the growth, and prosperity of trade, and manufactures; and now advances with such rapid strides, that it threatens to annihilate them, in the end. *Young*,\* in his account of *Lyons*, gives a picture of the condition of manufacturers, in large towns; which, I think, is a full refutation of his own doctrine. "No people work longer, or fare harder, than the manufacturers of *Lyons*; they rise before the sun; and work till late at night, yet they continue poor; they *last*," (note the expression) "but for three generations; the first is feeble; the second diseased; the third never comes to maturity, unless transplanted!"

An enlightened legislator, when he considers the state of the manufacturing poor, will not view them, in the light of mere machines, or consider, only, by what means they may be brought to produce, the greatest possible quantity of a certain fabric. He will find himself invested, with the important office, of consulting the health, the peace, the morals, the happiness, both present and future, of this most useful part of the community; and I am sure, all these may be promoted more effectually, by placing the manufacturers, in the country, and giving them small farms, than by crowding them together, in large and populous cities, alike the graves of the human species, and of morality; where the physical and mental atmospheres are equally impure, and general intercourse is general infection.—With examples of vice ever before them, the poor are trained, by prevailing dissipation; they see riches squandered, on a variety of enjoyments, to which they must not be admitted. Their peace is embittered. Their souls are filled with envy, at the sight of various gratifications of luxury, which are set far, far beyond their reach. On the other hand, many of the subordinate and baser gratifications of appetite, are ever near,

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\* *Young's Tour in France.*

and powerfully stimulate them, to all kinds of intemperance, and excess.—Where manufacturers are crowded together, in towns, and can be assembled, at a call; unlawful meetings, riots, and combinations are the certain consequences. All these mischiefs are aggravated, when famine, with inevitable and sweeping gripe, pounces on an aggregated mass of manufacturers, cooped up, and squeezed together, in a city. All this appears, just in theory; and, to confirm this theory, we see, that the linen manufacture, the only flourishing manufacture, in this country, and one of the most flourishing manufactures, ever carried on, in any nation, is managed by manufacturers, widely dispersed through the country, and living on small farms of their own.

We should endeavour, so to fix, and so to occupy the manufacturer, that, while we strengthen his hands, and render them skilful; we may, if possible, improve his mind; while we cherish in him, habits of industry, we should aim, at the rendering him virtuous and independent. We should remove, as much as possible, out of his sight, the inequality of ranks in society. We should preserve him from a painful feeling, of the omnipotence of riches. Let the manufacturers work for themselves, in separate families, in separate habitations, and in rural situations; thus, will they be rendered more cleanly, more industrious, more independent, and virtuous; they will lead a life of innocence, free from temptations to do wrong, removed from occasions of repining; they will feel the conscious dignity of honest industry. Contentment, integrity, and cheerfulness will become inmates of their cottages; they will seat themselves on the hearth; they will brighten the eyes, and illuminate the countenances of the humble owners.

The removal of manufactures from the capital, into the country, may be effectuated, in two modes.—The first is, by the establishment of large factories, where the workmen may be all collected together, under the immediate controul, and inspection of the master manufacturer. This is an undertaking, that requires a large capital, and considerable talent, in the adventurer.—A heavy preliminary expence must

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be incurred, in providing the necessary buildings, and accommodations, for the people; and the person, who enters on such a hazardous speculation, should possess abilities of a kindred stamp, with those of the legislator and the general, to prescribe rules, for the conduct of his subjects, to manage their various humours, to ensure their obedience, to make them work cheerfully, to guard against plots and combinations.

The other mode is, by exciting a manufacturing spirit, in the country people, or dispersing manufacturers through the country; the former expedient, of collecting together manufacturers, in a mass, and removing them to the country, is more hazardous and doubtful. The expedient, of exciting a manufacturing spirit, either for the perfection of manufactures, already known, and in part established, or the prosecution of such as are new, is more slow, but more certain. The manufacturing spirit may be excited, by premiums for manufactures, manufactured in particular districts; by encouraging the country manufacturers, to take apprentices; by the purchase of machinery, and utensils, and instruments of manufactures, for the purpose of their being lent, to workmen, who carry on manufactures in their cottages. Would it be too romantic, to expect, that the proprietors of estates, in manufacturing districts, should sacrifice something to patriotism, and consent to receive a certain proportion of their rents, in the various manufactures, which are produced, by the industry of their tenants? to this, I would superadd the measures—of loans, in the several districts—of depots of the raw materials, for the supply of the manufacturer, at reduced prices—warehouses, for the reception of manufactured goods, which should be admitted, in discharge of the loan, and in exchange for the raw materials; and, above all, the establishment of granaries, to secure abundance of provisions.

I proceed to a measure, more connected with this subject, than may at first appear, so strongly suggested, by the voice of humanity and compassion, and of such obvious utility, that, in more settled times, I should have warm hopes, of seeing it generally adopted. I mean  
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the establishment of an orphan-house, if possible, in each county, at least, in each province, for the reception and instruction of children, left destitute, by the death of their parents, or deserted by them. In these seminaries, they might be instructed, in the principles of religion, employed in such branches of useful labour, and finally bred up to such trades, and callings, as may best suit the health, the bodily strength, and dispositions of the children, or the local situation of the orphan-house.

I would consider all children as orphans, whose parents, being mendicants, instead of discharging the parental duty, carry about their offspring, as the instruments of pernicious and dissolute callings, and too often teach them, to anticipate a wretched and early profligacy. There can be no cruelty, in separating such children from such parents. There can be no cruelty in the rescuing innocent infants, from certain wretchedness, probable vice, and possible violent death, at the hands of justice; to place them in a state of industry and comfort, of virtue and independence. I would, therefore, confer on the magistrates of counties, and on the governors, and directors of these orphan-houses, full power and discretion to take their children, or reputed children, from all strolling beggars, and idle vagrant persons, and to lodge them in these seminaries of industry.

To an orphan-house, for infants, I would add a work-house, for adults, where the idle and dissolute should be compelled to labour, and the industrious, wanting employment, should be freely received, and set to work, on such tasks, as might turn to the best account, for the institution and themselves.—Many parts of the manufactures, of flax, hemp, wool, and cotton, might be thus carried on. Fishing nets, cordage, shoes, and knit hose, and gloves, might be made to advantage. Different ages and degrees, of strength, might be judiciously combined, and a very moderate share of preliminary instructions, with the attention of intelligent overseers, would prove sufficient.

It would be my great aim, by example, and precept, to bring home industry to the cottages of the poor. Could that be fully effectuated, Institutions, such as charter schools, parish schools, and orphan houses, would become less and less necessary, as the numbers of idle, and indigent persons, should decrease. Where habits of industry prevail, every one is able to maintain himself. Children, instead of being a burthen to their parents, are a source of wealth. In *Holland*, a child is soon able to subsist himself; among that industrious people, infants soon learn, to work at little manufactures, and make a variety of ingenious toys, which serve to amuse their idle coevals, in other countries. By a proper distribution of labour, and a little dexterity, and economy, in husbanding the strength and faculties of individuals, the youngest and the feeblest, even the blind, and lame, may be rendered useful for some purpose or other. For instance, in spinning, knitting, turning the wheels in rope yards, in picking oakum, rasping logwood.—Numbers of children might find employment, in the manufacture of lace and edgings. Numbers of children are employed, in the hardware manufactories of *Sheffield* and *Birmingham*.

#### SECT. 6.

##### *Of Morals, and public Instruction.*

Were a committee of moral inspection, and public instruction established, in each district or parish; it might effect wonders, in the great work, of promoting regularity of morals and industry, and at the same time, of diffusing a knowledge of arts and manufactures. The details of reformation, and the specific encouragement of industry, are of a nature somewhat approaching domestic regulation; and require minute investigation. It is the nature of the truest desert, to retire  
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from view, without advancing any claim; indeed, without being conscious, of its own value. So, it is the nature of the most acute distress, to pine, in secret, without uttering a complaint. To search out objects of encouragement, assistance, and instruction, a committee of a competent number of the inhabitants of the several districts, might be appointed, by the suffrage of the rest of the inhabitants. I would add, as of course, and without election, all the ministers of religion, in the district, without distinction of sect. These should, in turn, visit the habitations of the labouring poor; inspect their moral conduct; their domestic management, their care of their offspring, the progress of their industry. They should recommend such as were distressed, for relief, and assistance, to be collected by voluntary contributions; the meritorious, who might distinguish themselves, by superior industry, morality, and good conduct; for reward. The fund for these rewards, might be established, either, as aforesaid, by voluntary contributions; or, under the sanction of the law, by apportionment, on the several districts; and I have such a good opinion, of the liberality and humanity, of the people of this country; that I am persuaded, the sums necessary for these purposes, might easily be procured, in any method, that should be suggested. The too general apathy, that possesses the public mind, does not proceed, from the want of good feelings.

I would have premiums appointed, for,—the most industrious man, the best father of a family, the best son, the best brother, the best husband. Any signal trait, of humanity, of courage, of fidelity, or of honesty, should receive its share of praise and reward. Nor would I exclude even women and children, from these honourable distinction. —I would reward those women, who distinguished themselves, by their industry, and the care of their families. The woman, who had reared and educated the greatest number of children, in health, industry, and good conduct; she, that had earned the greatest amount, in value, by her own labour; she, that could boast the neatest cottage—should all be distinguished.—Let not the attention to neatness and cleanliness  
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be thought a trifling object; among the poor, it is absolutely necessary to health, and is commonly a pledge of industry and frugality. Among the children, those should be selected, for encouragement, who have shewn a particular degree, of obedience and attention, to their parents, masters, and preceptors; or distinguished themselves, by their industry; those, above all, should be highly rewarded, who should be able, at the earliest age, to earn the largest daily or weekly sum, by their own labour.—Let it not be thought, that I wander from my subject, in adverting to the mental qualities.—The moral dispositions of the labouring poor are intimately connected, with the maintenance of industry and frugality; and the consequent prosperity of manufactures; much more so, than careless pride, or unfeeling avarice could conceive, or would be willing to allow.

There should, likewise, be premiums, for improvements, in manufactures, either to shorten the process, or improve the fabric;—for the best web of linen, woollen, or cotton; the finest yarn, or thread; the best flax, or wool, produced in the district—for the discovery of any new vegetable, mineral, or animal substance, useful for the purposes of manufacture; or of new properties, and new applications, of substances already known.

The result of the researches of those committees, should be regularly entered, in books, to be kept by them respectively, for the purpose. Such registers, if faithfully made, and regularly kept, would furnish us, with authentic materials, for a work, which is, at present, a grand desideratum; and which would be of the utmost utility, in directing the attention and labours, both of the legislator and philosopher, in the encouragement of the agriculture, and arts of this country, I mean, a statistical account of *Ireland*. The great utility of a work of this kind, would compensate the expence of such an institution, as I have mentioned; were no other good consequence to result from it.\*

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\* Since this Essay was written, some progress has been made in a work of this nature.

I would seriously recommend these hints, to the notice of the wealthy and powerful, and conjure them, not to consider the foregoing scheme, as wholly chimerical, and impracticable. Much more might be effected, by the judicious expenditure of small sums, in this manner, throughout the kingdom; than by all the parade of bounties, soliciting the industry and enterprize of opulent traders, and master manufacturers, to exertions, which they would have been disposed to make, of themselves, had bounties been out of the question. Morality of manners would become a constant resident, in the homestead of the peasant, and the artisan; the industry, independence, and comforts of the poor, would be fixed on a rock, by permanent habits; and not left to wheel about, on the weather-cock of commercial speculation, the sport of every wind, that blows. Some few persons, of elevated rank, have attempted to set examples, of this manner of encouraging industry and good conduct.—For instance, premiums for spinning have been proposed, to the young women of a district; and, were methods to be adopted, by every gentleman and lady, of rank and fortune, in their respective neighbourhoods; the expence would be inconsiderable, compared with the magnitude of the object; and, I am persuaded, would quickly produce the most beneficial consequences to the nation.—I need not ask the humane and rational spirit, whether prizes of this kind would not be more useful to the public, and afford more real satisfaction to the donors, on reflection, than silver arrows, for bow-men, and amazons, and toxophilites; and gold and silver cups, for jockies, and running cattle.

Should the institution, at last, become a national object; and a fund, for the distribution of premiums, be provided, either as I have already mentioned, by applotment, on the different parishes, or by presentment, on the county; the adjudications might be made, at the different quarter sessions, by the justices, in conjunction with the parochial or district committees of moral inspection. I would propose, that the rewards, should be ready prepared, and bestowed on the deserving candidate



didate publicly, and at the very moment of adjudication; that the whole ceremony might make the greater impression on the general mind; and I would wish them to consist, of articles of permanent utility; as utensils of agriculture, or trade; wearing apparel; a cow, or some other useful domestic animal.

It may be objected, that the industrious, who live in the remote parts of a county, would lose more time, in the journey to the place of the quarter sessions, in the prosecution of their claims, than the prize, if obtained, would be worth. I cannot think so. Though the prizes, considered, in themselves, might be insignificant; in a moral point of view, they would be inestimable. The time, employed in these examinations of merit, would not be spent in vain, these inquests of virtue would be most dignified and affecting spectacles; they would be lectures of integrity and good conduct, to all the spectators; and leave the most salutary impressions on every mind.

#### SECT. VII.

##### *Subject of Morals, and public Instruction, continued.*

To secure the moral conduct, of the lower classes of society, and diffuse the regular habits of industry, among them, we should attend to the education of the rising generation. Much may be done, by reward, and punishment, by precept, and example, to reform the conduct of the old. It is from the pliable, and as yet, uncorrupted mind of childhood alone, that we are to look for a full return, to our cares; a harvest, free from danger of blight and disappointment.

The wisdom of some general plan of national education, which might embrace the children of the industrious poor, has been long acknowledged, and the want of such an institution deplored. Some preliminary

nary steps have been even taken, for carrying into effect, a national establishment, for the instruction of the poor. It was plainly seen, that to this alone, we could look with certainty, for improvement in public morals and industry, and of consequence, in public prosperity. It could not be denied, that there were funds, which, if well employed, would be more than sufficient, for the achievement of this great work, funds, which, at present, produce little, if any advantage to the community. It was supposed, that the measure had the warm wishes, and entire support of government, and a copious review of the subject, was drawn up, by a distinguished personage, then, high in situation, in this, and now still higher, in situation and confidence, in a neighbouring country. It is not easy to explain, why no further progress has been made, in this great and necessary work, a work, which, if properly planned, and duly executed, would contribute more to the prosperity and improvement of the manufactures of the country, than any other measure, which could be suggested. *Æque pauperibus prodest, locupletibus æque.*

In countries, where habits of industry prevail; children, instead of being a burthen, are a source of wealth, to their parents. In *Holland*, a child is very soon able to procure his own subsistence, by his little labours. Most of the toys, that amuse the children of other countries, are made, by their industrious cotemporaries, in *Holland*. Children of a very tender age, indeed, under the care of judicious and humane inspectors, may be most profitably employed in various branches of the linen, the hempen, the woollen, and cotton manufactures, as also in different branches of that of hardware. This is the great advantage of extensive capital, and consequent division of labour; that it assigns to sex and age tasks, appropriated and adapted, to the powers and talents, of the individual. We see instances of this, in the numbers of children, employed in the hardware manufactures, at *Birmingham* and *Sheffield*, and in the different cotton manufactories, in *Great Britain* and *Ireland*.

Much

Much is proposed to be done, by the legislature, in the establishment and maintenance of *protestant charter schools*; and large sums are annually voted, by parliament, for their support. Something, no doubt, has been effected, by these institutions, in the education of the poor; but, I fear, the success is far, very far, indeed, from corresponding, with the wishes of the legislature, or the heavy expence incurred, by the nation. There seems to be something wrong, in the first conception of these foundations. They commenced—not, with a double aspect, but rather with two distinct aspects, that point different ways;—they profess, as the name imports, to inculcate a particular mode of faith; and they propose also, (and I presume, it is on this account, they are supported, by parliamentary aid,) to encourage industry, in general.—Industry is of no religious sect; the wants of the labouring poor, the means of brightening their prospects, chearing their exertions, and ameliorating their condition, the immense worth and importance of the lower classes of the community, these are objects of public care, that stand clear of all religious controversy. National education should be directed, to general utility; general utility cannot be pursued, while we confine our views, to one particular sect, or class. Education, to be generally useful, must be something, in which, all, without reluctance or scruple, may co-operate. Intolerance must not counterfeit the amiable countenance, and clothe herself, in the venerable garb of *Charity*, that she may grasp, with profane hand, the funds, that should be consecrated, to the most holy purposes; to the diffusion of practical morality—of general industry—of national prosperity.

The idea of protestant charter schools, is not only ill calculated to promote the diffusion of industry and good conduct, and ill adapted to the present state of society, and the enlightened spirit of the times; but, I apprehend, that, (supposing the idea of protestant charter schools were now defensible, in theory,) the expenditure of the public funds, in these establishments, is not regulated, by judicious economy, or accurate

curate and enlightened inspection; nor are they rendered productive of all the good, of which even the present narrow and illiberal system is capable. I mean not to say, that, there is, in general, any gross malfeasance in the administration of the protestant charter schools; but, certain it is, that sufficient care and attention are not employed in the regulation of these seminaries. The children are too much at the mercy of the masters, and mistresses; and too little judgment is shewn, in the selection of the persons, who are invested with the important trust of educating these children. The consequences are such, as might naturally be expected; frequently gross inattention, or worse, with respect to the cleanliness, the diet, and apparel of the children; as well as to their morals, and progress in industry. Hence, it too frequently comes to pass, that when the charter school children are taken as apprentices, to be trained up as domestic servants, or instructed in manufactures, they most commonly prove slothful, dirty, and vicious.

The task of education is a most difficult and important one. There is none that requires an union of more talents; it demands a liberal and enlightened mind, enlarged and philosophic views, and an intimate knowledge of the human heart. Yet, to what hands is the work of forming the tender mind, too commonly abandoned! If high expectations, and rewards, fail of procuring instructors, duly qualified, even for the children of the generous, the wealthy, and the great, what must be the prospect of those, whose morals, and education, depend, on the cold, and churlish hand, of eleemosynary instruction. Yet, a proper education of the lower classes, directed to make them fill their rank in society, with comfort to themselves, and advantage to the community, is, at least, of equal importance, to a nation, with that of the superior orders.

The task of instructing the lower classes can only be performed by means of large institutions, that economize education, by bestowing it collectively. Yet, it requires no small degree of ability, and circumspection, to obviate the ill consequences, that may result, from the education of the poor, in large masses. Human creatures in a gregarious state. are too apt to deprave and corrupt each other.—in the  
public

public schools of the opulent and refined, this tendency is, in some measure counteracted, by the spirit of emulation, and an honest pride. These are motives, which one cannot expect to find generally prevalent, among the inferior classes, unless extraordinary means are employed, to infill them into the tender mind of youth. It is not for me, on this occasion, to prescribe, in detail, what these means should be: indeed, they cannot be comprised, in certain rules, they must be left, in a great measure, to the good sense, and knowledge of human nature, of those, who are engaged in this province. Could such means be successfully employed, they would render the task of diffusing industry and morality much more easy. I fear the province, of instruction in the protestant charter school, is confided, with few exceptions, to persons not very capable, of discerning, or employing those means.

In addition to some general system of education, which might comprehend the children of the labouring poor, and diffuse, together with principles of religion and morality, and a knowledge of reading, writing, and the elements of arithmetic; an acquaintance with agriculture, gardening, or the most useful arts and manufactures. I would propose the establishment of an orphan house, if possible, in every county; at least in every province. I say orphan house, but I would not confine the institution to orphans, in the very strict sense of the word.—Children, deserted, by the death, or the flight of their parents. I would consider those children as orphans, whose parents being mendicants, do not perform towards their offspring, the parental duty, of training them, in habits of industry, but carry them from place to place, as instruments of their dissolute, and pernicious vocation; and too often teach them, to anticipate the profligacy and dishonest arts, of maturer age. There is no cruelty, in separating children from such parents. The parents can have no real tenderness, no true affection for their offspring, who would wish, to lead them, through paths of vice and wretchedness, to the prospect of an untimely end by the hand of justice; or who could repine, at seeing them rescued from such a dreadful destiny, and placed in  
situations.

situations, where they may learn to become useful members of society and obtain an independent livelihood, by honest industry. I would consider, also, as orphans, the children of the criminal poor. Where children are thus rendered orphans, by the mendicity or criminality of their parents; the legislature ought to effect a separation between them, with the unsparing hand of a stern mercy. And this separation should continue, till the education of the child was completed. One description of children we may call *orphans* of death, another, *orphans* of dereliction.

Some questions may arise.—Shall any distinction of ranks be admitted into the orphan houses, and schools of general instruction?—Shall we admit them, with a reference to the origin of children, and discriminate them into separate divisions, and distinct places of residence, with a preference, in favour of the circumstances of respectability, and moral estimation, which will, commonly accompany the parentage of orphans by death?—Or, rejecting all distinctions, but those, which naturally result, from the difference, of sex and age, shall we adopt a principle of equality, and hope, that uniform treatment, and uniform instruction, shall produce, in the little members of those communities, uniform advances in morals and industry?—What system and form of education shall be adopted? In what specific tasks, in what particular branches of manufacture, or details of industry, shall the different divisions of sex and age be employed? These, and many other interesting queries, respecting the plan of education, and course of economy, to be observed, in orphan houses, and other charitable seminaries, will suggest themselves, to the good sense of the humane and patriotic persons, who may engage in the formation of such establishments. But, were I capable of answering them, the discussion would occupy more room, than can be afforded, within the limits of the present essay. Let us proceed,—To an orphan house, and seminary for infants, I would superadd a work-house, and penitentiary, for adults of both sexes. Those who should be received, only as objects of compassion, and relief, should be kept  
separate

separate, from such as should be received, for the purpose of correction, and reformation; or should only be sent among them, in case of ill conduct, by way of degradation, and punishment, or in the capacities of superintendents and instructors. Again, the two sexes, should be kept distinct from each other; and each sex should be subdivided, into several classes, according to their ages, their degree of strength, their moral conduct, their aptitude for learning any art, or manufacture; or the knowledge of any, which they might already possess. Tasks should be assigned to all these different classes, with a regard to the several principles of division, which governed their formation. The riotous and disorderly should be compelled to work, in total solitude. Committees of enquiry and inspection, chosen annually, by the magistrates of the county, with the concurrence of the ministers of religion, in each district, to superintend the management of the orphan houses, the schools, the work houses, and penitentiaries should take care to enforce such regulations, as might be adopted.

I shall conclude this section with an account of the *hospicio* of *Cadiz*, as I find it given in *Townsend's Travels*,\* which will convey to my readers, some most useful hints, on the subject of public seminaries and work-houses. The plan of it seems to have originated, from the notions of the enlightened and philosophical *Campomanes*, on the subjects of national industry, and political economy.

“In this institution are received the poor, of every nation, who are unable to maintain themselves; and, in the first place, orphans, deserted children, and the aged, who are past the capability for labour. The blind, the lame, idiots, and mad people, but especially priests, when aged, and reduced to poverty. Even strangers are admitted to a temporary residence in this establishment.

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( S s )

Neatness

\* *Townsend's Travels*, Vol. 2d, page 360. See a tract by Count *Campomanes*, entitled, “*Educacion popular*.” See also the regulations of the work-house at *Shrewsbury*.

“Neatness univerfally prevails; and all who are here received, are clean, well-cloathed, and have plenty of the beft provifions. Care, is taken, to inftruct them in the Chriftian doctrine, and every fix months the young people are publicly examined. Their education is, to read, write, caft accounts; and fuch, as manifelt abilities, are not only inftructed in the principles of geometry, but, if they are fo inclined, taught to draw. The boys are trained to weaving and various crafts, the girls fpin flax, cotton, wool; knit, make lace, or are employed in plain work.

“Forty-five looms, and fixteen ftocking frames, for the inmates, with a proportionable number of fpinning wheels, working benches, tools for carpenters, turners, fhoe-makers, and taylors; a twifting mill, and fpinning jenny, a machine for carding cotton;—all thefe are provided within the walls, for the purpofe of employing the inmates.

“To encourage induftry, an account is kept, for each individual; wherein he is made debtor to the houfe, at the rate of three reals the day, or about feven pence fterling, and has credit, given him, for all the work he does; and, fhould the balance be in his favour, as often happens, it is paid to him, whenever he leaves the *hospicio*, and can make it appear, to the fatisfaction of the directors, that he is able to maintain himfelf, without having recourfe to their future aid. ‘I examined,’ (fays *Townfend*) ‘the accounts of many, who cleared for themfelves more than half-a-crown a week, and were looking for fettlements.’

“Adjoining to the houfe, is a fpacious fhop, for the accommodation of all who are willing to work; wherein are provided proper implements, and raw materials; and the moment any one has completed his work, he receives the price of his labour; being permitted, not only to lodge where he pleafes, but to fpend his gains, according to his fancy.

“But, becaufe many who would work, are indifpenfably confined at home, where, from poverty, they are unable to procure either wheels



or wool; the governors provide both, and pay them, without any deduction, for their work. By these means, out of three hundred and forty eight families above five hundred souls were trained to industry. The directors informed me of three children, the eldest, nine years of age, who, by spinning, gained six reals, that is, more than fourteen pence a day, and supported a paralytic father.

“Not satisfied with these exertions, they have established schools, in different quarters of the city, on the same plan, and providing the best masters, in every branch of business, which they wish to cultivate, they admit freely all who are desirous of being taught.

“It is their intention, to pick out, from the brightest of the boys, the best draftsmen, and having instructed them in the various languages of *Europe*, to make them travel, for the acquisition of knowledge, and the advancement of manufactures.

“As the surrounding parishes may not find it convenient, to adopt similar institutions, on a smaller scale; therefore, they receive the infants, the aged, and the infirm, from any of them, on condition of being paid, in due proportion, for their board.”—This is a magnificent sketch of a system of public institution, with a view to arts and industry. The intelligent traveller seems to question the utility of some parts of the plan; yet, surely, the account of this establishment, may furnish many important hints, and matter of much profitable reflection, to the legislature of this country.—I have now appropriated sufficient space to the subject of education. It is time to examine other general methods of improving and encouraging manufactures.\*

( S s 2 )

SECT.

\* Some similar regulations are beginning to be put in practice, of late, at the House of Industry, in Dublin.

## SECT. VIII.

*Of Regulation and Controul.*

The establishment and diffusion of arts and manufactures depend on two things, which must co-operate in an amicable manner, though, in name, and at first sight, they seem to clash;—encouragement, and regulation, indulgence and restriction. The exertions of human industry to be most effectual, at least, to be most consistent, with the happiness of the individual, must be free, like his will. This I mean, with reference to the choice of objects of industry, and the selection of one path of exertion, in preference to another. But, though regulation may not point out any particular road, and compel men to pursue it, or restrain him from travelling, in that which he chuses; it may fairly compel him to walk uprightly, in his way, without jostling his fellow-travellers, or injuring the adjacent fences of his neighbours.

Encouragement prevents despondency, and excites emulation; regulation excludes fraud, and ensures subordination; encouragement may hold forth bounties, (if necessary) or offer immunities; it may even, in some create monopolies.—Regulation, on the other hand, prevents or punishes, dishonesty, and insubordination, and restrains abuses. On these principles, while the legislature protects the manufacturer, with a parental love, it will also scrutinize his conduct, with a parental severity; and endeavour to detect, and when detected, to remedy, by severe laws, all miscarriages, improprieties, and imperfections, in the manner of preparing, and making up the different fabricks, for home, and foreign markets.

To instance, in the linen manufacture, the legislature appoints inspectors, to control the linen manufacture, the favourite object of the country. It  
examines

examines the quality of the pieces, it measures their quantity. None are permitted to pass into the market, which are not duly sealed, as a badge of their integrity. We see, in consequence of these regulations, what a high character the linens of *Ireland* support in the foreign market; with what confidence the buyer is inspired; and, confidence, in dealing, is the very soul of traffic.

In addition to the rewards, which the manufacturer derives, from a compliance with these regulations, in the high character, and rapid sale of this production: the legislature remunerates his obedient conformity, with many valuable privileges. He can import, free from duty, the prima of his manufacture, and the materials, which are requisite in the different operations of bringing it to perfection; and he is paid considerable bounties on the exportation of his fabrics, to foreign markets. Certain it is, that these wise provisions, of the legislature, have been attended by the most beneficial consequences; and, that we may ascribe to them, in a great measure, the present flourishing state of the linen manufacture, in this country.

Sir *William Temple* mentions, among the causes of the prosperity of the Dutch manufactures, the order, and exactness, in managing their trade, which brings their commodities into credit abroad. This was first introduced, by severe laws and penalties, but is, since, grown into custom. I have observed, (says he) above thirty several placards, respecting the manner of curing, pickling, and barrelling herrings. The small arms made at *Utrecht*, are forfeited, if sold without a mark, or marked without trial. In the *India House*, pieces of scarlet cloth, which are sent, in great quantity, to those parts (meaning the East Indies) are marked, with the English arms, and an inscription in English.

There is a circumstance observed, by Sir *William Temple*, that contributes to facilitate the work of regulation, and to methodize, and simplify, trade, and manufactures, among the Dutch; and which, certainly, enables the legislature and government, with more facility, to take a bird's-eye view of the trade, the resources, and industry of the country; which

is, that every particular town affects some particular commerce, or staple, valuing itself thereupon, and carrying it to the greatest height. *Flushing* carries on the trade to the *West Indies*—*Middleburg*, that in French wines—*Rotterdam*, the English and Scotch trade, and that in French wines—*Harlem* excelled in the linen trade, mixed stuffs, flower roots, and garden feeds—*Delft* was formerly famous for a kind of porcelain—Other towns were celebrated for ship-building—Some for the herring, some for the Greenland fishery—The trade with the East Indies was carried on by *Amsterdam*—Something analogous obtains in Britain—*Sheffield* and *Birmingham* excel in the manufactures of hardware—*Manchester* in that of cotton—*Norwich*, *Wolverhampton*, *Frome*, and *Witney*, in different fabricks of wool—When manufacturers, that produce one and the same fabrick, are collected together, in the same town, or district, the task of inspection, and regulation, becomes, as I have said, more easy. It is, also, more easy to communicate instructions, in the art, to the young people. If any new invention, or improvement, in the manufacture, should be devised, and found useful, on experience; it is more easy to convey a knowledge of it to the artificers, and to render them expert in the use of it. The workmen, too, living, and labouring, in the presence of each other, exhibit examples of industry, and excite a spirit of emulation; and the division of labour, is promoted, by this congregation of workmen.

As many of the processes, in bleaching, in this country, are regulated, by the legislature; and certain modes are prohibited under penalties, which, to facilitate the operation of whitening linen, or, to save the charge of workmanship, and materials, would injure the soundness, and damage the texture of the cloth; so the French government, exerting itself, to bring the woollen cloth of *France*, to superior perfection; particularly, in regard to colour, employed itself, to regulate the art of dying; for this purpose, certain operations, and the employment of *certain drugs, and materials, were interdicted*,\* the effect of which was to give a fraudulent, and imposing

\* See Introduction to Bancroft, on permanent colours.

posing, or what is technically called, a *flying colour* were prohibited. The use of others, which give a more permanent colour, was enjoined by the government.

It was thus that the great *Colbert*, the father of French commerce, and manufactures, acted. He divided dyers into two classes; the one, dyers, *en grand teint*, were confined to the colours, deemed to be lasting; while the dyers, *en petit teint*, were allowed to give those, which were flying. Restraints of this kind, though intended to prevent fraud, must have operated, as checks upon future improvement, if the government had not encouraged useful discoveries, first, by offering particular rewards, for all such discoveries; and after, by appointing those eminent chymists, *Dufay*, *Hellot*, *Macquer*, *Berthollet*, in succession; to superintend, and improve, the arts connected with chymistry, and more especially, that of dying. This situation became a government appointment, and was most ably filled. An employment of the same kind, were it bestowed on a chymist, duly qualified, (and such might be found) would be of the highest utility, in improving many of the arts, and manufactures of the country.

When I propose, that the legislature should interfere, to regulate and control manufactures, I would, for the most part, confine its interference, to simple inspection, and examination; and that on the cheapest, and least oppressive plan, for the purpose of preventing carelessness, and frauds, that bring a discredit on manufactures in foreign markets. To enter into the details of a manufacture, and enjoin certain mechanical processes, and prohibit others, by force of laws, and penalties, is a work of some nicety, and hazard. The legislature, in *Ireland*, has done this, with respect to the linen manufacture. The government, in *France*, has done this, with respect to the woollen manufacture; and very judiciously, I am persuaded, in both cases. But the utility, or detrimental effects, of mechanical process, ought to be demonstrable, on scientific principles, to justify the interference of the legislature, or government, for the purpose of injunction, or prohibition. The nature, and genius of trade, and manufacture, are free, and independent. The productions of human industry, must spring of themselves. Government, may fence the ground from beasts, may cultivate the  
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foil around them; may prune their exuberances, may lop off diseased, and unproductive branches, and irrigate them, with bounties: but it will not succeed, should it propose, to rear them suddenly, in a hot-bed, to a maturity of healthy growth. It cannot clip, and torture them, into arbitrary forms, without incurring the risque of killing them.

SECT. IX.

*Of Charitable Loans.*

The true mode of encouraging industry is, by shewing to the people, that exertion and profit, labour and gain, walk hand in hand. That this sentiment may be excited, in its full force, and efficacy, there should not be any intermediate visible agency, or operating cause of benefit, between the artisan, and his own exertions. The fruit, which he derives from his labours, should seem the necessary, and immediate progeny of his labours themselves; there should be nothing, to leave his path doubtful before him, by giving him hopes of subsistence, from any other source, than his own actual merit. All that a person fairly obtains, by undisputed efforts of his own industry, is, to him, a lesson of industry, and a strong incentive, to profit, by that lesson. Far otherwise, with respect to all that is obtained, in the way of bounty, and gratuity; it is a thing foreign from the exertions of the industrious; it comes unexpectedly, and suddenly; it is, in some degree, fortuitous, and not necessarily connected with the exertions of industry. On these principles, I am convinced, that he who lends a sum to a manufacturer, and strictly holds him to repayment, as soon as repayment is in his power, is more truly his friend, and will serve the cause of industry more effectually, and extensively, than he who should bestow an equal sum, without any expectation of return, on the manufacturer in question.

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The most effectual mode of encouraging manufactures, is, by the exciting a permanent, and active spirit of industry, among the manufacturers. This end is most powerfully promoted, by a pursuit of the following objects; to secure, for the manufacturer, the necessaries of life, at a reasonable rate—To procure him the *primum* of his manufacture, of a good quality, and on good terms—To protect him, from oppression and wrong—To protect him, from himself;—that is to say, to put it out of his power, to be prodigal, or dishonest—To provide a market for his manufactures, when produced, and, as the moving spring, of all these productive causes, to furnish him with a capital, which may enable him to prosecute his art, or trade. Where a country is poor, that is to say, where there is a scarcity of capital, in the collective body, there will be found many manufacturers, who will not possess, of themselves, the capital requisite to set their industry in motion. The restraints on the commerce of *Ireland*, which subsisted for near a century, have concurred, with the multitude of absentees, who continually drain vast sums of money out of the country, to render *Ireland* comparatively poor; and that national poverty has shackled the industry of the people, and impeded the progress of improvement in manufactures and arts.

The great disadvantage and inconvenience, under which this country labours, is the want of capital. To remedy the fatal effects which result from this disadvantage, and to provide, for the regular support of industry, without forcing it into any particular channel, I would propose the institution of a fund throughout the kingdom, with an appropriate office, in every large town, for the purpose of lending money, at legal interest, to industrious tradesmen, and artificers. By this means, the poor artisan, would be enabled, to procure for himself tools, and the prime materials of his manufacture, without being under the necessity, of resorting to pawn-brokers, whose extortion consumes the whole profit, that arises from the employment of this little borrowed capital. Thus, would the manufacturer be enabled, to extend his industry, by purchasing a greater stock of materials, a larger quantity of tools, or machines, and employing an increased number of jour-

neyemen. He will, also, buy his materials, and tools, of the best quality, and on the most reasonable terms, through his being thus furnished with ready money, to pay for them. On the same account, he will be able to engage the best journeymen. Thus, the productions of his art, will be rendered more perfect; and the exertions of his industry, will duly replace the principal, and interest, with a competent profit for the manufacturer himself.

Yet, though the exactions of pawn-brokers are a severe grievance, I would not propose, to exclude them totally. The shops of pawn-brokers are an evil; but, I apprehend, they are a necessary evil. They are, sometimes, useful to those, whose wants are too proud, to borrow small sums, in the avowed, and usual modes of borrowing; and to those who, having neither friends, nor credit, to enable them to borrow, on more advantageous terms, find no resources, in their distress, but a deposit, and a pawn-broker. The wants of the borrower, and the scarcity of money, must be arbiters of the interest, that money will bring. Enact what penal laws you please, there always have been, and always will be, lenders of money on usury. It is better, therefore, that some bounds should be set to the practice; and that money-lenders should be curbed by some regulations, which may be really enforced, than that the evil should be aggravated, by a vain attempt to cure it. A total prohibition of usury will, certainly, be evaded. Both lender, and borrower, will conspire against the law; and the risk of lending, and the necessity of concealment, will only increase the hardships of the borrower, and the rapacity of the usurer.

I would be far from proposing an indiscriminate loan, to every person, who should apply, under the denomination of tradesman, or manufacturer. Such, only, should be entitled to aid, from the institution, as were likely to make proper use of the loan, and to repay it with punctuality; that is to say, such as could be recommended, for their habits of industry, and for the integrity of their dealings.

I would not propose, to lend this money, interest free; on two accounts: first, I would provide for the permanency of the fund; and, as the



the interest on the capital sum would, with good economy, considerably exceed the expence of management; the accumulation of this annual surplus, would guard against contingent losses, and preserve the fund from being diminished; perhaps, augment it. Secondly: the payment of a moderate interest, would serve to stimulate the industry of the borrower, to render him frugal, by deducting a portion of his gain; and by reminding him, of his obligation to discharge the principal.

This fund might be portioned out, through the different counties, in various sums, according to the population of each. The sums, respectively allotted, might be vested in trustees. The loans should be made, by the treasurers, of the different counties, who should receive an adequate compensation for their trouble, out of the returns of interest; but, should take neither fee, nor reward, from the borrower; nor be permitted, to recommend any person, or give a preference to any, as a borrower. The accounts, of the general fund, should be stated, four times, in the year, by an auditor, under the control of parliament; before which, a comprehensive view of the state of the institution, should be laid, on the first day of each session.

The only qualification, requisite for obtaining the benefit of this loan, should be, a certificate from three, or more, reputable persons of the vicinage, of whom the minister of religion, of the congregation to which the claimant may happen to belong, (whether protestants of the established church, dissenter, or catholic,) should be one. By this certificate, it should appear, that the person seeking the loan, is either a farmer, a manufacturer, or carries on some useful branch of trade; that he has resided, at least, twelve months, in that district, and maintained an unimpeached character, for integrity in his dealings, moral conduct, sobriety, and industry.

The treasurer of the county, or whoever should be the agent deputed to lend out these sums, should be required to keep a book, ruled in four columns, and disposed alphabetically. The first column should contain the day of the month, and year; the second, the sum lent, and time of the

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loan;

loan; the third, the name of the borrower, in alphabetical order; the fourth, his place of abode. The entry, being made in this form, the borrower should be obliged to subscribe it, with his name, or mark, before his receipt of the sum to be advanced to him; and this entry, and subscription, appearing in the book of the county treasurer, or other agent, for the fund, should be made sufficient evidence, in law, of the debt; and a judgment for the amount, with interest, and moderate costs (for I would have the costs limited to some small amount) should be final and conclusive; and have the force of an execution, as well, against the goods, as the person, of the defaulter, wherever he should be found. The term, for which the loan might be granted, should be of various duration, according to circumstances—not less than six weeks, not more than two years. The interest, if the loan exceeded three months, should be paid quarterly, and the principal should be rigidly exacted, at the end of the specified time.

The utility of institutions of this kind, early appeared, to the excellent Dean *Swift*; and we find, in the account of his life, that he constantly appropriated a considerable sum, to be lent out, in small portions, among honest, and necessitous tradesmen. These loans he received back, by weekly payments, out of the profits of the borrower, in such a proportion, that the whole sum should be repaid, in the course of a year, together with a small gratuity, to the person, who kept the account of the disbursements, and weekly payments.

The patriotic idea, that occurred to the Dean, has, since, been followed up, by the charitable musical society, in the district of Dublin; but their means are scanty, and their influence confined. Perhaps, it would answer the proposed end, to enlarge the funds of the Charitable Musical Society, and extend its operations over the whole kingdom.

Well——the utility of such a measure is acknowledged;—but, how is a capital, for the purpose, to be formed, and maintained?—Many of the sums, which are now given in bounties, on such objects, and in such a manner, that they seem calculated, rather to promote the speculation of the rich, than the industry of the poor, might be turned from their present destinations,

tions, with advantage to the country; and allotted, to the augmentation of the funds for the charitable loan. Consider, what sums have been granted, in bounties—What sums, lavished on moles, piers, and fisheries, without producing any visible benefit, to the community! Had these sums been circulated, in charitable loans, how would they have invigorated industry! To create a fund, for the maintenance of the proposed institution, I would impose a tax, of one shilling, in the pound, on the estates of all absentees, to continue for seven years.\* There would be peculiar justice, in this measure; they who, by drawing away the capital of the country, impede the progress of its improvement, would be taxed, to repair, the very mischief of which they are themselves the chief cause. A tax, of one shilling, in the pound, on what is supposed to be the annual revenue remitted to absentees, out of this country, would be forty thousand pounds, yearly, which, in seven years, exclusive of all increase, from accumulated interest, or any other source, would amount to two hundred, and eighty thousand pounds. A fund this, which would reanimate industry; send life, blood, vigour, and health to its heart; and diffuse hope, and comfort, thro' every member of the community; and, as the tax would not be a permanent burthen, on the proprietors of land, it would form no precedent, for a general and permanent land tax; the fear of which, has rendered many well-meaning people, hostile to the fairest of all taxes, a tax on absentees.

Would it be too romantic, and visionary, to suggest a tax on all pensions, exceeding five hundred pounds, per annum; and on the salaries of all sinecure places, for the same benevolent purpose? The times, at present, are not ripe, perhaps, for such a measure; but, a period may arrive, when it will appear just, and reasonable, that those should be selected, as objects of taxation, to serve the exigencies, and promote the emolument of the state, who receive large sums of the public money, without giving any value for them, in return, by their services, or exertions.

\* The reader will here recollect, that this tract was written before the measure of a legislative union took place.

## C H A P. II.

*Schemes, for the Encouragement of Industry, and Advancement of Manufactures, whose Utility is questionable.*

## SECT. I.

*On Bounties.*

Dr. Smith combats the utility of bounties, and prohibitions, (which always go together, in theory) with great strength of reasoning.

“ That the monopoly of the home market (says he) frequently gives  
 “ great encouragement, to that particular species of industry, which enjoys  
 “ it, and turns towards that employment, a greater share, of both the la-  
 “ bour, and stock of the society, than would otherwise have gone to it,  
 “ cannot be doubted. But whether it tends, either to encrease the general  
 “ industry of the society ; or, to give it the most advantageous direction, is  
 “ not, perhaps, altogether so certain.

“ The general industry of the society, never can exceed, what the capital  
 “ of the society can employ ; as the number of workmen, that can be kept in  
 “ employment, by any particular person, must bear a certain proportion to  
 “ his capital ; so, the number of persons, that can be employed, by all the  
 “ members of a great society, must bear a certain proportion to the whole  
 capital

“capital of this society. No regulation of commerce can increase the quantity of industry, in any society, beyond what its capital can maintain. It can only divert a part of it, into a direction, into which it might not, otherwise, have gone. And it is, by no means, certain, that, this artificial direction, is more beneficial to society, than that, into which, it would have gone of its own accord.”

Every individual is continually exerting himself, to find the most advantageous employment for his capital. It is his own advantage he has in view ; but, the study of this, necessarily leads him, to prefer the employment most advantageous to society.

The country which has not capital sufficient for all purposes ;—agriculture—manufactures—and the trade of export, has not arrived at the degree of opulence, for which it seems naturally destined. To attempt, however, prematurely, and with an insufficient capital, to pursue all these three objects, at once, is not the way for a society, no more than an individual, to acquire a sufficient capital.

The same principle applies to the various modifications of manufacturing industry. That country must be in a state, of the highest opulence, which is able to carry on, at home, all the useful and elegant manufactures ; so as, not only to supply itself, but to send the superfluities to its neighbours, in exchange for money, the necessaries of life, or the *prima* of manufactures. But, as an individual meddling, at once, in a great variety of manufactures, embarking in new ones, with which he is imperfectly acquainted, perhaps, to the neglect of others, of which he is a master, endeavouring, with a giddy rapacity, to discover new sources of gain, instead of employing himself, with patient perseverance, to keep open channels, for springs that already flow ; as such an individual would, in all probability, soon become a bankrupt ; a similar fate must attend the community, that should proceed in a similar spirit of unsettled speculation, and improvident avarice ; yet, to excite such a spirit, is the obvious tendency of bounties. Trade ought to be left to find its own level, and not allowed to force the exertions of industry, into  
particular

particular channels, less profitable to the society, than those, in which they would flow, of their own accord.\*

In fact, the whole idea of bounties seems to be ill conceived. To increase the prosperity of the country, you encrease its burthens. You take the money out of the pocket of the manufacturer, with one hand, in the vain hope of impressing him, with an opinion of your liberality, while you bestow it on him, with the other.

I am afraid, too, that bounties are calculated, rather to promote rash and sudden fits and starts of speculation, in mere projectors, and schemers, than a settled sober spirit of permanent and progressive industry, in the minds of intelligent traders and manufacturers; and that they scarcely reach the industrious poor.

But supposing, for a moment, the general utility of bounties; is it not to be apprehended, that the sums granted, under the pretence of encouraging industry, in this mode, may be dissipated, and fail of producing any beneficial fruit to the country?—Is not the distribution of bounties and premiums, liable to be made the subject of intrigue and cabal, to prove an object of speculation, and become a cause of expence, in clerks, accountants, and other officers; so that the persons, who shall receive and pocket the greatest portion, of the funds, intended for the encouragement of manufactures, shall be, not the manufacturers, but the pampered, full-blown, important, humble servants of the public?—Thus, may a very little public good be purchased, at a very enormous public cost. Supposing the distribution free from malversation, and needless expence; still, the persons, to whose province it may fall, to decide on the merits of the claimants, will be too often misled by false representations, and imposition, sometimes, through the want of that technical knowledge, which the subject, before them may require. Great is the influence and power of arrogant pretension and shameless assertion; particularly, where there is any thing, like *corporate* acting

\* See *Smith* ubi supra. The reader need scarcely be reminded, that this Section was written long before the Union.

acting. Man, in the aggregate, (through the clashing of interests, and contrariety of corruption) is, ever more absurd, than he is individually. In this chaos of selfishness and ignorance, the voice of the intelligent few is completely drowned and lost, and thus ignorance, impudence, and fraud devour the golden fruit, which ought to be the prize of industry, integrity, and skill.

It is highly incumbent on the legislature, and on those persons, who possess an influence in the country, to guard their minds, against the impositions, and arts of needy and profligate pretenders, and noisy charlatans; who, in proportion, as they discover ignorance and incapacity, in those to whom they apply themselves, are loud and vehement, in affeuerations, and profuse in promises.

Yet, while I profess myself, in general, unfriendly to bounties; I admit, there may be some exceptions, in their favour. The political situation of *Ireland*, considered in all its circumstances, is something so peculiar, that it seems to stand, without a parallel, in the history of mankind. This peculiarity in the political situation of the country, has had a great and very injurious effect on its commerce and arts; and so warped and infected the industry, the exertions, and even the very sentiments, and opinions, of the inhabitants, that the common maxims of political economy may be over-ruled, with respect to *Ireland*.

For a long series of years, the manufactures and industry, of the country, were in a state of proscription. The unvaried operation of a cruel and mistaken policy, and a code of oppressive laws, and regulations, like a chilling wintry wind, froze up all the energies of the people, and blasted their industry. The woollen manufacture, the staple of the country, in particular, was so completely ruined, that it, now, exhibits all the debility of an infant manufacture.

It is a ruling principle, in the allotment of bounties, to particular manufactures, in preference before others, that we are not to consider, so much the intrinsic utility, and abstract importance, of the manufacture itself, as whether it stands in more need, of assistance.—This

need of assistance may arise from various causes.—The manufacture may be a new one—there may exist a dangerous competition, supported by superior capital and skill, the manufacture may require large and expensive machinery, it may have been discouraged by bad laws,—the country may be deficient in capital.—In all these cases, it may be necessary, to counteract the operation of the causes, that prevent or retard the progress of a manufacture, by the cheering influence of bounties. As a depressing force has been employed, to bend and warp our manufactures; it may be wise, to depart from the ordinary maxims of national prudence, and employ some degree of force, to bend them in the opposite direction, that they may be restored to their due form and rectitude. this force we apply, when we grant *bounties*.

It may be proper, to grant bounties, for a season, to new manufactures, of a promising complexion. In the infancy of an undertaking, a series of experiments, doubtful in their issue, are to be encountered; a number of probationary losses to be sustained. Add to this the prejudices, that must be conquered, and above all, the destructive and universal prejudice, whether founded in indolence, or envy, which predisposes people, to augur ill to the success, of new undertakings. Far different is the case, where the benefit of experience has been already gained, the incentives of profit have been already felt, and the community, or the individual is possessed with a strong partiality, for a favourite branch, of manufacture, long and successfully exercised.

In every case, where bounties are assigned, for the support and encouragement of manufactures; it must be, in the hope and belief, that the manufacture, in question, though now unable to maintain itself, or march alone, will acquire such strength and maturity, in the course of time, as to be able to repay with interest, that support, which it now derives from public bounty, and to become, instead of a national loss and burthen, a national source of opulence and prosperity. It would be the height of madness and folly, to give bounties, for the encouragement of manufactures, on any other principle than this; and, far better would it be,



to relinquish, altogether, than to continue the pursuit of a manufacture, which, instead of promising to support itself, would require, to be fed with perpetual alms, and threaten to remain a permanent charge on the community. Loans from the public funds, to enterprising and intelligent individuals, to aid them, in the prosecution of expensive speculations, in manufacture, might be attended with the best effects, if they were not perverted, by the spirit of jobbing, and made subservient to corruption.

There is, no doubt, profound wisdom, combined with extensive knowledge, in Doctor *Smith's* admirable book on the *Wealth of Nations*, and, in a general abstracted sense, most of his positions are undeniably true; yet, I believe, his book has been productive of many errors and false reasonings, and much idle declamation, on different subjects of political economy. Were men to act fully on his principles, in detail, I am afraid, they would be the cause of irreparable mistakes in practice; and teem with the most injurious consequences to society. Many theoretical propositions may be true, which yet will not bear to be drawn out, into minute corollaries, and applied, in detail, to the purposes of real life. It has been the peculiar misfortune of the present age, to proceed too much on general reasonings, and abstract theories, in contempt of the plain good sense, and accumulated experience of past ages; and, without attending to the limitations, qualifications, and exceptions, required by real use and practice.—The vanity of the present generation, has disposed them to imagine themselves possessed of more wisdom, than all the generations, that have preceded them, put together.—Under this persuasion, they have ventured to meddle with every thing; and attempted to demolish, with a sweeping hand, all the opinions, establishments, and regulations, which had obtained the sanction of past ages. They seem to delight in confounding all the bounds of right and wrong. Thus, we have heard people, in the spirit of the new philosophy, preaching up the blessings of monopoly, and the beneficial tendency of excessive and unrestrained

usury; and there are, certainly, general theorems, and abstract propositions, on the subject of political economy, which may be employed, to serve the purposes of such theories.—If I may presume to controvert or criticize the opinions, of Doctor *Smith*, I should say, that some of his positions, respecting bounties, and prohibitory regulations, deserve particularly to be viewed, in the light I have mentioned. He has dedicated his work exclusively, to the consideration of the wealth of nations; and, in conformity with the plan, which his title indicates, he seems to have omitted the strength, and the morality, of nations, as foreign from his purpose. These are, certainly, considerations, distinct from the wealth of nations, as well as of individuals, and surely, more deserving of the care of an enlightened legislator. It may, perhaps, appear fanciful, to say it; but, in my opinion, the very title of a profound elaborate book on *the Wealth of Nations*, carries with it something injurious—something that induces error—inasmuch as it seems to denote, that the attainment of wealth is the greatest object imaginable, and should be the great motive and principle of national policy, the great spring of legislative interference. Doctor *Smith* seems to confine himself, to the means of employing capital, in the most profitable manner, without entering into a variety of moral considerations, which ought to have great weight, when we come to revolve the subject of national industry, and the mode and measure of encouraging and extending it. It should also be remembered, that the author, in his book, by treating of the wealth of nations generally, and abstractedly, makes his work a kind of *Utopia*, in political economy. He speaks of a country, as if it were wholly free, to act, and regulate its commerce, according to the maxims of philosophy, or principles of arithmetic, as understood in counting-houses, without taking into his account the foreign relations, the foreign enmities, the domestic and federal causes, and motives, which perpetually fetter and impede, nay, in many cases, wholly preclude the possibility of framing the regulations of home industry, and external trade, on the abstract principles of political economy, by their producing a thousand  
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and a thousand unforeseen circumstances, which operate to govern the details of practical regulation, in opposition to all the calculations, and reasons of mere theorists. I do not state this, as an objection to Doctor *Smith's* book; which, no doubt, is an admirable performance: but I mention it, to shew, what evils may possibly result, from the indiscreet, and intemperate use of such general doctrines, when men descend to business, and come to establish practical rules, for the commercial concerns of nations, and individuals. In fact, such theories contain in them too much, of the chimerical dreams of *perfectibility*, which have proved so fatal to the French revolutionists; and, by instigating men, to attempt too much, and to disdain a moderate degree of success, and perfection, such as, alone, are competent to man, and his labours; have, in fact, incapacitated him from accomplishing any thing good.

I have been led to these digressive reflections, by a recollection of what Doctor *Smith* has advanced, on the subject of bounties, and protecting duties. What he says, is for the most part, undoubtedly true, in general theory; yet, unless all nations should agree, by common consent, to act upon his principles, and forego all at once their long established systems of bounties, protecting duties, and prohibitions, it would be impolitic and chimerical, in the extreme, for a single nation to renounce them.

It is true, no doubt, as Dr. *Smith* observes, that the interference of the legislature, in the way of bounties, and protecting duties, may force the employment of capital from its level, and urge it into particular channels. It may be true, that, if all other trades were to resemble that, which must be supported by bounties, they would eat up, each, such a part of the capital, that there would, soon, be no capital left. It may be true, also, "That the trades, or manufactures, carried on, by means of bounties, are the only ones, which can be carried on, between two nations, for any considerable time, in such a manner, as, that one of them shall regularly lose, or sell its goods for less, than it costs to bring them to market."— These are, no doubt, strong considerations of inconvenience; yet, there may be other considerations, of higher convenience, to counteract these, and reconcile it to the true interest, and sound policy of a nation, to suffer  
privations,

privations, and inconveniences of this kind, for a time, or even in perpetuity. Suppose, for instance, that a foreign state should prohibit all the manufactures, of the state in question, may not the measures of prohibition, and protecting duties, be wisely, and successfully employed, to bring such a state to reason, through the very medium of her selfishness, and force her to recall her illiberal restrictions. Suppose, again, that a neighbouring state, wealthy, flourishing in manufactures, should determine to get possession of the entire market for the consumption of a country, even at the price of a temporary sacrifice of profit, and pour in its manufactures, at an under rate until it completely overwhelms the native fabricks. This is a common proceeding with trading nations. And, how is this mode of commercial aggression to be resisted, or counteracted?—Surely, by the means, of bounties, and protecting duties alone, which may enable the native manufactures to stand their ground, against the inroad of foreign fabricks.

It is to be considered, also, what may be the disadvantages, or inconveniences, resulting to a poor state, which has no commodity, or manufacture which it can give, in exchange, for the imported manufacture; from the constant drain of specie, which must be occasioned, by the free influx of foreign manufactures; how calamitous such a situation may become, appears, from the fearful poverty of *Spain*, and *Portugal*; though these countries are the owners of the richest mines in the world. The *Spaniards*, and *Portuguese*, can import woollen manufactures from *England*, of a better quality, and on cheaper terms, than they can produce them at home; yet, it might be found policy, to give a bounty on the productions of the home-manufactures, and to confine the people to the use of them; or, at least, to give them a preference, in the home market, by the force of protecting duties. Human nature is naturally sluggish, and inert; it requires, at first, the application of some external force, to give it an impetus, and direction; but, when it is once set in motion, it gains strength, and activity, as it goes on, in its course; and will proceed, by its own acquired momentum, without requiring the application of any additional impulse. Thus, in a country, which possesses, in herself the ground work, and means, of having flourishing manufactures, such as possessing provisions, and other necessaries, labour,  
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and the raw material, or prima of manufactures, on cheap terms: the people, if they are once roused from their indolence, and supineness, by the care of the legislature, and instigated to exertion, by bounties, and protecting duties, may come to improve their fabricks so much, not only in quality, but in cheapness, that they will, at first, be able to supply the home consumption, on satisfactory terms, and, in process of time, to contend, with some prospect of success, with their manufacturing rivals, in the foreign market. Supposing, even, that the system of bounties, and protecting duties, continued for some time, with patience, and perseverance, should fail of producing such a complete amelioration, as I have mentioned, in the situation of a country, with respect to its manufactures, I do not think, that, even then, it is to be abandoned, and condemned, in every case, and, all circumstances considered, as wholly impolitic, and injurious. We should consider the possible advantages, which may result from confining a large portion of the expenditure of a country, within its own bosom;—from directing a large portion of the expences of individuals, in a community, to the support of the labouring poor around them, in their own country, instead of letting the money, thus to be expended, pass out of the country, to support the labouring poor of another nation; while the poor of the state in question, are consuming away in apathy, and idleness; perhaps, the prey of the most squalid famine, and wretchedness.

Doctor *Smith* takes it for granted, that, if the employment of capital were not turned into some particular channel, by bounties, and protecting duties, trades and manufactures, finding their *own* level, (favourite cabalistic expressions, of his, which have been echoed, and re-echoed, even to satiety, by thousands of pretenders to political science) would flow in some other direction, more advantageous to the community. I do not admit the force of his conclusion. It does not follow, of necessity, from his premises. On the contrary, it is highly probable, that such a country might fall into ruinous despondency, and incurable apathy; and resign herself tamely to the mercy of foreign manufacturers, who may supply her wants, on their own terms. We have seen an instance of this, as I have said, in the present lamentable

mentable situation of *Spain* and *Portugal*; countries in possession of the precious metals, in abundance, and of all the means of carrying on manufactures to advantage. On the contrary, we see a proof of the advantages of a system of bounties, and protecting duties, in the present flourishing state of the linen manufacture in *Ireland*. No man will pretend to say, it would have attained to the state of perfection, which it now boasts, without the aid and protection of the legislature. The improvements, also, which the agriculture of *Ireland* has experienced, during some years past, furnish further arguments in favour of the system of bounties.

It does not follow, that the whole enhancement of price, or expence, to the consumer of any article of manufacture, by his being restricted to the purchase of a home fabric, though, perhaps, dearer in price, and less excellent in quality, is so much actually lost to him. He may pay dearer, it is true, for a yard of cloth, a hat, or a pair of stockings; because he is obliged to confine himself to the produce of his own country; and his coat, his hat, or his stockings may be less durable, than similar articles, with which he might be supplied by importation; yet if, by confining his expences within his own country, he contributes to encrease the quantity of money circulating in it, he will contribute, in proportion, to raise the rents of land, the price of provisions, and all other produce of land, the price of other manufactures, the price of labour, the price of all exertions, and productions of skill and genius, the reader will easily see, that it is most probable, nay, almost certain, that the individuals in question, must be concerned, in some one or other of these branches, and will derive more benefit, from thence, than he can possibly injury, judging from the enhanced price, or bad quality of the home manufacture, to which he is confined.

There is one other consideration, which is of high importance, and which may reconcile an enlightened legislator, to the system of bounties, and protecting duties; I mean, its effects, in a moral point of view; as being the means of furnishing employment, for the poor; and diffusing among them a spirit of industry, and habits of exertion. It is a trite maxim, but not the less true, on that account, that idleness is the nurse of vice, and the

root

root of all evil. On the other hand, an industrious temper, and a spirit of exertion, are most favourable to sobriety, good order, and a display of all the moral dispositions, and christian virtues. It is hard to say, what price would be too great, to be paid, by a wise and virtuous legislator, for the general diffusion of such habits, and such a spirit. I think it is a great objection, to Dr. *Smith's* book, admirable as it is, in many respects, that he does not advert, sufficiently, to moral objects; but seems to form his theory wholly independent of them; and to underate the influence, and potency, of moral causes, in producing, or countenancing, the welfare of nations.

To close this section, with an argument of the utmost strength, and authority, I would request the reader to turn his eyes to the practice, and situation of *Britain*, with respect to her manufactures—What has been her policy, during the last century? Shall we be ready to condemn those maxims, as unwise, under the practice of which, a nation has prospered, beyond all past example, and grown, to such a stupendous degree of wealth, and greatness? The fleece, in particular, has been the boast and treasure, of the people of *England*.—We know, with what a tender care, and fond sollicitude, they have cherished their woollen manufacture; and, with what jealous precautions they have studied, to guard the exclusive possession of this important source of national wealth, and prosperity. A similar spirit, and maxims of policy, dictated the famous Navigation Act;\* to which, it must be acknowledged, that *Britain*, at this hour, owes the sovereignty of the seas: and, it is manifest, that all the abstract principles, of the wealth of nations, respecting the false policy, of prohibitory, and protecting systems, might be applied, with much plausibility, and gravity, to demonstrate the utter inexpediency of this grand measure, which has ever been considered, from the time of its enactment, as the corner stone of English greatness—of the magnificent structure of the British commerce, and naval power:

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\* The reader will see the grand effects of the *Navigation Act*, acknowledged, in a late publication of Citizen *Hauterive*, on the present state of *France*.

## SECT. II.

*Of Protecting Duties.*

The course of my subject, naturally leads me to protecting *duties*.—Various grounds of objection, to this mode of encouraging manufactures, present themselves. The imposition of such duties, is not only objectionable, on the general principles of political economy, but there are additional prudential reasons against it, suggested by political relations, and the peculiar situation of *Ireland*.

\* Protecting duties, imposed by this country, whether amounting to a prohibition; or only, (which would be a preferable course) tending, to place our manufactures on an equal degree of footing, in the home market, with those of *Britain*; would wear an invidious appearance, of hostility, against that country, whose jealousy, it would be imprudence in us, to excite; and whose affection, we should endeavour, to conciliate. We have suffered much, it is true, from the mistaken policy, and groundless malignity of the sister country, but, it is to be hoped, that those evil days of blindness, and illiberality are past; that, more humane and rational maxims prevail; and that the two countries, united, as they are, in fate, will open their eyes to see, that they have one common interest. An *Englishman*, if he is not blinded by his prejudices, must be sensible, that whatsoever enriches *Ireland*, must, ultimately tend to the strength and support of *Britain*. I would chuse rather to trust to the gradual operation of reflections and principles, than to encounter illiberality with illiberality, and resort to a system of protecting duties, inimical in its aspect, as to the part of the empire, to which we belong, and questionable, as to the benefit of which it may be productive.

I consider protecting duties, as tending to introduce supineness and carelessness,

\* The Reader is again to be reminded, that this Tract was written, antecedently to the measure of a legislative Union.



lessness, fraud and extortion, among our manufacturers; to enhance the price, and deprave the quality, of our manufactures. Competition is not only the strongest incitement, to the exertion of skill and industry, in the workman; it furnishes, also, powerful motives, to induce him to content himself, with moderate profits, and to distinguish himself, by the fairness of his dealings, as the most effectual means of vanquishing his antagonist, in a struggle for pre-eminence in the market. Were we restricted, to the use of our own manufactures, in every instance; the immediate consequence would be, combinations among the master manufacturers, to raise the price of their labour. We should be obliged, either to recall the restrictions, which were the cause of this arrangement, or submit to be worse clothed and accommodated, than our neighbours, at an expence greater, than what they pay for commodities of superior quality.

There is a passage in *Young's* tour in France, very apposite, to shew, that monopolies, and prohibitory clauses, are not the most effectual means, of promoting manufactures. “At the fair of *Guibray*, I found the quantity of *English* goods considerable. A dozen of common plates, three livres; and four livres for a French imitation, but worse. I asked the man, (a Frenchman) if the treaty of commerce would not be injurious, with such a difference?—*c'est précisément le contraire, monsieur; quelque mauvaise que soit cette imitation, on n'a encore rien fait d'aussi bien en France; l'anée prochaine on fera mieux; nous perfectionnerons, et en fin, nous l'emporterons sur vous.*—I believe he is a very good politician, (continues the tourist), and that, without *competition*, it is not possible to perfect any fabric. The frauds, and extortion of the master manufacturers, the dissipation, and combination for encreasing of wages, among the inferior workmen, where a monopoly is established, by law, must effectually retard the progress of manufactures.” It is smartly observed, by *Young*, that the party of the plough, never had a monopoly on its side.

Another reason, why I would leave the importation of all fabricks, whether British or foreign, free, is, that our manufacturers might be furnished with patterns of all that was most perfect, and estimable in manufactures,

by which means, the arts and fabrics of the country will be improved. Taste and skill have made a greater progress in most manufactures, in the sister country; industry and invention are stimulated to new improvements, by the large rewards, which an abundant capital is able to bestow. The constant demands of a vast imperial city, the residence of a splendid court; the fantastic arbiters of fashion, are perpetually suggesting progressive ideas to the manufacturers of *Britain*; and fancy is for ever on the stretch, to devise new modes, of carrying the texture and beauty of their fabrics, to greater perfection.

*Adam Smith*, though decidedly unfavourable to the system of protecting duties, in general, admits, that there is one case, which may be an exception to the general doctrine.—“It may, sometimes, be a matter of deliberation,” (says he) “how far it is proper, to continue the free importation, of certain foreign goods; that is to say, when some foreign nation restrains, by high duties, or prohibitions, the importation of some of our manufactures, into their country. Revenge, in this case, naturally dictates retaliation, and that we should impose, like duties and prohibitions, on the importation of some, or all of their manufactures into ours. In this consisted a great part of the policy of *Mr. Colbert*, who, notwithstanding his great abilities, seems, in this case, to have been imposed on, by the sophistry of merchants and manufacturers, who are always demanding a monopoly, against their countrymen. It is, at present, the opinion of the most intelligent men in *France*, that his operations of this kind, have not been beneficial to his country.

“There may be good policy in retaliations of this kind, when there is a probability, that they will procure the repeal of the high duties or prohibitions, complained of.—The recovery of a great foreign market, will generally more than compensate the transitory inconvenience, of paying dearer, during a short time, for some sort of goods. To judge, whether such retaliations are likely to produce such an effect, does not, perhaps, so much belong to the science  
“of

“ of a legislator, whose deliberations ought to be governed by general principles, that are always the same, as to the skill of that in-  
 “ fidious and crafty animal, vulgarly called a statesman, or politician,  
 “ whose councils are directed, by the momentary fluctuation of affairs.  
 “ When there is no probability, that such repeal can be procured, it  
 “ seems a bad method of compensating the injury done to certain  
 “ classes of our people, by doing another injury, both to those classes,  
 “ and to all other classes of them. When our neighbours prohibit  
 “ some manufacture of ours, we generally prohibit, not only the same,  
 “ but some other manufacture of theirs. This may, no doubt, give  
 “ encouragement, to some particular workmen among ourselves, and,  
 “ by excluding their rivals, enable them to raise their price in the  
 “ home market. These workmen, however, who suffered by our neigh-  
 “ bours’ prohibition, will not be benefited by ours. On the contrary,  
 “ they, and all the other classes of our citizens, will thereby be ob-  
 “ liged to pay dearer than before, for certain goods.”

It might, perhaps, be expedient, to protect the *Irish* manufactures, of woollen fabrics, and of stamped, and printed cottons, and calicoes; by a duty on *English* manufactures, in these branches, at least, equivalent to what is laid, on the like manufactures of *Ireland*, when imported into *England*. It seems to be but just, that when there are protecting duties in *England*, there should be corresponding protecting duties in *Ireland*, to put the manufactures of the two countries, on an equal footing; and to counteract the industry, which is employed by the manufacturers of *Britain*, to stifle the manufactures of *Ireland*, in the cradle, and to overcharge the market of this country, with their fabrics. But this is *periculosæ plenum opus alex*, the political practicability of such a measure is questionable, the economical expediency is doubtful.

I would instance, as an example of an injudicious application of protecting duties, for the purpose of encouraging a manufacture, a late tax of two pence per pound, on paper imported. In vain did the  
 printers

printers of *Ireland* represent, that the paper made in the country was wholly insufficient to supply the consumption. The tax was imposed; the printing trade, in this country, was nearly destroyed, and thus the paper manufacture was injured, not advanced, by the duty.

Doctor *Adam Smith* observes, "that can hardly be called improvidence in states and communities, which is prudence in an individual." And, hence he would infer, that states, like individuals, should repair to purchase those articles of manufacture of which they stand in need, wherever they can procure them cheapest. "It is the maxim of every prudent master of a family, never to make at home, what it will cost him more to make than to buy."—But the comparison between the individual and the community does not seem to hold entirely; and if any fair distinctions between them can be taken, the attempt of Doctor *Smith*, to apply the rules of private domestic economy to grand, political and commercial regulations, must fail. I say this, supposing it to be the fact, according to *Smith's* hypothesis, that individuals, in the ordinary dealings of life, uniformly resort, for the purchase of such manufactures as they want, to the market, where they can procure them, on the cheapest terms. This strict economy in buying, is far, from being uniformly, or even generally pursued, in the course of ordinary life.—The fact, (as every person must be sensible,) is, that, in the dealings of individuals, there are many considerations, which controul the principle of saving in price,—such as connection,—neighbourhood—friendship—the accommodation of long credit—the prospect of reciprocal advantage, in the sale of some commodity, in which the purchaser himself deals. Such, evidently, are the motives, by which the majority of individual purchasers, in private life, are governed, and, among farmers, it is obviously the practice of families, to manufacture at home, many parts of their apparel

But, supposing, contrary to the experience of every man who looks around him, that the individual goes to purchase what he wants, wherever he can procure it for the least positive sum, without attempting

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to manufacture it himself, and without any consideration of other circumstances; still it remains to be enquired, whether we must admit it, as a general axiom, in political economy, that, whatever would be excusable, or even prudent and proper, in the private dealings of individuals, would be sound policy, and fit to be adopted, in practice, in the regulation of states.—I shall mention, what I think, would be the fair parallel from private life, for the policy of states, and the economy of a legislator, in regulating the dealings of a commercial and manufacturing people.—Suppose a gentleman has an estate, wholly peopled by a manufacturing tenantry; and suppose, at some small distance, another gentleman has an estate, which is also occupied by persons who carry on a similar manufacture; it will become a question, on Doctor *Smith's* principles, whether it would be prudent and adviseable, in the proprietor of the first estate, to give a preference to the industry of his own tenants, and confine himself, and his family, to the consumption of the manufactures produced by them, although, from some cause or other, he might be able to procure similar articles, and of equal quality, somewhat cheaper, from the tenantry of the next estate; or, shall he, on the other hand, prefer the immediate saving of a few shillings in the year, on his different purchases of manufacture, to the encouragement of industry, among his tenants, for whom he is bound to feel a fatherly solicitude, and to a certain mode of facilitating and securing the payment of his wants? and while he supports the industry of the tenants of another proprietor, and aids them continually in the payment of their rents, shall he tell his own tenantry,—“ I will seize your stock—I will sell your furniture—I will tear your beds from under you,—but I will not use your manufactures—I can buy them cheaper elsewhere;—with every disposition to labour, you must go learn a new trade, or you must starve, or quit my estate, and seek your fortunes in *America.*”——I ask, would such conduct be humane?—Would it be christian? Would it be prudent? Nay, would it not be absolute madness, in the landlord?

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The state is that landlord; the people, at large are the tenantry; the rent they pay, consists in their ordinary taxation, and in their extraordinary exertions, in times of want and danger. Had Doctor *Smith's* principle of private economy, been uniformly applied to public conduct, by *England*, she would not flourish, as she does, in manufactures, at this day;—her woollen manufacture might never have existed. There was a time, when her manufactures were in their infancy, and those of neighbouring states, (as the *Flemings*, and others) cheap, and in high perfection. What became of Doctor *Smith's* principle, in the interval, while *British* manufactures were, as yet, imperfect, and, as I may say, serving their apprenticeship?—As the situation of individuals in society, though it is frequently compared to that of independent states, is yet distinguishable, in some respects, from it; so, there are strong reasons, which may lead us, to conclude, that many of the principles, which apply to the conduct of states, either in their internal regulations, or their intercourse with other states, may be different from those of private economy; and that the prudence, and good economy, of the individual may be wholly distinct, and of a very different character, from the prudence and economy of the community.

The first circumstance of distinction, which must strike the most indolent observer, with respect to individuals in society, is this.—Neighbourhood is generally the pledge of friendship and good-will. The very term *neighbour* is an amicable appellation, and the people, who inhabit the same vicinity, are usually disposed, to consider each other as of the same family; to support each other, in all their quarrels; to assist each other, in all their difficulties, and distresses; and, in short, to cement the union, begun in mere juxtaposition, by the practice of all manner of mutual good offices. Now, it will appear, from the uniform tenor of history, that, with respect to states, the direct contrary is the case; and that the mere circumstance of *vicinity* is, in itself, a constant source

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of jealousy, envy, and animosity;—by producing usually a similitude of natural products, and, in consequence, a rivalry, in commerce and industry. We find that the very circumstance of neighbourhood, perpetually excites a secret ill-will, and a latent disposition to mutual hostilities. The words, *natural enemies*,—preposterous phrase! as if God and nature ever meant, that any human creatures should be enemies of each other.—What do they mean?—*Neighbours*—People to whom *vicinity*, is likely to furnish occasions of quarrelling, about their boundaries, or of rivalling each other, in commerce and manufacture.

There is another palpable difference between the individual, and the state, which will make it very necessary to distinguish between the principles and maxims of economy, which apply to them respectively—the individual is *transitory*—the state is supposed to be *immortal*. As the existence of the individual is brief, the principles of his economy will be cautious and contracted. He will confine his views to himself, and his family; *vetat spem inchoare longam*. He will grasp more, at immediate gain, and present savings; he will trust less, to speculation, and the promises of futurity. It is not so with states. They look to generations yet unborn, and build for eternity. Of course, their plans will not only be more extensive, but also on different principles. They will have greater inducements, to embark in speculations, to relinquish certain advantages, for great contingencies in prospect; to renounce immediate gains, and sacrifice the opportunities of present saving, to greater advantages in revolving time. Both individuals, in particular societies, and states, in the great society of the universe, are alike subject to a common head; but, the existence of the municipal superior, is more palpable—his authority is more an object of sense—the bands of his control are more closely strained,——his interference to maintain his dominion, and punish any violation of his laws, is more immediate. Hence it happens, in general, that the municipal laws of a nation, are more punctually observed, by the individuals, in civil society, than the laws of nations are, by independent states. Nations,

being thus left more to their own devices, run into greater eccentricities, and irregularities, with respect to each other, than individuals in society are suffered to do, by the civil magistrate. History is filled with acts of outrage, unprovoked hostility, shameless infractions of treaties, black perfidy, committed by states against each other. In civil society, the individuals rest under the protection of the laws, secure against aggressions of this kind, on the part of their neighbours; and act, in their common economy, as if they were always sure of their amicable dispositions. They seldom suffer by their conduct. It is not so with states; they must act on a supposition, that their neighbours are hostile. They must never be lulled into security; and they must often counteract the malevolent, the impolitic, and outrageous measures of their neighbours, by measures not, in themselves, and abstractedly considered, prudent, adviseable, or perhaps strictly moral; but, enforced by imperious circumstances, and justifiable, on principles of self-defence, and self-preservation.

In all matters, which are neither enjoined nor prohibited, by the municipal law, the individual has an unquestioned and uncontrolled right, to administer his concerns, to govern the interior of his family, as he thinks best; to adopt what system of economy he pleases, and dispose of his property, at his pleasure.—There seems to be but one rule, in this respect;—“Use your own in such a manner, as not to injure the property of another.” It is very different, with the ruler of a state or community, with respect to his system of economy. He must study popularity, and aim at conciliating the affections of the great family, over which he is set. His maxims of economy must, therefore, be very different, on this account; from those of the individual. He must, on many occasions, resign his own ideas, and act in opposition to his better judgment. He will consider, not, what is excellent, but what is practicable. He will not aim at chimerical perfection, and *Eutopian* happiness. He will pursue the interests of society, as far as the passions  
and



and prejudices of his subjects will admit ; but he will perceive, at the same time, the grand importance of pleasing his people, and keeping them in good humour. He will therefore make many sacrifices of his own opinion, and better judgment, to obtain this advantage, and conciliate their affections. A wise ruler will perceive, that if he can gain the affections of the people, the task of governing them will be easy ; and that all the wheels of the state machine, will go on smoothly, without any friction ; and it will be a point of good policy, to procure this advantage, at any reasonable expence. The government of a state, therefore, will not attempt, if it be prudent, what is positively, and absolutely, the best, but will adapt itself, to the prejudices of the people ; it is to govern, according to the circumstances and temper of the times. Where, for instance, the manufacturing part of the people, are so numerous, as to make a great part of the population of the state, they will be able to raise a cry, and to call the attention of government to their wants and wishes, in a tone of voice not to be contemned. We know how that wise minister, Sir *Robert Walpole*, abandoned his excise system, in deference to the public sentiment, convinced, as he was, of its excellence, in theory. He saw and felt, that abstract systems of perfection, obstinately pursued, in opposition, to what is practical, and practicable, will even do more harm than good. I might enlarge very much on this topic ; but, what has been already said, may lead us to examine, the solidity of the imposing and specious remark, that, “ What is prudent in the conduct of every private family, can scarce be folly in that of a great kingdom.”

## SECT. III.

*Establishments for the prosecution of Trade, and Manufactures, by Government, or the Public, on its own Account.*

In some countries, the government, or rich and powerful individuals, not being either merchants, manufacturers, or skilled in manufactures; from a well meant, but injudicious desire, of promoting commerce and industry, and furnishing employment, for the poor; have attempted to establish large and extensive manufactories, for the production of fabrics, on their own account. These vast and magnificent speculations, instead of proving serviceable to the country, at large, or any individual in it; prove uniformly ruinous to the undertakers, and injurious to the cause of general industry. They endeavour to confine in a hot-house, and rear to a premature growth, by forcing powers of artificial heat, a plant, which, if set in the open air and natural soil, and left to the free influence of the sun, and to the fostering rains and dews of heaven, would have spread largely, and yielded an abundant return; instead of exhibiting a sickly unwholesome vegetation, and affording a small produce, at a large expence.

There is something grand and imposing, no doubt, in the idea of being the sole proprietary of an extensive and flourishing manufacture; of the dispensation of employment, and bread, to thousands; of the inspection of their conduct, and distribution of rewards, to the exertions of their industry.—A very small portion of reflection will convince us, that the natural tendency of such schemes, so plausible at first sight, is to debilitate the energy, and waste the productive powers of the society; by transferring the employment of capital, from skilful to unskilful

ful hands, in consequence of which, the skilful hands will be paralyfcd or remain idle; while that part of the capital of the country, which, paffes through unskilful hands, will either be diffipated in fmoke, and wholly loft, or fail of producing that return which it would have yielded to the country. Thus, the nation fufains a total lofs of all that the industry of the skilful, now unemployed, might have produced, if they had been employed; and, with refpect to the capital mifapplied, a lofs, either total, by its being compleatly diffipated; or partial, by the fmallnefs of the return, which it yields, through injudicious management.

The famous Earl of *Strafford*, when chief governor of this country, was actuated, by miftaken ideas, of this kind, refpecting the eftablifhment of the linen manufacture in *Ireland*, which may be called—

Plant of his hand, and offspring of his care.

He meant to have formed very extenfive eftablifhments, for the purpofe of carrying it on at *Naas*, on his own account.

Sir *William Temple* propofes, “ that a fum of money fhould be kept ready, in the hands appointed by government, for taking off, at moderate prices, all fuch pieces of cloth, as fhould be brought in by any perfons, at certain times, to the chief town of each county. Such pieces as are fit for fails, to be carried to the ftores of the navy, all fuch as are fit for the army, to be given to the foldiers, in part of their pay. All finer pieces to be fold, and the money applied to the encrease of the main flock.”—But this would come to the fame point, of making the government a manufacturer, or, which is nearly tantamount, a factor, for the manufacturer. As to the fupply of the navy, and the army; it is found; by experience, that all neceffaries, for the one, and the other, can be moft conveniently procured, by contract.

In *Spain*, the government has fhown much follicitude, on the fubject of manufactures; and endeavoured to promote the interefts of industry,

dutry, and the arts, by large establishments of manufactures, to be carried on by government, on its own account. In this manner, great sums are annually lavished, which serve only to retard and injure, what it means to promote.

*Townshend* supposes, that the yearly loss by the porcelain manufacture, at *Buon-Retiro* is, 1,436,188 reals. The annual expence of the glass manufacture carried on, in like manner, by government, he states at 1,136,884 reals, and the loss by the cloth manufacture, of which government is the proprietor also, is extremely heavy. See what a diminution of the capital of the country, and, in consequence of the industry, which should be fed, and set in action by that capital, must result, from these annual losses!

A similar fate has attended a similar attempt of the archbishop of *Toledo*, as we find it stated, by the same writer. "The good archbishop," (says he) "here (at *Toledo*) feeds seven hundred persons, who are employed, in the silk manufacture; but, unfortunately, with the best intentions in the world, he has compleated the ruin of the city. By his weight of capital, he has raised the price of labour; and of the raw material; while, by carrying so great a quantity of manufactured goods to the common market, he has so sunk the price of the commodity, that those, who used to employ from forty to sixty workmen, now but two or three; and those people, who are employed by the prelate, far from supporting themselves, require forty thousand ducats a year, over and above."

These examples, and the reasonings on them, will in some measure, apply to the course, which was pursued by the *Dublin Society*, for the advancement of the silk and woollen manufactures; and explain to us the causes, which have rendered the patriotic wishes and endeavours of that body, so unavailing, in this particular respect. *Young's* account of this matter appears to me so judicious, that I shall transcribe his words.

"To encourage the manufacture of *Irish* woollen cloths, and *Irish* silks, the society have two warehouses, where goods are sold, on their  
" own

“ own account, by wholesale, and retail, for ready money.\* (This is  
 “ not altogether the case, with the woollen warehouse; as it is now  
 “ regulated, it is a depot for the goods of the manufacturers, of which  
 “ the *Dublin Society* pays the rent, together with the salaries and  
 “ wages of clerks, and other servants. But the principle is the same,)  
 “ the intent of these institutions, (says *Young*) is, to take the weavers  
 “ out of the hands of drapers and mercers, and let their manufactures  
 “ come to market, without the deduction of the shop-keeper’s profit.  
 “ One effect of this, is the taking the ready money, which is the most  
 “ profitable part of their custom, from the draper and mercer,  
 “ which, in fact, is laying a heavy tax on them. Now, it must ap-  
 “ pear a strange mode of encouraging a manufacture, to lay a heavy  
 “ tax on the master manufacturers.

“ All taxes, laid on a tradesman, in consequence of his trade, must  
 “ be drawn back from his customers. The effect of this will be like  
 “ that of any other tax, to enhance the price, and lessen the con-  
 “ sumption. The tax is equal to the profit, the master manufacturer or  
 “ shop-keeper could have made, by turning the sums, for which he  
 “ gives credit to his customers. To reimburse himself, as I have said,  
 “ he raises the price of his goods, to those who buy on credit, who,  
 “ by means of the institution in question, become his only customers,  
 “ for the home manufactures; but, the greater the price, the less the  
 “ consumption; thus, the general consumption of the manufactures of  
 “ the country is lessened, to let the ready money dealer have his goods  
 “ a little cheaper.”

Master manufacturers, with that vigorous attention, activity, skill, and  
 invention, which are the result of profitable business; are in every coun-  
 try, the soul of prosperous fabricks. Their profit animates them to  
 spirited exertions, on which the advance of manufactures depends.—  
 Where are the men of taste to invent, of quickness and sagacity, to  
 mark and follow the caprice of fashion?—Can we find them, among  
 the

\* This is not accurately the fact

the working weavers? Absurd! We must look for them among the intelligent manufacturers.—Go to the weavers in *Spital Fields*, and see them, mere machines, directed by their employers, the mercers, since it is their capital, that set the loom at work, their taste and judgment that direct and regulate its productions.—What would be the effect, were the mercers of *London* to be rivalled by public money? The ruin of the silk manufacture.—What induces men to embark large capitals? —Profit. The greater the profit of a manufacture, the greater will be the capital employed in it; and the greater the capital, the greater quantity of industry will be set in motion. Thus, the direct tendency, of measures, such as I have stated, is to diminish the quantity of that industry, which it seeks to augment.

Another effect of establishments of this nature, is to raise jealousies among the different tradesmen, concerned in the manufacture, wherein they are employed. The drapers and mercers, (in *Dublin* for instance) are not pleased with the manufacturers, who work for the Society's warehouses. Jealousies of this nature must be detrimental to the manufacturing interests of the kingdom at large. Fortunately for the kingdom (as *Young* observes) the ready money trade is, by no means, equal to that on credit. The drapers and mercers support their trade, in spite of this formidable rival, backed with a premium of 2500*l.* a year appropriated to their ruin; and this in order to encourage the manufactures of the country! Such has been the effect, of the best intentions imaginable, injudiciously directed. In truth, aggregate meetings are not well calculated to preside over, or encourage industry. And this leads me to the next section.

SECT.

## SECT. IV.

*On Corporations.*

Corporations flowed out of the feudal system ; and were erected, and grew, under the countenance, and protection, of the ancient monarchs of Europe, as a counterpoise to the tyranny, the turbulence, and power, of their great barons. The security of property, and relative tranquillity, which they afforded, first gave rise to commerce and manufactures. This has produced a prejudice, in favour of corporations, and erroneous notions, on commercial subjects. It has been supposed, that the same measures, and institutions, which, in times of outrage and anarchy, were necessary to the very existence of commerce, and the security of the persons, and possessions of individuals, would, in times of peace, and good order, contribute to the extension and prosperity of trade. In those early days, the maxims of industry were ill understood : trade was in low repute, and capital was not generally diffused. It was supposed necessary to allure men to commercial enterprise, by exclusive privileges. The crown, too, was fond of overstretching its prerogative, and gratifying its favourites, by the creation of monopolies. We find, in the early part of the *English* history, even down to the unhappy reign of the *first Charles*, perpetual complaints of the gross prevalence of monopolies.

The predominancy of these notions, gave occasion to the marshalling and arraying, the professors of various trades, into exclusive companies, embodied, by charter, endowed with beneficial privileges, invested with extra-

ordinary powers of making laws and regulations for themselves, and possessed of a monopoly in the art they exercised. This very art was supposed to contain in it, certain wonderful *arcana*, some abstruse discovery, not to be communicated, except to such, as were duly initiated, by a long apprenticeship. Thus, the terms,—*trade*, and *mystery*, became synonymous.

Monopolies, and exclusive privileges, may have their use, while arts, and manufactures are struggling for their existence, and in their infancy; but they cripple the vigorous progress of their youth, and palliate the strength and exertions of their maturity. They confine manhood to the leading string, and the go-cart. It is now understood, that the most effectual mode of encouraging industry, is, to leave the exertions free, and suffer every man, to find out for himself, and pursue, without interruption, or molestation, that species of employment, which seems to him most likely to reward his labour, with a return of profit.

The monopolies, and exclusive privileges of corporations, guarded, as they are, by a number of bye-laws, are wholly inconsistent with that choice of employment, and freedom of exertion, which are the very soul of industry. In fact, we find the customs, and regulations of corporations, and guilds, proscribe industry, and the importation of capital, by the exclusion of deserving aliens. They are injurious to the true interests of commerce, and destructive of all improvement, in manufactures, which they tend to render stationary: for a fair and open competition is, of all things, most favourable to the diffusion of industry, and perfection of all the productions of art, while, on the other hand, it is the natural effect of a secure monopoly, to destroy the true commercial spirit; to perpetuate a culpable indolence, and total disregard, for advancement, and perfection of manufactures.

While corporations endeavour to banish, or proscribe, the industrious manufacturer, with his capital; or, if they do not totally drive him away, to raise a tax, on his labour, and exertions, for the emolument of their own members; they interrupt the exertions, and distract the attention of their own members, by the idle activity, and low cabal, of corporation politics. These scenes of caricatured intrigue, and plebeian ambition, produce riot, intemperance,



intemperance, and prodigality; diffusing themselves, through the whole corporation, from the traders, or manufacturers, who canvass for the honours, and employments, (which however mean they may be, and even ridiculous, and degrading, in reality, are always objects of desire, to certain people) down to the poorest elector. The experience of every one must furnish him with melancholy examples, of families ruined, by the intemperance and neglect of domestic concerns, which are the inevitable consequences of a sanguine pursuit of corporate honours.

In fact, corporations, are not only subversive of industry; they are too frequently injurious to the cause of morality, and become nurseries of debauch, perfidy, falsehood, and wrong, accompanied with gross speculation, if the corporation has any estate, or revenue. In all these corporations, there spring up a number of idle, and profligate persons, whose only merit is their being active partisans, the creatures of some persons in power, in the corporation. These gradually engross, to themselves, the management of the society; become its ruling members; dispose of its property, and regulate all its concerns, to the great prejudice, not only of industry, but of good morals, by their example and influence.

The inconvenience of exclusive privileges, and corporate monopolies, appeared so palpable, and so injurious to the cause of industry, that the legislature of this country, when they were disposed to encourage the linen manufacture, by law, found themselves obliged, to interfere with the privileges of corporations, and suspend them, with respect to that favoured branch of industry; the same principle which actuated the legislature, on that occasion, applies equally to every other branch of manufacture; and could people divest themselves of prejudice, and private interests, and meet the subject fairly, and boldly, should lead to a total abrogation of all corporate privileges, and distinctions, that lead to monopoly, and tend to shackle industry. The clause, to which I allude, is in an act of the 19th of George the second.

“ Every flax-dresser, hemp dresser, profest maker of linen wheels, professed maker of hatchels, being a protestant, (I could wish that incon-

( Z z 2 )

sistent

“ inconsistent relique of illiberality had been omitted) shall be at liberty, to  
 “ exercise his trade, in any city and town corporate; and, during his resi-  
 “ dence, and following his trade therein, shall be deemed a freeman thereof;  
 “ provided, that he shall not be at liberty to vote, at the election of any ma-  
 “ gistrate, or of any member, to serve in parliament, for such town.”

In corporations there always exists, as I have said, a spirit of party, and a love of *jobbing*, (a name of great significance, denoting an evil, which is peculiarly prevalent in *Ireland*.) These contentions produce not only intemperance, and immorality, with beggary in their train, as I have mentioned, but also, personal animosities, and rancour, which are highly prejudicial to the interests of industry, by preventing the members of such societies, from assisting each other, in their labours.

We find the most flourishing manufactures are carried on, without the aid of incorporations, and exclusive privileges; such is the cotton manufacture of *Manchester*; such the hardware manufacture, through all its various extended branches, which is carried on at *Birmingham*; and such is the linen manufacture of *Ireland*; which has reached its present state of prosperity; by the vigour of individual exertion, a state which has few parallels; and this without any other aid, than the interference of the legislature, to prevent, or punish fraud, and encourage, by bounties, the importation of the raw materials, and the exportation of the manufactured fabrics.

Though I am unfriendly to monopolies, and exclusive privileges, I think, it may be necessary, in some instances, to depart from general commercial principles, in favour of patents, and chartered companies. In the infancy of commerce, most manufactures were carried on by companies. There were, in England, the companies of merchants strangers; the German merchants of the steel yard, (who were highly favoured by Henry third,) companies of merchants, of *Venice*, *Genoa*, *Florence*, *Lucca*, and *Lombardy*. It appears, that the art of throwing, spinning, and weaving silk, were brought into England, and practised by a company of women in London, who were called silk women. On a petition of this female company, to parliament, in the year 1455, representing, that the *Lombards* imported

imported into *England* such a quantity of silk manufactures, that they were in danger of being reduced to poverty; an act passed, (33 Hen. 6.) prohibiting the importation of any such articles, as were manufactured by the silk women.

In a poor country, where the spirit of commercial speculation, is not prevalent; where there is a deficiency of capital;—where the spirits of the people are low; and the projector apt to despond;—manufactures that may require a large capital, extensive, and elaborate machinery, and a costly apparatus; extensive experimental undertakings, which are attended with considerable risks;—all these are ill adapted to the temper and circumstances of such a country. Individuals, will be deterred, by the heavy preliminary expence, which must be incurred, antecedent to any operation of the manufacturer, or any hope of profit; and the fear of total ruin, should the undertaking miscarry. There are works of great promise, both as to public utility, and private emolument, which, even in thriving countries, and amidst the abundance of capital, exceed the means of the generality of individuals, and are of a character so hazardous, that it would be unwise in any individual, to embark his whole capital in them. Such is the working of mines, the forming of canals, a great iron work, an extensive cotton work, and a colliery.—In a great iron work, for example, the houses, and furnaces, for melting the ore, the forges, the slitting mills, the steam-engine for working the bellows, are instruments of trade, or manufacture, which cannot be procured without heavy expence. So, in a mine of any kind, the timber for propping the excavated ground, the machinery of various kinds, above all, the steam engine, for discharging the water, are highly expensive. The machinery, in a cotton work is scarcely less so. In all new undertakings, of formidable aspect, from the great preliminary expence, which they necessarily require, and the heavy contingent losses, to which they are exposed; people, in rich commercial countries are in the same predicament (as to those particular instances) as all people were, in the infancy of commerce, with respect to manufactures, in general, and in all such cases,

cases, it may be wise, to secure to the inventor of any new art, or improver of any art already known, a monopoly in his invention or improvement, for a certain period. It may be wise, to encourage individuals, to join their capitals, to form themselves, into companies, and to cement their association, by charter; that undertakings which exceed the means, or the courage of individuals, may be assailed and conquered by united strength; and that, if any failure should be the consequence of their speculation, that loss, which would have depressed an individual, to rise no more, and deprived society of all his future exertions, and industry, may be lightly borne, when distributed through the capitals, and resources of a large number of individuals, who compose the association.

SECT. V.

*On the Maximum in the Price of Labour.*

It is a misfortune, which attends all questions of commerce, and manufacture, that they are too liable to partial consideration. The interests of individuals, or of particular classes, will unavoidably, start forward, and become such prominent features, that they will stand in the way of free discussion, and enlarged views of policy. The merchant thinks, the peculiar branch of traffick, in which he is engaged, ought to be the object of prime consideration, with the legislature; and instructs his representative to oppose any impost, or regulation, that seems to militate against it. The manufacturer thinks, that the trade, or calling, by which he thrives, should be guarded, as the palladium of the country; that it should be held sacred, from prophane intrusion, with religious mystery; that it should be fed with sacrifices, and pampered with bounties. Of manufacturers, again, that exercise the same art,

art, there are two classes; and these differ as much, in their notions, and according to their confined apprehensions, in their interests, as those, who deal in two distinct, and separate trades: the master manufacturers, and the working manufacturers, or journeymen. The object of the master, is, to get as much work for as little money, as possible; of the journeymen, to get as much money, for as little work as possible. It is the object of the master, to fix the maximum of labour, and to make this maximum as small as possible. To effect this, he endeavours to obtain the aid of the legislature; and to establish such laws, as that in *England*, which empowers two magistrates, to fix the price of labour. He obtains penal laws, to restrict and punish all meetings and combinations of the journeymen, for the purpose of demanding, and enforcing, an increase of wages. He endeavours, to reduce his refractory workmen to his own terms, by taking an extraordinary number of apprentices, and inviting strangers into his employment. The workmen endeavour, to conquer their employer, and traverse his views, by refusing to work; by associations, and contributions, to support each other, in this refusal; by combinations, to limit the number of apprentices to be taken by one person; and, by threats, and outrage, they attempt to drive away strangers from the service of the master manufacturer;—great outcries are raised, on both sides; and mutual recriminations thrown out: the insolence, the intemperance, and riotous conduct of the lower classes, furnish topics, of complaint, and declamation, on the one hand; the high price of provisions, the inadequate price of labour, the oppressive conduct of the employers, are magnified, on the other.—There may be some truth, in the allegations, on both sides.\*

How is the controversy to be adjusted?—by introducing the law of the maximum; a law introduced in *France* under the tyranny of *Robespierre*, and which was attended with consequences most baleful to industry?—No; the interference of the legislature, to fix the price of labour, is, in all cases, injurious, and improper. If it fixes the price of labour too high, the master  
 manufacturer

\* See the interesting debate, on a motion introduced by Mr. Whitbread.

manufacturer is injured ; his profits, from the manufacture, become so small, it will not be his interest to carry it on, and he will discharge his workmen ; if, on the other hand, the price of labour is fixed too low, and the workman is restrained, by penalties, and punishments, from seeking an increase of it, the labouring poor must starve. They will desert an employment, that no longer yields them a subsistence. In either case, the manufacture is ruined. Where shall we find the golden mean, which gives, to the labouring mechanic, sufficient support, for himself and his family, to reward his industry ; while it leaves, to the master manufacturer, sufficient profit to his exertions ; and allows him to supply his manufacture, on such reasonable terms, as enables him to enter the foreign market with advantage ?—What may be a high price of labour, in one country, \* may be a very moderate one in another. The price of labour, in agriculture, must fix the price, to a certain degree, in every other department of manual industry. This price varies, in different counties ; and, in the same county, may vary at different times of the year. The price of the necessaries of life, the population of the district, a variety of other circumstances may operate, to vary the true criterion of a *maximum*.—What, then, is to be done ?—Let not the legislature attempt to fix an uniform *maximum*, in an article so various, and so fluctuating in its nature.

Labour is like every other commodity, where the wants of man are compensated by money. The want being of a necessary, the legislature should not interfere, to fix the price ; it should leave it to find its own level. It may interfere, indeed, to keep the level free ; it may prevent its being choaked up, and interrupted. The master should be left, to make the best bargain he can, with the workman ; the workman to make the best bargain he can, with the master ; but the legislator may interfere, and, indeed, it is his duty to do so, to prevent all fraud, imposition, or oppression, on the one hand ; all turbulence, combination,

\* The wages of Artificers in America, are now extravagantly high.

combination, and dishonesty on the other; to these objects alone should the hand of regulation be extended.

The security of property is one of the great objects, for which men unite in society. This object should be held sacred, by every legislator, as far as is consistent with the support and well-being of the community. The labour, the exertions, the talents of every man are his private property, and should be preserved to him inviolate, except so far as he agrees to sacrifice a portion of them, to the support of government, and to the exigencies of the state. But, this portion should only be taken, with his own consent, otherwise there is no liberty, or security of property. The free possession of property necessarily implies that the owner shall have the power of employing it, as he pleases, consistently with the public safety; Of the most profitable and expedient manner of employing it, he should be left to judge for himself.

Schemes for fixing the price of labour, have their origin in tyranny; are subversive of freedom, and contrary to the principles and rules of property. Demand, and price, reciprocally fix each other; if there is an uncommon demand for workmen, their wages must be proportionably high. It is just, also, that the expence of provisions, and the difficulty of procuring subsistence for the peasant, or the artificer, and their families should be taken into the account; and their wages ought to be augmented, with their necessities. Were the same price of labour to be established uniformly through the kingdom; it would be an intolerable grievance, to such of the industrious poor, as are settled in the vicinity of the capital, and other large towns, where constant demands render all necessaries of life, particularly of food, and lodging, dear. Its effect would be to banish the poor from these neighbourhoods, since, the same sum of money would purchase double the quantity of necessaries, in other parts of the kingdom, where, by reason of the scanty population, and remote markets, the necessaries of life are twice as cheap, and he can live twice as well, at the same expence.

It follows, that, in justice, the price of labour should be greater, in the neighbourhood of the metropolis, and other large and opulent towns, where living is dear, than in remote provinces, like *Connaught*, where there are few, or no large towns, and living is remarkably cheap. The fact is, that the price of labour does, in some degree, find its own level; and, that, partly demand, partly the relative dearth, or cheapness of provisions, determines this level. I am told, that on the canals, and public works in the vicinity of Dublin, a labourer is paid eighteen pence a day,\* while, in *Connaught*, he thinks himself rich, on sixpence a day, which is more than the common rate of the country.

In objection to the admission of dearth of provisions, as a criterion, for fixing the price of labour; I have heard it remarked, that, in the *North of Ireland*, which is the great manufacturing part of the kingdom, the price of labour is lower, in dear and scarce seasons, than, in those of plenty, and cheapness. But I speak of a regular, and permanent dearth; and, therefore, to be provided for, as affording a criterion, for the price of labour. The case is different, with respect to an accidental season of scarcity, coming unexpectedly, and pressing with severe, and unrelenting urgency. There, the artificer is taken by surprise; he expects, that this year will be abundant as the former; he has made no saving, from his earnings; he has accumulated no store; he is wholly unprepared, to wrestle with famine.—How shall he bide the pelting of the pitiless storm? all the horrors of want, and despair come on him, like a thief in the night; he is surrounded by a troop of famished wretches; and, unable to relieve the importunate calls of hunger.—The spirit of gain is unfeeling; the master manufacturer sees his necessities, and takes advantage of them; (perhaps, the artificer himself had provoked him to retaliation, by arrogance, and extortion, in the hour of fulness) he imposes on him conditions; he makes him labour, at a rate, which, in times of more abundance, when he could have remained idle, and tolerated existence, at a small expence, he would have rejected. †

But

\* It has since risen to two shillings.

† We had no combinations in Dublin during a season of distress;—they exist now.



But though every intelligent person, who considers the subject, must be convinced of the impropriety of a legislative interference, to fix the price of labour; it must be acknowledged, that the wages of the peasant are by far too low, in almost every part of *Ireland*. Six-pence a day are by no means adequate, to the support of a man and his family. This low price of labour, not only makes the peasant wretched, but, operates universally, to the discouragement of manufactures. *Young* observes, in his tour in *France*, that there prevailed there, in most places, a poverty, that strikes at the root of national prosperity. A large consumption amongst the poor is of more consequence, than among the rich. The wealth of a nation, lies in its circulation and consumption; and the case of poor people abstaining from the manufactures, of leather and wool, is an evil of the first magnitude. It reminded me (says the Traveller) of the misery of *Ireland*.

It will be difficult to point out any scheme, for the encouragement of manufactures, so effectual, as an amelioration of the condition of the labouring poor, in general. For this end, we should begin, with increasing the wages of the peasantry, at present unaccountably low. Were the poor better lodged, clothed, and fed; did they display more utensils, and furniture, in their habitations; they would give employment, to a large additional number of manufacturers; they would open an extensive consumption, of linen and metallic manufacturers, of carpenters work, and articles of furniture; but to increase this consumption of the poor, which, as has been justly observed, is of more importance, than the consumption of the rich, the means of the poor must be increased, by augmenting the price of labour.

There is a peculiar advantage, in the consumption of the poor. In the first place, it consists more in home productions, and less in imported luxuries, than that of the rich. In the next place, it not only brings the market to the door of each manufacturer, by the demand of his neighbour; it produces also, in addition, a profitable re-action, a reciprocation of exertion. Through the mutuality, of superfluities, and wants, the peasant, or manufacturer, who takes any

article of cloathing, any tool, or utensil, which he wants from his neighbour, probably gives him, in exchange, something of value, which he himself has reared, produced, or made, and receives, or pays the difference in money. The peasant gives a pig, potatoes, or corn to the weaver, and receives linen for shirts, in return. The weaver of linen, goes to the weaver of frize or flannel, and barter with him, in like manner. The shoemaker, or the hatter, goes to the carpenter, and exchanges shoes or hats, for a bench, a chair, a table, or a bedstead. Thus, the labouring poor, mutually excite each other, by example, and reward, to the exertions of industry. Premiums and bounties, drive manufactures into channels, which are not yet prepared for their reception. The silent, insensible operation, of physical and moral causes, gradually leads them, in the most salutary manner.

Though I am an advocate, for encreasing the wages of the labouring poor, I do not wish to see the augmentation made, by the interference of the legislature. I wish to see it proceed, from the wisdom and humanity, of the gentry and opulent farmers, through the country, acting according to circumstances, and adapting themselves to the peculiar situation of each particular neighbourhood. Were the legislature to interfere, it must proceed on general representations, and be guided by some common rules, applicable indiscriminately to all cases. It cannot provide for the mischief, in detail; or advert to all the local circumstances, which ought to vary the price of labour, perhaps, in every barony in the kingdom. One common rule would do too much for the poor, in some places; too little in others. It would be as injurious to the country, to do too much, as too little. Were the price of the peasant's labour too high, it would operate, as a tax, on the industry of the farmer; he would employ fewer hands, in the cultivation of his farm; he would make fewer experiments in agriculture; he would not keep his grounds and enclosures so neat and trim. Thus would he be enabled, to discharge a number of his labourers;

labourers; so that the fixing the price of labour too high, though intended for a benefit, would be a real injury to the peasant himself. The variations of wages, determined, according to a compound ratio, of what the price of provisions, and the scarcity of workmen require, on the one hand, and the profits of farming will bear, on the other; though differing, from each other, in different places, by a small fraction only, will, nevertheless, through the whole extent of a country, or a province, and the whole duration of a year, have a very sensible effect, in the encouragement or discouragement of industry.

By the present pressure of the times, and the increased expence of living, the poor of every description are sorely pinched:—" Marriage  
 " is discouraged (I use the words of Mr. *Pitt*, speaking of England)  
 " and in the domestic circle, the birth of a child, instead of being  
 " considered as a blessing, is regarded as a curse. To enable the ma-  
 " nufacturer to feed, clothe, and lodge his wife and children, and pre-  
 " vent the youth of the country from being driven into the army and  
 " navy, for subsistence, it is necessary to augment the price of labour." But let this be done by the operation of principles.

When the legislature has proceeded, to fix the price of labour, and restrained the workman, from trying to augment it; it has been governed, by an idea, that large bodies of men, by conspiring to raise their wages, may injure industry, and leave no room for superior exertion and excellence. When this legislative interference succeeds, it only does what might better be effected, by principle, were labour left to find its own level. When it fails, it produces, on the one hand, the severest oppression; it encourages, on the other, the most profligate idleness and extravagance. This interference, has shackled industry; and the best intentions produced the worst effects to trade; fettered the circulation of labour, and substituted a system of complicated abuses, in place of the abuses it means to remove. This is a subject which, of itself, would require a volume; and, conscious of my inability to do it justice, I shall not add any thing more, but proceed to the subject of the next section.

SECT.

## SECT. VI.

*Of Foundations.*

Among the various measures, that are subservient, or beneficial to the flourishing state of manufactures, that, of providing for the ease, comfort, and subsistence of the labourer, and the peasant, when age, sickness, or other causes, shall have rendered him incapable of supporting himself, holds a distinguished place. Such provisions, not only afford relief to the old, but a lesson and incentive, to the young. They shew them the respectability of honest labour, and teach them, what an estimable rank they hold in society; yet, is the regulation of this matter attended with difficulties, almost insuperable.

The poor's rate in *England*, was, no doubt, originally devised, with an intention of providing for this object, of true policy, and sublime benevolence; but, connected as it is, with the present laws of settlement, it is become the means of a most injurious, and impolitic restraint, on industry, and a burthen on the public nearly intolerable. The oppressive laws of settlement, prevent the workman, in *England*, from going to that market, where he can dispose of his industry, to the best advantage; they prevent the *capitalist*, from availing himself of his *capital*, and employing it, to purchase labour, on the best terms; and thus, they fatally injure the industry of the country: but the poor's rate and settlement laws, are not only grievous to the poor, and prejudicial to industry; they are a cruel burthen to the public, both by the vast and dreadful amount of the tax, and by their proving a source of endless litigation, and of the most scandalous contentions,

tions, directed to one sole object.—The restraint of the poor from the enjoyment of their natural liberty, and the free use of the talents, which God Almighty has given them. Half the modern books of law reports, are filled with settlement cases. If these regulations were ever founded in wisdom, and adapted to the situation of the country, which may well be questioned, it must now be confessed, that they require the correcting hand of the legislature.

Alms-houses, and institutions of that kind, like the *hospicio*, in *Spain*, which, at once, support those who are past their labour, relieve the indigent, protect the orphan, furnish employment to the industrious, and shut up and correct the idle, present themselves to the benevolent theorist, in a most favourable point of view. But even the *hospicio* at *Cadiz*, though, perhaps, one of the best-imagined institutions of the kind in the world, and (as *Townshend* says) the best conducted in *Spain*, is found liable to many objections; and fails, in various respects, of answering the ends proposed.

In all public foundations,\* for the relief of the poor, much is proposed and little accomplished. A small proportion of public good is purchased, at a very heavy public expence. There must be rules and regulations; these rules and regulations must be enforced, by inspectors; but who shall inspect the inspectors themselves? Society has not always the same wants. The nature and distribution of property, the opinions, the manners, the division into orders, or classification of the people may vary, at different periods; yet the *foundation* remains unchanged, and permanent; founded on and adapted to a particular aspect of all these; on maxims, relations, wants, and interests, which no longer exist. Thus, the crusades gave birth to a variety of religious foundations. There was a certain state of society, learning, and manners, when monastic institutions might have been attended, with solid advantages to the world; though, in the present state of society, their utility can hardly be considered as problematical. The protestant character

\* Section on morals and public instruction.

ter schools of *Ireland*, originated, in a necessity either real or supposed, resulting from the peculiar state of the country, of diffeminating that religion, which was thought to be intimately connected with the adherence of this country to the side of *England*. In the present state of society, and of public opinion, the utility of those foundations, conducted, as they are, at this day, on the obsolete maxims of former prejudices, or, if you please, emergencies, may (as I have already observed) well be questioned. The proportion of those, who remain in society, is perpetually varying, and the utility of foundations, which ought to be adapted to the different circumstances of society, must vary in like manner.

Most of these establishments, survive their utility a long time; first, because there are always men who profit by, and are interested to maintain them; secondly, because, although a person may be convinced of their inutility, it is necessary to combat prejudices, to take measures, and observe formalities, before you can proceed to overwhelm structures, which have stood for ages. Thus, foundations have frequently become actively pernicious, for a long time, before men could be brought to agree, that they were even useless.

This should be a strong reason, to make us slow, in proposing the permanent establishment of a foundation, however plausible it may appear in theory, because there is a certain prospect, that, however it may be adapted to present circumstances, and prevailing opinions, it may, one day, become useless, perhaps, pernicious; and continue to be injurious a long time, before it is abolished.

Another thing to be considered, is the luxury and pomp of building, of which foundations are generally the parents. The number of proud, luxurious, opulent servants of mendicity and misery, whom they maintain in state, lodge in palaces, and train about in equipages. Cast your eyes, on the buildings erected, for almost any public purpose, you will see what a large portion, and that the most splendid and best part of the edifice, is occupied, by the officers of the public, or the  
servants

servants of the institution!—A laundress—a steward—a providore—a matron of an hospital, or a poorhouse, is often lodged in apartments, that might serve a prince, and enabled (out of the funds intended for the lame, the blind, the aged, and the orphan) to run the whole career of fashionable dissipation, on an income adequate to the maintenance of an hundred paupers, or a dozen professors, of elegant accomplishments, or useful knowledge.

There is a method of providing for the wants of the poor, without burthening the community; without the glaring parade, and wasteful ostentation of charity; a method, which executes itself, and is adapted to all times and seasons, and which, while it provides for the future wants of the peasant, or the artisan, stimulates him to redouble his industry, at the present moment, and teaches him a wholesome lesson of frugality, by leading him to hoard up a small portion of his daily earnings; I mean the institution of beneficial societies, to which every man contributes a certain weekly sum, to form a fund, for mutual relief, in the hour of distress. Such institutions have become very general, in *England*, and they deserve to be promoted, and diffused, in this country, by every aid, that the countenance and protection of the legislature, can afford them. Let us imitate the example of *England*, where friendly societies for mutual relief, are now regulated by law; and provident societies, which are voluntary, established in most towns.

These establishments for mutual aid, possess many advantages, over public foundations. They do not interfere, with the freedom of the individual. They do not impose a burthen, on the community. They are cheerfully maintained, because they are freely established. They do not necessarily lead to profusion, or include in themselves a principle of corruption, and malversation. The plan is simple, and the execution of it easy. The fund will be managed with fidelity, and administered, with economy; because, the persons to be benefited by it, and who are therefore interested in its continuance, and encrease, are themselves the administrators. Foundations must proceed, on general rules

and will, therefore, do either too little, or too much, for the objects of their aid. Institutions of the kind, I now mention, will enter into the spirit of each particular case of distress, and proportion exactly the quantity of assistance to the emergency. Were such institutions to prevail generally, they would prove a means of cementing man to man, by the bonds of love, and acts of benevolence. They would improve and soften the heart, by cultivating the human affections, and tender sympathies; and teaching man to melt, at the distresses of his brother. I propose not to enlarge, here, on the form, and regulations, which may be proper to be adopted in such establishments. I content myself, with suggesting the measure, in general, to the wisdom and benevolence, of those who feel, for the distresses of the labouring poor; and for useful details, referring to the various publications on this important subject.

Work-houses are favourite objects, in the class of foundations, with political economists; and the use of them is very general in *England*. I fear, they are seldom productive of as much good, as is expected from them. Public bodies being deficient in watchfulness, activity, and zeal, labour under a disadvantage; and will never find a vent for the commodities manufactured in them. Hence arises one argument against such establishments. But, although strong, it is, by no means the strongest, because, universally, people who work in confinement, eat too much and work too little.

To conclude this head, I believe, if we look into the public foundations of the country, one with another, and estimate the real public utility which they bring with them, we shall pass a favourable judgment, if we value that public utility, at a hundredth part of the public expence. I speak here, with a reserve in favour of such noble institutions, as a Foundling Hospital, and a Lying-in Hospital. No change of times, or fluctuation of manners, can depreciate their utility. Nor do I speak of county infirmaries, or hospitals for the reception of sick  
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and wounded. Such foundations are absolutely necessary, for the relief of the poor ; and they are productive of much improvement, in surgical skill, and medical science.\*

\* When the nation is poor, (says Montesquieu) private poverty springs from the general calamity, and is, if I may so express myself, the general calamity itself. All the hospitals in the world, cannot cure this private poverty. On the contrary, the spirit of indolence, which it inspires encreases the general, and consequently the private misery.— Henry the VIIIth, demolished monasteries, and hospitals, where the lower sort of people found subsistence. Since these changes, the spirit of trade and industry have been established in England.

## C H A P. III.

*Brief Notices respecting the Encouragement of specific Manufactures.*

## SECT. I.

*Of the Linen and Hempen Manufactures.*

To set industry in motion, three things are requisite,—materials, to work upon—tools to work with, and the wages or recompence for which the work is done. To the certain attainment of the latter, a regular market is necessary. The encouragement of any manufacture consists in the providing for the attainment and security of these three objects united.

With respect to the linen manufacture, the *primum* of which is, or may be produced, at home, by encouraging the farmer to grow flax, in every part of the kingdom; but also to secure, if possible, an abundant and unfailing supply of flax-feed, within the country itself, independent of foreign aid. At present, though we grow the *primum* of the manufacture ourselves, we chiefly depend on *America*, for a supply of flax-feed; and in case of any rupture with that country, at a future day, the consequences to *Ireland*, in the total ruin of her staple manufacture, would be fearful indeed.\*

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\* The price of flax-feed has varied, from three to seven guineas per barrel.

It should be the care of the legislature, to put this precious manufacture, on which the very existence of the people of this country depends, out of the reach, if possible, of time and chance. To forward this great and desirable object, the farmer should be induced, by premiums, to cultivate flax, not merely as the *primum* of a fabric, but for the purpose of saving the seed. This appears, to be a very profitable species of husbandry; and, were it generally pursued, might relieve us from the apprehensions of a scarcity. I know it is supposed by many, that flax-seed, produced in this country, is inferior in quality, to that which is imported. I am apt to think this a mere prejudice, at least, it is an enquiry well deserving the attention of this country, to ascertain the truth; and determine, by a course of experiments, whether flax-seed, saved in this country, does not afford as abundant crops, and flax of as good a quality, as seed, which is imported, from abroad. If there were any overplus of seed beyond the demand of the flax grower, it might turn to good account, at oil mills.

Having secured the linen manufacturer against any failure of his raw material, the public attention should next be directed, to the perfection of the instruments and machinery, by means of which the different operations of the manufacture are performed. We see to what an astonishing pitch of prosperity the application of improved machinery has carried the cotton manufacture. Might not a knowledge of the mechanic powers be successfully employed, on the various instruments, and machines at present used, in dressing and preparing flax, for the spinster?—In spinning the yarn?—In making thread, for the use of ho-fiers, or for sewing?—In weaving the various kinds of linen webs? It is not impossible, that the different instruments at present in use, may be susceptible of very great improvements, either tending, to facilitate the several operations to be performed by them; or to produce the commodity, which is the fruit of those operations, in a state of greater perfection. Is it not possible, that some machine, like the spinning jenny, might

might be employed, in a more compendious mode of making linen yarn? Might not the rollers of *Arkwright's* water machine be employed, with good effect, in making the warps of fine cambricks? Might not the patterns of diapers be much improved, by some attention to the art of drawing and defigning? Might not the arts of dying, stamping, and colouring linens and cambricks, in various ways, be much improved, by an attention to the nature and combinations of colouring substances?—May not the art of bleaching be carried to a much greater degree of perfection, than it has yet attained?—These, and various other interesting enquiries, which might be suggested, ought to engage the care of the scientific head, and experimental hand. We should not suppose, from the present prosperity of the linen manufacture, that we have reached the utmost bounds of perfection.

The next measure in order, for the extension of the manufacture, is to find markets, for the finished fabric; and to bring them home, as near as possible, to the door of the manufacturer. I know not any means so effectual, for the attainment of this end, as the vigorous execution of the plan, which occurred to the legislature of this country, many years ago, but has not been properly followed up, in practice; I mean the establishment of a *Linen Hall*, or public ware-house, for the wholesale market of linens, in each county town, in this kingdom. The idea was well conceived; but, as I have already observed, the sum which the grand jury was authorized to present, was wholly insufficient for the purpose. The deficiency, however, might be supplied, and probably, with more profit to the manufacture, from the funds; which are now expended in bounties, on the exportation of linens.

The establishment of linen halls, is a measure, which has been attended with the most beneficial consequences, wherever it has been adopted. By means of these establishments, the market is not only brought home to the door of the manufacturer, whereby he is saved a considerable expence, in the bringing his productions to a mart, and enabled to sell them proportionably cheaper; but is rendered more advantageous to him, in the points of circulation of commodities, of num-  
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ber of buyers, and regularity and certainty of demand. It is of the utmost advantage, to the prosperity of a manufacture, that the manufacturer should have a certain place, to which he may convey, and wherein he may deposit his goods, in full assurance of finding a purchaser; it is of the greatest consequence to the buyers, to be assured, that there is a market, to which they may resort, for the different fabrics, which they require, to furnish their shops and warehouses, without any fear of a disappointment. The manufacturer is encouraged, by the certainty of purchasers, to fabricate goods, in greater quantity. The purchasers are encouraged, by the quantity of manufactures, to resort to the market, in greater numbers. These established markets are beneficial to the manufacture, in another respect: they render the work of regulation and inspection more easy, they facilitate the detection of all frauds; and tend to establish a fairness in dealing, that inspires the purchaser with confidence. And nothing is so favourable to a commercial intercourse, and to the prosperous circulation and improvement of a manufacture, depending on it, as this confidence, and good faith, subsisting between the buyer and seller.

It is true, some writers have declared themselves unfriendly to the general extension of the linen manufacture. It has been said, no great or populous country ever thrived, by a single manufacture. *Young* has declared, "that, were he proprietor of an estate, in the south of *Ireland*, he would as soon introduce pestilence and famine, as the linen manufacture, as carried on, at present, in the north of *Ireland*." Because, indeed, the existence of the manufacture, in its present state, contributes to the division of land, into small farms, which, as he pretends, introduces bad modes of farming. But surely the encreases of that, which, in its present extent is acknowledged to be the chief source of the prosperity of the country, cannot be injurious. The manufacture can never be said, to be overstocked, with hands, or to draw to itself too much of the capital of the country; while an easy vent is found, for the fabrics, which it produces. Indeed, when the linens

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of *Ireland* lose their price, when the demand for them is slack, and the linen market appears to be glutted; then, indeed, it will be time, to think of restraining the extension, of the linen manufacture. With respect to the south of *Ireland*, such is the utility and profitable nature of the linen manufacture, and such the aptitudes of the soil of *Ireland*, particularly, in the more fertile counties, for producing flax; that the linen manufacture, without care or encouragement, has spread, with a silent, unobserved progress, through the whole province, is become an object of great importance, and is prosecuted, (though without connexion or system, or the employment of large individual capital) to a vast extent, by the industrious poor. Inasmuch, that there is not a town in *Munster*, where considerable quantities of coarse, unbleached\* linen, the manufacture, of the vicinity, are not exposed for sale, on a market day. So that the question is not, whether, we shall extend the linen manufacture; for it is extended already, over all parts of this kingdom; but, whether we shall methodize and regulate the prosecution of it:—whether we shall prune and bind up the luxuriant shoots; and give form and order, to what now runs wild.—As no hesitation can remain; the utility of establishing a linen-hall, in every county-town in *Ireland*, must be acknowledged. The obvious utility of promoting the establishment of bleach-greens, in *Munster* and *Connaught*, is equally apparent.

It must be further observed, that, although the linen manufacture is the great staple of the country, and in such a flourishing state; there are some of its branches, minor branches, it is true, yet still objects of constant demand, which are either wholly neglected, or imperfectly pursued, in *Ireland*. Such is the manufacture of sewing threads—of the finer kinds of tapes, and other fabrics of that kind; for which, we are chiefly dependent, at present, on *Holland* and *Flanders*. Such the manufactures of thread lace, and edgings, and of fine cambric. An attempt was formerly made, to establish the manufacture of this last fabric, at *Dundalk*;

\* Particularly a narrow kind, called by the country people, bundle-cloth, from the measure employed by them.

*dalk*; but, from some error in the plan, (chiefly, as I believe, from its proceeding on the erroneous idea of being a public manufacture) it proved abortive. Some of those neglected branches of this manufacture particularly deserve the attention, and encouragement of the public, because they are particularly calculated, to furnish employment, for women and children, and might be advantageously carried on, in orphan-houses, and other public seminaries of industry.

Yet, though I profess myself an enthusiast, in favour of the linen manufacture; and so sanguine in my expectations from it, that my imagination cannot set bounds to the extension, of which it seems to be capable; or to the wealth and prosperity of which it may be productive to the community; I must say, that, in the present state of advanced maturity, to which the linen manufacture has arrived, in *Ireland*, I cannot see the necessity, for continuing to support it, with bounties and premiums. The utmost, that could be expected from the legislature, would be to admit, free of expence, the *primum* of the manufacture, the seed, from which it is raised, and the materials of bleaching.

The linen manufacture having continued to flourish, for a century, and advanced to perfection and vigour, is, as I have observed, in a former part of this essay, superior to all danger from rivalry. Some attempts in this branch, have been made in *Scotland*, but they are not considerable enough, to excite alarm. The encouragement given by the *British* government contracts, to the coarser flaxen and hempen fabrics, of *Silesia* and *Russia*, perhaps, in departure from the original compact, which secured to our linens the possession of the *English* market, is insufficient to make any impression, on the prosperity of this great manufacture. The fine linens of *France* and *Holland*, though perhaps, not equal to those of *Ireland*, will find their way into the neighbouring countries, and supply a considerable part of the demand of the *European* market. Still, our linen fabrics, particularly the finer kinds, will possess the home market; they will possess also the *British* market, for the demand of these markets cannot be supplied, from any

other quarter, with fabrics of the same quality, on terms equally advantageous. From our situation, favourable as it is, for an intercourse with *America* and the *West Indies*, we derive peculiar advantages, for supplying the demand of those countries, with our staple manufacture; and, in fact, a very considerable export of our linens to the new world, does at present subsist. All these markets, were we even to lose that of *Spain*; which has of late taken considerable quantities of our linens, as it is more than probable we shall do; are of themselves, sufficient to circulate the productions of our linen manufacture, were it even to be prosecuted to an extent, far exceeding the present amount. Such being the actual prosperity, and such the fair prospects of the linen manufacture; it will not be contended, that, there are any sound reasons, with respect to it, for departing from the demonstrable conclusions of political economy, which decidedly reprobate the measure of bounties. The linen manufacture has gained sufficient strength, to stand alone. It has attained a maturity, and need not now be fostered, and dandled, and fed at the public expence.

If the linen manufacture has now attained to a most flourishing state; the nation has, in some measure, purchased this blessing; I will not say, at a price adequate to its value; but, certainly, at a price very considerable. During a long period of time, large sums of public money have been granted, for the support and encouragement of the linen manufacture; certain duties\* have been appropriated to its support; bounties are paid, on the importation of flax, and hemp, flaxseed, ashes, soap, and other materials, used in bleaching; and, lastly, a bounty is paid on the exportation of linens. The amount, on an average, of the appropriated duties, for a period ending in the year 1777, according to the disbursements made by the vice-treasurers of  
*Ireland,*

\* An excise duty of five per cent. on the amount of the customs, for the encouragement of the linen manufacture, on calicoes and linens—additional duty on tea, coffee, chocolate, &c. &c. on foreign cambricks, for the encouragement of the cambrick manufacture.



*Ireland*, to the trustees of the linen manufacture, for which they claimed credit, was about 14,500*l.* yearly. Bounty, on the import of flax seed, and bleaching materials, 1500*l.* per annum. The amount of the parliamentary bounty, on the export of linens,\* 4000*l.* yearly, making the total yearly amount of, from 33,000*l.* to 34,000*l.* The total of the sums applied to the encouragement of this manufacture, from the year 1700, to the year 1777, is stated to be 1,295,560*l.*

*Ireland*, having been in the linen trade, since the beginning of the present century, and having an encreasing demand, both for home consumption, and the foreign market; it must naturally be supposed, that the trade would encrease, in proportion to the demand. We are not, therefore, to attribute its present prosperity to the operation of bounties; it would have thrived, and grown, at any rate. The linen manufacture was the only channel, in which the industry of the people was suffered to flow; and there it would have flowed; though no linen-board or bounty had ever been thought of, or existed. It is contrary to all principles of commerce, to think, that such an encreasing manufacture would want flax or flax seed, unless a bounty were paid, on the import. It may be made a question, whether the bounty on the importation of flax-seed does not tend to injure the agriculture of the country, by preventing flax from being raised, for the purpose of saving the seed. It is idle to suppose, that a manufacture, which has employed a fourth part of the kingdom, for seventy years; and exports a million and half in sterling-value, yearly, wants the support of boards, and bounties, and premiums. I speak, with respect to the manufacture of the north; but, in *Connaught*, and the *South*, the linen manufacture wants both regulation and encouragement. The fertility of soil seems to point out many parts of these provinces as the peculiar and favourite station of the linen manufacture. We must consider also, that, in these provinces are most of the chief harbours of the kingdom, and those, which are the most conveniently situated, for

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\* The bounty is one penny per yard.

an intercourse with *America*, and the *West Indies*. Were the linen manufacture properly cultivated, in these provinces, where provisions and labour are very cheap, at present; the commodity might be produced on lower terms, and consequently sold, in the market, at a reduced price; by which means, the demand might be still further extended. An emporium or grand depot of linens might be established, in the west, or south; where the fabrics might be stored or collected, for the *American* mart; as they are, at present, in *Dublin* for the *British*.

Let it not be thought, that such speculations would engross too much of the capital of the country; the general extension and improvement of the linen manufacture, will not preclude the establishment of others, when the capital of the country shall be sufficient to embrace them. We are only considering, at present, which is the most eligible manner, of employing a confined capital. In truth, the prosperity of the linen manufacture, far from being an hindrance, to the extension of others, is, in some degree, connected with many. I have noticed its subserviency to that of paper; it is allied to the cotton and woollen manufactures; and co-operates with them, in many instances. Thus, linen-yarn is employed, as the warp of cottons; and employed in the texture of the coarser kinds of fustians, thicksets, and corderoys; it is combined with woollen yarn, in the composition of damascus and cheques.

There is a quantity of sail-cloth imported into *Ireland*, and yet it is a known fact, that the canvas of this country wears as well as any other, if not better. It seems to be a culpable inattention, indeed, a strange infatuation, on the part of government, in this country, to neglect the means of employing numbers of the people, and the sources of wealth and strength, which this branch of industry offers to us. It seems to be an unaccountable want of policy, on the part of *England*, that she does not endeavour to turn our thoughts, to this important object, supposing us blind and befotled, and wanting to ourselves;

elves; from our lethargy, to promote a vigorous pursuit of this most important branch of manufacture. There are many parts of *Ireland*, as I have observed, peculiarly adapted, for the production of hemp; and, were the manufactures of sail-cloth and cordage, properly encouraged in *Ireland*; vast sums of money would be retained in the *British* empire, which are now sent out of it, to *Russia* and the other northern countries; and extensive tracts of ground, which are, at present wholly unprofitable, and a disgrace and deformity to the country, would then become some of the most valuable and productive parts of the soil.

Sir *William Temple* observes, that there is hardly any country, lying on the sea-coast, which has so little shipping as *Ireland*, or is capable of employing more. This he imputes, partly to the want of merchants. He proposes to improve the trade of *Ireland*, by making two free ports, one, in some part of the county of *Kerry*, and one, on the north-west coast of *Ireland*; which might serve as magazines, for the *West India* trade.

How far such a measure might be adviseable it is not my design, to enquire in this place. But, I proceed to remark a want of policy, and foresight in *England*, which has hitherto neglected to form any maritime establishments, or naval arsenals, on any part of the shore, of this kingdom, nor has she encouraged the building of ships of war, in any of the ports of *Ireland*, notwithstanding the situation is so favourable, for receiving supplies of naval stores, from the northern countries; and so convenient for refitting ships, arriving from the *Atlantic* ocean; and the equipment of squadrons, for that destination. It may be said, in answer, that *Ireland* labours under a natural disadvantage, which renders all her harbours unfit for the purpose of docking large ships; namely, the want of a sufficient rise and fall of the tide, on the coast of *Ireland*. On the shores of this country, it is said, the tide does not rise and fall, more than twelve feet; whereas, on many of the *English* harbours, it rises and falls, no less, than twenty-two, or twenty-four

four feet. This is an inconvenience, which, no doubt, would render some expence and exertion of industry necessary, to prepare and establish docks, for careening men of war; but it does not, by any means, present insuperable difficulties. The want of sufficient rise and fall of the tide, to bear in a large ship, and afterwards leave her dry, might be remedied, by digging docks, to a sufficient depth; from whence the water might be discharged, by pumps, and the steam-engine.

The establishment at *Kinsale*, is wholly unworthy of notice, as to extent or utility, but, were establishments, on such an extended scale, as I mention, fixed for the building, and repairs of ships of war,—one in the south—another in the west, and a third, in the north of *Ireland*; great advantages would result, to the navy of *England*; and the industry of the people of this country would be invigorated, by new objects, and new incentives. The rich lands of the south would be rendered productive of the highest advantages, of which they are capable; the people would be employed, on new objects of husbandry, and in new branches of manufacture, at present neglected.

## SECT. II.

### *Of the Woollen Manufacture.*

If the plan of encouraging a manufacture, by bounties, can be prudent, or eligible in any case, it must be particularly so, with respect, to the woollen manufacture of *Ireland*. This is a manufacture, in which nature seems to have destined this country to excel, when she gave it pastures and climate, peculiarly adapted for the breed and nourishment of sheep.

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It is a manufacture, capable of turning to the best account, that portion of the soil of the country, which is least fit for tillage, and the sustenance of black cattle. It is a manufacture to which the opulence and greatness of *England* is chiefly to be ascribed;\* and it is a manufacture, which formerly flourished, to an astonishing pitch of perfection, in this country. Even, at present, though by no means in the prosperous state, which a friend of this country might wish; it is in a sufficient degree of convalescence, to show, not only the possibility, but the probability of its regaining pristine vigour; and to convince us, that the care and attention, bestowed by the legislature, and the public, on this important object, will not be thrown away; should it become yet more an object of attention, than it is at present.

There are reasons, which do not apply to other manufactures, and which favour the adoption of bounties, with respect to that of woollen fabrics—the deliberate and continually operating injury of an hundred years duration cannot be repaired, in a short time, without extraordinary means and exertions. As trade, in this instance, was violently turned, out of one particular channel; it may be right, not to leave trade, as, in common cases, it ought to be left, to find its own level. Some extraordinary measures may be wisely pursued, to counteract the operation and effect of unnatural force; to free the channel, and to turn back the stream of industry.

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\* It appears, from sundry considerations, laid before parliament in the year 1739, that 1,500,000 people were employed, at that time, in the *British* woollen manufacture; and, if these earn but sixpence per day, each for 313 working days in the year, it amounts to 11,737,500*l.* which shews the great importance of the manufacture.

A pack of 240 weight of short wool, made into cloth, employs 63 persons to manufacture it;—3 men to sort, dry, mix, and make it ready, for the scribler, or stock-carder; five to stock-card it; 35 women and girls to spin it; and men to weave it; 4 men and boys, to spool it, and read quills; 8 men and boys, to scour, burl, mill or full it; row, spear, and press it; without including the operations of the dyer.

It is calculated, that the importation of old and new drapery, annually drains *Ireland* of 500,000*l.* and upwards.

We are particularly deficient, at present, in the finer branches of the woollen manufacture; and in the fabric of carpets. A great part of our consumption, in those articles, is supplied by importation. To produce the fabrics, I have mentioned, of good quality, on reasonable terms, there is a necessity for extensive work-shops and buildings, various, and expensive machinery, and, of course, a large capital. It might, therefore, be wise to continue some kind of public aid, to these branches of the manufacture, during a limited period of time. It would, perhaps, be worth the consideration of the legislature, whether it might not be both safe and expedient, to withdraw some part of the annual sums, which are now appropriated to the maintenance of the linen manufacture, (a manufacture able to maintain itself,) and transfer them, to the support of the woollen, which stands more in need of assistance.

There might be premiums appointed, with good effect, for improvements, in the breed and management of sheep, with a reference to the woollen manufacture; so as to encrease the length, the fineness, or strength of the staple, or filament. Experiments might be made, to ascertain how far it was practicable, to encrease all these properties at once, in the fleece of the same beast; or how far these qualities of wool interfered, with each other. It is known, that the wool is of unequal goodness, on different parts of the sheep; the farmer might be encouraged, to keep, those different parcels separate, so that the whole pack should consist only of the chosen parts of the best fleeces.—A mode of assorting wool, which, we are informed, is practiced in *Spain*. And, to encourage this attention to the fleece of sheep, and care in assorting the wool, premiums might be established for the first, the second, and third best packs of wool, which should be exposed for sale, at each of the wool fairs in this kingdom.

It would very much encourage the breed of sheep, and the production of wool, in parts of the country, where both have been hitherto neglected, were new fairs and markets for wool established, in the neighbourhood

bourhood of such districts, as abound in sheep-walks. It would be also a great advantage to the manufacturer, as he would then have the *primum* of his manufacture brought to his door, in such quantities, as would give him a free choice, at a fair price, instead of his being obliged, as is now the case, to resort to distant marts, and convey the raw material to his manufactory, at a heavy additional expence; or to practise the unfair mode of going about among the farmers, and forestalling the wool, which ought to come to open market. To encourage the sellers and buyers of wool, to frequent the newly established fairs or markets; I would propose, to grant a premium of so much per cent. on the amount of all wool; that should be sold in such fair, or market, during a period of five or seven years, from its first establishment, after which time, if the situation were judiciously chosen, it might be supposed, the market would subsist, of itself.

There is no part of the woollen manufacture, in which we are more deficient, than in the art of dying. There could not, therefore, be any service so effectually rendered to it, as by encouraging persons of chemical skill, to apply themselves, to the improvement of the art of dying. I have mentioned, in a former section, how solicitous the great *Colbert* was, on this head; and how much his cares have contributed to the subsequent perfection of the woollen manufacture in *France*.

Premiums should also be proposed, to stimulate the industry of naturalists, in searching for veins of pipe-clay and fuller's earth; or in their endeavouring to discover some cheap and effectual substitute for these that would equally answer the purpose of the scourer. There are many mineral productions, as alum, copperas, verdigrease, and several other substances, that are used in the process of dying, as colours in themselves, or as agents, in the fixing or transmutation of colours. There are useful vegetables, as woad and madder, which are generally employed by dyers, in the coarser and less delicate kinds of red and green.—As to all these substances, and many others, which might be enumerated, it is certain, that those of the mineral kingdom, might be ob-

tained, from the bowels of the earth, and those of the vegetable class, might be raised from its surface, in this country. Premiums, therefore, ought to be assigned to persons, who should raise, or prepare these commodities. It might also be expedient, to promote, by bounties, and parliamentary aid, the erection of fustic and logwood mills.

It is not improbable, that improvements might be made, in the combing and spinning of wool; particularly, as to the shortening of the operation, and the multiplying of the power of the human hand; as is done, with respect to the cotton wool. The industry and invention of the intelligent mechanist, should be turned, to consider the instruments, now used, in the preparation of the fleece for the loom; and should any improved machinery be the result; the manufacturer should be encouraged, by public aid, to procure and erect them, and the work-men should be trained, and encouraged by bounties, to render themselves perfect, in the use of them. Might not the filaments of woollen yarn, be rendered firm and wiry, by passing it through the rollers of *Arkwright's* machinery? (I propose this only as a question to those who are skilled in the woollen manufacture,) and might not yarn of wool, thus prepared, become a useful substitute for goat's or camel's hair, in the manufacture of camelots, mohairs, and fabrics of that kind. I mention these particulars, merely, as instances, to suggest what a multitude of useful experiments may be made, and what a number of important queries may arise, on the subject of improving the woollen manufacture.

It is rather difficult, it must be confessed, to conquer the prejudices, which people commonly entertain, for the old modes and instruments of carrying on manufactures; and to subdue the perverseness and obstinacy, that frequently indispose them, towards the adoption of new inventions. The pride, the ignorance, the indolence of the vulgar, all resist the progress of instruction. The workmen, in particular, are too apt, to rise in arms, for the destruction of any invention, that multi-  
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plies the power of the human hand, and enables one person, to produce more finished manufactures than another.

It might be wise, to establish woollen halls, under the direction of proper inspectors, regulated and appointed by the legislature, at least, in those districts, that abound in sheep-walks. Such is nearly the whole of the province of *Connaught*, such the county of *Kerry*, and a considerable part of the county of *Tipperary*, in *Munster*; and such is the county of *Wicklow*. In the last mentioned county, a woollen-hall has been established, without resorting to parliament for aid, and proved, within the short period, which has intervened, since its erection, of the most important utility to the county. By establishments of this kind, for the sale of wool, and woollen fabrics, the work of inspection and regulation, would be facilitated, frauds and abuses would be prevented, or detected, the buyer and the seller would be inspired, with a mutual confidence, and the manufacture would attain to a degree of credit and celebrity, hitherto unknown, in this country. In addition to the erection of woollen-halls, it were, perhaps, to be wished, that the legislature, with the assistance of a committee of persons, well skilled in the woollen manufacture, would frame a table of regulations, in a manner somewhat analogous, to those they have already adopted, with respect to the linen manufacture, which should point out, and prohibit the frauds, and errors, that occur in the different stages and processes of the woollen manufacture; should prevent damaged and unsound wool from being exposed to sale, or employed in manufacture; should impose penalties on those, who might bring damaged wool, or unsaleable pieces of manufactured goods to market; should detect and punish frauds in the admeasurement of woollen fabrics; perhaps seal or stamp the several pieces, in testimony of their having undergone a scrutiny, and been found free from defect, with regard to quality and quantity. To do all this, without entrenching on that freedom which is the animating soul of industrious exertion in commerce, would be, I own, a task of some delicacy and difficulty; but what has been

done, by the *French* government, in the department of this very manufacture, and what has been done, with such success, in this country, to regulate and improve the linen manufacture, may convince us, that it is, by no means impracticable. Certainly, could the establishment of such a system of regulations, be accomplished; the woollen manufacture might acquire a credit, in the foreign market, equal to what the linen manufacture of the country, at present possesses.

The woollen manufacture of *England* did not attain its present state of perfection, without the joint operation, of encouragement and regulation. There are classes of wool, the use of which ought to be prohibited, in manufacture; the wool that falls off sheep, by malady, the wool, of sheep that die of disease;—matters of this kind deserve the interference of the legislature. The care of the sheep was vested, by the *Romans*, (as we are informed) in their censors, who condemned to penalties, those who neglected their flocks, and gave premiums, with the honourable title of *Ovinus*, to those who were careful of them.

The mountain breed of sheep ought to be encouraged, as their wool is of a remarkable fine staple. The importation of *Spanish* sheep should also be promoted, as was done in *England*, as means, of yet farther improving the wool of the country. It is to be lamented, that the gentlemen of this country, who apply themselves to breed sheep are, in general, more attentive to the size and shape of the animal, than to the quality of his fleece; and breed, rather for the butcher, than the manufacturer; though certainly the wool should be the prime object. It is also worth enquiry, what effect the change of soil, may have, either to render the fleece coarser, or finer. The wool of *Spain* would not maintain its present character of excellence, were it not for the extraordinary public attention, which is paid to the breeding and pasturage of flocks. The patriotic cares of *Don Pedro* the Fourth, in 1350, ameliorated the breed of the country, by bringing over sheep from *Barbary*; and the wise plans, which *Don Pedro* commenced, were attentively

tentively pursued, by the illustrious *Ximenes*, when he became prime minister.

With respect to the public encouragement, which may be given to the different branches of the woollen manufacture; I would recommend, that, in the present state of the country, and under the subsisting deficiency of capital, a preference should be given, to the cheaper and coarser fabrics. They require less skill, less elaborate machinery, for preparing them; the buyers of such fabrics are less fastidious, less subject to the caprice of fashion; the fabrics are, most of them, articles of prime utility; of course, there is little or no risk to the manufacturer, who speculates in them; add to this, that the raw materials are wholly the produce of the country; and that great part of the manufacture of these fabrics may be performed, by the wives and children of the farmers and peasants.

Among the manufactures, which, at present, are little cultivated, in this country, is that of carpets; which seems to be particularly entitled to encouragement, from the legislature of the country; as it may be composed entirely of native wool, and turns to a profitable account the very coarsest part of the fleece, and the coarsest kind of wool. But, as this manufacture requires looms of a complicated and expensive nature, for the more perfect species of it; and owes much of its excellence, to perfection, in the art of dying; the want of capital, and want of skill have hitherto impeded the advancement of this important branch of industry; it requires, particularly, public aid, to assist the manufacturer in erecting looms, for the production of carpets, like those of *Wilton* and *Axminster*; and to carry the principles of chemistry into the process of dying, by proper encouragements to men of science. To induce skilful workmen, from other countries, to settle and reside in *Ireland*, who might instruct the natives of the country, in this, and many other important manufactures; they should be favoured, with some particular immunities. It might be wise, to suspend, in their favour, the exclusive privileges and regulations of corporations and guilds;

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on the same principle, which has been partially adopted, with respect to the linen manufacture.\*

In addition to all these measures, it might be prudent, to grant bounties on the export of such woollen fabrics, as are cheap in price, wholly composed of the wool of the country, most likely to be called for, in a foreign market, and least likely to excite the jealousy of the English manufacturers. Several branches of the woollen manufacture, afford an advantageous trade, with the United Netherlands, and some of the lighter, and cheaper kinds, could we afford them, on reduced prices, would find an extensive sale in America, and the West Indies.

Should it be thought expedient, to adopt these, and many other measures, which might be suggested, in favour of the woollen manufacture; it may be found necessary, to erect a board of trustees, for the woollen, similar to that of trustees for the linen manufacture; who may appoint proper inspectors, to enforce such regulations, as may be adopted, to detect frauds, and seal the woollen fabrics, if it should be found prudent to adopt such a precaution; may superintend the distribution of bounties, and premiums; may forward improvements in the various branches of this manufacture; and encourage industry, by giving or lending wheels, and looms, to proper persons. Some part of the sums now appropriated to the linen manufacture, might very safely be diverted to this purpose; and, in aid of this, the sinecure employment of alnager might be suppressed, and the salary applied to the same important object. But it is high time to conclude a subject, which has already betrayed me into considerable prolixity.

SECT. III.

\* To shew how solicitous the English government was to induce skilful manufacturers to settle in the country; we find in Rymer's *Federa*, Vol. IV. p. 406, a letter of protection from Edward III. to John Kemp, coming over to exercise his trade in *England*, and to teach it; whereby, the King takes all his servants and chattles into his royal protection, and promises the same to all others of his occupation, and to all dyers and fullers who were disposed to settle in *England*.

## SECT. III.

*Of the Cotton Manufacture.*

Many of the general observations, which I have adduced, under the head of the linen and woollen manufactures, will apply to that of cotton. I shall, therefore, be the more concise on this topic.

It is much to be wished, that some ingenious persons, capable of combining the philosophic theory, with the practical knowledge of different mechanical arts and trades, would publish plain and familiar memoirs, on the subject of manufactures, for the use of the intelligent and industrious artificer. The description of arts, and mechanical operations, made, with exactness and a knowledge of the subject, and stripped of all useless practices, with which ignorance, ever mysterious, overwhelms and embarrasses its proceedings, and reduced to the eternal principles of sound science, would be the most effectual means of bringing all arts to perfection; and of availing ourselves, to the utmost extent, of those goods, and advantages, which it is the will of the Supreme Being, that man should derive from his industry.—A detailed account of the various operations of the cotton manufacture, with accurate descriptions and drawings of the different machines employed in it, with sections of them, and separate delineations of their component parts; would, I am persuaded, be highly useful, as a measure preliminary, to the general establishment of this branch of industry.

As this country labours, at present, under a want of capital; and as the machinery and buildings requisite for the cotton manufacture, demand a very heavy preliminary expence; this manufacture may best  
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be carried on, by the united efforts of trading or manufacturing companies; and requires to be supported, in its infancy. It might be wise, to assist the spirited manufacturer, by public aid, in the erection of improved machinery. This aid might consist, either in the actual grant of a certain sum of money, which might sometimes be necessary: or, what would be preferable, if the end could be attained by it, in the payment of so much per cent. for a limited term of years (suppose five or seven) on the prime cost of all machinery, which should be erected for the use of the cotton manufacture; provided, however, that such machinery should be really, and bonâ fide, employed, in full work in the manufacture, during that time. The first cost of the machinery, and the regular and constant employment of it, to be ascertained on oath.

Is it not expedient, to protect the manufactures of cottons and calicoes, whether plain or printed, stamped or stained, by a duty, at least equivalent to what is laid, on the like manufactures of *Ireland*, when imported into *Britain*?—*Dr. Smith* allows, that there may be good policy, in such retaliations, when they lead to a repeal of the high duties or prohibitions complained of.

I have before explained, how the manufacturers in *England*, are enabled, by superior capital, and superior skill, to undersell our own manufacturers, even in the home market; and in particular, that, the proprietors of machinery are able to supply us with the article of cotton warp, (though subject to a duty of about two-pence per pound on importation) on cheaper terms, than it can be furnished from the cotton manufactories, and mills, of this country. So great, indeed, are the quantities, at present poured into this country, by *England*, that the proprietors of mills and machinery into this country, are apprehensive it may end in their ruin. The weavers of cotton, in this country, countenance these large importations, and conspire to oppose any diminution of them, with all their might, because they are thus furnished, with cotton yarn and warps, which are to them as the prima of the  
manufacture,

manufacture, at the cheapest rate.—Would it be wise in the legislature of this country, to interfere, and impose such a duty on cotton warps, as will secure to the manufactures of this country, at least, an equality in the home market?—The proprietors of machinery say, that this ought to be done. The weavers, on the contrary, loudly exclaim, that this would be a ruinous measure to the cotton manufacture; since the mills and machinery, now subsisting in *Ireland*, are wholly inadequate to supply the consumption of the country, with cotton yarn and warps. The solution of this question is not easy; either way it must be productive of considerable present inconvenience. I shall content myself with observing, that the erection of cotton mills and machinery, being an undertaking of such expence and hazard, as I have stated, and yet, the extension of such undertakings being so necessary to the prosperity of this manufacture, good policy seems to dictate, that persons should be allured, to embark their capital, in schemes of so much public utility and private risque, by a particular sollicitude of the legislature, to protect and indemnify them, against losses.

With respect to the means of diffusing a knowledge of this manufacture, it might be proper, to erect, in every charter school, and orphan house, in the Foundling hospital, and other seminaries, where the children of the poor are brought up, one or more spinning jennies, in proportion to the extent of the foundation, with skilful inspectors, and masters who might instruct the children in the use of these machines, and employ them constantly, until their encrease of size and strength should call them away to other tasks, in the business of spinning cotton.

As a great part of the cotton manufacture, and indeed the production of the fabrics in most general use, both for garments and furniture, consists in, or is conversant about stamped, printed, and painted cottons, and callicoës, it is obvious, that a knowledge of the arts of copper-plate printing, and designing, and an intimate acquaintance with the qualities of dyeing materials, and the power and combinations, of

colours, and colorant substances, is peculiarly requisite in this manufacture; since much of the beauty and price of these fabricks consists in the elegance of patterns, and brilliancy of colours; and any error, in the quantity or quality of the dying or staining materials employed, may destroy the brightnes or permanency of the colours; or, what is yet worse, impair and damage the texture of the fabrick itself.

SECT. IV.

*Encouragement of the Paper Manufacture.*

The manufacture of paper, at present, falls infinitely short, of supplying our own consumption. While the fabricks produced in the country, are insufficient for the supply of the home demand, I must certainly question the wisdom of imposing any tax, on the importation of this necessary article, however specious the pretext may be, of encouraging a domestic manufacture. Such an impost was, in fact, a tax on the literature of the country, and tended to enhance the price of all books; and only produced combinations among the workmen, employed in this branch of manufacture, to obtain a rise in their wages.

It must be confessed, that paper is one of those fabricks, which *Ireland* might expect to manufacture to the very best advantage. I have already stated what advantages, she possesses, both, with respect to the primum or substrate of the manufacture, and to the command of water, in addition to this, the home consumption of the kingdom would in itself, be sufficient, to give employment, to a very great capital, and a large number of people; and the manufacture is now well understood amongst us; nor does there seem to be any want of spirit  
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in the master manufacturers. The chief obstacles, to the progress of this important branch of industry, seem to be, deficiency of capital, in the first instance, so that the master manufacturers are not able to extend their works, as they ought, or make experiments, and improvements: In the next place, the misconduct of the workmen must be noticed. I am sorry to say it, there is an unhappy spirit of insubordination among these poor people, which is equally injurious to their own private interests, and to the good of the community.

I cannot forbear observing, as a matter connected with this part of my subject, a circumstance peculiarly disgraceful to this country, and that shews an uncommon supineness and want, of liberal and enlightened views, and philosophic spirit, in the majority of those, who compose the legislature; as well as a total disregard of literature, in persons of all conditions; I mean, the neglect of providing any security whatsoever, for literary property in *Ireland*. This security was given, by statute in *England*, so long ago as the reign of *Queen Anne*; and the utility of this measure has been felt, and acknowledged for near a century. Why has not a similar regulation been adopted, in this country? Has it never been suggested, or occurred, to the thoughts of any one in either house of Parliament?—To the knowledge of the writer of these pages, applications on this subject have been made, in quarters, from whence such a measure would have proceeded, without danger of opposition; but, in vain.—*Humblings of higher nature vexed their brain.*

Is it, that *Ireland* is incapable, of feeling a regard for literature? Is it, that having long been considered, as the *Bæotia* of the modern world, she means to justify the appellation, to claim ignorance as her charter; and tacitly to acknowledge, that a security for literary prosperity in *Ireland*, would be an idle and nugatory regulation, inasmuch, as *Ireland* is incapable of producing any original work of merit, entitling its author to praise or profit.—*Can any good come out of Galilee?*

Can it be, that for any reasons of state concealed, but obvious, it should be the wish of certain persons, to discourage the genius of the country, to repress the advances of taste and literature, and the diffusion of knowledge, as being too intimately connected, with a spirit of free enquiry?—I will not think so meanly of the government. It must be observed, still more to the disgrace of *Ireland*, that a country, new in legislation, and yet more new in literature, has felt the propriety of securing literary property by law; and accordingly we find a statute, for that purpose, in the *American* code.

The want of this security exposes to a certain loss, from piracy, the author of any original work, who shall publish it, at his own expence; and the greater the merit of the work, the more certainly will the author be exposed to this injury and damage. Nor is it mere literature, or book-learned pursuits, as the vulgar would call them, that suffer, from this insecurity of copy-right. The comprehensive evil assails, geography—the fine arts—music—painting—engraving. It precludes all improvement in the typography of this country, with respect to correctness, or beauty of type. Should any printer, of taste and enterprise in his art, prepare an elegant and costly edition of any work, he is liable to have the sale of it ruined, by a spurious and disgraceful republication.

It must be confessed, that the legislature is not altogether culpable in this respect. I have been informed, that when some enlightened members of the Irish parliament, wished to bring forward a law, for the security of literary property, the printers and booksellers of Dublin, most foolishly raised an outcry against it, from an idle fear, that such a measure would interfere with what constitutes, at present, the chief part of the printing trade of *Ireland*,—cheap editions of *English* books; though a moment's consideration might have convinced any intelligent man, that a statute modelled on the *English* act of *Anne*, for the purpose of securing to the natives of *Ireland*, their literary property, could not interfere with the republication of foreign books.\* As

\* Since this Essay was written, the act of Union past; and the law for securing literary property in Ireland, was past in the Imperial Parliament.

As cheapness is chiefly consulted, in the *Irish* editions of books; it cannot be supposed, they should contribute much to the improvement or prosperity of the paper manufacture. In fact, the type and the paper of these publications are, in general, so execrable, and they are so miserably executed, in point of correctness, that they are a disgrace to the country; and thus it will be, while literary property remains unprotected.

The article of paper-hangings, in the present mode of fitting up houses, is become a very considerable part of the paper manufacture. As the excellence of this branch chiefly consists, in the elegance of pattern and brilliancy of colouring, the study of drawing and design, and the knowledge must contribute greatly to an excellence in this department; and in this respect, we are vastly inferior, as yet, to the manufacturers of *England*; and they, I believe, are inferior to the manufacturers of *France*. This being a matter, merely of taste and science, the country is inexcusable that acquiesces, for any length of time, under an inferiority which can only proceed from want of genius, or want of industry. At present there is a very large import of paper-hangings, as well as of all the other branches of the paper manufacture.

It is to be observed, as a consideration, which ought to stimulate the exertions of the *Irish* people, in this branch of industry, that it would afford them, were it extensively carried on, through all its subdenominations, the materials of a very profitable commerce, with *America* and the *West-Indies*; particularly in printed books, maps, prints, and engravings of all kinds, and paper-hangings. In particular, it is incredible with what avidity, the people of *America* call for cheap editions of printed books; and for all kinds of engravings, which I understand are much sought for by the people of *America*.

In the manufacture of paper, there may be a variation of process, according to the various destinations of the paper, for writing—printing—engraving—drawing—furniture, or hangings. This variation may, perhaps

haps consist, in the employing or omitting, the operation of putrefying the rags, or in the degree to which the fermentation may be carried; in the mallets or cylinders, for the purpose of reducing the material to pulp, before it is diluted, and made into paper. It is worth enquiry, whether, shortening the process, by any, or what means may, or may not, injure the texture; and what are the peculiar excellencies to be required, in the finished paper, according to its several destinations.

I have found it necessary, to dwell at some length on the paper manufacture; because its capabilities and importance are not fully understood. I cannot think that a nascent manufacture, hitherto so little encouraged, and so very susceptible of extension, with infinite profits to the country, would have appeared an eligible object of taxation, had there not existed somewhere, an extraordinary degree of clumsy inattention.

Under the pretence, of encouraging the manufacture of the country, a duty of two-pence per pound was laid on paper imported. Whatever might be the real motives of imposing this tax, it produced consequences far different from those, which were proposed as the ostensible motives, and injured even the native manufacture of paper, in a high degree. Strong representations on this subject were made, by the printers of *Dublin*, in a petition to parliament.—They stated, “ That  
 “ the whole amount of paper made in *Ireland*, was insufficient for the  
 “ consumption of the country;—that, if the tax should take place, the  
 “ printing business, which then employed a considerable number of in-  
 “ dustrious persons, must be annihilated, at a blow;—that a very  
 “ lucrative channel of business, and capable of great extension and  
 “ improvement, had been opened,—the printing of cheap editions for  
 “ the *American* market;—that when competition, in the market of  
 “ paper, should be removed, a combination among the *Irish* makers  
 “ of paper, in consequence of their monopoly, and an exorbitant en-  
 “ crease, in the price of the commodity, would follow.”—But, “ wif-  
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“ dom crieth in the streets, and no man regardeth.” The legislature imposed a tax of two-pence per pound on the importation of paper, each quire of which might, on an average, weigh a pound, and be worth ten-pence. This was a duty of about twenty per cent. to the importer, and of course, produces a rise of near thirty per cent. in the price of the commodity to the consumer.

The allegations of the petitions were speedily verified, by melancholy experience. No sooner was the tax imposed, than violent combinations, for encrease of wages, took place among the workmen, employed in the paper manufacture. The printing business in *Ireland* was immediately extinguished; a lucrative and promising trade was annihilated, a meritorious and industrious set of manufacturers were thrown out of employment. Nor was the calamitous effect confined to mere printers; it extended to a variety of manufacturers, connected with the art of printing, either immediately or indirectly; as book-binders; leather-dressers; makers of pasteboard, glue and parchment; dealers in colours, thread and silk, and gold-beaters. A vast number of printers, with their families, would have been immediately forced to emigrate, from the country, if a temporary relief had not been offered to them, by an extensive undertaking in the department of printing, which was commenced in this country; I mean, a large impression of the parliamentary journals. This work, however, is near a close, and then the people who have hitherto been maintained by it, will be left wholly destitute.

Imported paper having been thus taxed, and the Irish manufacture of printed books, ruined, in consequence of the impost; it was seen, that the demand for Irish paper, instead of an increase, experienced a sensible diminution. The principal demand for paper is in the printing manufacture; but when the Irish printers, who had been traders, in common, with the printers of *England*, in certain branches of the trade, were wholly thrown out of employment, the Irish market for printing papers, ceased, almost entirely; and the Irish paper-makers, instead of their being gainers, lost the  
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share which they had formerly, in supplying the calls of the printers; while the paper manufacturers of *Ireland* were struggling, under this measure, which the legislature professed to intend for their benefit; a new, and most severe stroke was inflicted, by an excise of two pence per pound, on paper made in this country, as if any thing were yet wanting to the ruin of the paper manufacture, and the printing business. The tax on imported paper, had been severely felt, and found highly injurious; yet, now, in order to maintain some consistency of principle, and to continue that preference which was affected to be given to the manufacture of *Ireland*, in the home market, it was necessary to lay an increased duty on imported paper; thus, the evils resulting from former duty on paper, were doubled with the tax. As to the tax, in whatever point of view it can be considered, it will not be productive. For, by the annihilation of the printing trade, and the operation of other causes, the demand for paper will be reduced, and the manufacture, will, in a great measure, be discontinued. A very few of the manufacturers, who possess large capitals, will continue to make paper, because they will be put in possession of a monopoly, from which they expect such exorbitant profit, as will more than countervail the tax; but all the minor manufacturers will be undone. Excise duties, with the course of visitation incident to them, are highly injurious to the manufactures, and oppressive to the manufacturer; inasmuch as they tend to a disclosure of certain valuable, and important secrets, on which much of the excellence of the manufacture, and the opulence of the manufacturer may depend. I apprehend, that in the paper manufacture, this last remark is applicable, with peculiar force. But, I fear, my anxiety for the extension of this most useful and important manufacture, has betrayed me into a prolixity tiresome to the reader.

I might enter into minute details, through the various branches of the manufactures, which I have mentioned; but I wish rather, to pursue principles, than to prosecute details. A minute examination of the various, and ever varying productions of a manufacture, a tedious muster-roll of their names, a specification of their slight differences, and a particular description  
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of each process, that concurs to their fabrication, cannot convey solid information, to the mere artisan, and must prove unintelligible, or, at best, tiresome, to the reader, who is not a manufacturer, by profession. It was my wish, to impress certain obvious truths, of general utility, on the minds of those who possess influence in the country, and are likely to have a share in the regulation of arts and manufactures. Were judicious encouragement, on general principles, afforded to manufacturers, the manufacturers, themselves, would regulate the details, to the best advantage. Legislators of the land! encourage manufactures, judicious details will follow, of course. Details, in a theoretical essay, are merely of value, as they form a basis for general conclusions.

I have not attempted a full enumeration of manufactures; I did not find myself called to the task. Many others, doubtless, besides those which I have mentioned, may be cultivated, with success, in this country; but, I wish to point out those, which furnish the fairest hopes of thriving, and flourishing, and thus becoming sources of public and private opulence, and prosperity. Commercial invention, and national industry, may diverge, and ramify, into a thousand rills, and channels; but many of them, though they may employ a number of hands, and enrich some individuals, may not much increase national prosperity. Others may be of too trifling a nature, to deserve notice; or may serve to draw off industry, from more important objects. Travellers into *Portugal*, assert, that a whole town, *Coimbra*, is occupied in the manufacture of tooth picks.—What think you, reader, of a secton on the manufacture of tooth picks?—The Portuguese makes tooth picks for the Englishman, while the Englishman is making clothes for him.

I have not spoken of those manufactures, (if they deserve the name) which are wholly conversant about the preparation of provisions; though they are peculiarly adapted to the natural advantages of *Ireland*; because they do not properly come within the scope of the question proposed, by the Royal Irish Academy.

The manufactures within the contemplation of the Academy, were, as I conceive, those, where the patriotic care and attention of the community at

large, may hope to produce considerable effect from their exertions, where industry and skill have a large share, and the price of labour bears an high proportion to the prime cost of the materials; and, where a considerable division, and subdivision of tasks, obtains among the workmen. I would apply the term manufacture, when the object of industry is much changed, from its natural state, and first appearance, and derives its use and destinations, from the hand of the artist. Certainly, the popular, and common consent, seems to limit the meaning of the word, to this more confined acceptation; and, in this more narrowed, and vulgar sense, I chuse to employ it, rather, than in the wide, and technical extension to every department of manual industry, changing a commodity, however slightly.

It may well be questioned, whether it is not an abuse of terms, to apply the word, *manufacture*—synonymous to, *made by the hand of man*, to every object, on which human industry, is employed, in any degree, however rude, and inartificial. Where the thing appears, in almost the same original form, and is not deflected, by the hand of man, from its prime destination, but is only fitted to be used, or spent more commodiously, or transported with more ease, or retained for use a longer time. If these are to be called manufactures, such manufactures may be exercised, among people, very little removed from the savage state; very little advanced, indeed, in arts, and industry. Such are, the conversion of grain into flour, and meal—the preparation of salt and dried fish, of salted and dried flesh, of butter, and tallow.—Would it not be more accurate, to call the manual operation, which neither changes the form, nor destination of subject *preparation*, rather than *manufacture*?—It is an art, of a mixt nature, and appertains to husbandry full as much as to manufacture.

When the preparation of provisions is carried on extensively, as an object of commerce, and a source of national opulence, the exertions of industry are less employed in the actual preparation of the thing itself, than in the act of providing machines, apparatus, edifices, materials necessary for the commencement of the operation. In the preparation of bread corn, for the use of man;—the mechanist, the millwright, the builder of steam-engines,



gines, the stone cutter, the mason, the carpenter, the mariner who imports the stone, or the corn, the miner, who digs the coal, that warms the drying loft;—all these persons must contribute their aid, before the art or occupation of the miller can be exercised. But it would be an abuse of terms to call these ancillary Persons, manufacturers of flour. The machinery being erected, little skill is requisite, few hands are employed about the commodity. The apparatus for the preparation of animal food, is less expensive, less ingenious, and less implicated.—Stages, and sheds, for salting, and curing; smoke houses, for drying fish,—coopers yards, and warehouses, barrels, and salt.—For the trade in beef, pork, and butter.—a few hands may prepare a vast quantity of the commodity, to a great amount in value. This small number of persons, perform only simple operations. Little or no previous instructions are requisite; few instruments, or utensils are necessary. One person may perform the operation, just as well as another, few productive hands being employed.

Trades, like these, do not contribute much to the increase of population, or, to the extension of agriculture; on the contrary, as far as they prevail, they tend, to draw the proprietor of land, from the cultivation of grain, to the grazing of cattle, to the discouragement of industry and population. Arts, like these, neither seem to require, nor do they deserve, the particular attention, and encouragement of the legislature. The demand of the home market; and the speculations of the merchant exporter, will, of themselves, carry these branches of productive labour, to as great an extent, as is compatible with the public good. Where science, and the division of labour, have little or no place, legislative encouragement, can have little or no avail; and, if it could, an object, which interferes with the population, the agriculture, the productive labour of the country, does not seem to deserve such an encouragement.

The arts, which properly demand the protection and encouragement of the legislation, are those, wherein the science, and ingenuity of man, may make visible progress; may increase the productive power of individual labour; may facilitate the fabrication of commodities, requisite for the convenience,

venience, the gratification, or the opulence of man ; may transform substances (many of them usefefs in themselves) into an infinite variety of forms, and apply them to an infinite variety of destinations ; and, from the wants, the luxuries, the caprices of the people, furnish employment to the industrious individual, and derive strength, and wealth to the community.

SECT. V.

*On providing Food, for the Manufacturer.*

There are certain points, of the utmost moment, connected with the prosperity of manufactures. The discussion of each of these would deserve a volume. I can merely glance at them, in a cursory manner, with the limited lights, which I possess, and the scanty limits to which I am confined. In the first place, it should be the great public care, to supply the manufacturer with abundance of food, on cheap terms.—It has been too much the practice of many theorists, in political economy, to consider manufactures and agriculture, as if they were wholly independent of each other, and separate in their interest, or even to institute a sort of rivalry between them and to draw comparisons of their respective merits, for the purpose of giving a preference to the one, or the other, according to the fancy of the speculator. This, surely, is a great, and injurious mistake. The interests of commerce and manufacture, can never be disjoined, from those of agriculture.

Another great object should be, to facilitate manufactures, and lessen their expence, by encreasing the stock of fuel in the country ; rendering the supply regular, and constant ; and diminishing the cost of an article, so indispensably necessary, both to the comfort of the individual, and the exercise, and existence of every branch of manufacture.

A third

A third point, which deserves the most attentive consideration of every man, who is a friend to the manufactures of this country, is to facilitate the means of communication, to diminish the expences, delay, uncertainty, and difficulty of transporting, from one part of the country to another, either in the course of supplying the home markets, or, in the progress to or from exportation, or importation, the manufactured fabrics, or commodities of the country, or the unwrought materials, which are necessary to be employed, in the production of such articles.

With respect to the sustenance of the manufacturer, it is self evident, that improvements in agriculture, and farming, by rendering the land more productive, and encreasing the supply of food, will render provisions cheap, and, by thus diminishing, to the manufacturer, the expences of living, will enable him to bring the article, which he fabricates, to the market, on cheaper terms. It appears, therefore, that improvements, in farming, and encouragement to the good, and skilful husbandman, will ultimately tend to the prosperity of manufactures. There seems to be little necessity, at present, for stimulating the public mind, to exertions in this department. The improvement of agriculture is now the great reigning object; and the pursuits of the farmer, in addition to their own intrinsic merit, and utility, have now all the cry of fashion, and force of example, in their favour. With the active encouragement of the gentry of the kingdom, we shall witness daily improvements in the quantity and quality of the produce of land, both animal, and vegetable. Philosophy and science will go hand in hand, with public spirit; and daily augment the productive powers of land, by holding out their lights, to direct industry in the several operations of agriculture, and farming—The selection, the breeding, and management of stock;—the knowledge of the diseases of cattle, and their cure—the improvement of eir strain—The nature of manures, and the ascertainment of what particular kind of manure is best adapted to each particular soil.—We know how much has been done, in the improvement of land by irrigation. Many simple, and cheap hydraulic machines might be contrived, which would greatly extend the benefits of this mode of cultivation

tivation. The ingenious mechanic will perpetually supply the farmer with new instruments, and utensils of agriculture, or improve the construction of those already in use. It will abridge the labours of the husbandman; and, by enabling him to perform the same task, with a reduced number of men, and beasts, will render the process of agriculture cheaper, and thus contribute to lessen the price of provisions.

The methods I have mentioned, may serve, among others, to increase the produce of a given portion of land. There are other methods, which might be advantageously employed to augment the quantity of productive land in the country. The first is, by colonizing the wastes, and mountains; by which I mean, granting those unprofitable tracts, rent free, or subject only, to a small acknowledgment yearly, for a competent time, to industrious tenants. This should be connected with a barren land bill, exempting grounds, of this description, from the payment of all tithes, for a proportionable number of years. By such measures, great tracts of land, might, I am confident, be reclaimed, and rendered serviceable, to the public. The details of such an arrangement deserve to be considered attentively, and treated at length. It is sufficient for me to allude to them, in this place.

Another measure, something analogous, at least, proceeding in the same spirit, has been attended with the most beneficial effects, in *England*, both as to the encouragement of industry, and the increase of the quantity of productive land, I mean, the division, and enclosure of common lands.—This has a beneficial operation, to reclaim both men, and lands, from an inert, and unproductive state.—The neighbourhoods of all commons, are usually seminaries of idlers, and freebooters. The verge of a common is colonized by a set of vagabonds, and refugees from the adjoining country. The enclosing each common becomes the means of breaking up a nest of lawless depredators, and petty pilferers. When the common comes to be enclosed, and divided; it is then turned to account in the agriculture, and improved, to the best advantage.

These

These measures, which I have mentioned, would be the means of encreasing the actual produce of land, in the country. It would then remain to apply such regulations, as might give the poor, and laborious population of the land, their full share, and benefit, in the blessings of heaven on the fertility of the soil, and the industry of the careful farmer.

There is one measure, which would effectually disappoint the speculations of the rapacious monopolists, and, at the same time, offer a reasonable encouragement to the farmer, and prevent his being disappointed of such a price for his grain, as would sufficiently reimburse his expences, and reward his labour, even in years of the greatest abundance, and depreciation in the price of corn. I mean the establishment of public granaries. Such a measure, if judiciously executed, with integrity, and economy, would guarantee the poor against ever suffering the extremes of famine;—a most important object in every well regulated state. The wisest nations, in all ages, have perceived the utility of establishments of this kind. It may be said, that the moisture of the climate, in *Ireland*, will render it difficult, to preserve corn for the requisite length of time. I am confident, that this obstacle might be obviated, by proper construction of the depots, and a judicious contrivance, and application of machinery, and apparatus.

I am far from being an enemy to distillers, in general; they furnish a great resource, and support to agriculture;—but, I could wish, that they were restricted, as was formerly the case, to the consumption of bere, and barley, which are not so properly the food of the poor. It is much to be regretted, that the legislature should have relaxed the salutary restraints on this subject, and tolerated the employment of oats, and even wheat and potatoes in distillation. Thus, a spirit of inferior quality is produced; and, a manufacture, which is now growing up into an article of consideration for export, is depreciated in its character; and what is much worse, and more to be lamented, the poor are deprived of a material part of their sustenance.

Notwithstanding

Notwithstanding all the speculations of *Adam Smith*, and his numerous tribe of followers, I should be very unwilling to give up the good old laws, and regulations, devised by our plain, and unphilosophical, but wise ancestors, against the mischiefs of monopoly, and the frauds, and exactions of forefallers, and regrators. Notwithstanding so much has been said, and written, on the subject, I am disposed to think, that the several laws, ancient, and modern, which direct, that the provisions shall be brought fairly to market, and sold there, bona fide, to the consumer; and fix certain rules, and standards, for ascertaining the affize of bread, on a fair average, are highly salutary, and ought to be regularly, and firmly, enforced by the magistrate: the arguments of *Doctor Smith*, on this head, prove too much;—his principles, if fairly followed up, would go to the total subversion of all regulation, and control; and end in compleat, and universal anarchy. I have already had occasion to remark, on the dangerous tendency of the Utopian principles of *Doctor Smith's* work;—in leading men to aim at absolute perfection; or, at least, a superiority to all objections, and inconveniences, in the institutions of imperfect, short-sighted creatures, like man—If all people were honest, benevolent, enlightened, and, in short, philosophers, like *Doctor Smith*; manufactures, markets, labour;—every thing might be left to find its own level. But, while fraud, and folly, continue to be such general principles of human action, in a depraved state, and a slight prospect, of temporary gain, too commonly renders the vulgar insensible, not only to their duty, but to their own true interests;—it will not prove a very safe experiment, wholly to discard regulation, and control.

## SECT. VI.

## RECAPITULATION.

*Miscellaneous Observations, and Conclusion.*

I have already enlarged so fully, on the importance of science, and particularly, of chymical science, in a variety of arts, and manufactures, indeed, I might say in all; that it would be an unnecessary waste of time, to trace over the same ground again. However, such is the culpable supineness of people in this country, and so predominant the inert force of passive ignorance, unconscious of the advantages, or the capabilities of improvement, that the importance of knowledge cannot be sufficiently re-echoed to the public ear.

The utility of chemical knowledge, in the arts, that operate on minerals, is obvious, to the most stupid observer. I have pointed out its great importance, in the linen, the woollen, the cotton, and paper manufactures, and the improvements that may be expected from it, in the operations of bleaching and dying. Signal services might be rendered by it, also, to the manufactures in leather; not only by providing a substitute for oak bark, and shortening the operation of tanning hides, for the common purposes of life; but, in preparing and colouring skins, so as to imitate, and in time supersede, *Spanish*, *Morocco*, and *Russian* leather. Might not chemistry furnish us, with a substitute for barilla ashes, which are now imported, at a considerable expence, to this country, and which might answer equally well all the ends, to which that substance is applicable. We find what advantages, the French have derived, from their knowledge of chymistry, in the manufacture of saltpetre, and in the discovery of a substi-

tute, to supply its place, in the composition of gunpowder. We find what an extensive commerce, is opened to them, by their knowledge of chymistry, in the exportation of essences, perfumes, and all the various productions of the alembic, or the furnace, for the use of manufacturers, for luxury, or for medicine. I must again observe, on the utility, of rendering the philosophic principles, of mechanical operations, familiar to the people, by details of the operations, in mechanical arts, and of the process and operation, in preparing any valuable or useful substance, whether as an ingredient, or auxiliary, in a manufacture, or as in itself an object of commerce.

The publication, which is called the Repository of Arts and Manufactures, and is chiefly compiled from the specifications of various patents, may be attended with very considerable advantages. It contains instructive details, and important discoveries, in various arts and manufactures; yet it fails of being as useful, as such a publication might be, from a want of method and scientific arrangement. It is a confused chaos of disjointed materials, given, without selection as to importance, or connection as to subject matter, from the specifications, as they happen to lie in the office. It furnishes, however, excellent materials for a regular methodized work, on the details of trades and manufactures. It were much to be wished, that in order to diffuse a rational knowledge of the principles of trade and manufactures, and particularly of the application of natural philosophy, in all its branches, especially in chymistry, to the manual arts, some intelligent persons were appointed, under the patronage of the Dublin Society, to explain these topics, in public lectures, adapted to the capacities of common manufacturers, expressed in plain and familiar terms, and illustrated by experiments.\*

Such measures would contribute particularly to the extension, and improvement of the metallic manufactures, as well as of those  
of

\* This has been executed, in some measure, since this Essay was written, in the Lectures of the ingenious Mr. *Higsons*.



of glass and potters ware. But the most effectual means of promoting, and encouraging, the production of all the last-mentioned fabrics; will be, by searching for veins of coal; and by the extension of the inland navigation, which may convey coals or turf, on moderate terms, to every part of the country.

The cheapness and abundance of fuel, in a country, which, though temperate, experiences a considerable degree of cold in the winter, and for no short time, is of the utmost importance, to the health and comfort of all persons; but it is particularly necessary, to the flourishing state of manufactures. I have already mentioned, in detail, a number of manufactures, and operations in manufactures, whereof it is a principal agent. In others, where it does not appear to act so directly, it is still necessary, either to preserve the material, to be wrought, or the instruments, whereby it is so wrought upon, in due tone and temper. Was it prudent, therefore, to lay a tax on this necessary of life, the want of which so severely presses the labouring poor, and interferes so materially, with the industry of the manufacturer, for the embellishment of the metropolis? It is fully ascertained, that this island produces inexhaustible stores of excellent coal; all that remains, is to facilitate their conveyance, from place to place. We never can avail ourselves of the natural and acquired advantages, which this island possesses, in their full extent, until this great object is accomplished, by the completion of canals, judiciously laid out, in various directions. We find what happy effects have been produced, by the multiplication of canals in *England*. The utility of such undertakings, is felt in *France*; and even *America* has begun to embark in them. Indeed, I do not know any object, on which the spirit of pecuniary speculation can be more profitably employed, or to which the assistance of public bounty, can be more judiciously directed, in any country, than the extension of an inland navigation.

Next in importance to food for the prosperity of the manufacturer, is an abundant supply of fuel. No doubt can remain, that vast quantities of coal, of an excellent quality, may be found in various parts of Ireland; it only wants the concurrence of the mineralogist and engineer, with the support and encouragement of government, to develop these hidden stores, and pour them forth for the benefit of the country. If an accurate mineralogical survey of the whole kingdom, were executed, and the advice of skilful engineers were obtained; mines of various useful substances might be discovered, levels might be taken, and estimates made of the practicability, and probable expence, of working these mines. I do not apprehend, that it can be supposed, that any partial considerations could weigh with government, in opposition to an amelioration of the state of *Ireland*, by a circumstance so important as the working of its native collieries. It is not to be supposed, that the parental care of government, would be more particularly extended to one part of this great empire, than to another. It must be a strange policy, indeed, which should think it adviseable to discourage the people of *Ireland*, from supplying themselves with fuel, the produce of their own soil, in order to give an undue preference to the *English* collieries; or to encourage the navigation of a few *English* towns, at the expence of the trade and manufactures of this whole kingdom. I am persuaded, that such suggestions are merely the reveries of gloomy and discontented people.\* Certain it is, however, that the scarcity of fuel, in many parts of the kingdom, reduces the poor to a most deplorable state of distress and misery.

To meet the evil arising from the scarcity of fuel, in many parts of the country, a mining company should be formed, to explore, with care, the subterraneous wealth of the country; and, in particular, to indicate where coals abound. The operations of science, under the directions of men of practical skill, should be seconded,  
by

\* If any such narrow-minded prejudices ever existed, it is to be hoped, that all ground and pretext for them is done away, by the measure of a Legislative Union.

by the operations of wealth, in the forms of subscriptions and associations, to open and work the veins of coal; and also, by an extension of canals, which should facilitate the transport of fuel, which must be accomplished by subscriptions, and the formation of companies for the promotion of inland navigation, aided from time to time, by pecuniary encouragement from government.

To meet the destructive and disgraceful evil of combinations, should engage much of the care and attention of the legislature. For this purpose, it would be highly expedient to adopt the wise provisions introduced in favour of the linen manufacture, and to make them general. I would take away corporate privileges; I would attach severe penalties to the crime of illegal combination among manufacturers, and the disorders and outrages incident to it; and I would arm the magistrates with a summary power of inflicting them. There is no subject more connected with the welfare of this country, or which calls more loudly for the interference of the legislature, by the establishment of some more effectual and compendious remedy, than has hitherto existed. This must be effected, partly by regulating, in a more stern, compendious, and efficacious manner, the conduct of those who now actually do labour; and partly, by taking measures, to augment the numbers of those, who shall be willing to labour.\*

The price of labour, we are told, should be left to find its own level. Be it so. Let the level then be preserved, from obstacle and interruption; let it not feel the hand of coercion and injudicious controul, from the impolitic and unseasonable interference of the government, and legislature; nor, on the other hand, let it be subject to the greater mischief of licentiousness, and lawless intimidation, which prevent the true price of labour from being known, preclude a fair competition in the mart of industry, and tend to establish a disgraceful and odious monopoly of employment, founded  
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\* This subject has been taken into consideration, by the Imperial Parliament, in the present Session.

in brutality, outrage, and riot, at the expence of sober moderation, legal order, and peaceable industry. The checks, at present, provided against illegal combinations, in this country, are insufficient. All the regulations, which have been established for this purpose, and found highly salutary, in *London*, ought to be adopted in this country. A cheap, and summary tribunal, accessible to all, applying an immediate remedy to the disease, and deterring men from aggression, and contempt of the laws, by the certainty of immediate punishment, is absolutely necessary to meet the growing evil of combinations. Very severe penalties, and particularly corporal punishment, ought to be enacted against the crime of illegal combination; and also against the offence, of wantonly deserting work once commenced; and the magistrates, or even a single magistrate, should be authorized to animadvert on such offences.

The system of excise is, no doubt, the most equitable, and most convenient mode of collecting the revenue, which it is necessary for the state to raise, from the wants of the consumption of individuals, for its own support; but, in some instances, the jealous avarice of the excise laws, guarding against frauds, with a superfluous care, and multiplying restraints and regulations, without end, defeats its own purpose; and finds, with surprise, in the annihilation of trade, and dereliction of manufactures, a decrease of that revenue, which it seeks to augment. Many of the details of the revenue code are hostile, in a supreme degree, to the existence of manufactures. The constant visitation, through every stage, that is thought requisite to the jealous, and vigilant spirit of excise collection; the registry of every vessel and utensil; the right of commanding an entrance, at all times, into the dwellings and workshops of manufacturers; all these, by compelling them to disclose the secrets of their trade, and subjecting them to the caprice, the insolence, and the rapacity of petty tyrants, too generally taken from the lowest classes of society, alike unprincipled and ignorant, discourage the manufacturers, in  
some

some important branches of industry; particularly the maltsters, and distillers of this country, and the manufacturers of tobacco, leather, and paper hangings.

There is no object, which ought to engage the attention of an enlightened legislature, more constantly, or to be cherished, with greater care, than the manufacture of malt, and the breweries, and distilleries, of this country; both as they contribute, in a great measure, to the support of government, by the large revenue which they yield; and as their prosperity, and encrease, is inseparably connected, with the interests of agriculture; which, in every well-regulated country, ought to be the first national object, and the first legislative care. Agriculture is not only, in itself, the most profitable form of productive labour; but also, feeds and sustains every art, and every manufacture, in health and vigour. It is justly observed, by some writer, but by whom, I do not at present recollect, that, you may shear the sheep of agriculture, to the quick; they will bear it with all patience; while the swine of commerce, scream, and struggle, and make a hideous noise, if you attempt to touch but a bristle from their backs.

To assist us, in the discovery of veins of coal, as well as other useful minerals, to render us skilful, in the nature, properties, uses and applications of metals, and other mineral substances; to instruct us in the most perfect, and advantageous modes of working mines, and of smelting, assaying, and manufacturing metals, and minerals; for the various uses and purposes, to which they are applicable; it would be of the utmost utility, to send persons duly qualified by education, and talents, to travel into the countries, where these subjects are best understood, particularly in Germany, the great school of mineralogy, chemistry, and metallurgy, with directions to make themselves perfectly acquainted, with all the latest discoveries and improvements, in the arts of working mines, and smelting, assaying, and manufacturing metals; it would produce also important consequences,

quences, in the improvement of the metallic manufactures, were a judicious selection made from the German writers, on these subjects, and translated into English, at the public expence, for the use of mineralogists, miners, and artists in metals.

Would it not be wise and practicable to adopt a hint from the practice of *Spain*, and to avail ourselves of the improvements of every country, in every branch of manufacture, by selecting the most promising and intelligent artists, in each department of manufacture; causing them to be instructed in such foreign languages, as might be necessary for their destination, and sending them to travel, at the public expence, for the purpose of improving themselves, in their respective arts, and collecting all the knowledge and useful discoveries respecting them, that might be gleaned in foreign countries.

Farmers' Societies have been established, through most parts of *Great Britain*, and in some few parts of *Ireland*, with the happiest effect; it is something surprising, that the merchants and opulent manufacturers have not thought of establishing societies, on somewhat a similar plan, for the advancement of commerce, and manufacturers; it is surprising, that government has not thought of establishing a chamber of commerce, in a country, which possesses such commercial advantages; such institutions, directed by an enlightened patriotic spirit, and kept religiously clear, from a base and ruinous degeneracy, into monopoly and combination, must produce the happiest consequences, in the regulation, and improvement, of commerce and manufactures.

Intelligent manufacturers, under the direction of these societies, might be appointed to take circuits, for which purpose the kingdom should be divided into districts, they should visit the manufacturers, in their respective districts, and confer with them; on the state and progress of their manufactures, the capital they employed, the number of workmen they retained, the progress they used; the result of their examination should be carefully noted down, and communicated

cated to the society, by which they were sent, together with notices of the various improvements, of which the several manufactures were capable, and of the assistance of which they respectively stood in need.— In their conferences with the country manufacturers, these inspectors might occasionally communicate, in obvious and familiar terms, such modern improvements, in tools, and machinery, or in process, as might seem not to have yet reached them; and the most deserving and intelligent of the country manufacturers might, under the recommendation of these inspectors, be furnished with the more useful, and portable articles of machinery, and with patterns of new invented Fabricks and of such as were in the most general demand, for home consumption, and foreign markets; and instructed, to apply themselves, with a preference, to such as were in most general request.

It is much to be lamented, that we have, as yet, made little or no progress, in the useful project, of framing statistical tables, for *Ireland*, which was suggested by the royal *Irish Academy*, particularly as I have heard it suggested, that certain political considerations are likely to prove a permanent obstruction, to so useful a work; a detail of the natural productions, the quality of the soil, the amount of population, the state of agriculture, arts, and manufactures, with the improvements, and deficiencies, in their several branches, which were to be observed in each particular district, all these matters judiciously noted, and faithfully described, would serve, to direct the conduct of the manufacturer, the merchant, the legislator, in many operations, of great private and public importance.

To this I would add useful publications for the aid of the miner, the chemist, and the manufacturer; such as catalogues of minerals, catalogues, and descriptions, of the machines and instruments used in every manufacture, with brief and familiar explanations, of their properties and uses.—As to descriptions of machines and public works—dictionaries of arts and manufactures; the French nation has

furnished much excellent instruction, of this kind; judicious extracts from the labours of their writers might be made, and translated, with good effect, for the use of our manufactures.

Philosophy and science, will contribute to the encrease and improvement of manufactures—by discovering and pointing out for use, new substances or such as were not known or supposed to be the produce of the country,—by indicating new, and more profitable applications of substances already known,—by suggesting profitable uses for substances now known, but neglected and unemployed.

Philosophy and science, will also contribute to improve the quality, the strength, the fineness, the beauty of fabricks, to abridge the labour of the manufacturer, in producing them, by various improvements in the construction and adaption of machinery, by calling into act, the different mechanic powers, as auxiliaries to mere human skill, industry, and manual strength.

In the production of new substances, agriculture, mineralogy, and chemistry, may combine their forces.—Agriculture will naturalize and raise useful plants, which may furnish new materials for new manufactures, or the preparation of which may, in itself, be a manufacture. I can glance only at these things, with the imperfect knowledge of agriculture which I possess. It is supposed, that among other valuable plants, which might be cultivated advantageously in this country, madder, liquorice, saffron, hops, hemp, and tobacco, offer a faint prospect of success. The want of capital, the oppressive and discouraging influence of tithes, and the apathy and indolence, too generally prevalent in Ireland, have hitherto proved bars to experiments of this kind. There are many known and common vegetable substances, which are now neglected, but might be applied to useful purposes—thus, as I have observed, a coarse texture, fit for making sacks, waggoners frocks, and other articles of that kind, may be manufactured from the fibres of nettles. There are many common vegetables, which are known to contain the astringent tanning principle,



ciple, and might prove useful substitutes, for oak bark, in the process of tanning leather. There are many other plants, which would prove excellent ingredients for the preparation of dyeing stuffs.

Mineralogy might discover many useful substances, the perfect metals, coals, cobalt, fuller's earth, ochres, clays and sands for potteries, and the glass manufactures, all these by furnishing new objects and materials of manufacture, would afford new services of employment to an industrious population. Chemistry, also, by producing different substances for the purpose of the dyer, the painter, and other manufacturers and artists, will greatly enlarge the catalogue, and extend the sphere of industry.

Chemistry, will minister to manufacturers, not only by producing new substances, about which they may be conversant, but also by contributing to their beauty and perfection, by improvements in the preparation of various substances, employed in them, or in the process, of working up and employing those substances. It may suggest improved modes, of employing various matters, which are offered to the hand of art, by the mineral, the vegetable, and the animal kingdom; by communicating the result of various experiments, on their combinations, and decompositions. Thus many important philosophical facts, originally known only to the profound chemist, may be brought forward, for the instruction of painters, japanners, dyers, printers, manufacturers of glass, and hardware, hatters, clothiers, book-binders, shoe-makers, brewers, distillers, and a multitude of others. By this means, for instance, we may ascertain the best mode of preparing, and employing painters colours and dyeing materials. We may discover those ingredients, which, joined with other colours, and dyes, produce certain new derivative shades and colours, or improve the brilliancy of common colours, or bestow on them\* a fixedness and body.

( 3 H 2 )

Thus

\* See Bancroft's Philosophy of Permanent Colours.

Thus would philosophy and science multiply the substances, about which manufactures are conversant,—improve and extend the modes of employing them, and bring the processes of manufacture to the highest perfection, of which they are capable, while, by the introduction of new inventions in machinery, and the skilful adoption of the mechanical powers, they will multiply, beyond all calculation, the productive efficacy of human labour.

After what I have already said, of the silk-manufacture, I trust, it will not appear an unpardonable negligence, if I have forborne to enlarge on the most effectual means of promoting and extending it in this country. There yet remains some other manufactures, and the detail of these;—but I feel I have exhausted myself. I am sure, I have exhausted the patience of the academy; it is time to close this most prolix disquisition. I am sensible of all its imperfections. It has been written by fits and starts, and bears all the marks of precipitation. Many things are jejune, many paradoxical; and some, it is to be feared, impracticable. Many important matters connected with this subject, are omitted; many things of subordinate value, are unnecessarily repeated. I am also conscious of the tautology, and other defects of style, into which I have been betrayed, by haste and inattention. It is not possible to be always vigilant, in a work of this length. I fear my readers have feelingly experienced the truth of this observation; yet, prolix as I have been, I feel, that I have not been as extended, as my subject required. To conclude, if, even the Deity was disposed to spare a guilty city, for the merits of a virtuous few, that might be found in it; a few honest truths, and useful observations, together with the spirit of sincerity, and good intention of the whole, may spread a veil over the many and great demerits, of this production.

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INQUIRY *into the* CONSISTENCY *of* Dr. HUTTON'S THEORY  
*of the* EARTH *with the* ARRANGEMENT *of the* STRATA, *and*  
*other* PHÆNOMENA *on the* BASALTIC Coast *of* Antrim. *By the*  
Rev. WILLIAM RICHARDSON, D. D.

*Read May 2d, 1803.*

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Quod mecum ignorat solus vult scire videri.

PHILOSOPHERS at all times seem to have been seized with a sort of rage for inventing and supporting theories, and for explaining the operations of nature, and the phænomena she exhibits, upon principles discovered by themselves; they seem to have considered it as humiliating to admit they were not privy to her secrets, and that they were unable to explain the manner in which her various works were executed.

The mere adoption of the opinions of others could not procure celebrity; hence it became necessary, that those who thirsted for fame, should strike out something new, which, while it shewed their own sagacity, gave them an opportunity also of displaying their ability in support of the systems they invented.

Thus the attention of mankind was diverted from the study of nature to the discussion of opinions; for even those who did not invent, thought it necessary to adopt some theory, for which they soon

soon acquired a strong partiality, and became zealous to procure profelytes to it.

Hence the progress of natural history was small, and our knowledge doubtful; the causes of which did not escape the sagacious *Bacon*, who says, "the principal reason of uncertainty seems to be, that every enquirer carries his own *Idol*, or some preconceived notion along with him, to which he wrests all the facts, and the phænomena."

Had this great philosopher lived in our day, he could not have better described the feelings of the naturalists who have visited, and published accounts of the basaltic coast of Ireland; every one of them avows his favourite theory, and twists trifling facts to support it, letting the great features of nature, and the arrangement of her materials escape him, when a very slight attention to these would instantly have shewn him the insufficiency of his own theory.

Encouraged by the authority of Chancellor *Bacon*, I will venture to discuss some of the theories, which of late have become so fashionable, and try them by the test of *facts*, an ordeal which few of them can stand.

Lord *Bacon* says, "We cannot, perhaps, deserve better of mankind, than by endeavouring to free them from the tyranny of *false doctrines*, and *theories*, and bring them by a kind of *learned experience* to a more close and exact acquaintance with things themselves."—Lord *Bacon* thus expressed his disapprobation of theories, merely because they impeded the progress of science, and especially of natural history; he did not foresee that, at a future period, in the hands of *Antichristian Conspirators*, they would be made instruments to support infidelity, concealed under the mask of mere physical opinions, whose object was (as the ingenious Abbè Barruel clearly proves) to shew, "That a much longer space of time is required for the formation of the universe, than the history of the creation, as delineated by *Moses*, leaves us room to suppose."

That

That Dr. *Hutton*, in inventing the theory called by his name, had any such object in view, I by no means insinuate. It would be unfair to impute to any man motives he does not avow, and illiberal to attack a gentleman, who, having paid the debt of nature, can no longer defend himself. And after all, the question is purely physical; for, whatever Dr. *Hutton's* motives may have been, if his theory be established, we cannot prevent other men's deducing from the proposition such corollaries as it will fairly bear; and if it be overturned, all remoter inferences fall with it.

When I avow my intentions of attacking this fashionable theory, it will naturally be asked,

Cur tamen hoc libeat potius decurrere campo,  
Per quem magnus equos Auruncæ flexit alumnus?

Why I select a topic, upon which the celebrated Mr. *Kirwan* has displayed his ability?—It would be a poor justification of myself to alledge, that after the most ingenious advocates, something still may remain to be said; I make no such plea; a Department is left for me. Dr. *Hutton*, armed at all points, not content with establishing his theory most diffusively, *a priori*, admits that if it be true, it ought to be confirmed by certain *facts*, and then proceeds to assert that the *facts* are found exactly as he foretold; thus claiming to have proved his theory also *a posteriori*.

Now, as I have spent very many summers, and still occasionally reside upon a coast lined to a great extent by perpendicular precipices, often of enormous height, I have had better opportunities than most people, of examining the order in which nature has arranged her materials, that is, the strata of which the superficial part of our globe is composed; and as Dr. *Hutton* seems to rely for the support of his theory chiefly upon the positions of these strata, and other circumstances attending them, I have often compared his assertions with the *facts*, in many places magnificently displayed before me.

I will

I will venture to assign also another reason. Abbè *Barruel* has proved, "That one of the resources of the Antichristian Conspirators was to inculpate error and infidelity into those articles, that might be deemed least susceptible of them, such as history and natural philosophy." It therefore becomes necessary for those, who revere the opinions in which they were educated, to watch these new systems as they appear, and enquire into their remote tendency, though unavowed by the author. A reference to the real state of things (the *Book of Nature*; as Dr. *Hutton* expresses himself,) seldom fails to detect the futility of such whimsies, and I hope will also overturn his own theory, whatever may have been his motive for disseminating it.

The efficacy of this mode of proceeding in a case to which I take the liberty of digressing, will, I hope, justify me in advising those, who admit the necessity of repelling these frequent attacks upon revelation, first, *carefully to ascertain the facts*, before they suffer themselves to be led into the mazes of *theory*, and puzzled by speculations *a priori*.

A popular and lively traveller, Mr. *Brydone*, states, that it has been discovered in *Sicily*, that the world is of a much older date than has generally been supposed; that, by sinking wells, successive strata of lava have been found (at *Iaci* not less than seven) with layers of vegetable earth between them. Now, as these lavas must have been produced by successive eruptions, if the time can be estimated, which is required for a current of glowing lava to acquire a covering of vegetable earth, and that time be multiplied by six (the number of layers of earth) we have the period of the first eruption, which is thus thrown back to a distance utterly incompatible with the chronology of *Moses*.

Though this argument has been often refuted, yet, as it is still urged with much triumph, I will venture to encounter it upon new ground.

From

From an attentive consideration of Mr. *Dolomieu's* catalogue of the volcanic productions of Etna, (republished by Mr. *St. Fond*) and the accurate and minute account it gives of the strata of the country (currents of lava Mr. *Dolomieu* generally calls them) I have long been induced to think, that Sicily, in its original construction, strongly resembled the basaltic part of my own country, being, like it, composed of basalt strata, often prismatic and columnar, sometimes alternating with calcareous strata, and with others composed of marine depositions and exuviae; that in this state Etna erupted, and frequently covered with its lavas and scoria the preexisting basaltic and marine strata.

Conversing once on this subject with my friend, *Professor Pictet* of Geneva, he requested me to put my sentiments on paper, that he might communicate them to his friend Mr. *Dolomieu*: I did so, and aware that I was exposing myself to a charge of presumption, for discussing the construction and productions of a country I had never seen, I limited myself rigidly to the facts stated, and admissions made by Mr. *Dolomieu* himself; but, before my observations could reach him, he was no more. *Professor Pictet* has since published them, in his *Bibliothèque Britannique*, No. 144.

My conjecture, that many of the strata of Sicily, though called by *M. Dolomieu* currents of lava, were not actually such, has since been confirmed by observations made on the spot by *Sir James Hall*, Bart. a skilful naturalist, and able chemist, who first discovered the mode of fusing basalt without vitrifying it, therefore little likely to be mistaken upon a basaltic subject.

Sir James tells us in the transactions of the Royal Society of Edinburgh  
 “ for the year 1799, “ It is generally supposed, that some lavas of Etna con-  
 “ tain calcareous spar and zeolite; but, this I conceive to be a mistake. It is  
 “ true, as I have seen, that many rocks of Etna contain these sub-  
 “ stances in abundance; but, in my opinion, these rocks are no la-  
 “ vas, but have flowed subterraneously like our whins, and are the

“fame with them in every respect. A particular district of Etna, comprehending the Cyclopiian Islands, the country round La Frezza, and the castle of Jaci, is decidedly of this description.” \*

Here we have the most respectable authority for saying, what Mr. Brydone flippantly calls *currents of lava*, never flowed from any volcano; of course, all his calculations vanish in air.

Previous to entering into any discussion of Dr. Hutton's system, ludicrously, yet properly enough styled *The Plutonic Theory*, I will give a short epitome of it, that such readers as are not already acquainted with it, may be aware how much it is expected they shall believe.

Dr. Hutton asserts, that the materials of which the surface of this world is composed, loose and solid, are perpetually decaying, or decomposing, and in that state are washed away by the rivers into the sea, thence by the tides and currents into the unfathomable regions of the ocean :

That our surface, thus perpetually diminishing, in length of time is completely carried off, and deposited in the form of horizontal strata at the bottom of the sea :

That *there* fires are by some mysterious operation kindled, by which the loose materials of these strata are fused and consolidated into the hardest rocks, as *marble*, and every other species of stone, except *granite*, of which the Doctor has some doubt : †

That

\* These were the places, together with Paterno and La Mothe, which I selected as the subject of my observations intended for the late Mr. Dolomieu.

† Dr. Beddoes gets over Dr. Hutton's difficulties (whatever they were) by asserting basalt (with him unquestionable lava) and *granite* to pass into each other; an assertion I should not have minded, had he not drawn his *proof* from my country, considering the *whyn stone* of the Fairhead pillars as an approximation to granite.

Our country affords many varieties of basalt, that of Fairhead is somewhat more granular and of a lighter colour than the fine blue Giant's Causeway basalt, but it is obviously pure basalt; nor did I ever there, or any where with us, observe the trace of a passage of basalt into granite. In truth we have very little granite, and what I have met with was invariably of the red species.



That in proper time these fires assume a new office, and in a sudden paroxysm of expansion burst and break these strata, with every species of *dislocation and contorsion*, raising them up to the greatest heights, so that of what was just now at the bottom of the sea we may pronounce, with *Manilius*,

Altius his nihil est, hæc sunt fastigia mundi :

These are the mountains of a new world ready for occupation, which in like manner is to steal away to the *unfathomable regions of the ocean*, to undergo the same operations that have been performed on its predecessor.

At first view of this theory of Dr. *Hutton's*, the reader will probably say, that the friends of old opinions need not be under any alarm, lest the authority upon which their opinions are founded, should be invalidated by this or similar systems; that their advocates will find sufficient employment in establishing their own doctrines; and that such a rotation of destruction and renovation, as Dr. *Hutton* assumes, will of itself find difficulty enough in obtaining credit.

Yet it appears, that most of the naturalists of a neighbouring nation, whose zeal for the advancement of every species of literature deserves the highest applause, have adopted Dr. *Hutton's* theory; that they support it with their pens and from their chairs; and (like Sir *James Hall*, just quoted) catch at incidental opportunities to express their approbation of it.

An opinion so respectably maintained and defended should not be hastily prejudged from the wildness it may exhibit at first view. Dr. *Hutton* seems to have possessed in a high degree the esteem of his contemporaries. This flattering testimony must secure to his opinions the most respectful attention, even from those who do not accede to them, but who will, I hope, be excused for enquiring into his pre-

tensions, before they allow the partiality of his countrymen to place him in a rank with *Newton* or *Copernicus*.

Dr. *Hutton's* friend and pangyrift, *Professor Playfair*, among other eulogiums he bestows upon his late master's theory, says, (page 127) "It is impossible not to be struck with the novelty and beauty of the views which it sets before us, and which point it out as a work of great and original invention;" And again, (page 134) "Dr. *Hutton's* theory merits, in the strictest sense, the appellation of *new* and original."

But whatever other merit Dr. *Hutton's* system may have, it cannot claim that of novelty; for it seems strongly to resemble the opinions entertained by *Heraclitus* of old, and which he assigns as the cause of his melancholy.\*

Among the moderns who may contend with Dr. *Hutton* for the credit of this invention, the most formidable will probably be found among the sect of the *Illuminati*, who have their opinions accurately laid down and detailed in the lecture of a Prussian Illuminè, a knight of the *Phoenix*, who gives us a sort of a physical creed, which those who wished to become members of the society must previously adopt. I will quote a passage from this lecture, as published by the *Abbè Barruel*.

"After

\*—τὰ μὲν παρόντα οὐ δοῦν μεγάλα, τὰ δ' ὑπέροχρον ἐσόμενα πάμπαν ἀνευρά\* λέγω δὲ τὰς ἐκπυρώσεις, καὶ τὴν τῆ ὅλης συμφροσὴν. Ταῦτ' ὀδύρομαι, καὶ ὅτι ἔμπροσθεν ἔδδεν, ἀλλάκως εἰς κικεῖνα πάντα συνειλιόνται—μέγα, μικρόν\* ἄνω κάτω περιχορέουοντα, καὶ ἀμειβοόμενα ἐν τῇ τοῦ αἰῶνος παιδίῳ—  
LUCIAN. Βίον Πρασις. Chap. ιδ.

He says, "The present state of things I do not much admire, and what is to happen in future I consider as quite calamitous; for I expect conflagrations and the subversion of the universe. Therefore I weep; because I see nothing stable and fixed; and all things are to be mixed up in a sort of hodge-podge, great and small, whisked about, up and down, inverted in the sport of time."

“ After his first lesson, our Illuminè proceeded to explain his other symbols. This serpent, forming a circle, (says he) is the emblem of the eternity of the world; which, like this serpent, has neither beginning nor end. The serpent, you may also know, has the property of annually renovating its skin. This will figure to you the revolutions of the universe and of nature, which appears to weaken and even to perish at certain epochs, but which, in the immensity of ages, only grows old to become young again, and to prepare for new revolutions.—This phenix, is a still more natural exposition of the succession and perpetuation of these phenomena. Mythology has represented this bird as revivifying from its own ashes, only to shew how the universe is reproduced, and will continue to be so from itself.”

As I have no other materials but Dr. *Hutton's* memoir, from which I can form a conjecture as to his opinions, I would be sorry rashly to ascribe to him any of the principles of this dangerous sect: on one point, indeed, their language is very similar, the *Knight of the Phenix*, says, *the world, like this serpent, has neither beginning nor end*; and Dr. *Hutton* concludes his elaborate dissertation with these words: “ *The result, therefore, of our present enquiry is, that we find no vestige of a beginning, no prospect of an end.*” (Edinb. Transact. Vol. 1st. page 304.)

Mr. *Playfair* cannot bear to have these two positions confounded; the former he condemns harshly, (page 120) but highly applauds the latter.

The distinction between the position, “ *the world has neither beginning nor end,*” and the assertion, “ *we find no vestige of a beginning, no prospect of an end,*” may be ingenious, but it is not new; *Pere Arnauld* was censured by the Sorbonne, not for denying that certain propositions condemned by the Pope were to be found in *Jansenius's* book, but for saying, “ *that having read the book carefully, he could not find them;*” and he is just as ready to condemn them wherever they

they are found, as Mr. *Playfair* is to pronounce the position, the world has neither beginning nor end, to be *presumptuous* and *unwarrantable*. What credit Mr. *Playfair* will obtain for his distinctions, remains to be determined. *Pere Arnauld's* availed him nothing; the jefuits of the *Sorborne* understood distinctions perfectly well, but not liking to have them made use of againft themselves, they found *Pere Arnauld* guilty. (*Lettres Prov.*)

Mr. *Playfair* is very irritable on the fubject of thefe distinctions; and treats Mr. *Kirwan* with great afperity, becaufe he did not feem to comprehend them; and alfo becaufe he presumed to *censure the tendency of Dr. Hutton's opinions*.

The intention of an author, and the *tendency* of his opinions, are diftinct questions; the former may be innocent, the latter pernicious: of his intentions we fhould not rashly pronounce, as we cannot be fure we are right; but the tendency of his *published* opinions is a question of which the public is in poffeffion, and any attempt to deter from an inquiry into this tendency is an infringement of the liberty of difcuffion. Instead of fcoling, Mr. *Playfair* fhould have fhewn, that this pofition of his friend had not any tendency that deferved censure, for this is the point at iffue.

An impeachment of the credibility of *Mofes* has of late, it appears, been a favourite topic; and the mode of attack moft frequently adopted is, by contradicting his chronology in the date of the creation.

Every reader will probably form a conjecture as to Dr. *Hutton's* intentions, when he reads his affertion, *that he could find no traces of a begining of the world*; and, as to the *tendency* of fuch pofitions, I fhall reft it upon the authority of a perfonage more knowing in thefe matters than Mr. *Kirwan* or Mr. *Playfair*, I mean Mr. *D'Alembert*, who fpent his life in diffeminating opinions merely for the fake of their

their tendency, and encouraged physical pursuits for the sole purpose of extracting conclusions contradicting the chronology of *Moses*.

Yet Mr. *D'Alembert* is just as much hurt as Mr. *Playfair* himself, when the intentions of his friends, and the tendency of their works are deemed hostile to revelation; and bestirs himself with equal zeal to clear them of the imputation.

“Divines,” (says he) have sought to connect Christianity with systems purely philosophical; in vain did religion, so simple in its tenets, constantly throw off the alloy that disfigured it; it is from that alloy that the notion has arisen, of its being attacked in works, where nothing was farther from the minds of the writers.” (Abuse of Criticism.)

Such is the language Mr. *D'Alembert* holds out to the public; he talks in a very different style to *Voltaire*, his friend and ally in his attacks upon revelation, to whom he writes thus:

“This letter, my dear companion, will be delivered to you by *Desmarests*, a man of merit and of sound philosophy, who wishes to pay his respects to you, on his journey to *Italy*, where he purposes making such observations on natural history, as may very well give the lie to *Moses*; he will not say a word of this to the master of the sacred palace; but if, perchance, he should discover that the world is more ancient than even the Septuagint pretend, he will not keep it a secret from you.” (Vol. 68, Letter 137.)

This unprejudiced naturalist, who has determined upon his conclusion, before he examines the facts, that is, the premises from which he is to deduce it; this associate of *Voltaire* and *D'Alembert*, in their labours to rid mankind of their religious prejudices, this same *M. Desmarests* is now stiled the father of the volcanic theory, having, in the course of the mission upon which we have traced him, discovered basalt to be a volcanic production: nor did he neglect to apply his discovery to the main object of his mission, to wit, an impeachment of the credibility of *Moses*, for it appears, he industriously disseminated his doctrines

trines upon his route, where Mr. *Brydone* picks them up as he followed him, two or three years afterwards, and retails them *con amore*.

I have often wondered how this theory, irreconcilable to common sense, unsupported by any evidence, and contradicted by a thousand stubborn facts, came to make its way so generally in the world.

M. *D'Alembert's* letter to *Voltaire* clears up the difficulty; these gentlemen and their associates had then got possession of the French academy; they alone had the public ear, they extolled the writings, and supposed discoveries of their partisans, and as they were mostly men eminent for their literary merit, and not then suspected of any sinister intentions, they necessarily gave the ton, and the theories and discoveries which they approved (with apparent impartiality) were upon their credit implicitly received by the world.

Thus the volcanic origin of basalt is admitted as a proposition already demonstrated, and perpetually quoted as such, without further enquiry.

I am happy to find, that on this point (the volcanic origin of basalt) I agree in opinion with Dr. *Hutton* and his friends, and I hope this coincidence will procure my excuse for making some further observations on his position, that *he could find no vestige of a beginning, no prospect of an end.*

This epitome of Dr. *Hutton's* discoveries, the result of so much laborious investigation, has still less claim to novelty than his theory itself; there seems to be something fascinating in the atheistical proposition, *the world has neither beginning nor end*, since at all times, so much pains have been taken to extract it as a conclusion from different premises; nor is Dr. *Hutton* the only person that gravely announces the important discovery as if made by himself.

I will take the liberty of quoting the *Vicar of Wakefield's* friend, Mr. *Jenkinson's*, account of this question. "Aye, sir, replied he," as if he had reserved all his learning to that moment, "Aye, sir, the world is in its dotage, and yet the cosmogony or creation of the world has puzzled philosophers of all ages; what a medley of opi-  
" nions

“ nions have been broached upon the creation of the world; Sancho-  
 “ niathon, Berofus, Manetho, and Ocellus Lucanus, have all attempted  
 “ it in vain; the latter has thefe words; *anarchon ara kai ateleutaion*  
 “ *to pan*; which imply, that all things have neither beginning nor end.”

As thefe gentlemen exprefs their opinion very nearly in the fame words, they feem alfo to agree in another point, to wit, that the difcovery of this great truth fecures to them the reputation of deep learning; this laft circumftance probably induced them to overlook the evil confequences that might refult to fociety, from the removal of all religious obligation; for it will fcarcely be denied, that the belief of the exiftence of a God has a ftrong influence upon the morals of mankind. *Ovid*, who knew the world very well, but did not pretend to any religion, wifhed to preferve this fundamental part of it (the belief of the exiftence of God,) for the fake of its influence; he fays,

Expedit effe deos, et ut expedit, effe putemus.

And *Juvenal* ftates with precision, the bad effects of atheifm, in his day.

Sunt qui fortunæ in cafibus omnia ponunt,  
 Et nullo credunt mundum rectore moveri,  
 Atque ideo intrepide quæcunque altaria tangant.

If this was a proper place, to difcufs the queftion of the exiftence of a God, and to prove, that the world was formed, not by chance, but by confummate wifdom, I would chearfully refer the decifion of thefe points to the fame authority which *Dr. Hutton* himfelf fo often quotes, *the book of nature*, a code which, I apprehend, will not be found very favourable to atheiftical opinions. But I find I am wandering from my fubject, and muft return to the actual merits of *Dr. Hutton's* theory of the earth, without inquiring farther who was its original inventor, or what motive he had for diffeminating it, and the conclufions he afferts refult from it.

Dr. *Hutton* reduces his argument very methodically, into three distinct Propositions, a division into which the subject obviously resolves itself:

1st. That the materials of this World are in constant motion, from its higher parts to the unfathomable regions of the Ocean, where they are deposited in Strata, horizontal or nearly so.\*

2d. That the Strata composed of these loose materials, are there consolidated by subaqueous heat and fusion.

3d. That being so consolidated, they are afterwards elevated by the expansive force of heat, to the highest points of the earth, and in the operation are broken, dislocated, and distorted.

I must in general observe, before I proceed to examine the truth of Dr. *Hutton's* Theory, that it is necessary to be very watchful of his positions, which he slips in almost incidentally, and then proceeds to argue from them as if admitted. Thus, page 285 he says, “Philosophers observing an apparent disorder and confusion in the solid parts of the Globe, have been led to conclude, that there formerly existed a more regular and uniform state—that there had happened some destructive change—that the original structure of the Earth had been broken and disturbed by some violent operation.”

Taking

\* It is amusing to observe the wild and contradictory opinions, gravely maintained by Cosmogonists; Dr. *Hutton*, it appears, supposes the materials of the world to be in perpetual motion, from the land to the bottom of the sea; whereas, *M. La Trobe* gives them quite a contrary direction; he says,

“Some Geogonists make fire, and others water, the principal agent in the formation of the globe, or at least of its present surface; but he (*M. La Trobe*) contends, that another element, *the wind*, has, in certain districts, no inconsiderable share in the operation. The daily action of the flood-tide conveys a certain quantity of fine sand above high-water mark, and this being dried by the sun and air, is carried farther inland by the winds.” [Trans. American Phil. Society, Vol. 4.]

The reader may smile; but both Dr. *Hutton* and *M. La Trobe*, are perfectly serious.



Taking all this at once for granted, Dr. *Hutton* says, “ All these appearances find the most perfect explanation in the Theory he endeavours to establish, and are the facts from which he reasons.”

I can by no means admit the truth of these positions, which serve to justify the necessity of his theory, and actually (as he tells us) furnish his *Proofs*. The country which I have examined with care, has, (as will appear) suffered no *destructive change*; its materials and their arrangement, vary often, it is true, but the steady position of the strata of which it is composed, all horizontal or nearly so, shew, that *they have not been broken or disturbed by any violent operation*.

As the materials of this world, which, by Dr. *Hutton's* 1st proposition, are in constant motion from its higher parts, can be carried off from its surface alone, it becomes necessary to take a general view of the surface, and to examine of what materials it is composed.

I need not on this occasion take notice of our boundless ocean, nor the extensive plains covered with moveable sands, as they do not enter into this discussion.

The remainder of our surface is covered with a thin stratum of soil, well clothed with vegetables; through this naked rocks often appear; but these taken all together, bear a very small proportion to the parts adorned by verdure, and affording sustenance to numberless animals.

I consider this stratum of soil, with its vegetable coat, as a suit of armour, with which nature, in her wisdom, clothes the world, to protect its loose, moveable materials, and to prevent their being carried off by the rain and winds. The propensity of nature so to cover herself, is irresistible. Currents of Lava, in time, acquire a soil and vegetable cloathing. The bleakest parts of our wild rocks and mountains, are covered with their own soil, and their own vegetables; even the tops of the Giant's Causeway Pillars, where beyond the breach of the sea, are clothed with a fibrous, mossy earth, producing a good verdure.

Every one must have seen heaps of brick, when left long undisturbed, (the object for which they were burned being abandoned) gradually cover themselves with grass, and change apparently into green mounts.—I saw the same happen to a cargo of coals, in the garden of my late friend, *Hodgson Gage*, whose death prevented their being touched for many years. I do not know more perishable materials than each of these. The reader is to determine whether, according to *Dr. Hutton's* opinion, they would have found their way to the *unfathomable regions of the ocean*, or by the superinduced covering, were arrested on the spot for ever.

It has been deemed extraordinary, that the sites of *Babylon*, and other great cities of antiquity, cannot now be determined. This arises from the irresistible propensity of nature, to clothe herself with soil, and verdure; for, as soon as the perpendicular buildings collapse into ruins, a soil and grass covers them, and then,

—Priami Paridisque busto  
Insultat armentum.—

It is this vegetable foil (which is, as it were, the advanced guard) that alone sustains the attacks of the numerous enemies, which, according to both *Dr. Hutton* and *Mr. Playfair*, combine their efforts to carry off our world to the unfathomable regions of the ocean.—All depredations committed upon our surface, are at the expence of this foil; its abrasions discolour our rivers in a flood, and are the source of all our muddy depositions; the original earth is rarely encroached upon, except in a few gullies and ravines of little consequence.

Fortunately this protecting coat is as easily replaced, as it is taken away, or in *Mr. Playfair's* words, *is augmented from other causes just as much as it is diminished.*

We

We will inquire into the materials from which this superficial covering is formed and repaired, when we have taken a slight view of our naked rocks, to discover if they be really mouldering away, as these gentlemen suppose.

Mr. *Kirwan* considers the rocks on the sea-shore, exposed to the breach of the sea, and almost constantly wet, as not suffering the slightest diminution. I have examined many parts of our rocky coast with an eye to this question, and am clear that Mr. *Kirwan* is right: I find no difference between the spots where the sea breaks with the greatest violence, and those which by some local protection are left tranquil; not the least appearance of wearing away is to be observed at either of them.

The degradation of the dry inland rocks is more questionable; their surface is often well protected by a covering of *Lichen* and *Byffus Saxatilis*. The Trappe, I find, on our high grounds and mountains, are for half an inch within the surface, somewhat less found, and vary a little in colour from the interior of the stone; but I do not find, nor believe, that they decompose further, so as to crumble down; but if they do, the materials only fall to the foot of the rock, where (at least in our moist climate) they are soon covered with verdure, and arrested for ever.

Mr. *Playfair* speaks very positively on this subject. He says, "The atmosphere is the region where stones are decomposed, and again resolved into earth. This decomposition of all mineral substances exposed to the air, is continual." [Illus. page 97.]

"The law of decay is one that suffers no exception." [Page 116.]

I can by no means accede to these positions to the extent Mr. *Playfair* would carry them; the calcareous rocks, it is true, that bound the valley of the Nile, are, as we are told by *Denon*, perpetually decomposing; but, on our northern shore of *Antrim*, the atmosphere does not appear to make the least impression on our immense facades of white limestone; and in *Egypt*, the granite has withstood decomposition above 4000 years. "The marks (says *Denon*) of these first operations, are preserved

“ served so fresh in this unalterable material, that to look at them, “ one would suspect that the work had been suspended only yesterday.” [Travels, chap. 17.]

The decomposition of Basalt rocks, seems more questionable. I know that both the plain sides of prisms, newly exposed to the air, and also all recent fractures, very soon acquire a sort of rust, well accounted for by Mr. *Playfair*, who says, “ by the action of air and moisture, the iron “ becomes oxydated in such a degree, as to lose its tenacity, so that “ the texture of the surface is destroyed.” I strongly suspect this decomposition has its limit, and that this rust forms a sort of paste on the surface of the stone, which protects it from farther injury. I never saw a basalt pillar, which had the appearance of having suffered any diminution, farther than a slight blunting of its angles; the articulations too, suffer a little, and the points or pyramids which ascend from the lower joint often fall down, but all pillars of the most ancient exposure, seem to preserve their original diameters.

The more general account of the state of our world, as given by both Dr. *Hutton* and Mr. *Playfair*, is very alarming. The latter asserts, that, “ a system of universal degradation, and decay, may be traced over “ the whole surface of the land, from the mountain top to the sea- “ shore”; and, “ that water from the smallest rill to the greatest river “ attacks whatever has emerged above the level of the sea, and la- “ bours incessantly to restore it to the deep.” (page 99, 100.)

Mr. *Playfair* supposes a geologist suddenly transported “ into alpine “ tracts, where the surface of the earth attains its greatest elevation,” and then details the train of his reflections.

The first impression on his mind is made *by the novelty and magnificence of the spectacle before him*; he then finds out the caducity of the objects around him, and like another *Xerxes*, looking down with a melancholy eye upon his innumerable host, and weeping when he reflects on the short period of existence they have to enjoy, Mr. *Playfair's* geologist “ begins to discover the footsteps of time, and to per- “ ceive,

“ceive that the works of nature, usually deemed the most permanent, are those on which the characters of vicissitude are most deeply imprinted; he sees himself in the midst of a vast ruin, where the precipices which rise on all sides with such boldness and asperity, do but mark so many epochs in the progress of decay.” (Illustrations page 110.)

Dr. *Hutton* is full as gloomy; he says, (page 296) “in the natural operations of the world, the land is perishing continually; and on the mountain top nothing is to be observed but continual decay.”

And in another place, “if the vegetable soil is thus constantly removed from the surface of the land, and if its place be supplied from the dissolution of the solid earth, we may perceive an end to this beautiful machine:” and again, “we are therefore to consider as inevitable, the destruction of our land.” (Edin. Transf. page 115.)

Notwithstanding this desponding picture, I hope to prove, that the softer parts of our earth are still less in danger of dissolution, than our most solid rocks. I must dwell a little on these topics, for two reasons.

First, because I have met with intelligent persons who could not reconcile themselves to Dr. *Hutton*'s subaqueous fusions, or to his elevations of strata by igneous expansions; yet agreed with him in opinion, that the superficial parts of the world were gradually wearing away.

Secondly, because it is a question not of theory and speculation, but one upon which every intelligent person is qualified to form an adequate judgment from his own observation.

The proof of Dr. *Hutton*'s first proposition (the present question) turns much upon the definition of a soil, which, with Mr. *Playfair* is “the vegetable mould spread over the surface of the earth.”

Dr. *Hutton* is more particular: he says, (page 214) “a soil is nothing but the materials collected from the destruction of the solid  
“land.”

“land,” but Mr. Kirwan shews, that soils are often of a different nature from the stratum they rest upon; and I add, from my own observation, that the soil covering our bleak high rocks (generally a spongy moss) was not formed by the destruction of the materials it rests upon, to wit, found basalt.

That this soil is the great source of the detritus, or mud, carried down by rivers, we all three agree; but we totally differ from each other as to the materials from which this soil is formed.

Dr. *Hutton* from his definition of a soil, and the passages just quoted, shews, that he considers it as formed from the decomposition of the subjacent materials, regularly supplying the place of the soil, or superstratum, which is constantly moving away to the unfathomable regions of the ocean.

Mr. *Playfair* derives it from somewhat a different source, admitting in like manner, “that it is continually diminished;” yet states it *as a fact*, “that the soil notwithstanding remains the same in quantity,” and proceeds, “the soil therefore is augmented from other causes, just as much “as it is diminished, and this augmentation evidently can proceed “from nothing but the constant, and slow disintegration of the rocks; “in the permanence therefore of a coat of vegetable mould, on the “surface of the earth; we have a demonstrative proof of the continual “destruction of the rocks.” (Illus. Page 106.)

I am afraid that in this passage, Mr. *Playfair* mistakes *assertion* for *demonstration*.

I consider that the superficial covering of the earth, called the soil, is formed from the decayed parts of vegetables, and animals; which will be found to afford an ample fund for the repair of the losses that all parties agree it sustains.

Though the decayed parts of animals are known to pass into earth, and of course, to augment the soil, I will limit myself to vegetables alone, conceiving their contribution, on this occasion, to be much more abundant. That

That vegetables derive their sustenance chiefly from air and water, while the portion they receive from the soil is a mere trifle, is a fact often demonstrated; and that vegetable matters turn upon decay into pure earth, every florist can testify, who forms his composts of decayed leaves.

The gardener too throws his weeds and refuse trash into an heap, that he may bring them back again in two or three years converted into fine mold.

Since, therefore it appears, that vegetables take little from the soil, and add much to it, I believe we need not look for any other source whence materials for the repair and renovation of our soil are to be sought.

Should this mode of forming, and supplying the superficial covering of our earth, be preferred to those of *Dr. Hutton* and *Mr. Playfair*, it may be unnecessary to proceed any farther in the discussion of the *Huttonian theory*; as its inventor has no excuse for obtruding a new world upon us, if it appears that the old world is not wearing out; nor will he easily find a place to put it in.

Rivers are, both with *Dr. Hutton* and *Mr. Playfair*, the great agents by which the inequalities of our surface are formed, and the materials of our world carried off.

*Dr. Hutton*, re-echoed by *Mr. Playfair* (page 351) is positive "of the great fact, that the rivers have in general hollowed out their vallies." and *Dr. Hutton* asserts, page 295, "we never see a river in a flood, but we must acknowledge the carrying away a part of our land."

I must admit, that on these occasions, rivers are loaded with adventitious matter; but very little of this comes from the original earth; it is the vegetable soil of posterior formation, (upon which we have already dwelt so much) easily abraded, and easily repaired, which discolors the rivers; this is obvious in all countries abounding with

turf moss, where the black colour of the waters discovers the source whence they were stained.

Mr. *Playfair* says, " Rivers have cut and formed, not the beds only, but the whole of the vallies through which they flow." (Page 353.) He told us before, " that all these channels have been cut by the waters themselves, and that it is by the repeated touches of the same instrument, that this curious assemblage of lines has been deeply engraved on the surface of the globe." (Page 103)

Yet *M. St. Fond*, when he found it necessary to account for the formation of a deep valley, *l'escarpment ou coule l' Ibie* admits the insufficiency of Mr. *Playfair's* instrument; and says, it was excavated not by that paltry brook (*chétif ruisseau*) but by some diluvian torrent. (min. des volcans 173.)

Dr. *Hutton* and Mr. *Playfair* seem to consider the inequalities on the surface of the earth, to be produced by the operation of rivers, as well as the excavation of vallies.

I will treat of these two questions separately, beginning with our mountainous inequalities; and, should I be so fortunate as to meet Mr. *Playfair's* desponding geologist in his Alpine regions, calculating how soon

—————" The great globe itself,  
 " Yea, all which it inherit, shall dissolve;  
 " And, like this unsubstantial pageant faded,  
 " Leave not a rack behind."————

I would endeavour to dispel his fears by shewing him that the rivers, which he has been taught to think so active in the destruction of our globe, are very harmless, and that our inequalities have been produced by other agents, which by all appearance, have long ceased to act.

I would request him to observe, that in all mountainous tracts, there is a ridge higher than the rest, from which the waters run  
 down



down on both sides, and generally at right angles; that this ridge, (very properly stiled by *Livy* the *divortia aquarum*) has been fixed upon as the boundary of *empires*, of *districts*, and of *properties*; that though out of the reach of rivers, this ridge often exhibits greater inequalities than the contiguous tracts; sometimes consisting of a succession of round, distinct mountains; at others, of a long *dorsum*, occasionally cut down in gaps, shewing the mountain strata at the same level on both sides.

I could show him, that these gaps, (through which the roads crossing the mountains generally run) could never have been cut out by a river, unless we concede to Dr. *Hutton* his curious position (theory, page 296) "nor is there upon the continent, a spot at which "some river has not run;" his friend, Mr. *Playfair*, softens the expression a little, saying, *may have run* (353). If rivers have run once through such gaps, their course must have been up one side of the mountain, and down the other.

I would remind our geologist, that the long chains of mountains bounding the valley of the *Nile* on both sides, seem to have vallies and defiles exactly like our own; yet, in that country they have neither rain nor rivers. That hilly countries are alpine regions in miniature; their inequalities generally similar, though upon a smaller scale; yet such vallies are common without even a brook.

Rivers have been so much dwelt upon, by Dr. *Hutton* and Mr. *Playfair*, as the great agents and instruments employed in carrying away the materials of our world, that I must trespass a little farther on the reader's patience, for which I hope to be excused; the rather as it is a subject with which I ought to be well acquainted; my passion for angling having led me to explore the courses of most rivers I ever resided near; all of which nearly resemble each other, their differences arising merely from their different degrees of declivity.

Beginning at the mountain ridge, and descending, I boldly say that we find the valley begun before the rill appears, it being the *effect* not the *cause* of the valley, which, in such regions is often very great when the rill is insignificant, and (where the declivity is small) insufficient to cut a channel for itself, but forming a morass; it soon acquires quantity and velocity enough to form a channel, in which it runs peacefully at the bottom of the valley, increasing in size and rapidity; it now begins to commit some depredations, undermining occasionally the side of the valley it runs close to, especially if it happens to project; the materials tumble into the stream, are carried down, and deposited in different parts of its channel; if large, and heavy, they soon settle; if small, or soluble, they are carried farther.

The breach formed on the side of the valley, must necessarily be steep, as it is occasioned by the falling down of the materials, which have lost the base that supported them, and which would support themselves on a moderate declivity; it should also be rectilinear, unless where the valley and river correspond in similar curves.

Upon the whole, the portion carried away by the river, must bear the appearance of having been cut off by a plane, whose inclination does not deviate very far from the perpendicular.

It is not from our studies such questions should be discussed, we should refer to Dr. Hutton's code, *the book of nature*, and examine the facts upon the spot, before we deduce such general and theoretical conclusions, as he and his friend have done; I say *conclusion*, (rather than *assertion*) out of compliment to Dr. Hutton, who is perpetually calling his diffuse talk *demonstration*; it would be uncivil therefore, to call by any other name than *conclusion*, what he says, follows from it.

From the time that I was told that our rivers were carrying away the world, I have paid particular attention to them, whenever I had an opportunity; and I never met with a spot on their banks, where it could not be determined, on simple inspection, whether the sides of the valley were original, or formed by the depredations of the river; in  
the

the latter case, the banks must be *steep, uniform*, and of a *given* declivity; while those with gentle inclination, mild swells, and varying surface, could never have been touched by Mr. *Playfair's* instrument.

Though he tells us, (page 111) "*the result of a more minute investigation, would be in perfect unison with the general impression of waste and decay;*" I should be glad to accompany his geologist, and to descend with him from his *Alpine tracts*, and trace the course of any river, from its source to the sea; I think I could shew him, that the places acted on by the river, since it first ran, were not many, and the quantity of materials carried off, comparatively nothing; that in several of these places, a bulwark had been formed at the base of the steep, by the stones and rubble which had fallen down, and that thus further depredations were prevented, of course that the *progress of decay* is not to be found in the courses of rivers.

Perhaps this geologist would not thank me for dispelling his gloomy visions,

" Cui sic extorta voluptas,  
" Et demptus per vim mentis gratissimus error."

Should this be the case, and his imagination so habituated to depending speculations, that the prospect of ruin and desolation is become a necessary food to it, I would advise him, as there seems to be little hope of the world's making away with itself, to look for its destruction from external causes, and to calculate with *Swift's* wife islanders,

*How soon* the earth, by its daily approach to the sun, is likely to be absorbed by it?

*How soon* the sun itself will be incrusted by its own effluvia, so as to cease to give light and heat to the universe, and

*How soon* we may expect it will be consumed and annihilated, by the perpetual expenditure of its rays, without nutriment?

To

To return to our rivers; since it appears that the depredations they commit on their banks, are unimportant, let us try them in a vertical direction, and see, if in their channels and bottoms, they are invading and carrying off the world.

Mr. *Playfair* calls rivers, *lines deeply engraved on the surface of the earth*; I by no means admit this account of them, for where they run through plains, not alluvial, the river seldom is sunk more than a very few feet below the surface, and this is all the depth it has reached, since the beginning of the world: in alluvial plains they are perpetually changing their channels, cutting out new ones, and filling up the old; but this costs the world nothing, the river is acting upon its own deposits, carrying them off, and replacing them *ad libitum*, from the detritus of our soil, and this at a level above the original earth.

The reason why these lines are not deeper, is obvious; the bottom of the river, from its source to the sea, is covered with adventitious matter, stones, gravel, sand, mud, over these, without further invasion of the world, our river, like *Horace's*,

Labitur, et labetur in omne volubilis ævum.

That rivers in floods carry down with them vast quantities of mud, &c. cannot be denied, it remains to examine what becomes of it: the first deposit of the coarsest materials are made on the alluvial platforms, which abound in most rivers; Mr. *Playfair* calls them *baughs*; in the north of *Ireland* they are stiled *homes*; these (by his own admission) are found to be raised far above the level the river once ran at, a fact simple in itself, and easily accounted for; but so contrary to Mr. *Playfair's* system of perpetual excavation, that to get over the difficulty, he is obliged to *assume* that rivers, in their original form, were a succession of *lakes* and *cataracts*.

The principal consumption of the materials carried down by our rivers, is in the formation of alluvial land at their mouth, and the prolongation of our continents: still, however, we must admit that much

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is carried into the sea; the coarsest of this, which had been kept in suspension by the rapidity of the stream, is deposited as soon as the velocity is abated, in the greater expanse, and forms a bar at some distance without the mouth of the river; the remainder, consisting of the more subtle parts, continues for some little time to discolour the sea contiguous to the mouth of the river, and is acted upon by the tides.

Here I must venture to differ a little from Mr. *Kirwan*, as to the course of tides, for which I hope to be excused, as my experience upon that subject has probably been much greater than his; our conclusions, however, will be the same, though our premises are somewhat different.

Mr. *Kirwan* thinks the flood tide sets right in shore, and the ebb right out; that the flood is more impetuous than the ebb, and throws all floating things back on the shore; now the course of all tides with which I am acquainted, and, I believe, of tides in general, is in the direction (the trend as it is called) of the coast, the flood one way, the ebb the contrary.

Dr. *Hutton's* theory receives no support from this difference of opinion relative to the course of the tides. I live, in summer, on a coast between the mouths of two rivers, the *Bann* and the *Busch*, each subject to floods, the muddy water of which greatly discolours the adjacent sea: I have often amused myself, after heavy rains, watching from the high lands and precipices the course of these troubled waters, and have always observed them banded backwards and forwards along the shore, as the tide sets, and never reaching a mile from the coast; if, therefore, Dr. *Hutton* and his advocates persist in carrying on their operations of world-making, in the unfathomable regions of the ocean, they must look for other materials to work upon, than the *detritus* of our continents, not one particle of which will ever reach these regions.

A small quantity will not suffice, for, by Dr. *Hutton's* own account, he has two worlds always under hands in different stages of advancement,

ment, exclusive of the third that we inhabit, and which he thinks, is slipping through our fingers.

Dr. *Hutton* proves very clearly the necessity of having *two* new worlds going on at once, for otherwise we might remain a long time without any world, obviously a very great inconvenience; the passage in which Dr. *Hutton* establishes the necessity of three worlds, is very interesting, but quite too long for a quotation, I must therefore, refer the reader to his original work. Edin. Transactions, vol. 1st. pages 303 and 304.

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*Examination of Dr. Hutton's first Proposition a posteriori.*

Hitherto we have proceeded in some sort by speculation, and conjecture; we will now try a mode of demonstration applied by Dr. *Hutton* to his second and third propositions, though not to his first. We will examine the Strata of the World, and try if they bear marks of having been formed at the bottom of the sea from the detritus of our continents, as Dr. *Hutton* asserts.

The coat of adventitious matter formed at the bottom of the sea, in the manner so minutely detailed, should be homogeneous, since the detritus from different parts of the world must be nearly the same; and even should they vary considerably, where first carried off the surface, they must be so mixed by the agitation of great rivers in their tedious journey from their sources, and still more in their long travel over the bottom of the sea, that by the time they reach the place of their destination, *its unfathomable regions*, they should be formed  
into

into a mass completely uniform, no distinction of strata in a vertical direction, nor change of the materials in an horizontal one.

But even should the detritus of the same place (from causes which I cannot develop) suffer a considerable change, so that the mass of deposit should have its upper and lower parts different; should also the detritus of places not far removed from each other vary materially, still, in both cases, the changes in the deposited mass should be gradual, and never *per saltum*. Now, should the strata to which we have access, differ in every respect from this description, are we not to conclude that they were not formed as Dr. *Hutton* supposes, and of course that his theory is false?

I shall, therefore, proceed, to give a short account of the materials and arrangement of the strata, in an extent of about thirty miles along our northern coast, where they are most happily displayed, and have not, as far as I can find, been examined by any naturalist. The circumstances attending these strata, seem to me to bear directly against every one of Dr. *Hutton's* positions, and I hope will plead my excuse (and I admit I require one) for having taken up a question already in much abler hands.

I begin at *Murlogh*, four miles east from *Ballycastle*. Here the precipice is composed of alternate strata of freestone and coal, inserted between mighty strata of columnar basalt; the contiguous northern face of *Fairhead*, consists of vast basalt pillars, 250 feet long each, its N. W. side alternate strata of freestone and coal.

The precipice is interrupted a little at *Ballycastle*, and immediately resumed on its west side; a stratum of white limestone forms the base, and is covered by successive strata of tabular basaltes; the limestone soon disappears, and is resumed again at *Kenbaan*, with alternate strata of basalt and limestone (sometimes mixed) over it; the covering of the limestone stratum now changes to an alternation of great strata of co-

columnar basalt, and a red ochrous substance, no doubt, decomposed basalt.\*

At *Carrickarede*, this arrangement is changed into a solid unstratified mass of columnar basalt, 250 feet high, the alternate mass I have passed being about 400; above this the hill or mountain of *Knockfoghy* is composed of strata of columnar basalt alternately with another species of basalt (hitherto unnoticed, though common with us) of the same grain, but of quite different internal construction.

The coast now lowers for a few miles to the castle of *Dunseverick*, near which the bold promontory of *Bengore* projects into the ocean, displaying with great magnificence the various Strata of which it is composed.† To enumerate them all would be too tedious. I shall only observe, that the Stratum which (at the northern point of the promontory where they culminate) is the 8th from the water, and 250 feet above it, is composed of basalt pillars 44 feet long. At its eastern intersection with the plane of the sea, it forms the base of two beautiful islands, called *Beanyin Daana*, and at its western intersection, or immersion, two miles distant, it forms the *Giant's Causeway*.

For many miles westward, the face of the rock is composed of strata of table basalt, separated from each other by ochrous layers; this arrangement

\* I have, in a memoir read before the Royal Society, *Edinburgh*, assigned my reasons for supposing the red strata, which make so conspicuous a figure in the faces of our precipices, to have been once pure basalt.

† These strata are sixteen in number, all ascending to the northward, in an angle greater than that made by the irregular surface of the promontory with the horizon; of these, ten only reach the face of the precipice at *Pleekin*, the remaining six pass or vanish in the air, before they arrive at it; but if the façade be pursued to *Portmoon*, a mile S. E. they will be found to appear successively on its summit, then dipping rapidly, and regularly, until they immerse beneath the water towards *Dunseverick*, the first ten having immersed in succession about *Portmoon*.

Traced westward, their descent is not so rapid, as the promontory, on this side, does not fall off so much to the southward; but the three lower of the six, and part of the fourth, appear often on the summit, wherever the height of the precipice is sufficient to have room for them, and each invariably in its own proper place.



rangement is interrupted at *Dunluce* for about a mile, by a precipice of stratified white limestone, near 150 feet high.

The range of perpendicular precipices is terminated at *Magilligan Rock*, by a beautiful façade 180 feet high, on the summit of a mountain, and composed of six and seven strata of rude columnar basalt, elevated near 2000 feet above the surface of the sea near it.

However entertaining this magnificent, and perpetually shifting scenery may be to the spectator, I fear the reader will think the detail tiresome; I shall therefore limit my observations on the stratification of these precipices, to such circumstances alone as seem to apply directly to Dr. *Hutton's* theory.

The strata in this whole range are horizontal, or nearly so, and in the same spot all steadily parallel to each other, except at *Fairhead* alone, where the strata of freestone and coal are inclined to the horizon, in a greater angle than the incumbent stratum of columnar basalt.

Every stratum, according to *Buffon's* rule, seems to preserve an uniform thickness through its whole extent, and to be of precisely the same nature in its whole thickness, with one exception; the variety of basalt, called for distinction, *irregular Prismatic*, is at its lower edge formed into small prisms, shooting in various directions, while its upper part is amorphous. †

By examining these accumulations of strata in a vertical direction, we find the impossibility of their having been formed as Dr. *Hutton* supposes, still more decided; for whether by their nature they approximate to each other, as in the several varieties of basalt; or whether they be totally different, as *sandstone, coal, limestone, basalt*; yet in all cases the transition from one stratum to another, is *per saltum*, and never *per*

( 3 M 2 ) gradus.

† I have, in the *Transactions of the Royal Society, Edinburgh*, given, (amongst several varieties of basalt, hitherto unnoticed) a particular account of this species, which I call *irregular prismatic*; it seems to accompany the columnar basalt in most countries, their strata generally alternating.

*gradus*. The line of demarcation between contiguous strata, similar, or different, is as accurately defined, as if drawn by a pencil.\*

It remains for Dr. *Hutton's* advocates to explain how the powers of nature were exerted, to separate for a time from the heterogeneous mass of far travelled detritus, one distinct species of matter to the exclusion of all others, so as to form a compleat extensive stratum, for instance of limestone, then suddenly to change and collect another totally different, perhaps, sand-stone or argil; then as suddenly a third, or very likely to resume the first, as is the case in our alternations which so frequently occur.

The difficulties seem equally insurmountable, when we examine separate strata, and try whether, singly, they could have been formed according to Dr. *Hutton's* theory.

I begin with coal, both because its arrangement seems always to be in strata, and also, because it is particularly dwelt upon by Mr. *Playfair*, who says, in his 5th section, “ No fossil has its origin from the waste of former continents, marked by stronger and more distinct characters.”—“ There are entire beds of this fossil, which appear to consist wholly of wood, in which the fibrous structure is perfectly preserved.”—“ We cannot doubt that this fossil is every where the same, and derives its origin from the trees and plants which grew on the surface of the earth, before the formation of the present land.”

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\* To elucidate this fact, I give two small drawings, taken from parts of our grand façade, not far from *Pleikin*.

No. 1, is a portion of our 8th stratum (the same, which a mile westward forms the *Giant's Causeway*); with its transition into the ochrous stratum it rests upon (the 7th), and into the irregular prismatic (the 9th) incumbent upon it.

No. 2, exhibits a portion of the 10th stratum, composed of neat pillars, 54 feet long each, with their passage into the eleventh, formed of rude massive columns 14 feet long.

These sketches are the more to be relied upon, as they were taken without my knowledge, and without any view to the point I now refer them by my friend Capt. *O'Neil*, of the 56th regiment, who, by frequently assisting me with his pencil, has caught the spirit of a Naturalist, and is now as much struck by curious facts in Natural History, as by our magnificent scenery.

In section 138, Mr. *Playfair* tells us, that Mr. *Kirwan* makes a distinction between wood coal, “ in which the ligneous structure is so apparent as to leave no doubt of its vegetable origin ; and mineral coal, “ in which no such structure can be discovered.”—These two species of coal, Mr. *Playfair* says, “ the *Huttonian* theory considers as gradations “ of the same substance.”

And in section 145, accounting for the situation of a bed of coal, he says, “ It is part of a stratum of coal which has been deposited, “ like all others, at the bottom of the sea.”

Mr. *Playfair* should tell us, how the trees and vegetables of a former continent, have been able to preserve their fibrous and ligneous structure, after passing from one world to another through a process of decay, decomposition, and comminution ; also, in what form they travelled the long journey he obliges them to take, previous to their deposition at the bottom of the sea.

Similar difficulties attend the formation of calcareous strata, if we adopt the *Huttonian* theory ; for Mr. *Playfair* says, (section 2d.) “ These “ strata often contain shells, corals, and other exuviae of marine “ animals, in so great abundance that they appear to be composed of “ no other materials.”

And he tells us (section 402,) “ that all these, and even bodies of “ fish and amphibious animals, now converted into stone, are parts of “ animals not of the *present*, but of the *preceding* world ; yet neither he, nor Dr. *Hutton*, tells us, how these shells and bodies (often quite perfect) preserved themselves entire, in such a scene of decay and dissolution, as by their account must have intervened in the change from one world to another ; nor do they tell us by what means these exuviae were accumulated together, so as to form entire strata.

Were I to pursue this mode of discussion, and examine severally the different strata composing the superficial parts of our globe, I have little doubt but that the result would be, that not one of them

them was formed in the manner so minutely detailed in Dr. *Hutton's* theory.

I must, therefore, decline concurring in the numerous compliments paid to him by his friend, Mr. *Playfair*, in a grave eulogium, occupying, with pure praise, no less than fourteen pages; and particularly I must decline admitting, "That the lapse of time must necessarily remove all objections to Dr. *Hutton's* theory." (Illust. page 138.)

And also, that the author of this theory, "will be remembered among the illustrious few, whose systems have been verified by the observations of succeeding ages, and supported by facts unknown to themselves." (Page 140.)

I shall now proceed to parts of Dr. *Hutton's* Theory, still more astonishing, where, to use Mr. *Playfair's* words, "the greatness of the objects which it sets before us, alarms the imagination;"—and again, "these are things with which, however certainly they may be proved, the mind cannot soon be familiarized."

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*Examination of Dr. Hutton's 2d Proposition,*

*That our Strata were consolidated at the Bottom of the Sea by Heat and Fusion.*

In order to proceed with Dr. *Hutton's* theory, we must now give up the points we have hitherto been contesting, and admit the detritus of our continents to be deposited in the unfathomable regions of the ocean, where, he says, they were consolidated by heat and fusion.

The advocates for Dr. *Hutton's* theory, cannot reasonably expect that we should be more liberal in our concessions than he is himself; and as in refutation of some opinion with which I have nothing

" to

to do, he says, page 228——“ Thus it will appear, that to consolidate strata, formed at the bottom of the sea, in the manner now considered, operations are required unnatural to this place, consequently not to be supposed to support an hypothesis;” I cannot help thinking, that kindling fires at the bottom of the sea, and fusing all substances to be found there, *are performing operations unnatural to this place*, and consequently, not to be admitted merely to support Dr. Hutton’s hypothesis.

He is not the first who has fixed on the bottom of the sea, as a place where operations may be performed, which neither nature nor art can execute in our aerial regions.

M. St. Fond, as zealous a partizan of the *Volcanic Theory*, as either of our gentlemen is of the *Huttonian*, met with at *Chamavelle*, in the *Vivarois*, what he calls, *Un courant de lave compacte ; un Ruiffeau de basalte en fusion* ; which had penetrated into limestone rocks, and mixed with calcareous substances in a most extraordinary manner, so that without seeing, without touching this basaltic lava, *L’on ne se persuaderait jamais qu’un fait pareil put exister dans la nature*.

A current of lava from *Etna* or *Vesuvius*, could in our days, he says, exhibit nothing similar. He is therefore reduced to a dilemma ; he must either give up the volcanic origin of basalt, or he must account for these extraordinary phenomena.

Giving up is out of the question ; no theorist was ever guilty of such a weakness ; he therefore, as well as Dr. Hutton and Mr. Playfair, must account for operations that could not have been performed in *air*, and like them, he has recourse to another element.

*Flectere si nequeo superos, Acheronta movebo.*

He pronounces positively, that the volcano was submarine, and poured forth its currents of lava along the bottom of the sea.

Upon

Upon this point, our lively Frenchman talks with much more pleafantry; than our grave northern philofophers; he fays, “ as to the  
 “ aétion of the aqueous fluid upon the glowing bafalt, as to the ter-  
 “ rible combat, which muft arife from the contact of water and fire,  
 “ when matters in fuſion circulate at the bottom of marine gulphs, I  
 “ muft confeſs, that this part of natural hiſtory has, as yet, made a  
 “ very ſmall progrefs; that we are unprovided with accurate observa-  
 “ tions on the ſubject. Nature ſeems, on this occaſion, diſpoſed  
 “ to cover herſelf with an impenetrable veil, or rather ſcience has ad-  
 “ vanced too little, and the code of facts is too new, to enable us  
 “ to ſolve demonſtrably *ce beau probleme*.”\*

The agents employed by theſe gentlemen, are totally different; *M. St. Fond* prevents his calcareous ſubſtances from calcining by the help of the aqueous fluid, while *Dr. Hutton* (as will appear) performs the very ſame operation, by incalculable preſſure. (*Miner. des volcans*, chap. 13.)

*Dr. Hutton* (page 225) lays it down as a truth not to be queſtioned,  
 “ That the ſtrata formed at the bottom of the ſea, are to be con-  
 “ ſidered, as having been conſolidated, either by aqueous ſolution and  
 “ cryſtalization, or by the effect of heat and fuſion.”

He then proceeds to prove, that they were *not* conſolidated by *aqueous ſolution*, a queſtion with which I have nothing to do; but where he makes uſe of an aſſertion poſitively contradicted by *facts* within my own knowledge, I think I am not at liberty to ſuppreſs them, though I do not take any part in the queſtion.

*Dr. Hutton* ſays, (page 227) “ it is inconceivable how theſe maſſes  
 “ ſhould be abſolutely conſolidated, without a particle of fluid water  
 “ in their compoſition.”

No

\* That the ingenuity of modern chemiſts has diſcovered *preſſure* to be a powerful agent, I well know; as to “ the wonderful ſucceſs with which *Dr. Hutton* has applied it, “ to explain the moſt myſterious phenomena,” I cannot concur with *Mr. Playfair*.

No doubt, igneous fusion would at once satisfactorily account for the want of a particle of fluid water in these masses : let us try the fact ; I have frequently met with, in columnar basalt, cavities filled with fresh water ; I particularly refer to the stratum open at *Ballylagun*, two miles south from *Portrush* ; it is prismatic and columnar, and almost every stone when broken, contains cavities filled with fresh water.

Sometimes too, contiguous to the Giant's Causeway itself, I have found water in prismatic basalts, which I suspect had fallen from an upper stratum of pillars.

As these facts so positively contradict Dr. *Hutton's* assertion, which he puts so strongly ; and as they are obviously fatal to all Theories which suppose basalt to have been once in fusion, but have not (as far as I know) been observed by any other Naturalist, I am happy to have my solitary testimony confirmed by most respectable authority.

The Hon. Mrs. Stuart of Armagh, visited the Giant's Causeway last summer, and in one of the stones lying near it, which she had (among many others) directed to be broken, found in the inside of it, a cavity containing near two tea spoons full of water, also a nodule which she was so kind as to shew me ; it was a rounded rusty stone about the size of a marble, the interior was very fine chalcedony, coated with a stony substance of which the outside was smooth\*.

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( 3 N )

Dr.

\* This is not the only fact Mrs. Stuart discovered, which had escaped the notice of so many Naturalists who have visited the Giant's Causeway, and even published accounts of it.

Mrs. Stuart shewed me in the Collection she had made, a number of small neat prisms, triangular, quadrangular, and trapezoidal, the sides of the very smallest less than half an inch ; of these minute prisms laid horizontally, our vertical *WHYN DYKES* are formed. [See a preceding Memoir in this vol. upon *Whyn Dykes*.]

How a basalt, differing considerably in grain, and totally in form, from the contiguous Giant's Causeway basalt, could so long have escaped notice, is beyond my comprehension ; but neither Dr. Hamilton, nor any other writer, mentions these minute prisms, nor have I met with them before in any collection of basalt specimens, except where I deposited them myself.

Dr. *Hutton* having established, as he supposes, that his strata could not have been consolidated by aqueous solution, proceeds to prove *a priori*, that it must have been by igneous fusion.

I trust the reader will forgive me, for not following him through what Dr. *Hutton* himself calls (page 250) *a long chemico-minereal disquisition*), and especially when I inform him, that it contains near thirty quarto pages; nor is it necessary, as the Doctor proceeds to prove the same proposition *a posteriori*, and here I apprehend all parties will be better able to understand each other. He now states the appearances the strata of the world ought to exhibit upon each supposition, beginning with aqueous solution; in this case, he says, (page 258) "these masses should be found precisely in the same state, as when they were originally deposited from the water."

"But if by igneous fusion, (page 259) then in cooling they must have formed rents or separations of their substance, by the unequal degrees of contraction which contiguous strata may have suffered.— There is not in nature any appearance more distinct than this of the perpendicular fissures and separations in strata.— There is no consolidated stratum that wants them, here is, therefore, a clear decision of the question." And again, same page, (259) "in proportion as strata are deep, in their perpendicular section, the veins are wide, and placed at greater distances; in like manner, when strata are thin, the veins are many, but proportionably narrow."

It is very extraordinary that Dr. *Hutton*, after positively and repeatedly resting his proof of igneous fusion upon these perpendicular fissures, occasioned by contraction in cooling, should not give us a single instance of the *fact*, nor refer us to any particular place where such fissures are to be found; we know that the contraction, after such a violent heat, must be very great; he himself admits, that, in deep strata, the veins are *wide*, and in thinner strata *frequent*, yet, in all the strata I have examined, on our northern coast, for thirty miles, and many of them from 50 to 60 feet thick, at *Portrush* too, where thin  
strata



strata are accumulated on one another, and very convenient for examination, all these perpendicular fissures have escaped me, though in his own words, *there is not in nature an appearance more distinct.*

Dr. *Hutton* seems to have forgotten, that he had said, (page 224,) "it is necessary to look into these consolidated masses themselves, in order to find principles from whence to judge of those operations, by which they had attained their hardness or consolidated state."

And also, to have forgotten the rule he lays down, (page 273) "that, in order to have demonstration in a case of physical inquiry, we must have recourse to the *book of nature.*"

Now, I conceive this book should be referred to, like other books, by quoting chapter and page, and not by indefinite general assertion, that it contains such and such proofs.

I am aware, that Dr. *Hutton* considers our whyn dykes as filling up rents or fissures in the strata, occasioned by their contraction in cooling.

I have shewn in a preceding memoir, that it is by no means clear these mighty walls are of posterior formation to the strata they cut vertically, and also admitting the chasms to be antecedent, that they were not filled by glowing lava, as Dr. *Hutton* supposes; at present, we have only to enquire whether these immense fissures were formed by the contractions of the strata in cooling, I shall, therefore, state such facts alone as seem to me applicable to this point.

The distance between our dykes seems too great to suffice for the contraction of the strata; at the Giant's Causeway we have six in the space of a mile and half, at *Fairhead*. five in nearly the same extent; the intervals between the dykes, in both places, are, by Dr. *Hutton's* own account, too great; he obviously insinuates we should find the fissures frequent, and positively asserts there is no consolidated stratum that wants them, yet the greater part of our precipices have not any whyn dykes, or fissures; at Cave-Hill, near Belfast, where the perpendicular fa-

gade extends a full mile, I have been able to discover but one dyke, and in the mighty face of Magilligan Rock not one.

Dr. *Hutton* admits, (page 259), that, in deep strata, the veins are wide, in thin strata narrow; but in the faces of our precipices, where some strata are many times as thick as others, yet the fissures (filled, as he supposes, by our whyn dykes) are of uniform breadth in every stratum they cut.

He tells us also, that *contiguous strata suffer unequal degrees of contraction*; no doubt, for, sitting in his study, he could never conceive that strata of freestone and of basalt would suffer the same contraction with thin veins of coal, knowing that different substances have different degrees of contractibility; but each whyn dyke, cutting these strata, at the colliery near *Fairhead*, preserves an uniform breadth from top to bottom; the more accurate perpendicularity of the lofty precipices about the *Giant's Causeway*, exhibits this circumstance to great advantage in the dykes at *Rovinvalley* and *Port Spagna* on its east, and at the *Mile Stone* on its west side; in these places the uniform breadth of the dyke is strongly contrasted with the different thicknesses of the strata.

When discussing Dr. *Hutton's* position, that our strata were formed by deposition at the bottom of the sea, I shewed how incompatible that opinion was with the state in which these strata are actually found, that is, accumulated upon each other in great numbers, of different materials, and each stratum compleatly distinct from the contiguous ones.

The difficulty seems equally unfurmountable, when he comes to consolidate these distinct strata by igneous fusion, according to the tenor of his second proposition; for he must take his choice, either to kindle a fire at the bottom of the sea, fuse and consolidate each stratum separately, as soon as formed, then put his fire out, and wait until another stratum be ready for him, and so on; or he must fuse the whole mass at once, without suffering the heterogeneous materials to mix,

mix, or the parallel strata in the least to interfere with each other, a nicety of operation utterly unattainable in the laboratories of our upper regions.

I once thought, that when I found, at *Portrush* and its neighbouring islands, basalt strata abounding with marine shells, that I had got convincing proof basalt was not of igneous origin; I was not then acquainted with the powers of Dr. *Hutton's* submarine laboratory, nor did I know that he could there fuse substances, which in our fires are calcinable or combustible; but he expressly tells us, (page 282), "that if the theory now given be just, a rock of marble is no less a mark of subterranean fire and fusion, than that of the basaltes."\*

Mr. *Playfair* is more particular, and, as the reader probably never saw limestone exposed to violent heat without calcining, nor coal without burning, he may be glad to know how these refractory substances may be fused like metals, and melted like wax.

The great agent employed, for this purpose is *pressure*, whose powers, by Mr. *Playfair's* account are so very extraordinary, that for fear of misrepresentation I shall carefully use his own words: he says, (section 132,) "The circumstance which gives Dr. *Hutton's* theory its peculiar character, and exalts it infinitely above all others, is the introduction of the principle of pressure, to modify the effects of heat when applied at the bottom of the sea, (sec 15) this important remark was first made by Dr. *Hutton*, and applied with wonderful success,

\* I wish Dr. *Hutton* had been so good as to tell us what marks of *fire and fusion* a rock of marble exhibits; the most striking circumstance that occurs on the inspection of a piece of marble is, that it generally abounds with marine shells; with their distinct forms accurately preserved; with us, in our limited, superficial experience, the invariable effect of fusion is the obliteration of all forms, interior or exterior, possessed by the mass before it was exposed to the fire: I presume the power of fusing without effacing forms, is one more of the many advantages which Dr. *Hutton's* subaqueous laboratory possesses over ours; still he leaves us in the dark as to the agent, whether it was his own pressure, or the marine acid, employed by *M. St. Fond*, on similar occasions; possibly, had he not been in a hurry, he would have introduced us to some new agent equally powerful.

“ success, to explain the most mysterious phænomena of the mineral  
“ kingdom.”

Sect. 15. “ The tendency of an increased pressure on the bodies  
“ to which heat is applied, is to restrain the volatility of those parts  
“ which, otherwise, would make their escape, and to force them to  
“ endure a more intense action of heat. At a certain depth under  
“ the surface of the sea, the power even of a very intense heat might  
“ therefore be unable to drive off the oily or bituminous parts from  
“ the inflammable matter there deposited.” And again, (section 29)  
“ The weight incumbent on the strata of coal, when they were ex-  
“ posed to the intense heat of the mineral regions, may have been  
“ sufficient to retain the oily and bituminous parts, as well as the  
“ sulphureous.”

Coal, indeed, he seems to select, as a favourite substance for fusing  
without burning; he says, (section 28,) “ This argument for the ig-  
“ neous origin of the strata, is applicable to them all, but especially  
“ to those of coal.”

It appears that calcareous substances are as easily melted as the  
combustible, in Mr. *Playfair*'s laboratory, (section 17,) “ Some bodies,  
“ such as the calcareous, are able to resist the force of heat on the  
“ surface of the earth, yet it is perfectly agreeable to analogy to  
“ suppose, that under great pressure, the carbonic state being pre-  
“ served, the purest limestone or marble may be softened or even fu-  
“ sed:” and Section 25, “ calcareous earth, under great compression,  
“ may have its fixed air retained in it, notwithstanding the action of  
“ intense heat, and may by that means be reduced into fusion.”

Such is the mode by which Mr. *Playfair* endeavours to establish  
his singular positions; and that his friend Dr. *Hutton*, has also suc-  
“ ceeded, he seems perfectly satisfied: for he tells us, (section 25,)  
“ In all this, I do not think he has departed from the strict rules of  
“ philosophical investigation.”

Yet

Yet both Dr. *Hutton* and he shew a strong inclination to adjust matters with their readers by *postulate* and *admission*, rather than by the more crabbed process of demonstration.

Mr. *Playfair* says, (section 163,) “ a further postulatum is introduced in Dr. *Hutton*’s theory, namely, that compound bodies, such as “ carbonat of lime, when the compression prevents their separation, “ may admit of fusion.” And (section 17,) “ these effects of pressure “ to resist the decomposition of bodies and to augment their fusibility, once supposed, we shall find little difficulty in conceiving the “ consolidation of bodies by heat.”

Mr. *Playfair*, convinced of the accommodating dispositions of his readers, now takes for granted that his supposition is admitted, and shews, that he fully understands the importance of the concession, he says, (section 25.) “ The principle just mentioned, relieves us therefore “ from a difficulty that would have embarrassed, but could not have “ overturned this theory.”

Such is the sum of the *demonstrations*, or *postulates*, or *possibilities* (for it appears, much turns upon the word *may*) by which Mr. *Playfair* endeavours to establish the wonderful powers of his master’s subaqueous foundery, it is for the reader to determine, with what success he has laboured: I must now follow Dr. *Hutton* through other operations performed by the same agent, *subterranean heat*, not less wonderful, though totally different.

The third proposition concluding his theory, is stated by Dr. *Hutton* himself, page 263.

“ That the strata formed at the bottom of the sea, had been elevated as well as consolidated, by means of subterraneous heat.

This elevation of the strata of the world from the bottom of the ocean to the tops of our highest mountains, is one of the operations which Mr. *Playfair* has told us, “ alarms the imagination, and to which “ the mind cannot soon be familiarized.” Yet, as if our imaginations were not sufficiently alarmed already, and as if Dr. *Hutton* had not exerted the

the

the powers of his machinery to their full extent, Mr. *Playfair*, of his own authority, (for I find nothing similar in his master's theory) must double this operation, and make the strata of the world take another dive to the unfathomable regions of the ocean, and then resume their elevated situations; he seems to think a world,

——demum votis respondet avari  
Agricolæ bis quæ solem, bis frigora sentit.

or, in his own words, (section 109) “that has been twice heated in the fires, and twice tempered in the waters of the mineral regions.”

He takes care to be very explicit on this addition of his own, repeating, (section 121) “To this succeeded a depression of the same strata, and a second elevation, so that they have twice visited the superior regions, and twice the inferior.”

It is difficult to find patience for the sober discussion of such a suite of extravagancies, thus announced with solemn pomp; nor is it easy to preserve the gravity becoming a subject of natural history, when we find Mr. *Playfair* making the mighty strata of the earth perform such gambols.

He seems to have overlooked the situation of the world, as represented by Dr. *Hutton* (page 303 and 304) and to have forgotten, that at the very time he is making the venerable matron sustain such rude shocks, she is actually pregnant with two worlds, in different periods of gestation. \* I think Mr. *Playfair* might be alarmed, least *alma mater tellus*, indignant at the unbecoming treatment she was receiving, should again, (as when roughly handled by Phaeton) expostulate, and, in words far more apposite to her present condition, exclaim,

Hosce mihi fructus, hunc fertilitatis honorem?

I must

\* One of these worlds, Dr. *Hutton* says, (page 308) “which is formed and ready to be brought forth, must have been collected from the destruction of an earth which does not now appear.” While a younger embryo world is now forming from the detritus of our own world, as fast as it can reach the unfathomable regions of the ocean. Thus, by Dr. *Hutton's* account, we know of four worlds, one past, one present, and two to come. Mr. *Playfair* adds one more to the series, as he has discovered marks and tokens of a world antecedent to the predecessor of our present world.

I must now proceed with more seriousness to state the argument by which Dr. *Hutton* conceives he has proved that the strata of the world were elevated, from the bottom of the sea to the highest part of our land, by the force of subterraneous heat.

He says, (page 262) "There is nothing so proper for the erection of land above the level of the ocean, as an expansive power of sufficient force applied under the materials at the bottom of the sea."—Admitted.

Again, (page 263) "The power of heat for the expansion of bodies is, so far as we know, unlimited; but, by the expansion of bodies placed under the strata of the bottom of the sea, the elevation of these strata may be effected."

Dr. *Hutton* says, "The present question is, if this power of heat, which has certainly been exerted at the bottom of the sea for consolidating the strata, had been employed also for raising these strata."

Dr. *Hutton*, taking for granted that his preceding proposition is fully proved, and considering himself as having found a proper power in the proper place, proceeds: "Therefore, if there is no other way in which we may conceive this event to have been brought about——we shall have a right to conclude, that the strata had been elevated, as well as consolidated, by means of subterraneous heat."

The reader must decide upon the cogency of this argument, which I have epitomized as fairly as I could.

Doctor *Hutton* admits a great defect in the proof of this part of his theory. He says, (page 285) "But how that land is preserved in its elevated situation, is a subject on which we have not even the means to form a conjecture."

I shall now proceed, in the Doctor's own words, (page 265) "To consider how far the proposition, that strata were elevated by the power of heat above the level of the sea, may be confirmed from the examination of natural appearances."

"If," says he, "strata are erected with an expansive power acting below, we may expect to find every species of fracture, dislocation, and

“ contorsion in those bodies, and every degree of departure from a horizontal towards a vertical position.”

“ The strata of the globe are actually found in every possible position ; for, from horizontal, they are frequently found vertical ; from continuous, they are broken and separated in every possible direction, and from a plane they are bent and doubled.”

Here again we are at issue, and agreed in our appeal to the same authority, *the book of nature*. Doctor *Hutton* tells us how, (according to his theory) the strata of the world ought to be found ; and then, slightly varying his expression, asserts that such are the positions in which they are actually found.

To every particle of this statement, the face of nature in my country gives the most direct and positive contradiction. I refer to the account I have already given of the arrangement of our strata, in an extent of thirty miles, from *Murlogh* to *Magilligan Rock*, to which I will now add the island of *Ratblin*, the steadiness of whose horizontal strata, is visible, even from the main : they are also better displayed on its northern face, than any where I have mentioned, the precipice being uninterrupted for three miles and an half, generally much above 400 feet high, with the peculiar advantage of being perpendicular quite to the water, which is mostly of great depth.\*

I need

\* The contrast between the steady parallelism of our strata, and the inequalities of our surface, perpetually, and almost capriciously varying, affords a subject of curious speculation. That these superficial inequalities do not in the slightest degree arise from causes acting from beneath, is obvious to inspection ; nor am I acquainted with any natural powers that could even assist in performing the operations that have been executed upon our surface ; abrupting precipices, and carrying off materials to an inconceivable amount, without in the least disturbing what was left behind.

If my time would allow, I could state a number of most curious facts on this subject. Vast Atlantic torrents sweeping our earth with irresistible rapidity, have been invented for the purpose of accounting for the very irregular appearance our surface exhibits ; but it would be easy to shew from the facts, that those were not the agents employed ; our rivers I have already proved to be utterly inadequate to produce the effect.



I need not proceed further to shew, that the strata of my country have not sustained the operations which Dr. *Hutton* asserts have been performed upon the *strata of the globe*; but it may be objected that my arguments are local, and though they may restrict, should not overturn a general conclusion.

The objection is fair, but I believe will scarcely be offered by Dr. *Hutton's* advocates; for, from the nature of his theory, no spot in the world can be exempted from his revolutionizing operations, which, as he himself tells us, (page 253) "have been not only general, as found "in all the regions of the globe, but universal."

I by no means insinuate, that the strata over the world are always as steady as in our basaltic country; schistus strata, in particular, are often very much inclined; but I argue only from what I have seen, and from *facts* for which I make myself responsible.

Dr. *Hutton* seems to consider *wbynn* dykes as a strong confirmation of his theory. To me they seem utterly irreconcilable to it. We know that they cut through all strata they meet with, to depths we have in no instance been able to reach, and are generally perpendicular (such at least is the description of those with which I am acquainted). Dr. *Hutton* too (page 278) traced one *twenty or thirty miles* in length.

He must determine whether these enormous *septa*, were formed before or after his supposed elevation of the strata from the bottom of the sea, to the summits of our mountains; if before, how came these mighty walls to preserve their perpendicular position and long rectilinear course, in the midst of such a tremendous explosion, as by his own account, *fractured, dislocated and contorted* the other strata, changing their position from horizontal to vertical, and breaking them in every possible direction; from planes bending and doubling them?

If he makes these *wbynn dykes* posterior to the explosion, and formed by fluid lava, injected upwards through the fissures formed by the disruption of the strata; how can we conceive such steady perpendicularity in chasms formed in the midst of a scene of such confusion,

and disorder, as he himself describes? and how comes it that his lava (which must have been in an high state of fluidity, to admit its passage through such narrow crevices) stops in every single instance when it reaches the surface, without spreading along it when its confinement was at an end?

The next topic I shall mention, seems to me of itself decisive against Dr. *Hutton's* theory; I mean, *columnar basalt*, which he never once notices. This is the more extraordinary, as he seems to have seized as his private property, all the varieties of basalt, calling it *unrupted lava*, fused in his own submarine laboratory. He complains of the *Volcanists* for invading this property, and gives marks and tokens by which his unerupted lavas (basalts) may be at once distinguished from their erupted lavas, the obvious product of volcanos.

Still, however, *columnar basalt*, the most curious and important part of his property (as having of late excited so much attention) escapes him; no doubt it would have embarrassed him to account for the steady vertical position which these pillars retain in most places, after the subversion and jumble of his strata, which he so particularly describes. There are, I know, in other countries, instances where these columns deviate considerably from perpendicularity; with us (where such colonades are without number) the deviations are few and trifling; and even on these occasions, though the pillars are deranged, the stratum is undisturbed; for I cannot call the depressions that occur in a few places, a *disturbance*, since the permanent and depressed strata, continue to preserve a steady parallelism to each other.

Mr. *Playfair* is more particular on the subject of basalt than Dr. *Hutton*, and, as usual, more clear; but each of them, separately, gives such an account of this fossil, its department in the operations of nature, and its arrangement when exposed to our view, as excites my astonishment. It has been my misfortune already to differ often from them, both as to facts, and opinions; but when they come to treat of basalt, my contradictions must be much more decided; for  
though

though I am acquainted with the personal respectability of these gentlemen, and the high literary characters which each of them bears, I cannot suffer important facts in Natural History to be totally misrepresented, for the purpose of supporting the wildest opinions that ever entered the brains of speculatists.

I hope Mr. *Playfair* will excuse me, when he finds he is not the only person whose statement of *facts* I have been under the necessity of contradicting; and that I have, on different occasions, been obliged to treat every naturalist who has published an account of our basaltic coast, exactly in the same way, and to shew where they misrepresented our facts for the purpose of supporting their own systems.

I by no means insinuate, that an overweening zeal in support of opinions, which have nothing to do with common life, affects the moral character. Lawyers are used to take great liberties, when warmly defending their clients.

“Tunc immensa cavi spirant mendacia folles;”

without committing their own veracity; and I think it not unlikely that *system-makers* may think themselves entitled to the same latitude, which *Ovid* allows to another description of gentlemen.

“Jupiter ex alto perjuriam ridet amantum,

“Et jubet Eolios irrita ferre notos.”

In the common course of Natural History, *facts* should regulate *opinions*; the reverse happens in modern times, as it appears *opinions* have a great influence on the statement of *facts*.

I have already discussed so many wild opinions, broached by these gentlemen, that I might be excused for not encountering another, which does not seem necessarily connected with the demonstration of their theory; but when I find the *subterraneous fusion and flowing of basalt*, adopted by a naturalist of Sir *James Hall's* respectability, I will treat the opinion with a deference due to every thing countenanced by him.

With

With Dr. *Hutton*, basalt or whynn is a lava flowing in the bowels of the earth, driven upwards by some powerful agent; forced into the fissures and crevices of the strata, and sometimes impelled with such violence between parallel strata as to separate them from each other, and to lodge between them.

That this substance, out of the reach of our ambient air, and acted upon by incalculable pressure, possesses many properties totally different from those of common erupted lava.†

When Dr. *Hutton* and Mr. *Playfair* pronounce so positively, that basalt is subterranean lava, they do not attempt to enter into any proof that it ever was in fusion; they content themselves with denying to it such properties, as are obviously incompatible with the origin they give it.

*Stratification* is one of these; for it is clear from their own account of this substance, that it could not be arranged in Strata; Dr. *Hutton*, therefore, makes a grand distinction between stratified and *unstratified* bodies; of the latter, all he enumerates are *granite*, *porphyry* and *basalt*, or *whynn*.

As I am not acquainted with granitic countries, I can throw no light upon this part of the subject; I shall only observe, that the stratification of granite, is maintained by *Pallas*, *De Luc* and *Saussure*; even Mr. *Playfair* himself seems to give it up.

*Porphyry*, Mr. *Playfair* tells us, (section 76) is a variety of *whynn*; the *whynn-stone* of the old world. He forgets, however, to tell us  
how

† That basalt is often found as described by Mr. *Playfair*, cannot be denied; it alternates with calcareous strata, in many places, though in our extensive basalt country it mixes with it (and that slightly) but in one spot, *Kenbaan*. Its arrangement over the world seems to be in accumulations of extensive, parallel strata, covering the surface of the earth; so, at least, our whole basaltic country is covered. Of such arrangement, Mr. *Playfair* takes not the least notice; it is, indeed, fatal to his system, at first glance; for, exclusive of the impossibility of disposing his lava in regular strata, yet, admitting it was done, his *unerupted* lava, now is become erupted, and being spread on our surface, exposed to the air, and relieved from *pressure*, should possess all the properties of common volcanic lava, derived, by his account, from the same source; but he labours to shew, that important differences *do* and *ought* to exist between them.

how it escaped the general disintegration of all the rocks of that world; and how, in its present unwieldy masses, it travelled from the *old world* to the *new*, without undergoing the process of comminution, an operation by the foregoing theory, indispensably necessary to enable it to perform the journey.

As to the stratification of *whynn-stone*, or *basalt*, Mr. *Playfair* is positive. He says (section 76) "to conceive aright the origin of that class of unstratified rocks, distinguished by the name of whynn-stone;"—and again, same section, "these unstratified rocks;"—also, (section 62) "Whynn, though not stratified."

Mr. *Playfair* (section 29) considers it as a good defect in *Buffon's* Theory, "That it makes no distinction between stratified and unstratified bodies;"—"this system, therefore, has but a very distant resemblance to the *Huttonian* Theory;"—and again (section 125) "*Buffon* has no means of explaining the unstratified rocks."

From this last passage it is obvious, that Mr. *Playfair* considers the want of stratification in the rocks he mentions, as indispensably necessary to Dr. *Hutton's* Theory.

It is now full time to come to *facts*; I must, therefore state, that nature seems to me to have arranged *basalt*, that is, *whynstone*, in more regular strata than any other substance whatsoever; to confirm this, I must request the reader to turn back to a passage in this memoir, in which I gave a minute account of the strata of our basaltic country, in a course of thirty miles, nineteen parts of which out of twenty, are accumulations of basalt strata, arranged with consummate regularity.

Wherever we find the same material, nature has disposed it in the same manner; thus, if we proceed southward from *Magilligan* rock, by the basaltic mountains of *Bien Braddock* and *Carntogher*, to the point where the basalt terminates in the abrupt faces of *Monynceeny*, hanging over the valley of the *Mayola*; we find the base of all these mountains a mighty stratum of white limestone, upon which successive basalt strata are heaped upon one another quite up to their summits: the regular stratification of this mass is occasionally disclosed, whenever abrupt precipices occur,

occur, and more frequently by the strata themselves baffling on the sides and summits of the mountains.

In the whole of our extensive basalt country, I have met with but one spot in which this substance is not regularly stratified, namely *Carrickarede*, where for about 200 or 300 yards, the basalt precipice seems one solid mass.

There is a circumstance attending basalt, which much increases my astonishment at hearing it classed among unstratified substances, that is, it seems to be the only species of rock whose arrangement in strata discovers itself to the eye at all distances. The contrast between our *basalt* and *schistus* mountains is every where most striking, and the difference chiefly arises from the stratified arrangement of the basalt.

I think it possible a skilful naturalist, who had given his attention to this point, would, in sailing along a newly discovered coast, be able to pronounce on the materials of the mountains as he passed them, merely by their distant outlines; my experience has been too limited to permit me to proceed farther with this topic, I only suggest it to naturalists, who may have opportunities to make such observations.

The reader will probably be surprised to find Mr. *Playfair* perfectly acquainted with this natural arrangement of basalt, and ready to make his use of it, in his controversy with the *volcanists*, who claim his *whynstone* as their *eruptive lava*; and that stratification is one of the characteristic marks, by which he distinguishes his *unerupted* lava from their erupted.

He says, (section 236) “ There are other marks that distinguish the lavas which we suppose to have flowed in the mineral regions, from those which actually flowed upon the surface—the physical geography of whynstone countries, unlike in many respects to that of volcanic countries; the shape of whynstone hills; their large flat terraces rising above one another; their perpendicular faces.”

I see now that the natural arrangement of basalt, in Mr. *Playfair's* country and mine, is precisely the same; for what are *large, flat terraces, rising*

*one above another*, but accumulations of extensive basalt strata? and, I dare say, his *perpendicular faces*, like those with us, enable him to observe the uniform thickness which each stratum preserves in its whole extent,\* and the consummate regularity with which the mass is arranged.

Mr. *Playfair* says, that Mr. *Kirwan* did not view nature with his own eyes; I am curious to know, with whose eyes he himself discovered basalt to be an unstratified substance; had I not met with the passage I have quoted, I should have been tempted to doubt the evidence of my own. That the reader may not remain in a doubt between us, I shall appeal to the testimony of my friends, and request, before he decides, he will examine the sketches Captain *O'Neil* has given, of portions of the strata of *Pleskin* and *Port Spagna*, and still more the view of the magnificent façade half a mile farther eastward, and the view of the precipice at *Cave-hill* above *Belfast*, taken by my friend Captain *Chapman*; and I can assure him these were all taken before either I, or my friends, suspected any naturalist would be so hardy as to support his system by denying the stratification of basalt.

Mr. *Playfair* is pleased to dwell minutely on the fossils of *Port-rush* Promontory, and their arrangement, which last he has never seen: he says the shells found there in basaltic rocks, have been of late much insisted on as a proof of the aqueous formation of these rocks; and again, "these specimens with shells were supposed

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" he

\* From this rule the uppermost stratum must always be excepted, for, while the plane bounding its lower side is invariably rectilinear, and parallel to the mass of the strata below it, its upper side partakes of all the inequalities of the surface, and is perpetually undulating or sloping away to a point, where the stratum vanishes; the inequalities instantly transferred to the stratum next to it, now become the uppermost, follow the former stratum in the contrary direction, and another will, probably, soon appear over it, to which the irregularities will be transferred.

The confused manner in which basalt is disposed on the surface, might mislead cursory observers, but Mr. *Playfair*, by his own account, has perpendicular faces where the arrangement of the strata must necessarily be disclosed.

“ (he believes) to contain an irrefragable proof of the Neptunian origin of the basaltic promontory where they were found.”

Perhaps so, but not by me who discovered them: I communicated the fact as new in Natural History, and sent specimens to the curious wherever I had an opportunity, but I did not apply this fact to the support of any theory; I never insinuated that I thought the *Neptunists* had penetrated farther into the secret of Nature than other Theorists, and I furnished Dr. *Hope* of Edinburgh with such facts as occurred to me that seemed favourable to the *Plutonic System*, which I understood he had supported from his *Chair*.

I now congratulate myself that I did not engage in these wars, since I have found that the combatants use most dangerous weapons, and come into the field as well accoutred as one of *Homer's* champions.

————— πικρὰ δ' ἄρα χαλκῶν  
Σμερδαλίῳ κεκαλυφθῆ

My authority is from Mr. *Playfair* himself, who says, (page 297) “ Thus the weapons which directly pierce the armour of the Volcanist, and inflict a mortal wound, are easily turned aside by the superior temper of the *Plutonic mail*.”

Nature makes her genera and their varieties, on many occasions, approximate so close to (or rather pass into) each other, that it is not easy to make distinctions with certainty, nor is it fair to deduce from a fossil whose class is disputed, an argument for or against any theory; I shall therefore abstain from making such use of this *silicious basalt*, (as my friend Professor *Pictet* called it); but since such eminent Naturalists as he and Mr. *Kirwan* differ upon this point, from gentlemen of such respectability as Sir *James Hall* and Professor *Playfair*, I think it incumbent upon me who discovered this fossil, to assign my reasons for having originally called it basalt.

I know



I know that Sir *James Hall* has acquired most deservedly, great credit for his skilful management of his Laboratory, in fusing basalt without impairing its stony appearance; to differ from him, therefore upon a basaltic subject, will, I fear, be deemed presumptuous; but it must be observed, that Sir James did not analyse this fossil; he (as Mr. Playfair tells us) pronounced upon inspection alone; nor has he possessed the same advantage that I enjoy, of viewing it in its natural state and arrangement.

From these last, strong arguments may be drawn to prove it to be *basalt* and not *schistus*, as Sir *James* thinks; the strata of this stone and of the contiguous basalt are exactly similar, and of equal thickness (about 14 inches each;) they are sometimes disposed in alternate strata, sometimes in accumulations of each species separately.

The surfaces of the strata of silicious, and of unquestioned basalt, equally exhibit rude *parvès*, and when quarried into, equally produce massive prisms; those in the silicious basalt break into smaller prisms, mostly irregular pentagons of every size down to great minuteness.

Mr. *Playfair* says, "The specimens he saw had nothing of a "sparry or crystallized structure." If by this he means they were not of *prismatic form*, I refer him to the cabinet of his friend Dr. *Hope*, where he will find many of the specimens of this silicious basalt, actual prisms, as they might all have been but for the difficulty of conveying large specimens so far.

Prismatic construction is utterly incompatible with the fissile nature of schistus, but it seems to be a property essential to basalt; I never found this fossil in its original stratum (and it is always stratified) that it was not disposed in prisms, and although the great prisms of the columnar basalt do not break into smaller, yet there are other varieties which have a subordinate principle of construction, the large prisms breaking into smaller, as in the basalt dykes, and also

in our filicious basalt, and in a lesser degree in the coarse basalt contiguous to it.

I have, it is true, found one or two detached pieces lamellated, (they had been long exposed,) but nothing similar ever occurred in the original strata, nor have I met with a single particle of schistus in the whole extensive basaltic area: Schistus too is generally refractory, while the filicious basalt is easily fused and vitrified, and in its conchoidal fracture it more resembles basalt than schistus.

The strongest argument seems to be deduced from its grain, which may be traced in different specimens (in any of the collections I have given to Dr. Hope or our own Musæa) passing from the likeness of *jasper* or *sillex*, by insensible shades, until its grain approaches to, and then becomes coarser and more granular, than the Giant's Causeway basalt.

I hope Sir *James Hall* will be induced to analyse this stone; if he then shall pronounce it not to be basalt, I venture to predict it will be among the *filicious*, and not the *schistose* tribe he will class it.

Whatever may be finally decided as to its class, its arrangement with that of the contiguous basalt at Portrush and its islands, are fatal to a favourite position strenuously insisted on by the Plutonists, to wit, "That their fused unerupted basalt has been forced " up from the subterranean regions, and violently injected between " strata of other materials, by which their alternations with these " strata are formed."

Thus Mr. *Whitehead* accounts for the alternate strata of limestone and toadstone (*basalt*) of which part of *Derbyshire* is formed, to the greatest depths human industry can penetrate; he even flatters himself so far as to think, he had discovered the funnel by which the fluid lava had passed up from the centre of the earth.

In like manner Mr. *Playfair* supposes his lava was injected between the strata of this Portrush stone with shells; and at once considering the fact as established, he proceeds to avail himself of it, and to account for some similar appearance in the island of *Cerigo*, which he says, "The Italian Naturalist (*Spalanzani*) supposes "to be of volcanic origin."

These he admits would have been embarrassing, "without the "commentary afforded by the Portrush specimens." From these he concludes, "that in both cases the shells are involved in parts of "the rock, which have been in some degree assimilated to the "basalts, by the heat they have endured."—"Spalanzani would probably have used exactly the same terms which he employs in "speaking of *Cerigo*, if he had been required to describe the petrified shells at *Portrush*." (Page 289.)

Whether *Spalanzani* would have been equally ready to have accommodated the *Portrush* facts to his theory (a very different one from Dr. *Hutton's*) I will not take upon me to determine; but unfortunately they are most perversely contrary to what Mr. *Playfair* asserts (pages 287, 288): "Upon the whole it is evident, that the "rock containing the shells has acquired a high degree of induration by the vicinity of the great ignited mass of whyn stone."

No doubt so it ought, according to Mr. *Playfair's* Theory; and he must have thought it no great stretch to assert, that things *actually* were, as he thought *they ought to be*.

Unhappily the very contrary is the fact; for, instead of this stratified stone being affected "by the vicinity of the great ignited "mass of whyn stone," the alteration at the contact is made upon the whyn stone alone, which grows somewhat finer as it approaches the line of demarcation; and what makes this more provoking is, that it is the single instance in which I have found any stratum affected by the contiguity of another.

The next liberty Mr. *Playfair* takes with our *facts* is more guarded, and expressed with hypothetic caution. “ If (says he) a torrent “ of melted matter were poured in among the strata, by a force “ which at the same time broke up and disordered these strata.”

No doubt such a torrent must have broke up and disordered our strata, and therefore Mr. *Playfair* insinuates (for I cannot now say he asserts) that our strata have been so *broke up and disordered*. Here too the facts are directly contrary; for in the place where the stones with shells and impressions are found, there is no disorder nor breaking up. The strata of *silicious basalt*, and of *admitted basalt or wobyn stone*, are all steadily parallel, and of uniform inclination, to wit, a slight dip to the eastward, from which, upon the authority of Mr. *Playfair* himself, we may fairly conclude that no such torrent as he supposes, was ever injected among our strata.

Mr. *Playfair* brings us to the peninsula of Portrush, with a considerable degree of triumph. He could not have chosen a more unfortunate spot for his theory, as it abounds with facts irreconcilable to the operations he supposes to have taken place.

On the main, where the strata are deep and accumulated upon each other to stupendous heights, Nature (as I have shewn early in this Memoir) changes her materials, and her mode of arranging them, every two or three miles; but on the east side of Portrush peninsula, where the strata are thin, she changes her stile almost every hundred yards, passing from accumulations of alternate strata to an accumulation of silicious basalt, then to a similar one of what Mr. *Playfair* admits to be undoubted basalt in regular strata; such sudden changes in materials and arrangement, by no means resemble the effect of a mighty cause acting deep in the bowels of the earth, and forcing up torrents of liquid lava with irresistible violence.

I have already dwelt sufficiently on the very different opinion maintained by Mr. *Playfair* and me, as to the stratification of basalt.

I must

I must, however, state the *fact* that on the side of Portrush which Mr. *Playfair* mentions, pure basalt is more abundant than the silicious; and whether mixed with it or not, is always disposed in regular strata of uniform thickness, from 12 to 20 inches; and the west side of the same peninsula at 400 yards distance, is one mighty stratum of rude pillars from seventy to eighty feet long.

I fear I may have detained the reader too long upon this little interesting peninsula, where I have spent the pleafantest part of my life. I should be happy to have an opportunity of shewing to Mr. *Playfair* its curious facts; and how Nature, who every where around us executes her works *en grand*, here assumes a diminutive stile; and to make him amends for the arguments I have drawn from this spot to combat his theory with, I would shew him that it bears equally against other opinions; and that if he has mistaken our facts, other writers have overlooked them.

Mr. *Whitehead* and Mr. *Mills* have each of them published accounts of our coast; each of them was at Portrush, yet nothing there seems to have excited their attention; even Dr. *Hamilton* who spent many summers on the peninsula, and dates his letters from it, let all our curious facts escape him.

F I N I S.

However, the Government has the right to know  
and whether it is or not, it is a matter of  
of a Government, and it is a matter of  
the time period of the Government is a matter of

I am not a member of the Government, and I  
intending to do so, and I have no intention of  
this, I would be happy to have an opportunity of doing so.

and to that end, I have the pleasure of  
this, I would be happy to have an opportunity of doing so.

of course, and I am sure that you will find that  
to be a most interesting and profitable one.

# POLITE LITERATURE.

VOL. IX.

A

COLLEGE ENTRANCE EXAMINATIONS

1917



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ESSAY on the RISE and PROGRESS of RHIME by THEOPHILUS SWIFT, ESQ. To which was adjudged the Gold Prize Medal, proposed by the Royal Irish Academy, for the best Essay on that Subject.—  
Read Nov. 9th, 1801.

—•••••  
“ JUVAT INTEGROS ACCEDERE FONTES.”

LUCR.

IF it be of importance to the interests of letters, that the æra has been ascertained when the compositions of the Greeks first abandoned rhythm, and assumed the form called afterward in their own language *περὶς λόγος*, *oratio soluta*; the tracing to its source that branch of the poetic art, distinguished by the name of *rhime*, will be found an object not unworthy of learned curiosity; and the discussion, perhaps, may be productive of some collateral observations not unprofitable to the cause of philology in general.

It may be said, (for what silly argument hath not been urged in every age by the idle and illiterate?) that *verbal* investigations, such as the present, are attended with no solid advantage, are too inconsiderable for popular regard, and too remote from general utility. It is answered, that the most important disquisitions are often the most uninteresting to the multitude; but, for that very reason, become the more valuable to the few for whom they were intended. To underrate a subject, because it happens not to fall in with our own particular studies or pursuits, is the sure sign of a narrow and prejudiced mind. Poetry employs a language of her own, and addresses not herself to the vulgar: through her, every grace of literature, every intelligencè of science, comes to us recommended, embellished, illumined: and this academy, when it directed the present enquiry, sacrificed at her shrine, and added another leaf to her laurel.

A celebrated writer has observed, that “ the value of several circumstances in story, lessens very much by distance of time, though some minute circumstances are very valuable.” The observation is just; and as applied to the work of another author I am going to name, will be found to have its due weight. Aristotle in his Poetics hath left us the origin, progress, and perfection of tragedy. The value of ancient tragedy, in the present improved state of the drama, has certainly “ lessened much by distance of time;” yet “ some minute circumstances that affect it, are very valuable.” As the Greek drama was but the skeleton of that which latter times have filled up, giving muscle, and sinews, and flesh, and heart, and pulse, and motion to the lifeless representation of man; so there are some circumstances attending ancient tragedy, still more valuable than the thing itself. The philosopher’s pen, dipped in the fountain of an immortal language, preserves to us a treasure, rendered less venerable by time, than valuable for the incidents connected with it. Embalmed in its own excellence, the work has outlived the “ perfection,” and the wreck too, of its subject. But although the present question should lead to enquiries not less interesting to the cause of letters, neither the perishable language the author writes in, nor his skill in the management of his unfruitful materials, afford him the least hope of amusing the present age, or informing posterity. Yet the learning and the judgment of the philosopher had been lost in the maze of the proposed enquiry, where antiquity shrinks back into her cell, and refuses to be dragged out by the strong hand. The origin of rhyme, however, far more ancient than that of tragedy in Greece, though sometimes perhaps attempted, remains yet to be explored: its approach is tangled with errors, where obstacles rise with perseverance, and labour is rewarded with increasing difficulties. Hid in the recesses of age, it eludes enquiry; and like the great river of *Ægypt*, *not to be traced upward*, is to be found more by good fortune than painful indagation.

It has long been my opinion, and the more I have lately considered the subject, the less I have found reason to change it, that rhyme hath  
its

its origin in no exclusive language, but is original in all those, where it hath at any time prevailed. To find therefore the origin of rhyme, we must seek it in the origin of language itself.

Let us try it by this touchstone. If we repair to the most ancient of all languages, and fountain of every other, \* *the Hebrew*, shall we find it there? That question shall be answered presently. In the meanwhile I observe, that every language hath a genius peculiar to itself, and rhyme may not be that of the Hebrew. Written with an iron quill, musical inflexion † is almost a stranger to it: prosody it may indeed possess, for every language hath its own laws. But harsh, guttural, and unyielding, its rustic simplicity admits no transpositives, the very soul of numbers and character of an animated muse. Sublime and affecting as the Hebrew poetry undoubtedly is beyond all others, it is rather the inartificial burst of laud and magnification, than the strain or effect of regulated composition. It has more of the mountain storm than the murmur of the grove, the roar of the broken torrent than the music of the flowing stream, yet when the evil spirit was upon Saul, the soft melody of the harp calmed the passions of the king. In the language of Longinus, it contains that ponderous enthusiasm which is  
one

\* Vid. Strabo. Geog. Lib. 1. Where this well-informed writer says, that the Armenians, Syrians, and Arabians are homophylous, as appears by their LANGUAGE, *κατα την διαλεκτον*; which, he adds, shews that Mesopotamia is the common parent of the three: *οηλοι δη Μεσοποταμια εκ των τριων συνησασαι εθων*: idque ostendit Mesopotamia ex tribus hisce conflata populis. See the very learned Schikard's *Horol. Hebraic.* and the Phaleg of Bochart, with Vitringa's *Orig. Sac. passim*. In Lib. 1. Cap. 3. this last admirable writer expressly says, "Cum una eademque lingua omnes orientis populos diu post extruccionem civitatis Babylonice usos esse probavimus, haud obscure indicavimus, credere nos, illam linguam (scil. Ægyptiacam) fuisse vel Hebræam vel Hebraeæ simillimam: adeo ut simul nobis incumbat necessitas ostendendi linguas omnes ceteras ab Hebræâ paulatim deflexisse; atque hinc præstantissimorum cujusvis generis et linguæ vocabulorum apud gentem sacram reperiri origines."

† There are in the Hebrew thirteen accentual notes for the lowering and elevation of the voice in singing and recitation, which are called *Ionicæ*.

one source of the sublime, “ το σφαιρον και ενθουσιαστικον παθος.” Few in its radicals, incopious of derivatives, it owes more to the inspiration of HIM that gave it birth, than to its own fecundity. Yet, that I may not seem to undervalue its excellence, I hold it the first of all languages, and, from the words that are to be continued in heaven, presume it will be the *last* and the *eternal*, I respect, because it is the *sacred language*, the same in which Moses wrote his laws, the same that the prophets spake, and above all, the same that Christ, who was the light, and the wisdom of the Father, employed to manifest the divine will, and preach redemption to mankind. On these accounts I revere it: and, sure, of divine authority must be that language, whose power gave speech to the dumb, and made even the deaf to hear! Added to this, we have Christ’s own command to “ search the scriptures,” which we cannot thoroughly do, except in their original language, the very circumstance that consecrates its character, as if Providence had rendered it unfamiliar, to excite our enquiries, and sanctify it to himself. Perhaps no stronger proof can be brought of its divine original, than its disdain of artificial aid, and its ability to sustain its importance under difficulties that would have crushed a language less divine.

Sunt paucae voces, has unus devorat annus;  
In reliquis Babylon cernitur, atque chaos.

Unyielding to the profane touch of heathen Pantheonism, Apollo and his nine harmonious maids have no acquaintance with it. What Donatus said of the poet Virgil, may with little alteration be applied here; had he been doomed to write his *Æneis* in Hebrew, he would have performed it with no better success, than if he had attempted it in High-Dutch. The Hebrew prælections, indeed, by the very learned and amiable Lowth, have detected a few dactyles and spondees in the psalms, and perhaps in one or two other places of the sacred writings: but while the discovery was not wholly new, accident more than

lian selection or judgment seems to have given them birth: yet of the fact itself, even as stated by the author of the *Brevis Confutatio*, there does not, I apprehend, appear sufficient certainty. The learned *Bishop of Chichester* stands in direct opposition to the learned *Bishop of London*; the one affirming in his *Prolegomena in Psalmos*, “quantitatis syllabarum nulla ratio habetur;” the other, in his *Brevis Confutatio*, as roundly asserting, “quantitatis syllabarum semper habetur ratio.”

Who shall decide, when doctors disagree?\*

But supposing the point sufficiently established, the detection itself demonstrates the singularity, as if it had said in the very language of the scriptures, “hitherto shalt thou go, and no further”. These observations will presently assist us in shewing how it came to pass that the Greek and Roman languages were unfavorable to rhyme. And this part of the subject has been the longer insisted on, because it is the foundation on which the whole of the argument must stand or fall.

It will not, I presume, be necessary to trace the decay and declension of the sacred language through its various stages of corruption, from the dispersion of tongues to the long and bitter bondage of the Israelites in Ægypt, where their language must have undergone a severe and lamentable change: “cum fortunis gentium mutari quoque sermonem”: *Voss. de vir. Ryth.* Nor from thence to pursue it through all their gross idolatries, which permute a language more perhaps than bondage itself, to the Babylonish captivity, when “haud dubium quin lingua hæc multum “pristini splendoris amiserit, atque Chaldæa vocabula plurima irreperint”, *bitringa lib. 1. cap. 3.* Nor from thence to deduce it to the invasion of Antiochus Epiphanes, when both the language and the country itself suffered so total an alteration, as to render them altogether *Syrian*. Though something not unforeign to our purpose might perhaps be gathered from the poetry of the Hebrews during these periods of revolution, the investigation would both detain the academy too long, and appear

\* Vide Append. Numb. 1.

pear the leis necessary when we come to consider certain pieces of the Hebrew verse. It might be more to our purpose, though at first sight perhaps not so obvious, to trace the language from the time it ceased to be *vocal*, and became as it were a dead-letter; that is, from the time of Esdras to the period of the incarnation, a space that included some hundreds of years; and so subversive of the tongue, that during the sway of the Seleucidæ, Judæa nearly lost her original language, speaking a sort of Syro-Greek, known by the name of the *language of Jerusalem*. But even this, as well because the learned do not require such discussion, as for the reasons just assigned, will also be found unnecessary; notwithstanding the silence of the vowels must have greatly contributed, not only to embarrass the sense of many passages in the sacred page, but to render it at once uncertain and capricious, I had almost said, absonous and dumb\*, not more destructive to legitimate measure†, than to the happiness of the rhyme, should it be made appear that rhyme is the character of the Hebrew poetry. The learned Vossius indeed, rashly it may be thought, would cut the matter short with one sweeping stroke of his pen, observing, “Hebræorum qualis fuerit pœsis, adeo nobis ignotum, quam quod ignotissimum: nam quæcunque de hâc scribere nonnulli istius-“ modi sunt, ut longé melius fuisset ea tacuisse,” *Voss. de Vir. Cant. &c.*

Notwithstanding

\* The vowels, it is justly observed by Vossius, strongly express the manners and character of every nation, which he beautifully illustrates in the example of the Greek vowels: “Percuremus potestatem et efficaciam, quam vocales habeant in significandis moribus et gentis cujusque ingenio.” *Voss. de viribus Cant. et Ryth.*

† The language of the Poles, though scarcely possessing a vowel, and in this respect not much differing from the Hebrew, the natives thought well enough adapted to verse. “Polonum lingua ferream propemodum habet duritiem, utpote in qua uni vocali septem vel octo sæpe copulantur consonantes. Pene dixeris eos absque vocalibus loqui. Memini certè vidisse me aliquem ex ea gente, qui palam jactaret ad formandam vocem et explicandos animi sensus, vel solas sibi consonantes sufficere literas, Qui Polonice callent, facile et horum sermonem ad pedes et tempora syllabica poterunt revocare, cum nulla usquam sit lingua numerorum expertus.” *Voss. ibid.* Withdraw the masoretic vowels, and I much question whether a modern rabbi could perform as much in his own tongue.

Notwithstanding the great authorities that oppose the question of rhyme as constituting a part of the Hebrew poetry, what I have read on the subject, with my own slender knowledge of the sacred text, inclines me to think this ancient parent of tongues and *magna mater* of language, who has given birth to so many fairer daughters, nursed in her fruitful bosom the very soul of rhyme; and that rhyme formed a strong feature in her venerable face. The question then, as it effects the present enquiry, appears to be this: not, simply, whether rhyme did, or did not enter, and form a part of the Hebrew verse? (for that is a matter of proof, not of speculation.) But, *whether rhyme was an innate quality in the parent language?* Those, we know, who are born with the music of poetry in their souls, “lisp in numbers”. We require not the tuneful Ovid or the melodious Pope to assure us of the fact. Filled with the divine enthusiasm, the infant poet labours, like the Delphic virgin, till his words break into the harmony of numbers: and a judicious critic, who cannot be suspected of partiality in this matter, has confirmed its truth in an elaborate treatise on rhythmical composition. So natural, says he, is the rhyme in all languages, that infants of their own accord fall into it, by sounding batologically the same words of a song, and afterwards by varying them into similar corresponding sounds\*. This sure had been enough to convince us, that rhyme is coeval with language, and ancient as speech itself. If so, it cannot be a *borrowed* quality in poetry; neither can it be of European invention, or have been first brought by the Barbarians of the north into the more southern provinces. It is the object of these pages to shew that rhyme has in no age or country been super-induced into any language whatever, and least of all, into our own, that

“Slides into verse, and hitches in a rhyme”

It is the child of nature, not of adoption; the spontaneous language, speaking through the mouths of babes and sucklings, and as Vossius says of the infant poet, consulting the “ornament as well as the fullness of numbers.”

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B

numbers.”

\* Voss. *ibid.*

numbers." "Hac ratione non ornatui tantum, sed et verborum confu-  
litur copiæ," (*De Vir. Cant.*). In which fulness the language of every  
nation, whereof we have any knowlege, delights to express itself, be-  
fore it loses its character, and ambles into prose. If, then, the parent  
poetry, which is only the parent language of mankind, diversified and  
branched out into an infinity of channels, *does* court and acknowledge the  
rhime, to that fountain, and that fountain alone, must we resort for its  
*origin*; though we cannot, for that very reason, thence deduce its pro-  
gress, without deducing, at the same time, the progress of language with  
it; a subject for which this essay is not designed. And thus we may  
conclude, that what the fountain possesses, the stream inherits; and like  
the river of the poet, shall continue to flow as eternally as language  
itself; that universal voice of nature, varied by certain local habits and  
circumstances, yet always the same; resembling the copious and abun-  
dant Nile, that slender at its source, but winding into innumerable mazes,  
and enriched in its progress with tributary rivers, is still the Nile; till  
through its numerous mouths it discharges its agglomerated waters into  
the immensity of ocean.

Neither will this be found to militate against the argument, that the  
Greeks and the Romans excluded rhime from their poetry: it only proves  
that dactyles and spondees, with their complex varieties of long and short  
feet, did not *easily* admit the rhime; and that transposition does not fa-  
vor the teleutic harmony: for the same reason, that other languages, not  
admitting the Greek and Roman quantities, receive the rhime with ease,  
and make it a part of their poetry. Yet, we shall presently see, in the ex-  
ample of Theocritus, that where the Νενιον, or nenia, provoked it, that  
is, where nature invited, and called for it, (such as hath been observed in  
the case of infants that lisp the rhime, and in the la la songs noticed by  
Lucian, λαλα παιδικος επιφθεγμα, *Philopseud.*) even the Greek itself could steal  
it upon the ear. We shall hear the Grecian nurse most musically soothing  
her little children with its harmony; not perhaps using the direct ὁμοιοτελευτων  
but yet the ὁμοιοπρωτων; which, the cadence considered, amounts to the  
same thing, and produces the same happy effect.

And



And so true are these observations, for it is to nature we must trace this universal harmony, that the most unpolished nations of the world, as well as the most civilized, adopt the rhyme as a constituent part of their poetry: for every nation hath its poetry and its rhythm, from the war-song to the amatory ode: and without this rhythm, it would cease to be poetry. "Tollas compositionem et partium varietatem, simul quoque tollas pulchritudinem: tollas rhythmum, fracta et sine viribus erit oratio." *Vossius*. Most of the American tribes, of which we have any knowledge, make the rhyme an essential part in their songs: though Father Lafitau (*Mœurs des Sauvages, Tom. 2.*) says that the rhyme or teleutic music does not enter the rhythm of the Hurons and Troquois. But though I would not argue, *a posse, ad esse*, I think it highly probable, the learned father might have been mistaken, through his want of a thorough and perfect acquaintance with the language of these Savages; the polished European ear not always being able to distinguish, *ακριβως*, the just pronunciation of a barbarous tongue; and still less, to fix the corresponding sounds in their proper places. And this observation is strengthened by Mr. Carver, who, after premising, that "as the Indians are not acquainted with letters, it is very "difficult to convey with precision *the exact sound of their words,*" gives us one of the hunting songs of the *Naudowessies*, a tribe closely bordering on the Hurons, and which, speaking a language used on solemn occasions by the Hurons and Troquois themselves, viz. the *Chipéway*, do rhyme their verse. The writer then gives us this song:

"Meoh accoowah eshtaw paatah negushtarvgaw shejah menah. Tongo wakon meoh "washta, paatah accoowah. Hopiniyahie oweeh accooyee meoh, woshta patah otoh-to- "hinjoh meoh teebée."

Though Mr. Carver has not noted the rhimes, the academy cannot fail to observe them, notwithstanding the frequent recurrence of the same or similar sounds, may not allow us Europeans to determine their specific places. Which is thus translated, as literally as the genius of the two languages will admit.

## 1.

Ere the rising sun beams break,  
 I the lofty mountain seek;  
 Watch the new light's earliest ray,  
 Chasing the dark clouds away.

## 2.

Spirit hear! When comes the night,  
 Silver moon, oh lend thy light!  
 To my tent oh speed my way,  
 Laden with the hunter's prey!

Even in the liquid and melodious Italian, a language as smooth and musical as the Huronic is harsh and rugged, Le Clerc shews us, by throwing the verse into the order of prose, you shall not be able to detect the rhyme. And this argument we shall presently see applies yet more strongly to the parent poetry, that has been silent above two thousand years, "ab annis plus bis mille intermortua," as Lowth has it; and whose true enunciation the seventy themselves had lost, three hundred years before the coming of the Messias. Who then shall restrain the instability of language, who shall arrest its fugaciousness? Who, that considers the uncertainty of all human things, never at a stay, expects, that words shall be exempted from the general lot? Shall words be less fleeting than the things they represent, and of which they are but the sign? Their mutations shall be various as the changes of other mortal things: and the vowels, or tones of language, shall in their very nature be the first to depart. The seventy, learned as they were, and selected, for their superior erudition and judgment, have fallen into the common errors of humanity. The very mode, that was prescribed to ensure their accuracy, proved the source of their *inaccuracies*: for, being chosen out of the several tribes, each differing from its neighbour tribe in its respective pronunciation of the vowels, or elements of the language, they have more than once jostled one another: each tribe, by enunciating the vowels in its own way, and according to its own dialect, (for although the Chaldee was but a dialect

dialect or daughter of the Hebrew, yet, that dialect was now itself corrupted, and variously spoken) one, after the manner of Galilee, another, after that of Antioch, a third of Jerusalem, and so on, has sometimes given a turn to the original words that the text would not allow. In fact, since it is observed, that nothing is more fleeting or inconstant than the *found* of a LIVING language, especially after it hath acquired a mixture with other nations, that commerce, invasion, or migration itself, may have produced; by what standard shall we determine the exact and faithful pronunciation of a DEAD one, especially that of its *vowels*, its airy and elemental part? These observations will be found the more necessary, when we come to the examples Le Clerc has given us of the Hebrew poetry, of whose rhyme, though for the reasons assigned it may not *always* be possible to trace or fix it, I am as firmly persuaded, as I am of the rhimes of Dryden.

Captain Cook, or, rather, the more discriminating Dr. Hawksworth for him, has made an observation on the Otaheitean poetry, that comes directly to our purpose; and though I had designed it for another place, I cannot better introduce it than in this; especially, as it proves the point, which these papers have principally in view; viz. that savage poetry, which is but another word for *the language of nature*, hath its rhyme, as well as the courtly and artificial numbers of polished society; and that modern Europe just as much borrowed its rhyme from the islands of the Pacific Ocean, as from the shores of the Baltic. “They call every two  
“ verses, or couplet in a song, *pebay*; they are generally, though not al-  
“ ways, in RHIME; and when pronounced by the natives, we could discover  
“ that they were metre. Mr. Banks took great pains, to write down some  
“ of them which were made upon our arrival, as nearly as he could ex-  
“ press their sounds by combinations of OUR letters; but when we read  
“ them, not having their accent, we could scarcely make them either metre  
“ or rhyme. The reader will easily perceive they were of very different  
“ structure.

Tede Pahai de parow-a  
Ha maru no mina.

E pahah Tayo malama tai ya  
No Tebane tonaton whannomy ya.

E Turai eat terara patee whennua toai  
Ino o maio Pretane to whennuaia no tute."

*Cooke's Voyager.*

These couplets are undoubtedly rhythm; though like the Hebrew, we can neither measure their quantities, nor give them their proper cadence. We are obliged, however, to Mr. Banks for his care and accuracy, in preserving the rhimes: but, I cannot help being of opinion, that the same fate, which attended Lafitau, attended this gentleman when he put down the last *pebay*, that presents us, *as he has written it*, with two *blank* lines. Dissonant and unfamiliar as the Otaheitean verse must have been to his ear, it is more than probable he was unable to catch or follow its rhyme. Yet he enjoyed one advantage, that no Hebrew scholar can again obtain. Mr. Banks had the *natives themselves, and authors of their own poetry, to pronounce and repeat the pebays, till he should understand them*, at least sufficiently to pen them according to his own ear. And yet, he might have no better fortune than other travellers, who, with the very same disposition to accuracy, differ almost always in their pronunciation of the same words; those travellers especially who visit Arabia, the tribes of which nation are at as perpetual variance in their dialects, as themselves are in unceasing motion: and perhaps it were as easy to preserve the form of their letters committed to their own hands, as to retain their sounds among such a floating multitude. Hence it has happened, that the Arabian traveller hath not always been able to convey with due precision the legitimate sound of the word he would write down for European use; particularly the *vocal* words, or those in which the vowels predominate. The instances are innumerable. But if with such peculiar advantages, Mr. Banks found himself unequal to communicate the just metre of the Otaheitean poetry, by what rule or standard

standard shall the most able Hebreologist determine that of a silent and unvowelled language, a body without a soul? \* a lost and uncharacterised tongue! for the poetry of a modern rabbi just as much resembles that of the sacred pen-men, as the Cambridge fiddle of Joshua Barnes resembles the lyre of Anacreon. † Much praise, however, is due to those pious and learned men, both the Jewish and the Christian doctors, who have laboured in the thorny vineyard, and cleared away any part of the brambles that perplexed its poetry.

On the rhimes, contained in the last quotation from Captain Cook, I would offer one or two short observations. In the second couplet we have the word *ya* repeated as a rhyme; whereas to an occidental ear the combination of the letters presents but one sound, and that the same. The rhyme therefore to us Europeans appears not *homoioteleutic* but *homoteleutic*. It does not however follow, that the natives, who speak the language, do not accent or pronounce the word differently from what we do: and consequently, the last couplet in which the rhyme is not obvious to us, may yet be *homoioteleutic*. And the same argument addresses itself to the Hebrew poetry, about whose cadence and structure we know so little. This observation receives new strength from the remarks of Fathers Magaillan and Kircher on the Chinese language, viz. that the same word, by a change of tone and aspiration shall signify from fifteen to twenty different things; the first instances the word *po*, which he shews by certain marks has no less than eleven various meanings; and the latter has these words, “*hæc dictio monosyllaba ya, ex se indifferens est, sed pro diversitate vocalium quibus designatur, differentes significationes exprimit, uti sequitur.*”

Ca

\* “No single letter,” says Simeon Ben Jochai, in his *Zohar*, as I find it translated, “hath power to signify one thing more than another, without the points; and all the letters without the points, are a *body without a soul*. With the points, the body stands.”

† When Barnes published his Philautic edition of Anacreon, the Cambridge wits said, that it was not Joshua Barnes’s edition of Anacreon, but Anacreon’s edition of Joshua Barnes.

" Yá . . .	: Deus.
" Yǎ . . .	Mutus.
" Yà . . .	Excellens.
" Yá . . .	Stupor.
" Yǎ . . .	Anfer.

*China Illustrata, Pars prim. Cap. tert.*

To this list Mr. Ogilby adds half-a-dozen other meanings of the word *ya*, according to its accentuation, but which none except a native can properly pronounce.\* Nor is it foreign to our purpose to take notice, that Father Magaillan, who resided five-and-twenty years in the country, and received the applause of the Chinese themselves for his compositions in their tongue, has observed that the Chinese language is the most facile and accommodating of any in the known world, the Greek itself not having surpassed it in copiousness and variety, in perspicuity or in sweetness, and though consisting of between five or six thousand letters, yet possessing no more than three hundred and twenty words, all monosyllables; but these by artificial combinations and accents so modified and varied, as to form the most luxuriant and eloquent harmony. This peculiar genius of the language admirably fits it both for poetry and for rhyme, the *decus et tutamen* of numbers; and accordingly we shall presently see that the rhyme invariably prevails in the Chinese poetry. Those languages too, which abound in monosyllables, are observed to rhyme with the most ease; a remark so obvious as scarce to deserve notice. This monosyllabic quality in the Hebrew may however have been one of the principal causes why rhyme took such strong possession of its poetry, and continues to characterize most of the English, with the whole of the Gallic verse, and more or less the entire poetry of Europe.

Though

\* Father Le Compte, in his letter from China to the Archbishop of Rheims, observes, that if you do not take care, you may call a man a *beast*, when you intended to say *Sir*.

Though many learned rabbies had endeavoured to preferve or illustrate the sacred text, while the Christian church slept in sinful and slothful ignorance, yet it was not till about the fifteenth century, that the Hebrew became an object of classical regard: soon after this period we find Abarbanel, the learned jew, better known by the name of Abrabanel, or Abravanel, writing his dissertation on the minor prophets; a work which I have not seen, but in which, it seems, the author lays down *rhime* as a principle, or primary canon of Hebraic poetry. Previous to Abarbanel, I do not know of any writer who has noticed the rhimes of the sacred text; although the rhimes of his brother rabbies, who learned theirs of the Arabians, are sufficiently numerous. Indeed, Le Clerc himself, whose learning and observation scarcely any thing escaped, does not seem to have been conscious that Abarbanel had ever written a word on the subject; not so much as naming him, he only observes generally that later critics, such as Buxtorff, the father, in his *Profodia*, and Theodore Herbert in his *de Poeticâ Hebraicâ*, and Ferrand, in his Commentary on the Psalms, with some, perhaps, of less note, had here and there discovered rhimes in the Hebrew poetry, and slightly mentioned them, but that they had all imputed them to *accident*: this, therefore, being pretty much the case, we must not be surprized to find the learned Dr. Lowth, and other Hebrew scholars, opposing the *new* doctrine, as a sort of poetic heresy, whose very novelty had been sufficient to provoke the thunders of orthodoxy. Of Abarbanel's dissertation, however, the doctor thus delivers himself, "ABARBANEL tres statuit species canticorum. Prima est "rythmica, five *ομοιοτελευτικῆς* constans; id usu apud recentiores Hebræos, "qui ab Arabibus didicerunt, sed sacris scriptoribus planè ignota." (*Præl.* 18. in *Annot.*) Abarbanel, then, for ought that appears to the contrary, was the first that had noted the rhimes of the Hebrew poetry: and it is somewhat extraordinary, that he, Le Clerc, Garofalo, Fourmont, and other learned champions, should discover in it what we are as positively assured is not there to be found: and just as extraordinary, that if the Rhimes are there

to be seen, that neither the sharp-sighted Lowth, nor the acute Calmet, nor the profound Pfalmanaazar, nor the judicious Bedford, with other distinguished Hebrew scholars, should be able to perceive them. One would suppose that something divine indeed and sacred, had been lodged in the tongue, whose mysteries may not be unlocked; that like the tables of testimony, it had literally been written "*with the finger of God.*" (Exod. c. 31.) or as Fleury, in his *Mœurs des Israelites* has sublimely expressed it, that the Hebrew poetry was the language of spirits, who stand not in need of words to communicate their ideas. (Chap. 20.)

When I observed that the rabbies had learned their rhimes of the Arabians, it was in pursuance with the words of Dr. Lowth, cited above: but while Le Clerk, from whom the doctor borrowed the observation, has ascribed them also to the same source, Vitringa has proved beyond all contradiction, that the Arabians originally spoke the Hebrew; and thus, instead of referring the rabbinical rhimes to the Arabian poetry, they might, with as little difficulty, have been traced to another fountain. The Arabian, says Vitringa, is but a dialect of the Hebrew; "*Dialectum Arabicum adeo tum temporis (scil. Jobi) non distulisse á Ebreá.*" (*Vitr. obs. sacr.*) and Lowth himself has said, in express terms, "*omnes Abrahami posteros, Israelitas, Idumæos, Arabas, tum Keturæos, tum Ishmaelitas, communi linguâ diu usos fuisse veri est simillimum.*" (Præf. 32.) But the Doctor's argument, that, because the rabbinical rhimes are, as he tells us, borrowed from the Arabians, rhyme, therefore, cannot enter the sacred text, (for if his words have not that meaning, they have no meaning at all) is to me no more conclusive, than if the same argument had been employed to prove that these rhimes had arisen out of the *ομοιοτελευται* of the second psalm. The one, in my humble opinion, is just as conclusive as the other. When the rabbies began to write verse, they might find, without recurring to the Arabian poets, or the Hebrew bards, or even the christian monks themselves,



felves, as Scaliger supposes,\* that the monosyllabic character of their language challenged and facilitated the rhyme; and, to use an observation of Le Clerc, that the cases and suffix pronouns chiming so perpetually with one another, and the plurals again so constantly terminating and consoning alike, it was more difficult for them to *avoid* the rhyme than to *find* it. Yet, it is somewhat singular, that the learned Pfalmanaazar, a man eminently skilled in oriental literature, should borrow this very argument of Le Clerc, and employ it against him, with a view to show that the sacred writers did *not* compose their poems in rhyme. His words are these: "Those that are ever so little acquainted with the Hebrew grammar know, that the termination of verbs, and even of nouns in the plural, and the junction of the possessive pronouns to both of them, are so alike and uniform, that it would be vastly more difficult to write a poem in blank verse in that tongue, than to have it all in rhyme." (*Hist. of the Jews to the Babyl. Captiv.*) From these premises, then, I should suppose it was not of the Arabians that the rabbies had learned their teleuties; and I lay it down, as a rule not to be departed from, that rhyme is not a *borrowed* character in poetry; notwithstanding the monks, who found pleasure in difficulty, might have forced it for a time upon the Latin, to shew what the forbidding genius of an obstinate and unaccommodating tongue could perform: a tongue so unmanageable, even in its most improved state, that Cicero himself complains of its inflexibilities.

C. 2

This

\* "Neque vero putaveris genus illud rythmi, quo Proverbia, et liber Job constant, esse simile ei quod hodie Judeis in usu est. Nam hodierni versus Judaici sunt plane rythmi nostri vulgares *ομοιοπτατοι και ομοιοτελευτοι*: quod a nobis Christianis ante annos D, plus minus didicerunt, nos autem ex Leoninis Hexametris quæ vocant, eos effinximus." (Scal. Animad. in Chronol. Euseb. p. 7.) Yet, in the preceding page, the same Scaliger had said "Solum canticum Mosis, extremo Deuteronomio, Proverbia Solomonis, et totus ferè liber Job, quadam rythmi necessitate cõhibentur, qui rythmus est inflexarum Iambicarum, et *tinnulus accidit ad aures.*" Scaliger, therefore, need not have sought the rhimes of the rabbies in Christian convents, nor should Le Clerc have asserted that Scaliger had said nothing concerning the ancient Hebrew rhimes.

This however shews only the sport of cloistered dullness, possessing no better refuge from unbroken apathy; the gambols of a dormouse catching at its own tail, and for the same reason, the rhyme being abhorrent to the Roman language, (as the monkish latin itself proves it to have been,) it fell into disesteem and disuse, the very moment that taste and corrected judgment had shewn that the structure of the language resisted the rhyme, and wrestled with it as unnatural; while the rhyme as naturally formed a part of, and still continues to hold its place in, those languages, which grew out of the *corrupted* Latin, that solicited the rhyme, for the same reason the *pure* Latin refused to receive it, all which languages formed themselves pretty much about the same time: for with the loss of Roman liberty, and the consequent fall of that mighty empire, fell its *language*, giving birth to new tongues, like those of the confusion, that gradually settled in distinct *dialects*. Nor was it long before these tongues molded themselves into rhyme, as if by common consent, not borrowing it of the Goths, as some have supposed, and adopting it, as of violence, after the manner of the monks, but *yielding to it, as of necessity*, some sooner and others later, according to the degree of inversion and the transpositive turn, that each language happened to take; that is, as each respective tongue partook more or less of the genius and conformation of the Latin: and this is strongly exemplified in the modern French, whose construction, while it abounds in words formed from the Latin, resembles the Hebrew more perhaps than any other language, the words following one another in the same temperate and natural order. Hence it happens, its transpositives being but few or none, the language not only receives the rhyme with ease, but in most cases *requires* it: for, excepting those of Ronfard about the middle of the sixteenth century, and some few others his contemporaries of less note, whose poetry has deservedly been rejected for its hypallages and other affected Latinisms, the whole of the French poetry is of the simplest construction; and from the time of Marot, a period that embraces nearly three hundred years, it

it has been improving, in all the modest graces of the most elegant and harmonious rhimes. Inſomuch, that blank verſe may be ſaid to be an entire ſtranger to the French poetry.\*

What has been ſtated will ſuffice for a ſhort but general view of the progreſs of rhyme in Europe, where ſcarcely one nation took the lead of another; or if any, Italy perhaps the firſt, then, courtly and gallant France, after theſe Spain, England next, and Germany laſt: each conſtructing a language of its own, compounded of Roman and Septentrional phraſe, that formed a kind of gotho-latinity; till learning, ſcience, judgment, and above all *taſte*, had perfected the muſic of the European muſe, and poliſhed it into that ſweetneſs and harmony, which it is hoped it will long retain. It is probable, therefore, I ſhall not dwell long on this part of the ſubject in the ſequel: and, indeed, as rhyme, for the reaſons aſſigned, almoſt at the ſame inſtant took poſſeſſion of the European tongues, (of weſtern Europe, I would ſay) and became as it were a part and member of their poetry, there will be the leſs occaſion to purſue its “progreſs” through the mazes of the modern languages. The ſubject would require a little volume; and theſe papers have already ſwelled to an unexpected ſize. The period of the Troubadours alone would furniſh a diſtinct eſſay.

As I propound the Hebrew to be the parent fountain of language, and aſſume its precedence in Rhime, it may be expected, I ſhould prove a fact that has been ſo ſtrenuouſly denied. Thoſe who would have a complete view of the queſtion, are referred to Le Clerc’s “*Eſſai de Critique, où l’on tâche de démonſtrer en quoi conſiſte le poëſie des Hebreux*”, publiſhed in the *Bibliothèque Univerſelle*, for the year 1688, Vol. 9. Art. 8. one of the moſt luminous and beautiful traacts, and at the ſame time the moſt concluſive, that has ever fallen within my knowledge. To eſta bliſh the rhyme, the entire “Eſſai” ſhould be tranſcribed, for every argument riſes upon the other, with additional force and luſtre, the whole forming a well-cemented building, that even prejudice has not been able

\* See Append. Numb. 2,

able to destroy ; but the strength or beauty of which I could no more shew by an extract, than the pedant of Hierocles could give an idea of the excellence of his house from the sample of one of its bricks. Besides this tract, whose main object is to prove that the psalms had been composed in rhyme, our author, some years after, published, in his commentaries on the Pentateuch, the two songs of Moses in Exodus and Deuteronomy, verse for verse, and rhyme for rhyme, proving in the same irrefragable manner, that these treasures of Hebrew poetry had likewise been composed in rhyme. The great charge against Le Clerc is, that he has transposed the Hebrew text to his own purpose ; and Calmet, the bitterest of his enemies, (who seems to have indulged more heat than became such a cause) asserts, that any part of Cicero's orations might in the same manner be twisted into rhyme. The experiment has been made on some of them, and failed. But, supposing the trial had succeeded, and rhimes been picked out of the Roman orator, what would have become of his beauty and eloquence so transposed ? *Lost in the transposition.* And conceding Calmet's accusation well-founded, and that Le Clerc has, for the sake of the rhimes, inverted the textual order, (which, as before observed, the simplicity of the Hebrew did not admit,) what harmony, what clearness has been lost ? So little, that where the text itself was obscure, Le Clerc by *restoring* the rhimes, throws both a new light and a new elegance on it. Indeed, he seemed himself aware of the objection ; and by an extract from the Pastor Fido, which he throws into prose, challenges his adversaries to determine the rhimes. The same he observes of the Spanish verse ; both of which, though familiar languages, he provokes them to make trial of : shewing that the rhimes even in these languages, could not be traced in the manner he has done in the Hebrew. But by one well-timed observation, which, however, some of his objectors set at no account, he has put the matter beyond dispute : he proves, that in order to accommodate the rhyme to the verse, and the verse to the rhyme, the Hebrews would sometimes abandon their own language, for that of their neighbours the Chaldæans, when the *τελευτην* called for it : as in the second psalm v. 12. where

where instead of the legitimate word בן, *son*, which did not answer the rhyme, we have the adfictitious word בר *bar*, of the Chaldee, because it affoned to יבער *jibar*; though, when the rhyme did not demand the change, as in verse 7. the word בן, *son*, hath been retained: and in the Exodial song of Moses v. 29. he observes on the corrected words *one jerescham*, “sensus hic, observato ομοιοτελευτω levi mutatione commo-  
“diffimus est: quod est versuum Hebraicorum τις ομοιοτελευτω non leve argu-  
“mentum, ut ostendemus in *Diatribá de Poetica Hebræorum*.” But it is not these hymns only, and the psalms, that are found to rhyme: Le Clerc has made the same successful experiment on other parts of the sacred poetry. I shall select a short specimen from the “Effai”: Le Clerc’s own comments upon which may there be found. It is a part of the second psalm; and the “Effai”, as might well be expected, drew on its author an host of adversaries. But it shews with what sort of spirit his objectors replied, when the great Pfallmanaazar produces the thirty-fourth psalm, whose 4, 5, 9, 10, 12, and 13th verses he gives us with all their rhimes, and then triumphantly adds, they are “accidental only and inevitable”, so inevitable indeed, that Le Clerc had anticipated the very objection; and Pfallmanaazar himself, as noticed above, had remarked, that such was the perpetual recurrence of the rhyme, it had been difficult to write a poem in that language that should *not* be composed all in rhyme.

Eth mosrothe MO  
 Venaschliche mimmennou, abothe MO,  
 Joscheb baschamajim jisch AK.  
 Adonei jilaAG  
 La MO  
 Az jedabber ele MO  
 Bappho oubacharono jebahale MO.

Rhime

Rhime, in its origin, resembled the bold sweep of the mountain, or the simple majesty of the forest; though, now, by the caprice or fastidiousness of its possessors, it hath often dwindled into the clipt hedge and the trime parterre. But this destroys not the grandeur and dignity and echo of the patriarchal forest, whose oaks, while they shade us and cover us with their venerable arms, serve as an aylum from the obtrusions of impertinence.

Here, says Le Clerc, the third *MO* was unnecessary, had the rhime not been intended. The author of the psalm might have said *jil AG vajedabber, ele MO*;——which would have done just as well. And if rhime, adds the critic, had not been the character and genius of the Hebrew, the rhimes themselves had been altogether avoided, on account of the suffix *HEM*——, which, says he, is ungracious to the ear, for proofs of which he refers us to the 118th psalm. It may be necessary to observe, that Le Clerc instances the rhime by several other proofs, illustrated with the shrewdest remarks and profoundest comments, which I have not yet seen confuted, though sometimes angrily denied.

But it is not the purpose of these papers to argue the question of rhime in the Hebrew: the negative is left to its oppugners, who however, some of them at least, by their mode of arguing have rendered the proof unnecessary. Yet justice should be done to the famous Psalmanaazar, who, while he denies the rhime, has so beautifully supported the superior expressiveness of the Hebrew, over the Greek and Roman tongues. It will not lead us from our subject, to observe that this able man, as other scholars do, supposes the Hebrew to have been regulated by prosodial rules. I dare not pretend to deny the fact, but other distinguished authorities, and Beda in particular, imagine that the Hebrew poetry expressed itself rather in rhythm without metre, than in metre with rhythm: forming a kind of broken and disordered, but measured prose, sometimes of long, and sometimes of short syllables, more of them or less, according to the pathos or affection expressed, and not perhaps unlike the rhimed prose of that prophane example, “the humble petition of Mrs. Francis Harris,” or in the vigorous and expressive language

language of Scaliger, (*Loc. citat.*) “ aliquando pauciorum syllabarum, aliquando plurium, quales Græcorum *επιχει καταληκτικοί, βραχυκαταληκτικοί, υπεργεμετροί*: non utique quod compensatio fiat *κατα ισοχρησιαν*, ut in Græcis solet: neque enim hoc exprimi potest idiomate Hebraico: sed quantum sententia postulat, rythmus nunc longior, nunc brevior est. Est enim rythmus, ut doctissimus Beda ex Marii Victorini, Augustini, et aliorum scriptis collegit, metris consimilis verborum modulata compositio, non metricâ ratione, sed numero syllabarum ad iudicium aurium examinata, ut sunt, inquit, carmina vulgaria poetarum. Et quidem rythmus sine metro esse potest, metrum vero sine rythmo esse non potest.” So far the venerable Bede, strengthened by the masculine learning of Scaliger; and from the *knock-down* argument, that Pfallmanazar himself has employed, I am inclined to think there is much truth in the observation; and further, that this has actually been the case, not only with the Hebrew verse, but with that of every other people in the world, whose poetry has laboured under strong affections of the mind;\* till time and experience, and art had regulated the paces of their poetry, and taught it to move on stated feet. But should this have been the condition of the Hebrew poetry, its metre can never be distinguished, by any given rule or standard whatever, because it must have depended less on established laws, than on the ear, which was capricious, and open only to the impression of the sentiment to be expressed. “ Quæ omnia si ad rectæ rationis normam exigas, quid absurdius? Si naturam & affectuum motus spectes, quid verius, quid expressius, quid pulchrius? (*Præl. 23.*)

*And in my God I will knock down an ox. (Ps. 28. v. 19.)*

*Ubelohai adaleg sboor,*

*Procumbit humi bos.*

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\* Since this was written, the author has found the observation fortified by the learned author of the Hebrew Prælections, who produces instances of it, both from the Greek and from the Latin, especially from a Greek scolion preserved in Athenæus.

This of the Latin poet, (whose rhythm *falls* so exactly into the cadence of the inspired bard, that had the Hebrew, like the Greek, formed a part of the Roman studies, we should have supposed it had been borrowed or imitated) is but just reducible to metrical order, and almost out of it. The passage has been admired less for the happiness of its scanion, than for the echo of the sentiment: less for the legitimacy of its metre, than for its “*ad iudicium aurium ratio.*” It is the same, I apprehend, with the Hebrew, that expressed what it felt in *rhythm*, that is, in a bold but disordered measure, rather than in faithful and certain quantities, and Virgil himself, we know, would on extraordinary occasions, disdain the stated feet that usually governed his muse. But the examples here produced are the strong and unfettered language of nature, which will ever be the same in all ages and countries: and he who expresses that language in the happiest and most forcible manner, will best deserve the name of *inspired*.

As our learned countryman has denied rhyme to the Hebrew, and as his authority must always carry great weight, the academy may not be displeased to see in this place what the illustrious Lowth has said on this subject. I shall not detain them with a long answer.

“ Quod ad eorum attinet sententiam, qui Hebraici carminis artificium  
 “ in ομοιoteλευτοις unice ponunt, in versuum clausulis similiter desinentibus;  
 “ eam quanquam multos habuerit fautores, et eruditos propugnatores,  
 “ Clericum, Garofalum, Fourmentium, multo tamen esse arbitrator om-  
 “ nium vanissimam, quippe cujus vanitas tam manifeste deprehenditur.  
 “ Nam cum in carminibus alphabeticis nonnullis certo definiuntur ver-  
 “ suum clausulæ, cumque in eis planè apparet versuum clausulas non  
 “ esse similiter desinentes, nullam adhibitam fuisse circa ομοιoteλευτα curam aut  
 “ cogitationem; clarè id evincitur, Hebraici carminis artificium in ομοιoteλευτοις  
 “ positum non esse.” (*Met. Har. Brev. Confut.*)

This sort of *Brevis Confutatio* is not the proper mode of disposing of a great and important question; a question that at once involved the interests of biblical literature, and had been maintained by pens surely as learned as his own, without the smallest disparagement to his great  
 erudition



erudition and talents. Fourmontius I have not seen; but Garofalo's "considerazioni intorno à la poesia degli Ebrei" &c., was certainly entitled to more respect. The book was printed at Rome in the year 1707, and in 1710 Le Clerc takes occasion to pay an high compliment to the author's great learning and ingenuity, (see *Bibliothèque choisie. Tom. 20. Art. Livres Historiques, &c.*) Observing, that Garofalo, since the publication of his book, had declared to several of his friends, that he, (Garofalo) when he wrote his "Considerations," had not read or heard of the "Effai"; or known that Le Clerc had supposed rhyme to be the character of the Hebrew poetry, which the Frenchman considers as a strong argument, supported as he was by so illustrious a man, that himself had not been mistaken. And on examining Garofalo's volume, it actually appears, that the learned author had in a number of instances agitated the question of rhyme, in the very same manner that Le Clerc had done before. Another happy argument in favor of the "Effai," but Garofalo goes one step further; and asserts, that not only the two hymns of Moses, and the songs of Deborah, and Hannah with the psalms 3, 4, 29, 31, and 33, but that the Threni, the song of songs, and the prayers or songs of Jonah and Habakkuk, are likewise in rhyme. And all these he supports with superior address and ability. "Vedrà poesia dichiarata la natura dell' antica Poesia degli Ebrei, la quale non già consiste in versi misurati, come altri s'ha dato di leggieri a credere, ma bensì in una certa cadenza armoniosa, espressa in rima." Indeed a friend, whose great learning is entitled to the highest respect, informs me, that the late erudite rabbi Openheimer of Prague had assured him a part of the third chapter of the *Threni* was composed in a small elegiac stanza of rhyme, of the Pindaric nature, and irregular, denominated *Schlofchib*: but whether Openheimer ever published the observation, I have not heard. Doctor Lowth, however, says that the whole of the *Threni*, excepting the last chapter, are of the alphabetic order, to which, as we have seen, he denies the rhyme.

What Le Clerc and Garofalo, with their learned associates, have said, does not appear to be shaken by any thing the learned professor has

written : the argument however more properly belongs to Pſalmenazar, who had uſed it before, as indeed moſt of thoſe who oppoſed Le Clerc, had likewiſe done. The argument, as they have put it, may be reduced to this: “ becauſe the rhyme cannot be traced in the alphabetic, or acroſtic verſes, therefore it cannot be found in verſes of another caſt.” As well might the advocates of the rhyme turn it the other way, and argue, that “ becauſe the alphabetic order cannot be traced in the rhiming verſes, therefore, *claré id vincitur*, it cannot be found in verſes whoſe clauſulæ reject the rhyme.” The fact, indeed, we know to be otherwiſe : but the ſupporters of the ομοιοτελευτων being equally convinced of the exiſtence of the rhyme, as its oppugners are of that of the ακροσυχου, they have an equal right to the benefit of the argument. If any conſequence, however, can be drawn from the reaſoning of the learned profeſſor, it ſtrikes me to be the very oppoſite of what he intended, viz : that the rhyme receded where the acroſtic was employed : for that the alphabetical verſes, which the Prælections themſelves aſſure us were contrived *memoriæ juvandæ cauſâ* (Præl. 3.) rendered the preſence of the rhyme unneceſſary ; but that when this mode was diſregarded, the memory, not being aided at the ακρον, or *beginning* of the verſe, might ſometimes require to be aſſiſted at the τελευτων, or *cloſe* : or, to condense the argument, and to ſpeak technically, that the acroſtic, as the word imports, was the *initial*, the rhyme the *final* impreſſion of the verſe. Or, perhaps, the acroſtic might have been a ſpecies of verſe, purpoſely deſigned, and invented to encrease the difficulty of the compoſition, by the excluſion of the rhyme, whoſe recurrence we have ſeen, was almoſt unavoidable. And ſhould this be allowed me, both the previous exiſtence, and the proof itſelf of the rhyme, follow as of courſe. But I inſiſt on nothing : it is a mere conjecture of my own ; and the admirers of Doctor Lowth will I hope forgive me.

The Ακροσυχου was common to moſt of the oriental nations ; and among the Hindoos, the Syrians, the Arabians, and the Perſians, continues to be uſed even to the preſent day. But we know rhyme to have been their invariable character : the acroſtic, then, not excluding the rhyme  
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from these tongues, may we not, by a parity of reason, infer, that it did not exclude it from the parent poetry, though, for certain reasons not now discoverable, as well as from the peculiar cast and indoles of the language, the rhyme in that tongue might be laid aside when the alphabetic order was observed? Yet, should it be allowed to Garofalo that the *whole* of the Threni are in rhyme, while the four first chapters are acknowledged to be alphabetic; and should the remark of Openheimer appear well founded; what will become of the professor's argument? And thus, I hope, enough has been said to establish the priority of rhyme in the oldest language of which we have any knowledge. Its præantiquity has been argued at some length, because so many learned men had disputed the fact of the rhyme. It is not, however, contended that the Hebrew rhyme is the progenitor of teleutic harmony, further than as that language may be the parent of every other. That which is universal, cannot be partial, and that which belongs to all, is the exclusive property of none. From the lisp of the infant to the lyre of the bard, the rhyme has been a note in the voice of *man*.

Of the ancient Ægyptian poetry not a vestige can be found, unless perhaps the song of Moses in the wilderness may have been composed in that language. But we have seen "illam linguam vel Ebræam, vel Ebrææ simillimam." "In that day shall five cities in the land of Ægypt speak the language of Canaan," (*Isaiab Chap. 19. v. 18.*) What, therefore, is true of the rhyme in the Hebrew poetry, will be found true in the Ægyptian: and thus the rhyme, familiar in the former, could not be abhorrent to the latter. Yet, if we concede that Moses composed his song in the Ægyptian, we establish the rhyme in that language, and prove that it was familiar to the Israelites under the bondage, who would not have endured, murmuring and discontented, as they were, the introduction of a species of composition altogether novel and unknown.

The Æthiopians, we know, who most probably are the descendants of the old Ægyptians, that spread themselves southward, continue even to this day the Ὀμοιοτελευτων in their verse; not much unlike the rhimes of  
the

the parent Hebrew, from which their language is but a barbarous deflexion.\* The very learned Ludolfus, in his Ethiopic history, *L. 4. cap. 2.*, has observed of the Ethiopians, “inter artes liberales poësim maxime amant, sed sacram duntaxat; ethnicam merito detestantes. Carmina vero Ethiopum in meris consistunt rythmis; si rhythmos vocare licet consonantes ejusdem ordinis versus finientes, quamvis vocalibus dissonantes. Præter eos vix ullum observari potest metrum. Genera varia habent, prout in profodiâ novæ grammaticæ nostræ adjecta, fusius docebimus.” But unfortunately I am unable to present the academy with the promised specimen; for, on a careful examination, I could find no profody attached to that edition, which I consulted. One thing, indeed, candor obliges me to confess, because it is at war with the principle I lay down, neither have I any thing to offer against it: but this learned writer has noticed in his grammar, “nominibus, formâ, ordine, et maxime ratione legendi àb orientalibus differunt; scribuntur enim et leguntur dextrorsum more latinorum, ut mireris in tantâ hujus linguæ cum reliquis orientalibus convenientiâ, tantam scripturæ diversitatem inesse.”

From Ægypt the transition is natural to *China*; and some, perhaps, would give the peopling of this country the priority in point of time. Like the Ægyptians, the settlers must have brought with them the language their fathers spoke at Sennaar, together with such of its poetry as was then in use. Now, we have seen the parent language refined its verse; and the first laws of most nations being delivered in poetry, the venerable father of Chinese philosophy borrows his political and moral maxims from the poets of his country. Over these laws and maxims time has spread a sacred rust, and stamped their rhyme with the

\* Ludolfus, however, says that the Æthiopic is the old Abyssinian language, that originated in Saba, the country of the Homerites, who settled in those parts, (*Æth. Hist. Cap. 1.*) But if the present Æthiopic be the old Abyssinian, then must the language be as ancient as its first deflexion from the Hebrew, the very same now that it was several thousand years ago; probably no other than the old Ægyptian, Abyssinia having never been civilized as Ægypt was. The inference is, that the Abyssinian or Æthiopic language having continued unaltered to the present day, when the Æthiopians rhyme their poetry, they but do as their progenitors had always done.

the mark of inestimable antiquity. Every page of Confucius quotes the *Chi-Kim*, or *Volume of Verse*, most of whose odes, the great Sir William Jones assures us, "are near 3000 years old, and some, if we give credit to the Chinese annals, considerably older," (*Jones on China.*) certain of these odes, according to Le Compte, being composed by Fohi himself, and forming a part of this most ancient volume. But as their language is stated to be more than three thousand seven hundred years old, who shall presume to fix the beginning of their rhyme, but with their language itself? If it be true, that their laws were composed in verse, the better to assist the memory, and if, as agreed on all hands, the Chinese have a strong affection to music, and that they who made the laws put them into verse, "afin que chacun pouvant chanter les choses qui y font contenües, elles fussent dans la bouche de tout le monde," let us cease to be astonished, that the harmonious [and impressive rhyme should characterize the poetry of this wise and moral people. In such esteem is the rhyme held among them, that the road to honours and dignities lies but through the temple of their muses: and, independent of the *Chi-Kim*, so very ancient is the Chinese rhyme, that we have four Lilliputian lines, composed by one of their ancient kings, that while they remind us of Mr. Pope's "In amaze, lost I gaze," far exceed it in sentiment and poetry. They are worthy of a King.

Voene khoo skene miene  
 Louh shee nane piene  
 Chi troo i shingh  
 Chioo shai trine kiene.

"When the dragon and serpent are still, we know not the difference, but no sooner do they begin to hiss, than we distinguish them.\*

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\* The dragon is a device worn by the emperors, and was given to the Chinese by Fohi, as the symbol of their nation.

As the ancient poetry of every language undergoes some change in its progress towards refinement, this mode of verse has been diffused for a longer and more varied measure, but *never* to the exclusion of the rhyme, the monosyllabic nature, perhaps, demanding it.\* Their poetry has now become highly cultivated, for which state the various tones or vocal inflexions of which the same word is capable, together with its numerous and musical diphthongs, peculiarly fit it. In one respect it excels any European verse I have seen: while *that* is content with the corresponding *sound*, they take care of the *sentiment*, which must accord in the stated verse of the stanza; and no other. When this mode is followed, they inviolably observe it, executing the poem after the most classical manner, not surpassed by any ancient or modern examples. Could one thing more than another dignify the rhyme, this surely gives it preeminence, the rhyme and the sentiment, and the sentiment and the rhyme, harmonizing together, each in its proper and allotted place. At other times, not Mr. Pope himself, that grand master of antithesis, could set off a rhyme with an opposition in the thought to more advantage: on such occasions, the lines form a rhiming antiposition, sometimes of the passions, sometimes of the elements, sometimes of the seasons, the hours, &c. as love is opposed to hatred, fire to water, summer to winter, morning to night &c. This, undoubtedly, while it enriches their poetry, gives infinite variety to their verse, and if they do not ascend to the boldest flights of Pindar, for which the very nature of their verse, regulated by the strictest laws, unqualifies them, yet, in the *ode* they principally excel, and in that are not transcended by any Grecian master, for a noble and dignified simplicity.† In their anacreontics

\* “ Tutte le parole però son’ monosillabe; ma accoppiandosi l’una coll’ altra, con cert’ ordine fisso, e determinato; vi si richiede, per apprendere la lingua, uno studio faticosissimo.” (*Viaggio &c. dal Signor Aureliano degli Anfi. Printed at Parma, 1692.*)

† Diogenes Laertes and Athenæus have, each preserved to us a hymn to *Virtue*, the composition of Aristotle, and very improperly, I think, called by them a *Scolion*. Scalliger,

anacreontics also they are chaste and sentimental, beyond even the grace of the Teian bard. And we do not find, that in these symposial and amatory odes the *rhime* has destroyed either the moral or poetical sentiment; witness this, which we give in English, “Ye who drink  
“ out of golden cups, despise not the coarse vessel of the poor man,  
“ who has no slaves to fill it for him; when two of you have deeply  
“ drank, as is your fashion, remember, it may be your fate to sleep  
“ together under the same tree.”

Those who desire to know more of the Chinese poetry and its rhimes, may consult Du Halde, whose account of China I have found more satisfactory than any other, not excepting Fathers Magaillan and Kircher.

Like that of the Hebrews, and, it is presumed, of most infant states, the early poetry of the Arabians consisted in a sort of *rhimed prose*,\* *αμετρον*, but always rhiming, either in a repetition of the very same rhimes, or in the return of similar sounds, corresponding to the first rhime throughout; or again, in such distinct and varied rhimes as fancy or convenience offered. Of the first sort Le Clerc gives us two examples, one from the *Lamiato' l Ajam* of *Tograi*,† whose rhimes, he tells us,

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end

liger, in his Poetics, pronounces it not inferior to any thing in Pindar; and Casaubon in his Animadversions on Athenæus, calls it *carmen aureolum*. Might I offer an opinion after such great authorities, I should say it was the work of a great *poet* and a great *philosopher*. The odes of China, it should seem, strongly resemble this of Aristotle in their sober simplicity, and that *virtue* which is observed to animate them.

\* This *rhimed prose* they use even to this day, in their common discourse, as well on affairs of business, as in their salutations and visits of ceremony. When we reflect that the Arabian language is singularly adapted to poetry, being expressive, strong, musical and sonorous, and perhaps the most copious of any in the world, one is tempted to think rhime essential to the language of the muses.

† Vid. *Lamiato' l Ajam*, Carmen Tograi, poetæ Arabis doctissimi, cum versione Latina, operâ Edvardi Pocock. Oxon. 1661.

end all in *LI*; the other from that of *Abn-eb-ula*, all whose rhimes end in *LA*. In this manner, says Le Clerc, nearly the whole of the rhimes in the 119th psalm, are observed to end, terminating in *CHA*. (Vid. "*Essai*," as before.) Such, it seems, was pretty much the state of the Arabian verse, when, soon after the beginning of the seventh century, Mahomet composed his Koran, a work that attracted general attention, and led the way to a more artificial structure of the national poetry; for, under the Caliphate of Arashido, we find the learned Al-Chalil-Ebn-Ahmed-Al Farahidi reducing the Arabian verse to rule, but that rule consisting rather in the adjustment and ordering of the rhyme, than in the distinction of long and short syllables; or in other prosodial regulations. Be this as it may, the rhythm of the Koran, we are told, is far from elaborate, or well constructed.\* But whatever is its deficiency in point of cadence, we are assured it has no deficiency in the rhyme; † as if *that* alone had been worthy of regard, or at least was a primary object with the composer. We may be very certain that, had not the Arabians considered the rhyme a quality essential to their poetry, this artful impostor would not have so rigidly observed it, to the neglect of more substantial ornaments. He was a merchant, that knew mankind, and knew that rhyme graced the poetry of every nation: he knew also that the ear is the inlet to the heart, and that his poetry

\* *Quamvis enim Poësis apud Arabes longe ante illius (Al Caili) ætatem summo studio culta fuerit; ipsum primum novimus, qui ad artis leges eam revocare tentavit. Totum autem hic artificium in literarum Motaharracaton Motarum Sawaceno, quiescentium debitâ dispositione situm est.* (Sam. Clarke's *Scient. Met. Arab.*)

“Sciendum tamen pleraque eorum omnibus suis pedibus integris apud poetas raro, quædam etiam nunquam usurpari; cum docendi tantum gratiâ ab Al Chililo inventæ et introductæ fuerint istæ formulæ, ut ad eas, tanquam normas, numerosæ illæ, in quas sese diffundunt hi trunci, propagines exigerentur.” (*Ibid. Cap. 5.*)

Delectantur vehementer Arabes stylo rythmico, qua in re cum plurimi auctores imitentur Alcoranum, cujus periodi plerumque in rythmo definant, dici vix potest, quam sedulam operam navant, ut genium ac indolem styli illius rythmici in Alcorano contenti expriment. Quo frequenter enim rythmus incidit in periodos et commata, eo sublimior et perfectior est dictio.”

(*Specimen Arabicum: Auctore Patricio, Dantz.*)



poetry without its music would miss of its effect. We are not, indeed, well informed to what extent the cunning Mahomet improved the Arabian verse, when he boasted the beauty of his Koran to be such, that neither angel nor devil could mend it; but this very boast serves to shew, that the poet had preserved the *form* at least, and characters of the national verse; yet are we not so wholly in the dark, for without putting our infidel feet into the Temple of Mecca for more ancient proofs and authorities, in some of the European libraries, as well as in private cabinets, are to be found a number of Arabian manuscripts prior to the age of Mahomet, all of which are written in *rhime*.\*

Where materials have been wanting for regular history, oral tradition not unfrequently supplies the defect. All nations are proud of their descent, and be their manners ever so rude and barbarous, delight to perpetuate their story. Ambitious of renown, they attach the highest merit to the highest antiquity; and that point once established, are little solicitous about intermediate character. Narrated events pass for recorded history; and having small desire to falsify, the transmitter relates the progressive story of his ancestors as he received it from them. The very fables of antiquity prove by their disguise the truth of the facts they include; and where language throws aside her robe of mystery, simple narration has a claim to confidence. Greece thought it no dishonor to declare the founders of her greatness to have been pirates; and Rome avowed that she owed her origin to a band of robbers. The vagrant mode of life to which the Arabians had been fated, did not permit them to preserve so many records of their history as other nations of better fortunes have done. But they admit, (and the admission not being much in their favor, deserves full credit) that their manners and customs have continued unvaried for these thousand years. Now, we know that nothing so much preserves a language as a continuance of the same habits and manners; for assuredly, new customs and modes of life are followed

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\* *Quem numeram, (rythmum) uti in omnium gentium et nationum sermone natura generavit; ita quoque in antiquissima hac gente Arabum observatur.* (*Spec. Arab. Ibid*)

by a change in the language where they are introduced. This has ever been the case with all nations, and the nature of things, will not suffer it to be otherwise. Neither, if we suppose these vagrant tribes to be the descendants of Ishmael. "In the forest in Arabia shall ye lodge, O ye travelling companies of Dedanim." *Jaiab chap 21 v. 13*. Shall we have much reason to doubt what they tell us. Here, then, we fix our foot, and I offer it as no unreasonable conjecture, that if the language of these people shall have suffered as little alteration as their manners, their poetry can have changed but little from its original cast. And if the whole of that poetry whereof any part hath reached us, (and some of it we know was composed at those early periods called by the later Arabians their *times of ignorance*) be regulated chiefly by the rhyme, this deduction seems naturally to follow, that from the earliest formation of the Arabian verse, the rhyme has been one of its invariable features. In fact, not having any intercourse with the Greeks or Romans, whatever might have been the fashion of their poetry, the Arabians could not have borrowed it of them; so far then its *form* was its own, and it owes nothing to more polished nations. Separated, moreover, like the Hebrews, from the rest of mankind, they could have had little opportunity of new-modelling their verse; and therefore it is reasonable to conclude, that from unregistered times to the period of Mahomet, the character of the Arabian poetry has continued the same; and that, from his time to the present, "neither angel nor devil hath mended it."\* Not to mention the Archaic *Cbi-Kim* of the Chinese, I trust I have asserted the claim of rhyme to Trichiliar antiquity.

One institution, however, is highly honorable to these people, and could not, I think, have been borrowed of their neighbours. It gradually

\* This remark is strengthened by the observation of Voltaire in his Universal History, where he says that the Arabian poetry had been ascertained before the time of Mahomet, from which period it never altered. (*Tom. 1. C. 5.*) *Kafia*, from whence the Arabians call rhyme *Kafiaton*, by his royal authority regulated the laws of the Arabian verse: but Al Chili afterwards unsettled these laws of the Caliph, and introduced a better regulation. (*See, Sam. Clarke's Scientia Metric. Arab.*)

dually led them to those literary attainments for which they were afterwards renowned. I speak of their *academy*, formed on the same plan with that before which I have the honor to appear, having for its object the national glory and diffusion of knowledge, with honorary rewards to stimulate the genius of the candidates. Neither did it stop here. We learn from Sir William Jones, that they transcribed the successful pieces in characters of gold, and then hung them up in the temple of Mecca, proclaiming them at once sacred and immortal; the proudest compliment they could bestow! These pieces were distinguished ever after by the name of *Moalbaket*, or *Suspended*; and sometimes, like the Pythagorean verses, by that of *Moadhabet*, or *golden*. Though several musæa and colleges had doubtless existed before, it is the oldest institution of the sort on record, being 1200 years since its first establishment, having preceded their own Hegira, and even the boasted period of their Koran. From a rhiming contest that we read of between Mahomet and the celebrated *Lebid*, the two most distinguished poets of their day, and their verses on that occasion having been *suspended*, it is highly probable that both of them were members of this famous academy.

If the Persians, as Sir William Jones has observed,\* borrowed their poetical measures of the Arabians, we must not be surpris'd to find the  
rhime

\* The remark of this great orientalist seems very just: for at the end of nine years, Mahomet found himself strong enough to extend his conquests into Persia, beginning with Syria, then under Heraclius. And indeed the great Bochart, in which he has been followed by others, particularly by father Alexander, expresses a strong doubt that the Persian is an original language, See *Pheleg*. Lib. 1. Cap. 15.

The oldest Persian poems that Sir William Jones had seen, were those of Ferdusi in the tenth and eleventh centuries, an epic poem of whose consisted of "sixty thousand couplets in *rhime*, all polished with the spirit of Dryden, and the sweetness of Pope, a glorious monument of eastern genius and learning; which if ever it should be generally understood in its original language, will contest the merit of *invention* with Homer himself, whatever may be thought of its subject, (the old History of Persia) or the arrangement of its incidents. An extract from this poem will exhibit a specimen of the *Persian* tongue, very little adulterated by a mixture with the Arabic, and in all probability approaching nearly to the dialect used in Persia, in the time of Mahomet, who *admired it for its softness*,  
and

rhime a constituent appendage of their poetry. But had the rhime not originally formed a part of their verse, we cannot suppose they would all at once borrow it of their unwelcome visitors. We know the strong reluctance of every conquered people to receive the language of their new masters: the old Persians, therefore, seem rather to have adopted a new mode or measure of versification, the words of Sir William importing no more, than to have been ignorant what the rhime was, till Mahomet had instructed them. Those, however, who understand the language, say, that it is admirably well adapted to poetry, and that its verse falls naturally into rhime. Thus, it comes to pass, that the whole of their verse, with few exceptions, is in rhime, though sometimes perhaps capricious, like that of other eastern poetry. Of the structure of the Persian verse I am wholly ignorant, and therefore shall say nothing upon it: but in the wildness of its imaginary, and luxuriance of its description, it bears all the marks and character of the Arabian poetry. Perhaps the scenery of the country, which strongly resembles that of Yemen, may tend to inspire the poet with the same happy source of ideas, and even modes of expression: and all things considered, we must suppose that the Persian poetry partakes the nature of the Arabian.

Observing, perhaps, not the strictest chronological order, it may be remarked in this place of the Turks, that as the Persians borrowed their poetry of the Arabians, these, again, after they had carried their arms into Mesopotamia and Syria, borrowed theirs of the Persians, from whose language they enriched their own, naturally barren and rugged, with a variety of simple and compound words, making the form of the Persian numbers the model of their verse. Like the Persian, their poetry is wholly

and was heard to say, that *it would be spoken on that account in the gardens of Paradise.*" (*History of Persia.*)

But Sir William afterwards gives us a specimen of the *old* Persian itself from the *Zend*, which had been communicated to him as a great favor. He gives it after the prosaic manner, as he received it, but it is evidently rhimed, all the rhimes in stated returns ending in *I. D.* Here, then, we have an actual proof that the poetry of the ancient Persian was in rhime.

wholly in rhyme; and as the Latins, after Greece had submitted to their power, polished and enriched their uncouth dialect, by a close imitation of the smooth and sonorous Greek, so the Turks as wisely enriched theirs by borrowing as much of the manner and grace of the Persian, as their language would allow. The late Mr. Paradise, who was a Byzantine gentleman, and an excellent scholar, I have often heard speak in the highest raptures of the Turkish poetry, some of which he would repeat, observing that the whole of their poetry was in rhyme. Mr. Nott too, the learned translator of Hafiz, has mentioned to me a Turkish poet, whose name I forget, that bore a strong resemblance to Juvenal, in the vehemence and indignation of his verse; perhaps it was *Ruby Bagdati*; the same of whom Sir William Jones speaks in his essay. Yet, rhyme, it appears, has neither impaired the vigor, nor cramped the force of the Turkish Juvenal, who, like the nervous Pope, or perhaps the more stubborn Donne, bars the fury of his satire with the rhyme, as the Indian manticora brandishes his spiked tail, and strikes his adversary with repercussive vengeance.

Let us turn our eyes to Tartary, and then behold what an immense portion of the world rhimes its poetry; Grand Tartary alone comprehending nearly one third of all Asia! We admire, and naturally ask from what source these populous and extended nations derived this strong feature in their verse? And here we must call all those *Tartars*, or *Scythæ*, who bent their course northward, for by that appellation they were anciently distinguished, whether as Asiatics or Europeans. Of these latter Scythæ Strabo thus speaks, *Ὡσπερ τὰ πρὸς Βορρῶν μέρη*” &c. “sicut notæ versus septentrionem gentes uno prius nomine omnes vel “Scythæ, vel Nomades, ut ab Homero appellabantur, ac postea temporis cognitibus regionibus occiduis Celtæ, Iberi, aut mixto nomine, Celtiberi, as Celto-Scythæ dici cœperunt, cum prius ob ignorantiam singulæ gentes uno omnes nomine afficerentur.” (*Lib. 1.*) Of the Asiatic Scythæ the same accurate author speaks, *Lib. 2.*, and gives the geography of them both at large; but it is remarkable, that

while Diodorus ascribes a cruel and ferocious barbarism to the more northern or European Scythæ, inasmuch, says he, that Pontus acquired the epithet, *αξεινος*, (*Lib. 4.*) and while the excursions of these people have given them a kind of historic notoriety, so little should be known concerning the Asiatic Scythæ. Yet to their origin we are no strangers, and are not at a loss to find the source of their poetry. The northern Scythæ, we find in the correct and judicious Strabo, were the hordes of Elam, or the old Persæ, whom he calls emphatically, *ληστρικοι ανδρες, robbers*; *και ορινη τραχεια πεπιθωτες, men who trusted to their difficult mountains*; that is, those who inhabited the kingdom of Chederlaomer, one of the four kings that caused the five to serve him, according to the history of Moses. (*Gen. cap. 14.*) Now, Strabo, and other ancient geographers shew Elam to be the country lying between Media and Mesopotamia. (*Strab. Lib. 11.*) These Elamites therefore must have spoken either the Hebrew, or an Hebraic Dialect; but after their defeat by Abraham, forming themselves into a band or mass, collected in those flagitious and barbarous times, from the various kingdoms that served Chederlaomer, and spreading north, (the fertile and more inviting plains of Greece having been preoccupied,) they speedily barbarized the tongue, their very wickedness precipitating its downfall. But independent of ancient authorities, and the similar habits of life still common to the Scythæ and ancient Elamites, we have certain Scythic words that are evidently Elymæan, or the old Persic. The earliest orientals, we have seen, rhimed their poetry, and these men, various and violent as they were, must have brought with them such language as they knew, or, properly speaking, had then an existence. And thus we have the origin of our European rhimes, that had taken a septentrional direction so early as the time of Abraham; for in whatever shape the rhyme may now come to us, or however mixed and varied, it may be, still it will be found *Scythic*, and the Scythæ at last the *stirps* of us all." "Hinc" " (scil. Scythis) says Vitringa, "Hinc Galli, Germani, Gothi, Sali, Celtæ omnes orti sunt, et Belgæ nostrates, nequid Anglos memorem, quod Galli et Britannî veteres eodem ante usi

“ uſi idiomate; ut ex tacito conſtat, unde ex eâdem gente videntur ori-  
 “ undi. Hæc autem ſi præpoſuerimus, *quæ facillima et certiffima ſunt*,  
 “ feliciter admodum de linguis harum gentium fumus judicari. Videlicet  
 “ colligimus hinc primò linguam Scytharum, Celtorum, Gothorum, Ge-  
 “ tarum, Maſſagetarum, Cimbrorum, Teutonum, Germanorum, Belgicam  
 “ veterem (omnes hæ gentes uno idiomata ante fuerunt uſæ, licet pro-  
 “ nunciandi ratio aliquo modo per ſucceſſum temporis fuerit variata)  
 “ ex orientalibus linguis omnino derivandam eſſe,” &c. &c. (*Lib. I. Cap. 3.*)

But I have ſaid, that the Elamites with their language carried their poetry into Scythia. This both analogy and reaſon tell us: We know too that in the time of Auguſtus, the Scythæ had their poetry, whatever it was; for Ovid tells us us, the Getæ were pleaſed with the verſes he had compoſed in their language, whoſe barbariſm, as he calls it, however it might ſuit their own modes of verſification, but ill accorded with the ſtructure of the Latin.

“ Ah! pudet, et Getico ſcripti ſermone libellum,

“ Stricteque ſunt noſtris barbara verba modis.

“ Et placui, (gratare mihi!) cœpique Poetæ

“ Inter inhumanos nomen habere Getas.”

(*De Pont. 4. Ep. 13.*)

It is not improbable therefore, that the *rhime*, (which we have beheld ſo interwoven in the oriental poetry, that their bards felt difficulty to avoid it, but which we have alſo beheld offensive to the Latin,) might have been a principal objection with our exiled poet, who found its recurrence in the Getic, formed as that language was of the ancient Perſic, an obſtacle perpetually in his way.\* Nothing certain, I confeſs, can be deduced from it, except that the Getic language did not accord with the

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\* The firſt line of the quotation from Ovid ſtrongly implies, that the poet had compoſed Latin verſe with the Getic rhime; and the ſecond as ſtrongly that he had alſo adapted the Getic words to the Roman quantities; this comment, I apprehend, has never before been offered.

Latin ratio ; an argument, that well applies to all the fantastic attempts of different verse-makers, in different ages, to bend and compel their own tongues to the profody of the Greek and Latin ; a practice that cannot be more severely reprehended, or in more dignified language, than in the words of Scaliger on another occasion ; “ Hebraismus, Syriasmus, et “ Arabismus, nullo modo ad metrorum Græcorum aut Latinorum regulam “ revocari possunt ; etiam si cœlum mari misceatur.” (*Scalig. in Chron. Euseb.*) Writers of this sort have not even the merit of *novelty*, and the example of the sweet-tongued Ovid, who knew what his own language was capable of bearing, full as well as any monk whatever, might have taught them a better lesson.

We have now taken a large view of the question. And surely there must be something strikingly natural in this species of harmony, when all nations, howsoever distinct and unknown to each other, howsoever differing in the form and structure of their language, not only concur in the adoption of the *rhime*, but apply it, as the fairest grace and ornament of their poetry ! It must possess a charm sweeter than any note in music : for we find certain enlightened nations, that have a taste for music, and even excel in it, decry and ridicule the music of other countries. The Chinese, whose ear undoubtedly is more harmoniously constructed than ours, treat European music with contempt, declaring they cannot comprehend it. We return the compliment ; yet neither ridicules the *rhime* of the other, or understands not its application. I shall just observe, that with their arms, the descendants of Timur-lenc carried into India the language and poetry of the Persians : yet the Indians had their poets long before the time of Timur-lenc, particularly *Mir Rbufr*, on whose poetry, composed wholly in rhyme, not only the Indians, but all the orientals set the highest value. The Indian Mahometans, however, entertain such respect for their prophet, who taught the Persians a better versification, that they usually compose in Persian : and if they *do* write in Hinduoï, still observant of the rhyme, adapt it to the Persian structure. Thus, the sun of poetry, that rose in the east, still pours its lustre on the world, illumining all with the rays of rhyme ; and should it again be eclipsed by barbarism, its splendors will set in the west.

Whoever



Whoever makes the slightest observation will perceive it impossible, in the flux and multitude of discordant languages, existing, perishing, and changing every moment, that rhyme should have been borrowed by one from the other. The Hebrews and Arabians, in particular, as observed above, were shut out for a long, long time, from the rest of the world, and neither composed treatises of prosody themselves (the Hebrews never, and the Arabians, as we have seen, not till after the time of Mahomet) nor communicated their poetry to their neighbours. We must not reason, from the state of things as they *are*, to the state of things as they *were*. Numerous are the circumstances, that have given birth to a new order, and none more than the propagation and establishment of the gospel, with the lights that typography has thrown upon human knowledge. Formerly the communications of knowledge were few, and those confined to private libraries, chiefly of Monarchs, inaccessible to the multitude; which alone may account for the slow progress, that science, till of late years, had made in the world. To reason philosophically, therefore, we must not, we cannot suppose, that one nation *borrowed* its rhyme of another: but that each language, having its own peculiar tone, constituted as it always must, its own peculiar verse; that rhyme, from the very nature of language itself, has been a mode or quality, which entered more or less, into the music of every tongue, whose construction would endure it, forming a constituent part of its harmony, and that its *universality* proves there must be something in it less dissonant than agreeable, less barbarous than natural. For, not considering the genius of the Greek and Roman tongues, from the moment we leave school, we are prejudiced in their favor, and bow to their authority; and unconscious that we retain the impressions of education, which never wholly forsake us, conceive there can exist no excellence out of these languages. This, I am persuaded, has more influence on our minds than we are aware of, or perhaps are disposed to allow. But, if pleasure and instruction be the end of poetry, the office of rhyme cannot, I apprehend, be more successfully employed than in the words of the philosophic Johnson,

“ To point a moral, or adorn a tale.”

I come now to the most difficult, though not the least pleasing part of my subject, the Phœnician poetry. The learned academy does not require to be told, that the Carthaginian and Phœnician tongues are supposed to be the same, and that, if we except the lines in the *Pœnulus* of Plautus, no remain whatever of the Phœnician verse hath descended to us. But the Hebrew and Phœnician being the same language, or at least sister dialects, it follows, that what attaches to the one, attaches to the other; and that, if the Hebrews rhimed their poetry, the Phœnicians rhimed theirs. The verses that Plautus gives us, were perhaps never yet written in the Punic: had we them, however, accurately penned after the old Carthaginian manner, it is probable we should be less at a loss, than we are now to acquire their true understanding. Plautus, it is certain, has translated them, but with too much latitude, as Bochart has proved after the most satisfactory manner. The rhimes indeed are not obvious; for the transcribers of Plautus, by writing in the Latin character, and not understanding the proper sound of the Phœnician vowels and consonants, might not be very correct in putting down the Punic words: and what has been observed above concerning the Hebrew, Chinese, and other unfamiliar poetry, applies here in the very same extent. Even in the Greek and Latin, of which the copyists had always some knowledge, the oversight of transcribers is the perpetual complaint of the critics, who, however, by their skill and accuracy in these languages, and their perfect knowledge of the rhythm of the poets, have generally been able to restore the true reading. But the total ignorance of the copyists here, and until of late years, of the critics themselves in the lines before us, might easily have let in as many errors, as there are words in the verses. Even the transposition of a sentence, or of a single word, might defeat the rhyme, and though not alter the sense, yet confound and embarrass the rhythm. And, indeed, supposing the text were completely restored,\*

the

\* So little hope have we of this, that I have not seen two editions of Plautus, whose text has agreed in the reading of these lines. It looks, as if the editors had been running a race, to see which of them should deviate farthest from the true lesson; yet none of them materially

the true Carthaginian pronunciation would still be wanting, without which the position and return of the rhyme must for ever continue uncertain. Neither are we very sure, that Plautus himself was correct; and if we may judge by the looseness of his translation, it should seem he was not. Yet I would not be understood to disparage the venerable Plautus, whom I do not the less respect for having preserved to us the only existing fragment of the Phœnician muse.

Whatever our predecessors taught us,  
I have a great esteem for Plautus.

But we know that the Septuagint themselves, as Cappellus has abundantly shewn in his *Critical Notes*, have with all their accuracy and industry, betrayed in many places the grossest ignorance of the text, from which they translated. Most true it is, that, in the time of Plautus, notwithstanding the recency of the first Punic war, the Carthaginian language was utterly unfamiliar to his readers, or the poet had not been his own interpreter. All these circumstances considered, and many more that might be added, it is not wonderful that the rhymes should not stare us in the face. But enough of accuracy has remained, to enable the learned Le Clerc to gather up the rhymes; and it must be owned, that, with the assistance of the Great Bochart, he has performed his task tolerably well; to me, at least, in the most perspicuous and beautiful manner; assuming only, what it would be uncandid not to allow him, because he has proved the fact, that Plautus consolidated two and twenty lines of the Punic into the eleven of his own. One thing more I would add, that although we should punctuate the words in Plautus, after the manner of the Hebrews, or of the Syrians, there would, even then, be  
no

materially differs from the other in his general interpretation of the words. Le Clerc, it is presumed, with so excellent a guide as Bochart, had an equal right to amend and restore the text, especially if he inserted no one word of his own, to make out the rhyme. Nay, I am of opinion, that the rhyme itself is the best guide to the true reading of the passage, if what Le Clerc tells us be a fact; viz. that in several places of the Septuagint, where the version abounds in more words than the text of the original seems to warrant, if you restore the *rhime*, the Septuagint shall be found to have translated faithfully.

no certainty that the Carthaginians pronounced them according to such punctuation. For instance, the word בנורתי, that forms the rhyme in the 6th verse, who, says Le Clerc, can say whether the Carthaginians pronounced it *Benothai*, or *Benothi*, or again, *Benothe*? But it would detain us too long, were we to go further into the argument. Suffice it, that Bochart has shewn the Punic, and its translation by Plautus, to be widely different, in that part especially where Hanno beseeches the gods to grant him some certain sign, by which he shall know his nephew and daughters; of this Le Clerc very properly avails himself, and throwing the whole into Chaldee characters, confronts the same with the Roman, accompanied with his own version in the French, verse for verse.

	נא אתעליונים ועליונות	Na eth eljonim <i>veljonoth</i>
	שכורת יסמכון זות	Shechoreth jismchoun <i>zoth</i>
	כי נתם מלכי	Chi nittham <i>milchi</i>
	ומתדברי עש קי	Oumithdabbre <i>is ki</i>
5.	לפוחתה אות במצותי	Lephochanath oth <i>bimtsoti</i>
	את בני ואת בנותי	Eth bni veth <i>bnothi</i>
	ברוח רוב שלהם	Brouah rob <i>schellaben</i>
	עליונים ובמשורתהם	Eljonim <i>oubimtschouratheben</i>
	בנות שנגבו לי	Bnoth schenignbou <i>li</i>
10.	ובן אחי	Ouben <i>achi</i>
	בטרם מרת וחוחו	Bterem moth <i>schanoutho</i>
	תא נחלכתי אנטידמרכו	Tha nhelachti <i>antidamarco</i>
	איש שידעו לי ברום תפל	Ifsch fchejada <i>li bram thippel</i>
	את חילי שכינתם לאפל	Eth chale schchinatham <i>lophel</i>
15.	את בן אמיצ	Eth ben <i>amits</i>
	דבור תם נקוט נוה אגורסטוקליס	Dibbiur tham ncot nave <i>Agorastoclis</i>
	חותם חורתי הכיור הוה	Chotem chanouthi hacchior <i>hazze</i>
	לי חוק זרת נושא	Li chok <i>zoth noze</i>
	בין החיל חוי לולגבולם	Ben hacajil hivvou <i>li ligboulam</i>
	לשבת תם	Lschebeth <i>tham</i>
	בוא די עלי תרע אנה הנו	Bo di ale thra inna <i>hinno</i>
	אשאל אם מנכר לו שמי	Eschal im manchar <i>lo schmo</i>

Whatever

Whatever may be the result of Le Clerc's rhimes, it is necessary to observe, that the Africans of the present day rhyme their verse, whether that ratio be continued to it from the Phœnicians, through their Carthaginian ancestors, or of later introduction by the Arabians. The former, I am inclined to think, the African tongue being found to partake more of the Tyrian than Moorish dialect. The Maltese is a supposed dialect of the Phœnician or Carthaginian; which is extremely probable, the situation of Malta having rendered it a port of great convenience to the trade of Carthage, that subdued and colonized it: and I am well assured, notwithstanding the island has so oft tenchanged its masters, that the language of the aboriginal natives, while it resembles the African, possesses a venerable air, being perhaps the old Carthaginian somewhat corrupted, or a dialect compounded of Hebrew and Phœnician. And indeed, the same learned friend before-mentioned tells me, that the language of the natives has a strong tincture of the Hebrew; adding, that he has known an ordinary Maltese and an Irishman converse with as little difficulty as a Connaught and a Munster-man. The conclusion I would draw is this, that the two tongues being so near a-kin, let their present deflexion arise from what it may; and the oldest Irish poets we know of having composed in rhyme, Le Clerc was not mistaken, when he asserted that the Phœnicians rhimed their poetry.

While on this subject, the academy will, I trust, allow me one or two short observations, that arise out of it. The most learned Gronovius has given us a translation of the lines in question from Petitus, (*Miscel. L. 2. c. 3.*) somewhat differing from that of Plautus. Without detaining the academy by going into the whole of the lines, the remark I would offer shall be confined to the first, as it stands in Petitus.

“Ythalonim, yvalonoth si chorathisima comfith.”

This Gronovius reads and stops thus,

“ Neth alonim, ualonoth, fecor eth ifi macum foth.”

which, by the way, forms a good rhyme. This verse however Gronovius translates after Petitus, “ Incline, et advortite, o di, deæque, quorum sub numine viri hujus civitatis sunt.” Against the translation I have nothing to offer, nor would it become me; but it differs from Plautus’s own, though perhaps not much from Le Clerc’s; yet more literally it might be rendered, *superos superasque adoro qui incolunt hunc locum*. Again I must repeat, that I consider the old Phœnician to have differed but little from the Hebrew; and were the text in the line before us well restored, we should suppose that not Hanno, but some inhabitant of old Jerusalem were speaking.

את עליונים וזליונות אסכור החושבי מקום זה

I would ask any orientalist whether the verse thus slightly amended, be not genuine Hebrew, although perhaps it may not with Le Clerc, have consulted the rhyme?

Were there a doubt that the Phœnician and Hebrew embraced the rhyme as languages, we have an indisputable proof that their colony at Carthage, notwithstanding their long mixture with Africans, had for several hundred years, after the time of Plautus, retained a great deal of the old dialect of Tyre. The celebrated doctor of Hippoo, himself an African and eloquently learned, speaking of *Messiah*, expressly says, “ which word agrees with the Punic, as do many other Hebrew words, *nay almost all of them.*”

After such authority we must no longer doubt the close affinity of the two languages, or not conclude that the genius of the one transfused itself into the other, commixing as it were, and settling in it. This then conceded, it follows that the characteristic rhyme of the old characterized the new muse, having been only transplanted; like the vine, that, passing from one soil to another, changes its flavor, but retains its original quality.

I shall

I shall only add, that Le Clerc in the *Biblioth. choisie*, Tom. 11. Art. 2. has given us impressions of twelve Phœnician medals, with their inscriptions, found by his friend Mr. Bary in Andalusia, the letters on which are evidently Hebrew. The learned author offers no conjecture as to their age, or how they might have come there, but I think it extremely probable, they may be as old as Plautus's Hanno, who it is certain, took the rout of Spain, and voyaged *viâ* Gibel-Tarack.

While it is now universally agreed that the Greeks were descended either from the Phœnicians, or Ægyptians, or perhaps from both, we naturally enquire, how it happens, that in the form and construction of her language, Greece should differ so materially from the oriental? The answer is not difficult. So early as the time of Abraham, Greece began to be peopled from the east. Their oriental origin is satisfactorily made out in the two Chronica of Eusebius and Marsham, *Herod. L. 11. Strab. L. 6, Meursius de Reg. Athen. Vossius de Orig. et Progr. Idol.* and other authors. The language of the settlers would not have materially differed from the pure oriental. Vitrunga and Father Kircher shew at large its rise and progress; the latter proving the ancient Greek to have as nearly resembled the Ægyptian, as the present Italian resembles the Latin: and indeed Pausanias has noticed a statue of Agamemnon, extant in his time, the inscription, on which was written *lavvorfum, επί τα λαία εκ δεξιων*. How then, it will be asked, came their language to defect in a manner so extraordinary? Their commerce, undoubtedly, was a principal cause, the numerous and commodious ports of Greece receiving into her bosom an influx of strangers, whose various dialects composed in no long time a language distinct from what the colony had brought with it. Their *pride* too, which induced them to ascribe their origin rather to the earth as grasshoppers, or even to aboriginal robbers, and piratical adventurers, than to *barbarians*, as they affected to call the Orientals, had a large share in this change, and might prompt them, more even from choice than from necessity, to strike out a language for themselves. Their great talents, favoured by

a propitious climate, and a concurrence of circumstances never likely to happen again, admirably qualified them for such an undertaking. Nor is it improbable, that this vain and aspiring people might endeavor to form a tongue, that should differ in all respects from the Orientals, as well in the complex order of its phrase, and their manner of writing, as in the total exclusion of the *rhime*: as if they scorned to be indebted even for a *winged word* to any nation but their own. Even the divine Plato, from whom more candor might have been expected, proudly derives certain primitive words from a spiritual source, as the language of superior intelligences; but with shame and reluctance confesses the word *πυρ* to be of barbarous origin, *ονομα βαρβαρικον*, that had some how stole itself upon the Greek; seeking thereby to conceal the real origin of his country.

The Orientals, as we have seen, rhimed their poetry; and I did expect to find in some of the *Σκολια*,\* or other of the early Greek verse, a solitary rhyme, that, while it marked the legitimacy of its birth, might have pointed some one of those moral sentiments, which at all times, especially in the infancy of their state, this ingenious and wise people impressed on their youth. The great flexibility of their language had promised something of the sort. But, after a laborious search, no trace of the rhyme has been found, or at least at the period when one would think it might have been indulged. Still, however, I am inclined to think the first Græcians, whether Cadmæi, Cecropii, or Danai, rhimed their poetry, whatever they might have done afterwards. The colony must have brought with it that language, out of which sprang the daughter, whose beauty was appointed to enamour the world: but if they *did* bring their language with them, then, assuredly, the rhyme distinguished their first poetry. The song, undoubtedly, whether festal or instructive, was their first species of verse. Their *Νομοι* prove it, which were sung, *παρ' οινου*, over their wine. *Ειδοντο δε Αθηνησι και Χαριωνδε Νομοισ παρ' οινου, ως 'Εγμυππος φησιν εν εκτω περι Νομοθητων*, says Athenæus, *Deipn. Lib. 14. cap. 3.* Originally *Νομοι* signified

\* See Append. No. 3.



nified nothing more than a tune or song; but these songs leading their youth to the practice of virtue by precept and wholesome discipline, in process of time obtained the name of *laws*. (*vid. Aristot. Prob.* 19.) It is astonishing therefore that these songs, prompt at first and inartificial, like those of other unpolished states, (for then such was Greece) should not have borne any mark of the rhyme, influenced as their first poetry was by its oriental origin. And this is the more extraordinary, because on amatory and symposial occasions, man is naturally given to turn his discourse into cadence and metre, as the sage Plutarch has observed.\* Nor the less so, as the music that always accompanied the song, and inspired the sallies of their mirth, while the branch of myrtle passed from hand to hand,† might have either edged the jocose and playful *Σχομμα*, or pointed the close of their *Νομοι*, which Aristotle expressly tells us were sung *μη επιλαδονται*, lest they should be forgotten;‡ and we know that nothing impresses a gnome or proverb stronger on the memory than a *rhyme*. Yet,

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\* *Γενομενοι δε τωτοι, προς τας επωδους και συμμετροις μαδιςα φωνας εκφερονται. Et qui tales sunt redditi, ad cantilandum vocesque mensura contentas maxime efferuntur. (Symp. Lib. 1. Quest. 5.*

† *Αδειν προς μυρρινη*, is a well known sentence or gnome of the Greeks. See Plut. Symp. Lib. 1. Quest. 1. *Δευτεραν δε αφεξης εκαστω μυρρινης παραδιδόμενης, &c. &c. (Plut. Ibid.)* This circumstance may account for the constant mention of the myrtle, by Anacreon and other Greek poets, in their songs, as it always accompanied their repasts. The *Συντεφανηφορει* in the catch translated in a former note, shews that the myrtle, as a *wreath* at least, formed a part of their entertainments. Sometimes they introduced the *rose*, from whence our proverb *under the rose*, taken probably from some moral scoliion now lost; and sometimes the *laurel*: but the *myrtle* was the never-failing attendant on the Athenian feasts.

‡ Whatever some moderns may think, the *memory* of old was held in high respect, and even came to be deified. The muses themselves were said to be the daughters of *Mnemosyne*, and are invoked as such.

“ *Μνημοσύνης θυγατέρες*,” (*Arist. εις Ερμ.*)

And Virgil,

*Et meministis enim, Divæ, et memorare potestis.*

*Æn.* 7. v. 645.

after a laborious search into and investigation of the fragments and detached sentences of the Greeks, which Athenæus, Tzetzes, old scholiasts and others have collected or commented on, I have not been able to lay my finger on a rhyme, I mean *ancient* rhyme of the Greeks, that bears at all on the question. I find, indeed, that old Simmias Rhodius, who flourished at the commencement of the Olympiads, and according to Suidas 406 years after the Trojan war, dedicated a copy of verses to Diana in her obstetric capacity, which Dr. Ascham acquaints us was composed in rhyme; but which appears to be nothing more than a verse-constructed egg, called by Simmias himself the "Egg of a Musical Bird," whose hard *yoke* sat uneasy on this *poacher* in Parnassus. After this followed the ax and altar of our bard, his wings and his lyre; — οὐρανὸν ἔκτισεν. All which gave birth to christian altars, globes, cups and balls, pyramids, and other poetic *evils*; ab ovo usque ad malum. Could Pliny have looked from his grave, and beheld an addle-headed Monk laying an egg, would he not have again exclaimed, *operose nihil agens!*

Some critics have detected in Homer and other Greek writers, certain *Affonants*, or words that echo; but these are only occasional, and perhaps more the effect of chance than design: though a better reason may be offered; that, such is the harmony of nature, it were impossible to give a beautiful expression to the *sense*, and not to express the *sound* with it. In this very principle lies the *germen* of rhyme. Rhyme, we have said, is the language of nature. A sound grand or terrific accords not with one that is soft and tender; for in the recurrence of the same sound their contrary expressions can never be felt. If a sublime sound be required to express the thunder of the battle, or the shock of jarring elements, (and in what language can they be expressed *without* sublimity?) shall we seek its similar cadence in the murmur of the rivulet, or the whisper of the breeze? And if they *do* join, what effect can they produce, but unwelcome discord, that, while it abases the subject, disappoints and offends the ear? If then a sublime sound require another equally sublime, shall not their consonance amplify its grandeur? And must not *rhime* be the noblest harmony of the muse? Take this

Euphonic

Euphonic Affonant of Theocritus, which I believe has never been noticed. Alcæna says to her twin-infants, whom she had put to rest,

Ευδετ' εμα βρεφεα γλυκυρον και γρηρασιμοι υπνον,  
 Ευδετ' εμα ψυχα δυ' αδελφω, ευσοα τεχνα,  
 Ολβιοι ευαξοισθε, και ολβιοι ωω ικοισθε.

*Idyll. 24.*

These lines became a kind of *Nunnon*, or *Nurse's song*, as it was called; for the Greeks had almost as many kind of songs, as subjects. The *νυννοι*, or *Nænia*, was divided into two kinds, one that cheered and invited the infant to suck; as an authority for which Quintilian (*L. 1. c. 10.*) quotes Chrysippus; "*Chrysippus etiam nutricum quæ adhibentur infantibus allectationi suam quoddam carmen assignat.*" The other, we are told by Athenæus, (*Deipn. L. 14. c. 3.*) was sung as a *καταβαυκαλλησις*, or lullaby, as Hefychius interprets it, a sort of *επασμα*, like this before us, that hushed and composed the infant to sleep. But although the affonants in the last line are not a direct rhyme, I cannot help imputing the words *ευαξοισθε* and *ικοισθε* to something more than mere accident, the plaintive rest or pause on the words in the position they hold in the verse, having something in it uncommonly soothing and musical, independent of the beauty of the sentiment. But if the words were accident only, it proves that on *some* occasions the *ομοιοπρωτων* might not be unfavorable to the Greek, but even be employed with advantage. I will venture to say, the most learned critic cannot substitute a word for *ικοισθε*—a word not echoing to its sister-word—that shall have an effect half so graceful and harmonious. The rhimes, for so I would call them,\* are emphatic; and not only happy in the place they occupy in the verse, but in the very sentiment itself: each is a sort of set-off against the other, and both harmonize in the same fortunate point. I know of no rhyme in the English language so truly musical, or that possesses a more elegant antithesis. And this again leads us to the point, where we set out; that rhyme is natural to children,

\* Quintilian entertains the very same idea of it. "Tertium est, quod in eandem finem venit *Ομοιοτελευτων*: Ea vero videtur optima in quibus initia sententiarum et fines consentiunt; ut et pene similia sint verbis, et paribus cadant, ut eodem modo desinant. (*Rhet. de fig. verb.*)

children, and that infants delight in it. The Sicilian bard, who was no stranger to the voice of nature, felt, acknowledged, and applied its truth, in one of the most charming verses that ever fell from the pen of a poet.

While the Greek language retained its purity, we have seen that no poem professedly in rhyme, distinguished its verse. From the time of Homer to that of Gregory Nazianzene, at the latter end of the fourth century, was considerably more than a thousand years; and so long did this admirable language continue, if not in all its ancient splendor, at least an expressive and harmonious tongue. The christian Iocrates may be esteemed the last of that great and fallen people, a dreadful memento of poor humanity! After this time, certain hymns, it is said, began to be composed for the Greek church, in rhyme, which, should they be the same, continue to be sung by that communion. Indeed, as the first poetry of every nation has generally been employed in religious purposes, christianity, when she ceased to be persecuted, would naturally recommend herself in numbers; and in order to give a more sacred air to the new religion, might wish through the emphasis of the rhyme, so happily adapted to music, both to draw attention, and to interest the heart, by an impressive devotion. Could the date, however, of these hymns be well ascertained, we might probably determine the first rhimes in the Greek, after its declension; a painful and mortifying enquiry, that would reward us only with the recognition of what it *was*, the bitter downfall of the finest language that ever elevated man above the brute; and bring us at last to the tenth or eleventh century, stumbling on a miserable epigram, or an impious epitaph, whose wretched rhyme, while it humbles human pride, proves that of all barbarians a *Bad Taste* is the worst. “Eo sunt redacti miseri Græci, ut nec legere nec cantare Græcè sciunt amissoque omni pristino cultu, cum cæteris barbaris ritibus, musam quoque barbaram sint amplexi.” (*Voss. de Poem. cant. &c.*)

Of the Latin it is more difficult to speak: and here it is not material to our purpose whether the old Etruscan was Canaanitish, or Phrygian, or Pelasgic: its original uncouthness is acknowledged, and it was not till  
after

after much care and pains had been employed on it, that it became a smooth or graceful tongue. Luculent\* it never was. Its best writers always confessed its difficulties, and its critics perpetually recommended the study and adaptation of the Greek to render it perspicuous and musical. Perhaps, the sternness and martial turn of the Romans might have contributed to give the language that iron aspect, which it never wholly lost. Even the Court of Augustus did not think the language sufficiently polished without the aid of the Grecian file, nor thought their youth properly instructed till a Grecian education had tuned and regulated their words. To every nation which they conquered, the political Romans gave their own tongue; but conscious of their rusticity, Greece they left in possession of hers, borrowing rather than giving to her, herein shewing their masterly and consummate wisdom.

Grecia capta ferum victorem cepit, et artes  
Intulit agresti Latio.

But it is not necessary I should compose a history of the Latin tongue. The only question is, did the Romans rhyme their verse? They did not: the terminations of their cases, and the embarrassing position of their words scarcely allowing the attempt: to say nothing of their close imitation of the Greek, and their dislike of whatever that nation disapproved. Well, therefore, might the rhyme be abhorrent from their language. Yet have we the most learned of the Romans making an effort at a grace which perhaps he deemed natural, but found forbidding to the tongue that himself had enriched and assisted to polish. I shall extract from the *Adversaria* of the learned Barthius a part of the seventh chapter of the thirty-first book. Its curiousness will apologize for its length.

“ Consonantium syllabarum in fine versuum nos hic rythmum appellamus, non quem doctissimus Victorinus in grammaticâ et alii Artigraphi docent, quem quidem nostrum, quamvis ultimis seculis corrumpendæ Latinitati summus auctor erat; etiam aliis in generibus versuum non abhorruisse

horruisse verè Romanos docent affectatè scripti hi versus M. Varronis

*Ὀνὸς λυγρὰς.*

Et Orthophallica attulit Pfalteria  
Quibus sonant in Græcia dicteriâ,  
Qui fabularum collocant exordia.

In quam rem et alii priscorum loci adduci possent, si analectica nostra poetica exscribere vellemus. Sufficit vero Terentiani auctoritas, qui rythmos a metris ita distinguit, et utrumque genus in usu fuisse confiteatur: et eam distinctionem novit ultimum etiam ævum, studio, non ignorantia peccans."

Not having the *Analectica* of this learned man, from the grave Varro I pass to the accomplished Cicero, who, in my humble opinion, was as poor a poet as he was an able orator. His

*O fortunatam natam me consule Fortunam*

has been often quoted as a rhyme, and is therefore noticed here: but it is more a pun than a rhyme, and a vile pun too, as wretched as this of a much better poet, that yet has been considered as a rhyme.

————— Consul vetus ac sine *fastu*  
Scribere bis *fastis*, quanquam diademata crinum  
*Fastigatus* eas. (*Apol. Sidon. Paneg. in Consulatu. Anthem. Aug. v. 111.*)

Here, beside the miserable affectation of the rhyme, if it must be one, we have an egregious solecism, for *fastigium* makes *fastigiatus*, and cannot, by any analogy, become *fastigatus*, there being no such word. But Cicero has left us another rhyme, rather better than his unfortunate *Fortunatam*, and as it contains a moral not unlike the Proverbs of Solomon, it deserves some regard.

Quod fecisse voles in tempore quo morieris,  
Id facias, juvenis, dum corpore sanus haberis.

Had no monkish rhimes ever been worse than these, I should not quarrel with them. Horace likewise has given us a precept in rhyme: he was however,

however, too chaste and correct a poet, to have purposely designed it.  
 “ Non me fugit in veterum scriptis nonnunquam istiusmodi consonantes  
 “ clausulas occurrere, sed adeo eæ raræ sunt, ut vel ipsa raritas satis  
 “ ostendat illos vel aliud agentes, vel necessitate metri compulsos eas usur-  
 “ passe.” *Voss.*

Non satis est pulchra esse poemata: dulcia sunt:  
 Et quocunq;e volent animum auditoris agunto.

*Art. Poet.*

But these are spots in the bright sun that warmed the poetry of Rome: and it was not till about the middle of the fifth century, that the Latin received any material corruption. At that time, the author of the panegyric above quoted, introduced a sort of sparkling and clinking, as well in his prose as in his verse, which the Latin never lost, till Erasmus and Longolius by their examples exposed the frippery, and banished it from the tongue. Unhappily, it was too successfully imitated for a thousand years. “ A quo deinceps cæteri omnem eloquentiam in affectatos illos rhymos fregerunt, multa paucis includere, et consonis sententiarum clausulis velut harmonicum genus dicendi affectantes, Et id quidem scribendi genus in Monachorum postea scriptis tantas radices egit, ut vix versus sine rythmo, vix oratio ulla prorsus sine versu scripta plurimis seculis fuerit.” *Barth. Ibid.* And again

“ Ab hoc autem exemplo (scil. Sidonio) sequens ætas omnem aliam laudem contemnere cœpit, eloquentiam veram et ingenuam et facilem prorsus aspernata, hanc autem ut acutam et nervosam, et summam denique omnium aded inhians, ut versus etiam nullos scripserit, aut pro legitimis denique habuerit, nisi in quibus ille omnium rerum gratissimus rythmus, ita componeret mediam syllabam, ut illa ultimæ responderet, in quo artificium omne condendi carminis esse existimabatur, &c.—At neque hoc genere stetit infelicitas iudiciorum. Supernati sunt ingeniosiores alii qui triplici quadruplicique rythmo hexametros suos infringentes, extrâ omnium au dum aleam provecti eâ commendatione habebantur; inter quos insignis fanè est Bernardus Morlanensis, non sine acutâ et multiplice lectione scriptor,

quem emulari etiam utroque pollentior hodie vix quisquam valeat.—&c. Sed observatum nobis ante eum Petrum quendam nomine Monachum paribus rythmis laudem quæfivisse." (*Ibid. Lib. 57. Cap. 11.*)

The following, as a unique, is given from Barthius, who ushers it in with this reflexion: "Non quidem ego animatus sum in id corpus eos poetas deducere, qui barbarè ad minorum gentium linguarum morem et legem versus Latinis numeris conceptos infringunt in rythmos, ut sunt, Bernhardus Morlanensis, quem vel principem talium dicas, Goffridus Viterbienfis, Metelli Quirinalia hexametro composita, Petri Blesensis, Wilerami Abbatis, Wipponis, et mille talia carmina; hoc tamen carmen peculiari mihi genio scriptum videtur, nec indignum cujus extra ordinem ratio habeatur. Est vero de bello Trojano in hæc verba scriptum."

Pergama flere vo	}	lo
Solo rapta do		
Est Paris absque pa	}	re
Audet tenta		
Vadit et acce	}	dit
Nauta solo re		
Tuta libido ma	}	ris
Civibus igna		
Post raptus Hele	}	na
Mille rates ple		

And so on, through a vast number of these lines. Barthius then adds, "scriptum hoc carmen est ante annum domini MCC. Inveni vero genus novum est, nec tale quid hætenus prodiisse in publicum puto."

Sidonius has been reputed the father of the Latin rhimes: but their origin may perhaps be traced to the earlier Christians, who devoted themselves wholly to the service of God. Terentianus, who lived in the first century, when he made the distinction between metre and rhyme, might probably have had an eye to the hymns of the devout, at that period, whose meetings were as regular as the return of the night, which they spent in prayer and psalmody. "Hymnos, Litanias, omnesque  
"cantilenas



“ cantilenas *rythmicè*, *metricè*, vel *profaicè*, quas fecerant, authenticavit.”  
 (Ekerbardus, in *Vit. Notkeri*, *Cap. 17.*)

Yet the *Cathemerinon*, or body of hymns, composed by Prudentius, in the fourth century, is not distinguished by any rhyme:\* perhaps that ratio had not then obtained in Spain, who, while other countries were murdering the muse, disdained to be their accomplice. In fact, it is difficult to say, whether the piety or the elegance of this admirable poet more deserve our esteem. Certain, however, it is, that so early as the sixth century, St. Gregory, after the Goths had destroyed whatever of the fine arts remained, collected with great industry, all the ancient hymnal music, which he incorporated for the use of the Roman church, into one grave and dignified Antiphone. At this period, the state of French music was deplorable, being little better than the howlings of wild beasts, particularly in the northern and more remote parts of Gaul, where it resembled the barbarous and ferocious shouts, with which the leaders of her armies animated their soldiers to battle. And, indeed, such then was the state of Gallic music, that in Italy its barbarism was a proverb, *Γαλλικὴ καὶ βαρβαρικὴ Μῦσα προσπαλεῖται*. Yet before the ninth century, France had learned the value of a civilized music, and adopting the Italian mode, soon became the rival of her neighbour; Charlemagne himself becoming the arbiter in their musical contests. Many of her hymns at this period are composed in rhyme, and, until lately, were performed on festivals in her cathedrals, under their old titles of *triumphes* and *laudes*, being probably some of those, that Notkerus of Saint-Gall, in the tenth century, had consecrated to the service of the church: “*sanctæ ecclesiæ Christi per mundi climata in laudem Dei canonizavit.*” (*Ekerhard. Loc. cit.*) As the state of Italian music improved, the old hymns and Antiphones of St. Gregory were new set; some of which, in their ancient rhymes, are yet sung at Rome, on extraordinary occasions. They need not here be further

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insisted

\* Yet in this very century, viz. anno 386, certain Latin hymns in *rhyme*, had been composed at *Rome*. Of this I am well assured, by the same learned friend I have so often mentioned, who had seen them of that date.

insisted on, except just to express the extreme antiquity of the Latin rhyme; which, from the church found its way to the cloister, and from thence to the multitude, with whom it lost the solemn dignity that piety had attached to it.

I had once intended to pursue this subject, tracing the Latin rhimes through the dark ages, in the respective countries of Italy, France, and England, and of later days, Germany and Belgium. But enough, and perhaps too much has been said on a subject that all acknowledge, and of which few are ignorant. Those, however, who would extend the enquiry, may consult Camden's Remains, Barthius, Paschius, Baillet, &c. &c., all of whom give us various specimens of the barbarous muse in the different ages of monkery.

Of the southern provinces, Italy took the lead both in prose and in poetry: the Roman tongue, indeed, was spoken in all the provinces, but with less purity as remoter from the seat of empire: it was natural therefore for Italy to form her language, if not prior in time, at least pre-eminent in harmony; and to this day the Italian holds its superiority, deservedly admired above the other European tongues. When it was that Italy laid down the Latin for the Italian, has not been precisely ascertained: for like the lights and shades of a good painting, it is not possible to say, where the one begins, or the other ends. We are told however that it continued to be spoken till the time of St. Bernard and the Emperor Barbarossa in the twelfth century; and that afterwards it was wholly dropt in conversation. But Voltaire, who was better qualified to compose a light memoir of events passing before him, than to drudge through musty authors, asserts that the Italian was not formed at the time of Frederic 2d, that is, at the beginning of the thirteenth century. By *formed*, the historian meant, I presume, *perfected*; otherwise the very lines he produces to prove it, contradict the fact. The verses of this Emperor whom he calls *great*, less perhaps for being an Emperor than for being an *Atheist*, are as follow:

“ Plus

- " Plas me el Cavalier Frances  
 " E la donna Catalana  
 " E l'ouvrar Genoes  
 " E la danza Trevisana  
 " E lon cantar Provenzales  
 " Las man e cara d'Angles  
 " E lon donzel de Toscana."

These lines, says Voltaire, are the last example of the Romance language, free from the Teutonic asperity: as such, they are here transcribed. He observes further, they are a precious monument of the language at this period, and more valuable, says he, with his usual raillery, than all those ruins of the middle age, so greedily sought after by men of more curiosity than taste. The historian then gives us some provençal rhimes of the year 1100, which for their *jargon*, as he calls it, are here transcribed, as well as for a specimen of the provençal rhime.

- " Que non volia maudir ne jura, ne mentir,  
 " N'occir, ne avontrar, ne preure de altrui,  
 " Ne s' avengear deli suo enemi,  
 " Loz difon qu'er Vaudes et los feson morir."

The provençal language, adds the historian, continues the very same now. Its poetry of course, and its rhimes can have suffered but little change. His short observation on the Italian as a language is subjoined, because it is of some authority, and applies to the matter before us. Under the direction of Petrarch, says he, the Italian acquired that force and elegance, which have rather improved than declined. It assumed its present form about the close of the thirteenth century, in the reign of the good King Roger, father to the unfortunate Joan. This is the substance of what he says: but beside Petrarch, the authority of other great men, who at once preceded Petrarch and were his cotemporaries, must have had great influence on the Italian poetry. In the middle of this century we have Brunetti and his pupil Dante; and, contrary to the statement of Voltaire, Petrarch did not flourish till the fourteenth century,

century, at which time Boccaccio contributed, if we take the word of no incompetent judge, to illumine and enrich the Italian quite as much as Petrarch himself. This excellent judge thus delivers himself; *Whoever hath not read Boccaccio, can have no conception of the extent or energy of the tongue.* (*Vincende della letteratura, del. G. Denina.*) To these may be added the brother historians Villani, in the same century, whose labors sealed the purity of the Italian prose. Petrarch, however, had an unreasonable despair of the Italian, and supposing it would not outlive his century, composed much the greater part of his works in Latin. The latter is nearly forgot, while his Sonnets have immortalized the Italian. This was the Augustan age of Italy, and it were the compliment of a coxcomb to say, with a certain finical writer, that Petrarch was the Waller of his day.

In the investigation of subjects like the present, it may sometimes be necessary to view a question with a philosophic eye, and instead of merely stating a fact, to account for the causes that produced it. Thus the period when France resigned the Latin for her own tongue, being so much earlier than when Italy formed hers, requires a short reflexion. France, it was observed above, had made some successful struggles in *music*, which before the ninth century had considerably altered the ferocity of her manners, and prepared her bards for those notes, that not only distinguished the succeeding age, but produced consequences which the finest phrenzy of the poet's eye could not have foreseen. Full of war and bloodshed as were those times, they yet invited Taste and Learning, in whose train followed Arts and Science, that after the revival of letters, and under the patronage of the great, illuming the darkness that shaded the human mind, led to the happy Reformation that has since been so beneficial to the world. Europe looks back with astonishment, but finds in the eighth and ninth centuries the dawn of her present greatness, when poetry, music, and the arts that polish mankind appeared with unexpected lustre, giving birth to efforts by which the ages that followed have been enriched and adorned: and it might be proved, that the very subject we are now upon is a wheel in the great machine then put in motion. This machine it was reserved  
for

for a Charlemagne to direct; and without going into the history of that extraordinary man, it is sufficient to observe that the dignity and greatness of his mind, had no sooner conceived than it executed the grandest designs, doing more in forty years than any succession of Kings have been able to perform in four hundred. He wisely saw that France could never be a great nation, till she possessed a language of her own, and himself (for who so fit?) composed the first grammar she had witnessed. Her tongue therefore may justly be called *Royal*: indeed it had been the policy of the wisest nation the world ever produced, to plant her language with her standard; and *modern* France has wisely profited by the great example. But the best grammar in the world without good writers to sustain its rules, and good poets to embellish them, for it is poetry that both makes and embalms a language, could of itself perform little: accordingly, we find that great monarch not only erecting churches that were to meliorate the world, and founding public schools for its instruction, but liberally rewarding all who excelled in those arts by which his country could be benefited. Among these the poets and musicians had his chief regard. But this æra produced under its wise King those *merry men* that at first were called, not *poets*, but in the provençal language, *troubadours*, or inventors of stories, mostly of a comic nature, sung to the harp, that always accompanied the feast. So well did this monarch understand the powers of music and poetry, so fond was he of these arts, and so encouraged their cultivation, that we find him in one of his journies over the Alps, met by a Lombard *troubadour* (we should now call them *savoyards*, the degenerated race of minstrels!) whom the King made his guest, suspending for a night his cares in that cold and cheerless region with the rhimes of this itinerant trouvaire. In Provence lay the scene of these sports; and what land could the muses with more propriety have chosen for their residence, than this inspiring country, whose pure and delightful air breathed the very soul of harmony? But the unhappy wars in which France was plunged for two centuries after, gave a severe check to the language formed by Charlemagne, which at first was called *Romanesque*, being an admixture of the Roman and Francic tongues, whence the

succeeding

succeeding compositions in the new tongue were called *Romance*, a name by which those of a particular cast are still distinguished. In this state stood the language with little improvement, till the eleventh century opened at the Court of Constance,\* a fresh theatre for the display of genius, when these Troubadours new strung their lyres to notes of gallantry and valorous deeds, rehearsing, as the poet says,

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“ High-wrought stories  
“ Of ladies’ charms, and heroes’ glories.”

The Popes too, whose court was become highly polished and splendid, had made Avignon their residence, where the holy see consecrated these pastimes, well knowing its throne was of this world. And indeed such influence had these sports, that artfully causing the women to become a party in them, combined all the graces of mirthful music and novel poetry, on the ages immediately following, that it was said, Charlemagne, in the division of his dominions, had assigned Provence as a property to the *merry poets* and men of the court, *Homini de corte*. At this period† too, the Arabians had considerably spread themselves in Europe, and so acknowledged was their language, that over the King’s chapel at Palermo, we have an inscription in Latin, Greek, and *Arabic*, setting forth, that in the year 1142, a Time-piece had been made by the order of Roger.‡  
Though

\* Surnamed *Blanche*, daughter to William Compte of Provence, on occasion of her nuptials with Robert King of France, in the year 1001.

† The author has never seen Mrs. Dobson’s history of the Troubadours, nor can he now procure it. He may therefore be found to differ from that lady, writing from memory of what he may formerly have read in other authors; a memory not always correct, and sometimes unconnected. It is so many years since he read the Bishops of Avranche and Worcester, on the subject of romance, that he is at a loss to say whether he may not be indebted to one or both of those distinguished authorities for some of the observations he has made. And the celebrated history of the Troubadours by Nostradamus, it is not at this time in his power to command.

‡ Hence it seems, that not only the language and poetry of the Arabians had universally influenced the verse of Europe, but we stand indebted to these ingenious people for our  
knowledge

Though the Arabians most certainly did not teach the Troubadours to rhyme, notwithstanding Fauchet and Le Clerc suppose they did, their poetry must have deeply colored the provençal verse, enflamed as it was with the wildest ardor and enthusiasm. Despicably then as some may judge of *rhime*, these *Rhimers* and *Merry Men* all will be found the real fathers of chivalry and crusade, that were nursed in their songs, and impassioned the age with that romantic love of glory, which still gives a complexion to the politics and manners of Europe. Then it was, that under these *Rhimers*, and their patrons the *Homini de corte*, the poetry of France and Italy, for that of Spain had a very different cause, first assumed a regular form in all the graces and decoration of numbers, that fancy could invent, or care employ, or rhyme and harmony recommend; laying the foundation of the various poetry, which these kingdoms afterward produced, whether heroic or dramatic, satyric or amatory, allegoric or sublime. This rhiming entertainment continued at the courts of the great, under the different appellations of *Chançons* and *Tençons*, for upwards of 200 years after the time of Robert and Constance, not only advancing Italian and Gallic poetry to a rapid pitch of improvement, but considerably influencing that of Europe in general, especially that of England, which scarcely yet had begun to dawn; but whose meridian afterward blazed out in a splendor and magnificence surpassing the most brilliant æra of her neighbours. Here we will leave the French poetry, of which some little had been said before, though more perhaps may occur in another place.

From France, and her own immediate translations from the Norman, the English took the turn of their poetry, and shaped their versification:

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for

knowledge of the *Time-piece*, whose invention has been ascribed to a so much later date: and we read also, that after the time of Roger, the Sultan of Ægypt made a present of another *Time-piece* to the Emperor Frederic II, which not only shewed the hours of the day and night, but with them the motions of the Sun, Moon, and other planets. Thus in two different parts of the world, we have an ORRERY five hundred years earlier than its reputed invention.

for nothing so much contributes to change the form of a language as *translation*, which necessarily carries with it many of the idioms and modes of phrase peculiar to its original; and whose multiplied transfusions must in the end destroy the character of any tongue. But the poetry of England appeared to little advantage till about the beginning of the thirteenth century, when the language, then almost wholly Saxon, but now incorporating with the Norman, first began to strike root. For, as the civil wars of France, and other troubles, had for a long time impeded the advancement of the French language; the expulsion by the Saxons of the old Britons to a corner of the island, followed by the barbarous invasion of the Danes, and afterward of the Normans, suspended the progression of English poetry, in a degree that can hardly be conceived. Such indeed had been the miserable state of English verse, if that may be called *verse*, whose scansion at once defies and shocks the ear, that for several centuries the language itself cannot be said to have had existence, at least for any literary purpose. In vain therefore shall we seek for the rhyme, where there was almost no verse at all. Add to this, the *early* Saxons did not rhyme what little poetry they had, the inflected cast of their language, like that of Greece and of Rome, not favoring the corresponding close. But when its involutions had unfolded themselves into a more simple and settled order, *then* we see their poetry embrace the rhyme. So that its absence in the *early* Saxon verse proves only, that the structure of their poetry at *that* period resisted it: but, the impediment removed, that their verse fell naturally into rhyme. Contrary therefore to a great authority,\* the Saxons did not "imitate" their neighbours, but yielded as of necessity to the final harmony, imposed by the temperate order of their verse. Still however, the English verse, like the imbued vessel, retains a strong tincture of the Saxon transpositive, and while it receives the rhyme, abounds in more inversions than any other of the polished European tongues.

To

\* Doctor Samuel Johnson.



To return. The first romances, like the first histories of the world, delivered in rhythm to fix the morals and strengthen the polity of savage man, were composed in metre, impressed with the *rhime*, and sung at festivals to the harp; like the odes and hymns of the Grecian bards, or the songs and melodies of the Hebrews for the service of the Temple. After this manner the original romances of all Europe were composed and sung; and from what observations I have been able to make, it does not appear that any one nation borrowed the custom of the other; which induces a strong supposition that the minstrel part of the ceremony had an higher origin than the fashion of the day; and that probably the Celts had given it birth. For all nations appear to have sung their poetry to the Harp, nor was their union separated in Greece till about the time of Aristotle. (See his *Polit. L. 8. c. 5.*) From this period however the rhyme seems to have become a necessary appendage to European verse; and indeed the genius of the French poetry had now taken that turn, which did not admit of *prose mesurée*, as they very properly call *blank-verse*; and surely no language was ever less adapted to it! He that is curious to trace the progress of the French rhyme, may consult Messrs. Fauchet, Baillet, and De La Rue, of whose work Mr. Ellis has very properly availed himself; and whose enquiries to pursue in this place would be only a repetition of what that gentleman has so ingeniously written.

Yet something must be observed on that source, from which the French are said to have derived their rhyme.

Mr. Ellis quotes Fauchet, for saying that his countrymen claim the honor of its application to their poetry from the Monk Otfrid, A. 870: but, says Mr. Ellis, succeeding antiquarians have ascribed its invention to the Latin rhimes of the sixth century. As the argument of these gentlemen applies equally to the rhimes of Italy and Spain, our own rhimes, and those of polished Europe in general, the same answer will serve them all.

I do not think it material to the present question, when it was that the monks began to torture the Latin tongue, or first twisted its inflexions into rhyme: neither is it worth the enquiry; for with great deference to

Mr. Ellis, for whose observations on ancient poetry the learned world is much obliged, I would say, that had the monk of Weiffemburg never been born, nor a single Latin rhyme disgraced the sixth or any other century, every nation in Europe would have rhimed its poetry in the very same manner it now does. Not considering the genius of language, or the facility with which the poetry of some nations more than of others receives the rhyme, we are seeking for its cause where it cannot be found, and without examining the question, assume that for a truth, which a little reflexion would have told us could have no foundation. Thus ignorance having first peevishly asserted that rhyme was a monkish invention, because the Italian monks had brought it into contempt by their tasteless and barbarous jingles, a dark and credulous age embraced it on trust, as firmly acquiescing in it as in the masses of the monks themselves. Neither time, nor the illuminations of learning have yet dispelled the error; the deception continues, and the veil yet remains to be removed.

“ But,” says Mr. Ellis, “ this date, (viz. the 6th century,) is certainly anterior to any that can be assigned to the *Runic* ode, called “ *Elgill’s Ransom*, that has been translated by Dr. Percy, and affords “ perhaps the earliest specimen of rhyme in any MODERN language.” The precise date of the *Runic* ode I do not pretend to know; but the *Armoric* or ancient *British* continues yet to be spoken, and with great purity, by an whole people, and is therefore *modern*: yet the rhimes of *Thalieffin* are more ancient by a century than those of the Latin monks, while those of *Aneurin* are at least of equal antiquity,\* and consequently each of them “ anterior” to any date that hath been assigned to the *Runic* ode. The *Irish* likewise is a *modern* language, and perhaps both more generally, and more accurately spoken than the *Armoric*; yet we have a fragment of *Ullen*, a poet far more ancient than *Thalieffin* himself,  
in

\* See Appendix, No. 4.

in which the rhyme is plainly visible. And this, surely, while it proves the wide universality of rhyme, will take precedence of the Runic ode, unless the *Ransom of Elgill* shall be "anterior" to the age of Caracalla.

The fortunes of Spain took a turn very different from those of Italy and France; for, notwithstanding the arms of Rome had spread the Latin language over this province, it was received there with great reluctance, and entirely rejected by the lower people, who adhered to their primitive tongue and ancient poetry. The Cantabrians or Biscayans had made a long and glorious struggle for their liberty: and if it required the Roman legions, with Augustus at their head, to subdue their arms, what human strength could subdue their language? Accordingly we find the old Basque or Celtic to prevail at the present day, rude as the mountains that guard it, and sacred for the antiquity of its poetry. The Phœnicians indeed being the first that civilized Spain, their language became general, and all orders adopted the oriental poetry. But while the Roman yoke was reluctantly borne, their predilection for the old rhymes of the country, rendered the Latin still more intolerable: inasmuch, that no sooner had the western empire declined, and the Visigoths possessed the kingdom, than we find the Latin despised and neglected by this impatient people; for though necessity obliged them to retain many Latin words, they yet returned to their old tongue, which in fact they had never wholly quitted. And in the year 570, when the Romans were totally expelled, the political Leuwigildus loses not a moment to reduce the influence of the Roman poetry, by reinstating the Asiatic and African in all their original forms.

The people of Spain were naturally grave and solemn; and the Romans being now expelled, leisure and contemplation gave every man, who was not engaged in arms, an opportunity of cultivating the muses, in whose harmony they soon excelled: and, in less than two centuries and an half, the settlement of the Moors in this country, instead of destroying the national verse, rather improved it in those forms and graces that are the true ornaments of poetry. What Leuwigildus and  
his

his successors could not entirely accomplish, was now performed by these ingenious people, who before the end of the eleventh century entirely broke the language of the Latin, and established the Arabic and other Eastern modes of verse, with stated and regular rhimes, which the Spanish poetry yet retains; the 2d and 4th line of every stanza uniformly ending in a double rhyme, with rarely the intervention of a monosyllable.

The numerous colleges founded by the Moors in this country, contributed much to preserve that taste and harmony they had introduced: and if the Spaniards at any time rhimed the Latin, as the drones of Italy and France and our own dreamers had done, what they performed was in *contempt* of the Latin, with a view through the influence of the rhyme to disengage their poetry from the Roman feet. When therefore it was said above, that Spain did not become an accomplice in the murder of the muse, the expression was not incorrect. Yet when they *did* rhyme the Latin verse, such rhyme was principally confined to their hymns, which being in Latin for the service of the church, and the Roman quantities giving offence, they as of necessity introduced into them a ratio of their own. This, it is apprehended, will suffice for a brief outline of the origin and growth of Spanish rhyme.

After what has been said on the general subject of English poetry, it is presumed there will be little necessity of going into a long deduction of its rhyme, especially as all that can be said on the subject of its verse may be found in Mr. Wharton and other labourers in this quarter of Parnassus. Enough has been already stated to shew the general sterility and uncouthness of the language, especially of its poetry and versification, prior to the thirteenth century, when our poetry first began to assume a form, under Robert of Glocester, who figures in more than 13,000 rhimes! I shall pass by Pierce Ploughman, who wrote about the middle of the fourteenth century, and excelled in the *συγγραμματα*, or alliteration, which may be called the rhyme *inceptive*, and of which it were endless to produce instances: every language favors it, and none I should suppose more adapted to it than another. For the like reason I shall also pass by Gower, and his "Confession of a Lover," with his *Eches*, and *Londes*, and *Maies*; likewise his disciple Chaucer, with his *Ayens* and *Befmotrids*, abundance  
of

of which sort of phrase may be found in all the writers of that age, by those who are curious after this sort of learning. From them and the intermediate improvers of our poetry, which may be traced at large in the ancient songs and ballads collected by several ingenious hands, I shall pass on to our Spencer, who continued the ancient stanza with its rhimes, and the allegories that grew out of the provençal songs. The muse of Shakespeare seems to have struck out a new mode of versifying for herself, sustained more by the vigour of superior genius than by any innate strength *at that time* in the language; though it must be confessed that the two Earls of Howard, in the time of the last Henry, had done much to give a masculin turn to our poetry, while they smoothed its asperities, and gave it a large portion of that music and harmony it now enjoys.

After Shakespeare, Milton “broke the bondage,” as he calls it. But it should be observed, that to attain his object, the British Homer found it necessary to invert the order of the language, by causing his Muse to speak a new dialect. Neither should it be forgotten, that our poetic language had not at that time assumed the regulated form that Waller discovered to be its true genius, that Dryden confirmed, and the immortal Pope has harmonized with a grace and a music that have not yet been equalled, and probably will never be surpassed. When I read Milton, I do not feel at ease, for I am not reading my native tongue: it is Greek, it is Latin, it is both, it is all three, Greek, Latin and English heaped together, like the mountains of his own devils. Like the earth he describes, his poem sustains itself by its own ponderosity: resembling the clock of some ancient and venerable abbey, whose chimes have been silenced; but whose vast and complicate machinery, *ponderibus librata suis*, performs all its movements in exact time. The dignity of his subject, aided by the vastness of his genius and learning, alone enabled him to support a sight, that had broken the heart of an inferior poet. Of this we have a striking proof in the miserable Miltonics of Addison, whose muse, however, sported gracefully enough in the rhyme that was natural to her. If aught could have inspired him *out of rhyme*, he had surely kindled his torch at a sublime passage in the Roman bard, which himself had selected, as the touchstone of his

his own Miltonic powers. He entitles it, "Milton's style imitated in a translation of a story out of the third Æneid."

" 'Tis said, that thunder-struck Enceladus  
 " Groveling beneath th' incumbent mountain's weight,  
 " Lies stretch'd supine, th' eternal prey of flames. —"

*Obe jam fatis!* But we have another proof in the *Splendid Shilling*, whose Miltonics, as the author had intended, become downright burlesque when applied to familiar subjects. Philips brought it to the test, and shewed in the happiest manner that the Greek and Roman phrase employed by Milton, was nor designed by that bard for others to imitate: but rather as a succedaneum for the rhyme he disdained and had studiously rejected. Yet such is the nature of the British muse, that it is with difficulty even the great Milton himself, with all his elaborate Hellenisms and Latinisms, sometimes escapes the rhyme, which at every turn obtrudes itself on him. And to avoid a word that both taste and convenience had offered to him, this very champion of blank-verse, this *Hercules Musarum* has more than once found himself compelled to adopt another word less beautiful and expressive: a proof that the great adversary of rhyme felt his trammels more difficult than those he had gloried to burst: like the honest Irishman, who, having fallen in love with his jailor's daughter, that had assisted his flight, exclaimed, "By my conscience I was never more a prisoner than now my *feet* are at liberty." When to such a man, even in his own laboured construction of a language whose very turn, one would think, extruded the rhyme, it was difficult to eschew the correspondent sound, let minor poets, beware how they attempt the bow of Ulysses, and abandon that easy grace now embodied into English poetry. And while tragedy from custom, as well as from the loftiness of her tone, and the very nature of dialogue, is allowed to reject the rhyme; I trust we shall never again, till another Milton shall arise, see an English poem in *prose mesurée*.

I have

I have said above, that the æra of Dante and Petrarch was the Augustan age of Italy. Others, perhaps, may have formed a different opinion, nor shall I now contest the point. What I principally meant was, that Dante and Petrarch had unlocked the springs of Italian poetry, and certainly have not been outdone by any of their successors. Crescimbeni too had said, that such was the excellence of Petrarch's verse, that reaching the highest point of perfection, the Tuscan poetry, after the manner of all sublunary things, speedily sunk once more into its ancient rudeness. And so true is this, that for a whole century after, the Italian poetry stood still, as if in astonishment of the efforts itself had made. Nor was it till Lorenzo of Medici, about the middle of the fifteenth century, had recalled the muses to their ancient groves, that they again appeared in Italy. After these, a second but shorter calm succeeded, when Ariosto and Tasso burst upon the world, with Costanzo, Tansillo, Guarini, and some few others in the sixteenth and seventeenth centuries, who have fixed the Italian poetry as on a rock that cannot be shaken, but with the destruction of the language itself. But all these distinguished bards composed their best and noblest works in the teleutic harmony: neither would they have committed the brazen monuments of their own and their country's fame to the precarious tenure of a rhyme, had they not been sufficiently convinced of its importance; and that, whatever might have been the stubborn and inflexible feature of the Roman Verse, the genius of the Italian muse, from whose ashes she sprung, spoke in rhyme, and like another phoenix, from burning in the balsms of the parent nest, took a bolder flight, and adopted a sweeter music of her own. And although England for the most part shaped both the language and the form of her poetry after the fashion of France, as she has followed her in almost every other, yet was it at the Italian fire that Spenser lighted his allegoric lamp, and the sublime Milton kindled the torch, that animating the frame of the universe, blazed on the confines of futurity, and flaming into another world, "far round illumined hell." To Dante

therefore, the severe, the nervous, inventive Dante, and the more polished Petrarch, with their graceful and copious brother, Boccaccio, belongs the honour of Italian poetry. These were the fathers and founders of its verse, the venerable Homers of their country, whose self-illuminated constellation rose upon the world, and though eclipsed for a time, as the sun itself shall be quenched and darkened, lighted Italy to the sacred fountain, of whose waters the rest of Europe has so largely drank. Yet these immortal men, so far from disdaining the rhyme, found in it the legitimate harmony of verse, that harmony whose music has since captivated all Europe, and will continue to charm the ear of poetry to the end of the world, with which it is coeval, and out of which it sprang. If Ariosto, therefore, has dressed out a rhymeless comedy,\* or Milton an heroic poem in a dialect till then unknown, it proves nothing against the general argument; rather shewing that a poem *may* be sustained without rhyme, than that it *should*.

We are now arrived at *Germany*; and on such a dry soil, what staff can support our uneasy steps? Taubmannus referring to *Tacit. de mor. Germ. cap. 11.* shews that several hundred years before the time of Otho, a vast number of German poets had existed, who composed their verses in *rhime*, after the manner of the Celts, “*Qui ferè rhythmicam poesim induebant.*” And Paschius, alluding to Otho, “*Quin longe antiquiora artis vestigia apparent. Apud Celtos (quo nomine appellari omnes populi qui Germaniam et Galliam occuparunt, a quibus ipsi quoque Galli suam originem trahunt) celebrantur olim bardis, unde antiquum vocabulum, Bar, ortum, quod cantilenam significavit.*”

Of Carolus Magnus, who, like Otho, had been the reputed founder of the Celtic poetry, because he had extended certain new privileges to the order of bards, Taubmannus says humorously, “*quem quidem Teu-*  
“ tonicæ

\* See Appendix, No. 2.



“ tonicæ scripturæ (rythmicæ poeseos) autorem faciunt, eâdem fide poterant et Alexandrum Magnum Græcè, et Julium Cæsarem Latinè nobis architectari.”

Beside the rhimes of Otfrid, of which something has already been said, this bard's translation of the gospels in Teutonic rhimes is yet preserved in the monastery of St. Amand. Its antiquity, I apprehend, is its best recommendation, notwithstanding the pompousness of its title, “ *Otfredi Evangeliorum liber : Veterum Germanorum grammaticæ poeseos, Theologiæ præclarum monumentum.*”

We have likewise a monk of this order flourishing about the same period, in an ΕΠΙΜΝΙΟΝ, or triumphal ode, the original of whose good old Teutonic rhimes is still to be seen in that monastery.

“ Sunt qui,” says Paschius, “ vel ab initio versuum, vel ab initio et sine simul, vel denique in medio eorum rythmis accumulandis operam navant, quam ultimam rationem inire Zefio præ ceteris visum est.” Thus, it seems, this German excelled in the *accumulated* rhyme, carrying that species of harmony to an extent which none of his countrymen had done.

Like their neighbours, the Germans had also their *macaronic* poetry, originally broached by the Italians, who borrowed it of Lucretius,

“ Nigra μελιχροος est.” &c. *Lucret. L. 4.*

But from what I have seen of the German Macaronic, such antiquated rudeness as this,

“ Gens sine capite mag feinen Rath geschaffen,  
“ Imperium vacat capite, so hant sein hoßt die Pfaffen,”

could give little pleasure to the academy. I shall therefore hasten to

The Belgic poetry; on which I shall be as short as possible. Paschius shews that the Belgians being a branch of the same tree with the Germans,

derive like them, their poetry from the Celts; and yet it does not seem to have taken an early form, for in the year 1670, James Doufa is the first who composed the Belgian alexandrine, which is in rhyme, and may be found in Paschius: after him comes B. Dn. Major, in a Latin poem out of all metre;

“ Sperlingi, Panfophe, Theologe facunde,  
“ Musæum ambulans, dic mihi unde,” &c. &c.

About this period we have also Riparius, who has the honor of being the inventor of another species of Latin verse, in strophes, with intercalary rhimes, all ending alike. Plempius, another Belgian, in the year 1639, published his “*Quisquilix Poeticæ*,” in which he rhimes away in as bad Latin as any monk of them all. He has the merit of inventing another sort of Macaronic, or a Belgico-Latino-Latino-Belgico verse, the words in each language bearing the same import; a specimen, it is presumed, is unnecessary. Yet although as said above, the Belgic poetry had not taken an early root, we have in the ninth century, Hubald, a monk of this order, (the order seems to have been more devoted to the rhyme than their rituals,) composing a poem in praise of *baldnefs*, and address to Carolus Calvus, the first line of which begins thus,

“ *Carmina Clarifonæ Calvis Cantate Camænæ.*”

This reminds us of Placentius's pig-poem, mentioned by Vossius, in his history of the Latin poets, cap. 3.; where every word began with a P, but which Sandius, in his *Animadversions*, declares to have been impossible. Hubald, however, has proved the possibility of such alliterative rhyme. And had this been wanting, we have Hader the Dane's “*Canum cum catis certamen*,” which may be construed in his own way,  
“ The

“The Contest of the cats and curs;” every word of which begins with the letter C. It may be found in the work called “*Deliciæ Poetarum Danorum.*” Tom. ii. p. 369. The invocation opens in this manner.

“*Cattorum Canimus Certamina Clara Canumque,  
“ Calliope, Concede Chelyn !”*

The poem consists of ninety-three verses, all in this style. Heaven preserve us from going through the alphabet ! But enough has been said of the Belgic poetry, that like the German, of which it is a dialect, bears also the impress of the old Celtic or Teutonic, and like that, is constantly marked with the rhyme, unless perhaps where it has studiously, and sometimes even for the sake of novelty, been avoided.

And now, from the general view of the question, the following conclusions may be drawn.

That the population of the world began in the East.

That in whatever manner the dispersion of mankind, and the origin of diverse languages, at what is called the confusion of tongues, took place, it is evident that they began from the East, and thence were spread over the habitable globe.

That the first empires, states, and governments were also in the East, and Asia and Africa peopled from thence, spreading over Chaldea, India, Persia, Arabia, Egypt, Tartary, China, and from thence diverging into Europe.

That each successive people, at their first migration from the parent source, used the language in which they were capable to converse.

That

That each language had great affinity with the other; and in proportion as they advanced in refinement, that their poetry was decorated with the rhyme, or correspondent sound.

That the descendants of each people *still* use the rhyme in the structure of their poetry, as they originally had done.

That the first colonization of European Greece was from Egypt.

That under whatever names their leaders were called, their language was Egyptian, and adopted the rhythmus to which it was congenial.

That the Greeks, and afterward the Romans were the only people, who, by adding quantity and feet, pretended a melioration of their verse, by abstruding the rhyme, which all the other nations of the earth had found so natural to language.

That when the Greek and Roman states lost the power of conquerors, by which alone their languages were either extended or sustained, the different tongues into which the Greek and Latin were split, each as soon as formed, resumed the rhyme, that had been continued by general use.

That although the language of Greece and Rome for some centuries denied the rhyme, by adopting quantity, yet no sooner did invading nations destroy that custom, than a return to the ancient rhyme, in their several poetries became universal, and remains in that pristine state.

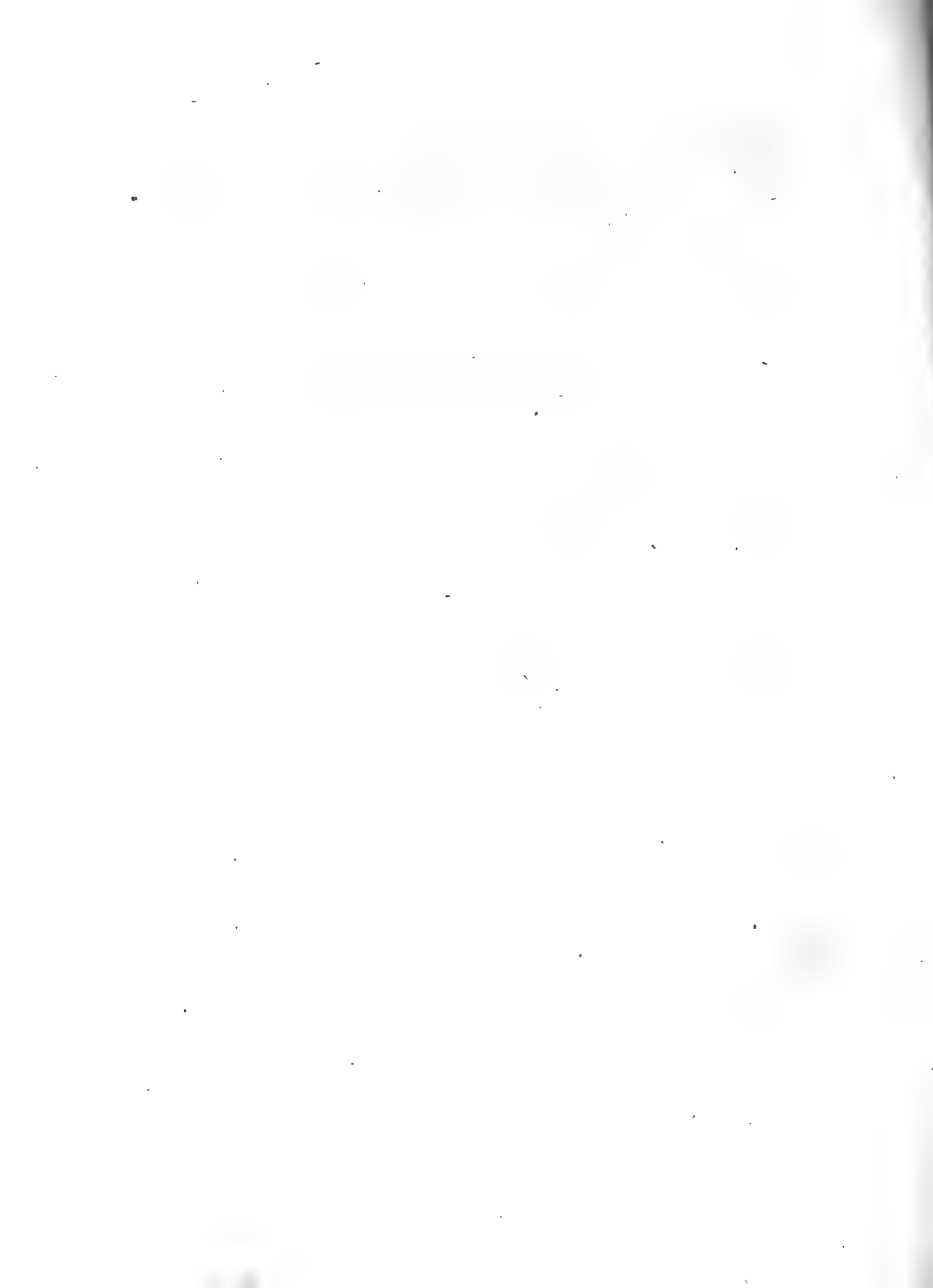
That, as poetry was primarily introduced in honour of the religion of the country, no sooner was it restored, than the Greek and Latin languages

languages also had their rhimes in the service of the Christian Church, a mode that continues in practice, as well in the hymns of the Greek- as those of the Roman and other churches. And, in fine,

That from the first ages, rhyme ever was, and now is, and ever will be

THE UNIVERSAL VOICE OF NATIONS.

APPENDIX.



# A P P E N D I X.

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## NUMBER I.

ONE of these learned doctors shall himself decide the point. “ Quod ad veros horum versuum numeros, ad rythmum et modulationem attinet, id omne et penitus ignotum est, et nullâ unquam arte aut industriâ humanâ investigari potest.” “ Manifestum est antiquam et veram Hebraica pronuntiandi rationem omnino esse ignotam.” And again more particularly, “ De versuum singulorum numeris nihil certò definiri potest.” “ Profecto qui metricam Hebræam veram illam et genuinam instaurare conatur, is ædificium extruit, cui fundamentum in quo nitatur planè deest.” Præl. 3d. “ Quanquam Hieronymus de metris Hebraicis multa disputat, multa de tetrametris et hexametris, de iambicis et sapphicis memorat, ea tamen omnia nimium urgenda esse res ipsa ostendit; etenim planè pingui, quod aiunt, Minerva agit, in Hebraicis remotam quandam similitudinem Græcorum metrorum quærens.” (Præl. 18.)

Here, then, the learned Doctor asserts as *Professor*, that which, as author of the *Confutatio*, he denies; for it requires no long argument to prove, that if in the Hebrew poetry *semper habetur ratio*, it is impossible that such ratio should be *penitus et omnino ignota*. These instances, however, selected out of fifty others, will suffice to prove, that whatever might have been the genius or structure of the Hebrew verse;

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whatever might have been its rythmal character; in whatever might have consisted its Dithyrambic thunder, or its *terrible graces*, the *δυνατα μελωδια* of its poetry, I was warranted in saying, that Apollo and his nine harmonious maids had no acquaintance with it. "Fatendum erit, non modò Hebræorum carmina nihil reliqui habere, sed nihil unquam habuisse, *harmonia ac poetica suavitatis.*" Præl. 3. Like the coruscations from a cloud by night, the flashes of their poetry just illumine the obscurity that surrounds us, leaving us again in the darkness we had been in before. Yet with all its obscurities and all its uncouthness, it is not wonderful that the hymnal poetry of the Hebrews should lift itself above the grandeur of the Greek or loftiness of the Roman ode; or that thunders and lightnings should accompany its enthusiasm. With the Hebrews, as with all other nations, the hymn indisputably was the form of their first compositions; and of this we have a beautiful proof in the Eucharistic ode of Moses, beyond all question the most ancient piece of poetry in the world. But the gods of other nations being local, the strains and raptures of their poets were as limited as the objects of their adoration; while the omnipotence and wisdom and goodness of an eternal and universal creator, filled with unbounded sublimity the hymns of the Hebrew bards, who felt his protecting power, and acknowledged his beneficence. Nor were the Hebrews themselves insensible to this distinction, or to the advantage they enjoyed: one of the sublimest of their poets says, "As " for the gods of the heathen, they are but *idols*, but it is the *Lord* that *made the heavens.*" And again, " Among the *Gods* there is none like thee!" The theme kindles him, and he feels his superiority arising from the very nature of his subject. Yet, while I agree with Lowth, that the similitude between the structure of the Hebrew and the Greek verse is remote indeed, I cannot help thinking the odes of Pindar yield to those of the inspired writers in nothing but the inferiority of their subjects, whose nature and condition did not allow a wider range of fancy, or a more glowing enthusiasm. And we are likewise to take into the account *our own interested feelings*, neither the exploits of a horse-race nor the genealogy of a king, being objects of Christian regard. Let us divest ourselves of these *incidental* circumstances, and as far



far as Christians can, look at the question without prejudice, allowing something for the distinctive genius of the two languages, and we shall find that the odes of Pindar, in their frame and form, bear a striking resemblance to the hymns of the Hebrew bards, whose long and short, and broken numbers, carry with them all the character of the Theban muse; the same abrupt transitions, the same graceful negligence, the same happy omissions, the same headlong metaphors, the same fury of conception, animate the one and the other with the same enthusiasm of soul. The daring Dithyrambic of the Greek, equalled alone by the Thunder of the Hebrew, sweeps with precipitous arm all nature before it. Methinks I see the bard seated on his throne of gold in the temple of Apollo, pouring like the God himself the torrent of his song, and like him regarded as the genius of the fane. Who will deny, that had the author of the Grecian hymns been an Hebrew celebrating the One Eternal God, he would have kindled the strings of his lyre with the same lofty success, and *inspiration* too, that the royal prophet “awaked *his* lute and harp”? And who is it will say, that had David been doomed to sing the praises of Theron and Hiero, with those of their horse Pherenicus, this highly favoured bard would have transcended the flights or surpassed the music of the Theban swan? In a word, the ideas of the profane bard, through his ignorance of the divine nature, are necessarily restricted to sensible objects, and the sphere in which humanity moves: while the “Prophet of the Most High,” drawing his inspiration from the immediate source of truth, not from the imaginary fountain of the muses, is as necessarily transported into the bosom of the Deity. Let the Grecian bard become the prophet of the Most High, let him celebrate the wonders he had witnessed, and the favours he had found; what then would be his language? Instead of setting forth the Ionian philosophy, with *Αἰσιον μὲν ὕδατος*, his language would be this, “Thou sendest the springs into the rivers, and the waters rush through the midst of the hills.” Instead of Hiero’s victories, with his horses and his chariots, that raised *him* to a god, we should have this triumphal address to the Father of all victory, “Thou makest the clouds thy chariots, and walkest

upon the wings of the wind :” and instead of “ His glory beams through Peloponnesus,” we should hear him exclaim, “ O Lord, my God, thou art become exceeding glorious ; thou art cloathed with majesty and honour, and deckest thyself with light as with a garment.” It were a delightful task, and an honourable reward, for any man of taste, and at the same time critically skilled in the respective languages, to trace both the particular resemblances, and the respective differences between the Hebrew and Æolian instruments, and oblige the learned world with so noble a work.

#### NUMBER II.

Jodelle first, according to Baillet (*sur les Poetes*) and after him Baif, made some idle attempts at blank-verse in the French. Passant followed him with equal success ; then Paquier, remembered only for the impotence of his muse. They all flourished about the middle of the sixteenth century, Paquier at the beginning of the seventeenth. Of Baif, Baillet tells this curious story. “ Il ne voulut pas meisme se contenter de faire vers rimez comme les autres, il tacha aussi d’en introduire des mesurez a la mode des anciens Grecs et Romains : et dans le dessein de faire mieux reussir la chose, il avoit etabli dans sa maison de plaisir qu’il avoit à un des Faubourgs de Paris une academie de beaux esprits, et particulierement de musiciens, pour prendre plus seurement la mesure, les nombres, et la cadence du vers Françoisé sans rime.” But he allows some merit to Rapin, who however had been weak enough to try his strength at “ les vers mesurez,” and failed like the rest. In this list we are sorry to see the charming Desportes, whose exquisite taste sustained for a long time, the purity of the French verse, against the barbarisms of Ronfard, who, with great genius, but a perverse judgment, had so debauched the poetry of France, that Boileau wittily said his muse spoke Latin and Greek in French,

“ Sa muse en Françoisé parlant Grec et Latin.”

Yet

Yet Ronfard both 'had, and continues to have his admirers; Thuanus says of him, "naturam arte ita temperavit, admiscens Græcæ et Latinæ Camænæ spiritum, ut post Augustum seculum poetarum qui post fuerunt, præstantissimus evaserit." But to Desportes the French poetry owes more than to any other writer, except Marot, notwithstanding his Græco-Franco hexameters had exposed him to deserved ridicule. But such was then the taste of the day; which had probably been picked up from Figliucci, who, in the year 1551,\* having published his admirable commentaries on Aristotle's Ethics, a book then in every one's hand, had taken occasion to abuse rhyme as Gothic, and of barbarous introduction, recommending the Greek and Roman quantities in its stead: himself at the same time setting the laudable example by translating the verses which Aristotle had quoted from Homer and Euripides, into the same metre with their originals. This concetto, however, as might be expected, just lived out its day, and died; and I do not find that the solemn Spaniard ever condescended to canter in dactyls, or trot in tetrameters. § The dactyls of Desportes and his cotemporaries resemble those in English modelled after the manner of Figliucci, being the two first lines of Abraham Fraunce's attempt to translate the Æthiopic romance of Heliodorus into English hexameters.

As

\* Yet above a century before, we have Leo Baptista Alberti dabbling in this muddy stream, who, with Tolomeo and others of less note, probably first suggested to Figliucci these quaint attempts. Alberti was a man of talents, and most of his poems have been preserved, but by the fate of his *Italico-Latino-metrico*, which has perished, we may estimate the value his cotemporaries set upon it. Vaffari, his biographer, has, however, preserved two of its precious lines, with which Mr. Roscoe has favoured us, in his admirable *Life of Lorenzo de Medici*, Vol. 1. chap. 2.

" Questa per estrema miserabile pistola mando,

" A te, che spregi miseramente noi."

‡ This must be said with some reserve, for Gonzales Perez, in compliance with the fashion, is said to have translated into his own tongue the whole of the *Odysey*, in the same feet with the original.

As sōon | ās sūn | bēāms cōūld | pēēp ōūt | ōncē frō thē | mōūntains,  
And bŷ thē | dāwn ōf thē | dāy hād | sōmewhāt | lightēd | Olŷmpus,

And this other effort of the third line in Homer's first *Odyfsey*,

Πολλῶν δ' Ἀνδρῶπων ἰδεν ἄστεα, καὶ πόλις ἐγγύω.

Qui mores hominum multorum vidit et urbēs.

“ All trāvē | lērs dō rē | pōrt grēāt | prāife ōf U | lŷffes,  
For thāt hē | knēw mānŷ | mēn's mān | nērs, ānd | sāw mānŷ | citiēs.”

This, we are told, is “trew versifying”; Dr. Ascham declaring, “it was not made at the *first* more naturalie in the Greke by Homere, nor afterward turned more aptelie into Latine by Horace, than translated into English *roundlie* by myne old friend Mr. Watſon,” who, fans doubt, is much obliged to *his* old friend Doctor Ascham for having so carefullie preserved this trewlie deliciouse morſelle. But this illegitimate and mongrel fort of verſe has not, I believe, been attempted in the European tongues, ſince the ſixteenth century, and I truſt will never be revived, notwithstanding the ſage admonition of our old friend Horace, “vos exemplaria Græca.”

As Figliucci was the first who *recommended* the ancient quantities to modern language, (for it was not altogether ſo new a conceit, that the Greek and Roman meaſure was unknown to England in the twelfth century, the *Ormin* having been compoſed in tetrameter iambics,) ſo he was the first who *condemned* rhyme as of barbarous invention.\* *Blank-verse,*

\* About twenty or thirty years before Figliucci's Commentaries appeared, viz. anno 1524, Giovanni Rucellai printed at Rome a poem called *Le Api*, “which,” ſays Mr. Roſco, “will remain a laſting monument that the Italian language requires not the ſnaekles of rhyme to render it harmonious.”

*verse*, however, and *Roman quantities* have been improperly confounded; for though Roman quantities are certainly *verse* without rhyme, yet *verse* without rhyme is not therefore Roman quantities. Even the learned Pafchius does not discriminate them, but puts the quotation given above, from the translation of Heliodorus, on the same footing with the measure of the Paradise Lost, merely because the rhimes in both had been omitted. In the sixteenth century we have the Lord Henry Howard discarding the rhyme, and translating the fourth book of the Eneis into English hexameters, as in the same century, we have Cardinal Ippolito translating its second book into Italian hexameters, which he entitles, in the true spirit of the times, *Il Cavaliero Errante*; to these may be joined Stiernhelmus the Swede, who writes the Gothic history in Swedish words with Roman quantities. These, I believe, are among the first attempts in Europe at blank verse, if we except a vain effort of Ariosto, who wrote comedies *out* of rhyme; as our own Ariosto, Mr. Hayley, wrote comedies *in* rhyme: with *novelty* for their motive, and possessing similar genius, their success has been the same.

The French verse, in its texture and turn, strongly resembles the cast and character of the Hebrew, for which excellence it is principally indebted to the chaste and polished Marot, author of the French rondeau,\* and father of the masculine and feminine rhimes, that give such

“ Ed odi quel che sopra un verde prato  
 “ Cinto d’abeti e d’onorati allori,  
 “ Che bagna or un muscofo e chiaro fonte,  
 “ Canta de l’api del suo florid’ orto.”

These lines, it is confessed, are very beautiful, and I must not dissent from so exquisite a judge as Mr. Roscoe: nevertheless they only prove, that Le Api has perhaps been composed with some degree of success; but that Rucellai thought *one* trial of the sort quite sufficient. See Appendix, No. 5.

\* Dr. Percy has given us a Rondeau of Chaucer, which, says the learned Bishop, the bard had picked up among his neighbours. I believe it was a stranger to the French

such spirit and variety to the French numbers, and are now incorporated into its poetry. Had the bloated Ronfard trod in the steps of this accomplished writer, and we find La Bruyere and others of that day, sharply reprovng him for not imitating his simplicity, the French poetry would have owed him more obligations: for the author of "La Printemps a la sœur d'Astrée," had a rich and copious fancy, and when he chose to lay aside his "Estes-vous pas ma feule Entéléchie?" and speak mortal language, could be as courtly and perspicuous as he was tumid and perverse. But of the services that Marot had rendered her poetry, France is truly sensible: and I much question, had he not given that early turn to her language, which in a manner fixed the laws of her poetry, whether Fontaine or Voltaire, with all their wit, and all their ease, could have so easily sustained the naiveté of the French Muse: sure I am, but for Marot, they had not left behind them such admirable monuments of noble simplicity. The couplets of Marot in the French rhyme, present to me a beauty not unlike the eyes of a fine woman, whose beams, emanating from a double source, end in one point of lustre. This is but a faint sketch of French poetry, and still less of the Italian or the English: but, though cast into the back page, perhaps not wholly un-  
useful to the elucidation of our subject.

#### NUMBER

French language, till Marot gave it birth; and if he did not introduce it, he certainly improved and fixed its laws. The rondeau consists of thirteen verses, as the sonnet does of fourteen; eight of the rhimes must correspond in sound, and be set out in their allotted places: the remaining five rhimes, having likewise the same echoes, must have also their allotted places. It has two burthens, the first placed after the eighth verse, and the last concluding the piece. In addition to this, it is indispensably necessary there should be a rest or pause on the sixth verse. I speak only of the *French Rondeau*; thus, then, the principal beauty and excellence of the rondeau lie in the rhyme and its happy disposition. I say nothing of the *Triolet*, which is only another species of the rondeau, somewhat varied in the situation of its rhimes. This had formed a part of the earlier French poetry, but not Marot himself has been able to give currency to the fettered rondeau.

## NUMBER III.

The Σκολιον was a sentence or maxim delivered and sung at their entertainments; for which reason they were sometimes called *Αδομένα*, and were generally the sayings of the wise men put into verse, that became a sort of proverbs or gnomes, βιωφελῆς. See *Athen. Deip. L. 15. c. 14 and Casaub. animadv. in Athen.* Of this sort is the well-known Scolion entitled *Αδμετα λογοι*, from its initial words, but happily amended by Dr. Bently, into *Χαρωνδῶ νομον*; a gnome, *περι κακομιλιας*. Thus,

“Χαρωνδῶ νομον, ὦ ταιρε, μαθὼν τῆς Ἀγαθῆς φιλει,

“Τῶν Δειλῶν δ’ ἀπεχε, γυνε Δειλῶν ὀλιγη χάρις.”\*

This Scolion was deemed so excellent that its author has been much contested, some ascribing it to Alcæus, some to Sappho, and some to Praxilla, to whom Eustathius, *II. β. p. 326. Edit. Rom.* on the authority of Pausanias the lexicographer, has allotted it. It may be thus translated.

“Taught by Charondas’ laws, the Brave respect;

“But shun the Vile; the Vile no grace reflect.”

Sometimes they relaxed this didactic mode, and by an inviting sentiment, gave it the more familiar air of a *catch*. As a proverb of our own seems to have had its origin in the following, we select it for an example.

“Σὺν μοι πίνε, συτηθῶ, σὺνερα, συνεφανεφωρεῖ,

“Σὺν μοι μολόμοσῶ μάινε, συσσωφροσῶ σιωφροῖ,”

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“Drink,

\* The morality of this maxim is enforced in the sacred page,

“Evil communication (*κακομιλία*) corrupts good manners.”

“ Drink, live, and love, and bind thy brows with me :  
 “ With me make merry ; I’ll be wife with thee.”

The original is “ be *mad* with me,” but that was a sort of Græcian idiom for the full indulgence of the genial hour. After the manner of Anacreon, it is thus paraphrased by my son.

## 1.

With me the social goblet share,  
 With me enjoy the youthful hours,  
 With me carefs the frolic Fair,  
 With me compose the wreath of flowers.

## 2.

Now drive with me dull thought away,  
 With me defiance bid to forrow,  
 Be merry thou with me to day,  
 And I’ll be wife with thee to-morrow.

## NUMBER IV.

The great object of the Saxons being the extermination of the Britons, together with their language, we must not be astonished there should remain so few monuments of British poetry. The high reputation of Thalieffin, *Britannicorum bardorum princeps*, could not save him from the general wreck, but rather marked out his songs for destruction ; and most probably he may be placed among those whom the Saxons drove into the mountains on their first coming over. The bards too, whose poetry being calculated either to prompt their countrymen to instant vengeance, or to keep alive the memory of their sufferings, would be the first object of the jealous invader. This very policy, it is thought, determined our own Edward, in less ferocious times, to attempt



tempt the destruction of the order; yet the tyrant failed, their music, like that of Orpheus, proving too powerful for Pluto. For, so low down as the year 1593, we have a commission issued by Elizabeth, to the magistrates of North Wales, directing them to regulate certain abuses that had crept into the profession; a proof that the minstrel order existed in Wales, to the latter end of the sixteenth century. If I do not mistake, we have a statute, in the time of Charles the First, that controuls the itinerant minstrels of Ireland, whose profession, as an order, could not, for the same reason, have been extinct *at that time*. Of Thalieffin, however, there does not, I believe, exist any fragment, except such as Gildas, who may be stiled his cotemporary, might have snatched from the grave: and we are indebted to the indefatigable Usher, who has brought to light out of this author, five original lines of our poet, in the old British character.

“ Gwae yntwy yr ynvidion, pan vy waith Baddon  
 “ Arthur been haelion y lasneu by gochion  
 “ Gwneeth ar y alon givaith gwyr gafynion  
 “ Gonynton gwaedd daredd mach deyrn ygrgledd  
 “ Heb drais het droffedd.”

“ Quæ,” (says Usher, *Britann. Eccles. Antiq. c. 5.*) “ in Latinum ser-  
 “ monem traducta ita exhibuit D. Johannes Prifæus.”

“ O miseros illos nimium sub monte Badone  
 “ Quum cruor Arthuri, magnatum principis, ensem  
 “ Inficeret; fusi que foret jam sanguinis ultor  
 “ Heroum, quorum auxilio borealia justé  
 “ Regna stetero diu——.”

Gildas, says Usher, explains *monte Badone*, “ qui prope Sabrinum  
 “ ostium habetur.” But the lines of our bard are valuable for some-  
 thing more than the *rhime* which adorns them. They prove, that what-  
 ever may be the doubts of some learned men, respecting the existence  
 of Arthur, Thalieffin, in the very moment he is deploring the cala-

mities of his country, whose woes required no fiction, and where truth had best served his purpose, clothes his hero with flesh and blood; and farther, that the Britons were of northern extraction, the truth or the falsehood of the one and of the other standing committed on the same bottom. This single authority is worth a volume of conjectures. Gildas, who quotes our poet, lived at the latter end of the fifth, or beginning of the sixth century; Thalieffin, therefore, must have flourished in the fifth, perhaps about the middle of it. This then traces the rhyme one century higher than the rhimes of the Italian monks in the sixth.

This long note shall be closed by observing, that the *Gododyn*, in the century after Thalieffin, on the battle of *Cattraeth*, is composed of 363 stanzas, containing ten or eleven lines each, the rhyme of every stanza being respectively the same, as was the fashion, and is still in use with the Arabians and other eastern nations. But while this is a proof of the antiquity of the rhyme in Europe, it shews also the great facility with which the Welch receives it. Who then shall say that the Britons *borrowed* their rhyme, and that monks gave it birth? When the French, therefore, would seek the origin of their rhyme, they would do well, instead of rummaging the rotten archives of *Weiffembourg*, to explore the records of *Bretagne*. Mr. Ellis has well observed, that it "is well known the Welch soldiers who served in our army at the siege of *Belise*, (in the year 1756,) found little difficulty in understanding "the language of the Bretons." Yet this learned author, whose judgment on other occasions is not apt to fail him, has ascribed to the Latin rhimes of the sixth century, that which *Faucher* and other French writers might have found indigenous, or at least as ancient as the 650th year of old Rome, when the *Cimbri* and *Teutones* invaded the Roman province, and no doubt brought with them their *Cimbrian* or *Cambrian* war-songs. Mr. Ellis has likewise remarked, that "the *Slavonian* sailors, employed on board *Venetian* ships, in the *Russian* trade, never fail to recognise a kindred dialect, on their arrival at *St. Petersburg*." All this goes to prove, that the rhyme is not *borrowed*: and *Russia* now

now rhimes, not after the manner of monks, nor even that of France, or any other polished state; but after the manner of her Slavonian ancestors; that is, after the good old Runic mode. The learned Abbé Fortis, has observed, that the Slavonian language *cannot be doubted* to have existed in Dalmatia, *even from the time of the Roman Republic*; which he proves in an infinity of instances, drawn from the names of cities, rivers, mountains, families, &c. preserved by the Greek and Roman authors, that are manifestly Slavonian: to say nothing of the inscriptions yet existing in Dalmatia, under the first emperors. So that the Russian rhimes, that are but a dialect of the Illyrian, are as ancient in Europe as any perhaps that may be brought against them.

#### NUMBER V.

Since the writing of the note to which this refers, an ingenious friend has favoured me, with a view of "Le Api," a work that I had not seen before. It was composed in the year 1524, and printed at Venice, in 1539. I do not affect much skill in Italian verse, but "Le Api" is, undoubtedly, a very fine poem. The following simile is in Virgil's best manner, and not unworthy of the country which gave birth to that poet.

Come ne la fucina i gran Cyclopi,  
 Che fanno le fiette horrende a' Giove,  
 Alcuni con la forcipe a due mani  
 Tengono ferma la candente massa;  
 E la rivolgon su la falda incude;  
 Altri, levando in alto ambe le braccia,  
 Battonla a tempo con horribil colpi;  
 Altri hor alzando le bovine pelli,  
 Et hor premendo, mandan fuori il fiato  
 Grave, che stride ne i carboni accesi:  
 Farte quando piu bolle, e piu sfavilla,

Frigon

Frigon la massa ne le gelid' onde,  
 Indurando 'l rigor del ferro acuto ;  
 Onde rimbomba il cavernoso monte ;  
 E la Sicilia e la Calabria trema.

Nevertheless, this poem has not proved to me, that rhyme is not the genius of the Italian : and, from several incidental circumstances in the poem itself, I am convinced its author found he had undertaken a forbidding and ungracious task. Now, although the poem consists of 1062 lines only, there appear, on a cursory inspection, not less than 290 verses that terminate in *O*, thus forming considerably more than one fourth of the whole poem in that teleutic. It looks, indeed, as if the subject had invited these harmonies ; how else shall we account for this species of *clustered* music, in a poem that professes to take wing, and rise above the correspondent sound?

“ Non temerò cantare i vostri honori,  
 “ Con verso Etrusco da le rime sciolto.”

V. 24.

To use the language of a bard, whose verse has proved that rhyme is the true source of harmony, these terminations *conglome*, as he says of the Hivites that murmur round their queen, and *cohere* in every page of the work, especially at verse 972, where, in the space of only thirteen lines, we have no less than *ten* of these terminative *O*'s ; not to insist on the polished (but with us, *vulgar*) rhimes of *imago* and *drago*.

“ Così vedrai multiplicar la *imago*  
 “ Dal concavo reflexo del metallo,  
 “ In guisa tal, che l'ape sembra un *drago*.”

Beside the numerous terminations in the letter *O*,<sup>1</sup> we have, on the same hasty inspection, two hundred verses, out of the remaining 972 that end in *I*, conglobing and clustering after the same bee-like manner.

ner. So that on these two vowels only, we have a swarm of teleutics that buzz through one half of a blank-verse poem! As if the poet had literally intended to *hum* us. Le Clerc, did not find better rhimes in the second psalm, where five out of his seven *ομοιοτελευτα* end in this very vowel, having the same unvaried return, *Mo*: yet the learned have acknowledged their legitimacy. I admit that the Italians do not denominate these vocal terminations *rhimes*; for that their rhimes have taken a more artificial cast: but this proves nothing, we are speaking of rhyme as it is in *nature*, not in *nations*. National echoes may be as remote from truth, as the execution of the elbow is distant from the simplicity of a Scotch air, or a squeak from the rhyme *masculine*. And what is rhyme but the voice of nature and harmony of repetition? The same which the ancients impersonated and deified under the title *Echo* or *Imago*, that *imaged* the poet's notes, whose sounds she repeated in the very voice and accents of the bard himself. Man, unpolished man, felt himself a part of that universal harmony, and soon learned to imitate what unerring nature had taught him; for of all animals, man is the most imitative. Hence we find the lively and philosophic Greeks appropriating the air of Tempe to the residence of the Muses, where the resounding hills of Parnassus and other mountains, *colles collibus ipsis*, returned the same repeated notes the one to the other, as if nature herself were reverberating her own harmonies. Hence too, we find their writers of pastoral, who followed *nature* in all things, constantly observing that Echo, in responsive sounds imitated the shepherd's music, or that harmony with which nature had inspired her bards. The Romans likewise felt its truth; it did not escape the observation of their great pastoral poet, when he said *respondent omnia sylvæ*, and caused all the groves to echo every syllable, every letter, every *rhime*, for such it is in all its elements, of the most harmonious verse that ever the hand of a master composed.

“ Formosam resonare, doces Amaryllida sylvas.”

Our

Our own Spencer also, who knew he never spoke with more truth or more propriety, than when he echoed the sentiments of his great originals, arrested the idea, and after them has said,

“ The woods shall answer, and their echoes ring.”

*Epithal.*

Neither was the music or the philosophy of this verse unacknowledged by the most harmonious and philosophic of all modern poets, who, in his pastoral entitled “ Summer,” puts the very same line into the mouth of his “ shepherds’ boy.”

Man, I have said, is the most imitative of all animals: this it was, perhaps, that induced the great philosophic poet of Rome to suppose, that his first music was borrowed of the birds, whose notes he imitated, nature and the country inviting him to make the attempt.

“ At liquidas avium voces imitauer ore

“ Ante fuit multo, quam lævia carmina cantu,

“ Concelebrare homines possent, aureisque iuvare.”

*Lucret. Lib. 5. v. 1378.*

I shall not stop to debate the question: but we know, that the first accents of the plummy people, like those of the unfledged poet, composed, as we have seen, of correspondent sounds, are chirped in the same imitated notes. And what is the long-drawn warble of the sweetest of all birds, the Attic songster herself, but the assemblage of the same notes lengthened and multiplied without end? Well therefore, might the poets personify sound, and make a goddess of *her* whom they found to be nothing more than *nature* herself in her most simple but captivating character. How beautifully and piously, has Fabricius, the learned author of “ Specimen Arabicum,” described this prevailing nature, that harmonises all creation! “ Deus Optimus Maximus

imus hunc terrarum orbem, et omnia ab eo contenta certâ ratione quasi metro disposuit, rebusque tam celestibus quam terrenis harmoniam quandam indidit: satis patet cum ipsius *naturæ* primordiis cantum primo existitisse." And just after, with an exquisite knowledge of nature: "Videmus omnes aves plurimum, multas totum annum exercere cantillando. Quod si aptis illis inter se, atque mutuo responso fonis æquantibus inæqualitatem suam vis addatur orationis: quid aliud est, quam imago quædam illarum proportionum, quæ solis notæ sunt sapientibus?"\*

But that Echo is the soul of poetry, and *rhime* her proper office, we have Rucellai's own authority, in the very poem before us. Hear what a poet he has made of Echo! Not content with making her the inventress of the rhime, she must be something more; she must be the genius of the first harmony, in the moment he is asserting the superiority of blank-verse.

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N

Fuggi

\* Left the reader should suppose that the author indulges an opinion too airy and fanciful, he is requested to read the greater part of the fourth book of Lucretius, *De Rerum Natura*, where the principle of *Imago* is illustrated in the most beautiful and philosophic manner. Particularly let him read the whole of the verses, from line 529, beginning with "*Principio auditur sonus*," to line 598, inclusive; *Sound*, he will there find, to receive a corporeal form, and the doctrine here laid down enforced on such principles as Anti-Lucretius himself would not disapprove.

Sex etiam, aut septem loca vidi reddere voces,  
Unam cum jaceres: ita colles collibus ipsis  
Verba repulfantes iterabant dicta referre.  
Hæc loca capripedes satyros, nymphasque tenere  
Finitimos fingunt; —————  
Chordarumque sonos fieri; dulcisque quærelas,  
Tibia, quas fundit digitis pulfata canentum,  
Fistula sylvestrem ne cesset fundere musam.

—————ut omne

Humanum genus est avidum nimis auricularum.

————— *Lucret. Lib. 4.*

Fuggi le rime, e 'l rimbombar sonoro.  
 Tu fai pur, che l'imagin de la voce,  
 Che risponde de i sassi, ov' Echo alberga,  
 Sempre nimica fu del nostro regno:  
 Non fai tu, ch'ella conversa in pietra,  
 Et fu inventrice de le prime rime?

Nor was this a slip of Rucellai's pen; for so powerfully did he feel the force of her dominion, and the weight of his new caparisons, that he repeats, like echo herself, the very same words, *inventrice de le prime rime*, at the distance of 180 lines, stumbling, at the same time, on an *ομοιοπρωτων* that stood in his way,

“ E lieto se n' ando volando al cielo.”

*Verse 22.*

But another poet of his own country, one whose taste was not apt to mislead him, has finely touched this subject in his personification of Echo, giving her all the fullness of her proper character. With him she is no longer an image of the voice, but, *per emphasis*, IMAGO THE, IMAGE; she is nature, she is harmony herself, that jocosé and sportive goddess, who dwelling in shades and caverns, plays with the language of the bard, and *rings back, recinit*, the last protracted notes of his lyre.

“ Quem virum aut heroa lyrà vel acri  
 Tibiâ, sumes celebrare, Clio?  
 Quem Deum? cujus recinet jocosâ  
 Nomen imago?”

*Hor. Lib. 1. Ode 12.*

The result is, that notwithstanding Rucellai glories in the strength and superiority of his *verso sciolto*, yet Echo, in spite of the poet, and as it were in derision of him for having scorned her simple harmonies, mocks his vain attempt, and playing with his own tortured terminations,



tions, ingeminates and multiplies them upon him. For my own part, from what little knowledge I possess of the tongue, I am of opinion, that instead of the Italian resisting the rhyme, there is no European language that courts it so much, or one in which it would be more difficult to avoid it. Rucellai therefore is entitled to praise for having *blanked* one half of his admirable poem.

Rucellai's successful attempt seems to have given birth to other efforts of the sort among the Italians: for not long after, we have the celebrated Annibal Caro translating the *Æneis* into blank-verse, a work in high esteem with his own countrymen, who are the best judges of its merit; though severely censured by Mr. Dryden and Doctor Trappe in their prefaces to their respective translations of the *Æneis*. But whatever Mr. Dryden had done, who was the friend of rhyme, and whom no man excelled in the graceful application of it, Dr. Trappe should have spared his abuse; knowing that himself had transposed the same author, and might be judged by those who were best qualified to pass an impartial sentence.

“ Read the commandments, Trappe: translate no further—

“ Is it not written, Thou shalt do no murder?”

Cotemporary with Caro was Alamanni, who, in the year 1546, published “*La Coltivazione*,” a Georgic, *castrated* of its rhyme. Most, however, of the Italian tragedies are composed in the *verso sciolto*, as if the buskin had asserted her exclusive claim to it: though some of their epic, as of late years, the translation of Milton by Rolli, have been manufactured in this metre. Indeed, as the Italian favours the Roman quantities beyond other European tongues, so it falls with less difficulty than any of them into blank-verse; for, although the Italian invites the rhyme in a superior degree, and notwithstanding its various mixtures of the Gothic, the Greek, the Arabian, and afterwards of the Norman, yet being more immediately founded on the Latin, and arising out of it, it retains a

larger portion of original *blankness* than either the French or the English, that have less of the Latin, and more of the Teutonic character. But we are not therefore to argue from the *possibility* of a thing, to its *propriety*. Were it necessary to insist farther on the vocal rhimes of the Italian poetry, "La Coltivazione", which is written with great ability, would confirm the general truth of these observations.

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NOTICES *relative to some of the* NATIVE TRIBES *of* NORTH AMERICA, *by* JOHN DUNNE, ESQ.—*Read May 3d, 1802.*

SECTION I.

I ANXIOUSLY availed myself of a favourable opportunity which occurred, to obtain some insight into the real state of the natives of North America. I knew from a thousand sources, that they hunted, and fought, and harangued, that they danced and sung, and amused themselves with various sports; but I was at a loss to know whether they were satisfied with those exertions of their powers, or amused themselves in their hours of leisure, between the busy acts of life, with exercises of memory, invention and fancy; whether they laughed and wept at fictitious tales as we do, and conjured up the forms of imaginary beings to divert and instruct them. Not content with seeing the bark of a Wigwam, and the outside ceremonial exhibited to strangers, I wished to know what passed in its recesses, and in the hearts of its inhabitants. My wishes were, in this respect, fully gratified by the friendship of a Miami Chief, who, adopting me according to their custom, in the place of a deceased friend, by whose name I was distinguished, entered warmly into my views, and gave me his confidence. I have derived from him a great deal of information relative to his countrymen, which I at least think interesting. For the present, I shall confine myself to notices respecting this friendly chief, and some of the works of Indian fancy, which

which he communicated, with the addition of a few general remarks upon Indian language. In the examples I have selected for the view of my friends, I have preserved, the incidents with fidelity, as he related them, but unless I could represent them on paper with the united powers of an actor and an improvisatore, an actor too, that extends his imitations even to animals, it would be impossible to give an idea of the expressive effect of his relations. The chief I speak of, is the celebrated Tchikanakoa, who commanded the united Indians at the defeat of General St. Clair; an uncommon man, for with the talents and fame of an accomplished warrior, he is the uniform supporter of peace and order, among five or six tribes who put their trust in him; simple, wise, temperate, ardent in his pursuits; speaking different languages eloquently; attached to the hereditary chief of his tribe, whom he supports though he might supplant; preserving his dignity among the vulgar of every rank, by a correct reserve; to his friends, as it were, unembodied, shewing all the movements of his soul, gay, witty, pathetic, playful by turns, as his feelings are drawn forth by natural occasions; above all things sincere. Such is the outline of the character of that nobly endowed Indian, who gratified my curiosity by recitals of the tales and fables of his countrymen, of which the following are a specimen. While the weapons, dresses, and trinkets of these people find their way into our cabinets, these ornaments drawn from the Indian wardrobe of the mind, the dresses in which they exhibit the creations of their fancy, may by some be thought not uncurious.\* The North American Indians have no other, for far to the southward of the Missuri, as I have been informed, and from thence to the Northern Ocean, they have no idea of poetry, as it derives its character from rhyme or measure. Their songs are short enthusiastic sentences, subjected to no laws of composition, accompanied by monotonous music, either rapid or slow, according to the subject, or the  
fancy

\* These are Miami tales and fables. Mr. Kirwan, our learned president has shewn me a passage in Mr. Gibbon, where that writer expresses himself with enthusiasm, on the subject of an original Iroquois tale.

fancy of the singer. Their apologues are numerous and ingenious, abounding with incidents, and are all calculated to convey some favourite lesson. Their tales too, generally inculcate some moral truth, or some maxim of prudence or policy. I recollect one where the misfortunes of a great chief are so linked with his vices, and wind up so fatally at last, that a man of worth whom he fought to oppress, is by his own agency, made the instrument of his destruction, and established as his successor. The private virtues of this successor, particularly his respect for the other sex, the want of which was the great vice of his predecessor, is made the foundation of his fame, and of the prosperity which attended him through life. This is one of the tales of the women. Another is addressed to the youth, teaching them how to avoid or overcome those often fatal panics to which unforeseen accidents in the woods expose young hunters; this is done by enumerating the terrifying appearances most likely to occur, and accounting for them in a natural way. In another, the particular duties of women are enforced, by shewing how certain women who deviated from ordinary rules, were persecuted by the Manitoo of the woods; in the progress of which, they are made to owe their safety, in various trials, to some particular act of female discretion or delicacy, which they had before neglected.

The Indians have their Circe\* as well as the Greeks, she is very seducing, and the fate of her votaries very terrible; the strokes of the pencil, by which she is drawn are masterly, but the tales respecting this lady are only calculated for the ears of the men. This people, worthy of a better fate, are gradually degenerating and wasting away; I have seen an Indian nation already so degraded, that it cannot produce a single orator. Half a century will efface their best peculiarities, and so multiplied are the causes† of their decline, perhaps extinguish them altogether.

“ The

\* Vide post Fabulam Sect: 5. luci datam.

† The epidemic small-pox mentioned by Mr. Hearne, in his Journal, carried off the year the French took possession of the settlements in Hudson's Bay, *one half of the whole Indian*

“ The dark cloud from the east, (the strong painting of the Miami chief), dashing against our coast, bursting on our shores, and at length drifting its rack in broken, but still spreading and advancing masses, over our land, has not only destroyed whole nations of Indians, but has cankered and withered and blasted whatever is left that bears the Indian name.” If it be true that a taste for pleasures not merely sensual refines those sensibilities that conduct to the extremes of happiness or misery, perhaps the slight view I have given in the following pages, of the innocent amusements of the Indian people, may furnish an additional motive to treat them with humanity.\* The only excuse for the harsh dominion

*Indian population in North America, from the Mississippi to the most distant North, some tribes, as I am credibly informed, were left without a man, the ensuing years, many of the women and children, who had escaped the disease, perished by famine. In a few years the boys of those tribes, who had suffered most, arrived at an age which enabled them to hunt; this first put an effectual stop to the destruction by famine. The Indian chief who is said by Mr. Hearne to have put himself to death, on hearing that the French had taken possession of the English forts, did end his life by suicide. But the cause of his despair was the loss of his wife and children, all of whom perished by the small-pox. This is one of the very few mistakes which occur in Mr. Hearne's most excellent narrative, faithful in describing manners. It is, however, positively asserted by many of those Indians who accompanied him to the northward, that he never saw the Coppermine river, but stopping with the women, when his male companions declared their determination to exterminate the Eskimaux, remained till the return of the war-party, and took his account both of the situation of the river, and the particulars of the massacre, from their narrative.*

\* I do not mean to exaggerate any thing, nor to play the rhetorician on the philanthropist; the persecutions of Spain, I know have ceased, the benefits of the other powers bordering upon these retiring tribes, flow towards them, however inadequately, with benevolent and sound intentions. Their vexations now arise from individual injuries, the consequence of ill executed laws, their internal evils from the inadequacy of their constitutions to their present exigencies, from their confined territory, from deep rooted mischiefs long since introduced and still in operation. The tribes of the coast, such I mean as have not entirely perished off the face of the earth, are dispersed like wanderers.

If

dominion assumed by man over the brutes, is that the stroke which deprives them of existence, is neither painfully anticipated nor long the subject of surviving regret. It is far different with the Indian, his ant-

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cispations

If we take the Delawares for an example, unhoused by what is called compact, we shall find one miserable band hiding their misfortunes among the Senekas; another has found shelter among the Mohawks; a third has taken refuge among the distant Miamis of the lakes; while a fourth has been compelled to seek out a home on the western banks of the Missisipi. Little more than a century ago, the fertile territory of Pennsylvania, was their undisputed inheritance. I do not mean to arraign the justice, or the sovereignty of cultivators; nor to impede the assertion of their prerogative claims. From the mode of that assertion, however, the extinction of the native tribes without an *active interference* is become inevitable. From what quarter can we expect this necessary aid more naturally, than from the generosity of Great Britain? from the humanity of that younger nation of British origin, which has divided her responsibility in the west? from the justice of the high minded relenting Spaniard, at length listening to the voice of nature? With a view to relief, there are two classes of Indians to be considered, those who touch upon the European settlements, and those who are more remote. With respect to the first of those classes, the evils to be considered are, 1st, the necessary scarcity of peltry, and venison, that is to say, of food and clothing, from the restricted hunting grounds, and the effect of a neighbouring unimpacted cultivation. 2dly, the private aggressions and unwarrantable usurpations of Indian territory, and that whole detail of reciprocated crimes, practised between corrupted Indians, and unprincipled adventurers, that harrasses the frontier. 3dly, the internal disorders, murders, and depopulation, which arise from intoxicating poisons supplied to the Indians. 4thly, the defective powers of the chiefs and fathers of the tribes, to restrain crimes and irregularities, which a corruption of morals has introduced or augmented; 5thly, the dreadful ravages of contagious small-pox, fatal to the Indian nations beyond any former examples. To diminish these evils, requires much patient consideration; and in executing the plans, a humane attention must be paid to Indian prejudices and customs. To me it seems obvious that the effectual introduction of the plow, the scythe, the sheepfold, the hardy living hog, are with respect to some of these tribes of primary necessity. Inoculation practised by a few young and active physicians, chosen with humane hearts, a spirit of enterprize, a contempt of luxury, and a capacity to acquire Indian languages might easily be taught to the Indian doctors, who are often men of talents and discernment, and would soon become hallowed as an Indian rite. As a secondary object could there be a more effectual mode of acquiring a knowledge of Indian remedies, indisputably valuable? and extending the empire of the natural historian? In aid of the execution of wholesome laws, for preventing a corrupting or predatory intercourse between the white and red casts, and  
the

ticipations are terrible ; he sees his approaching ruin, he sees it appalled ; it haunts him in his solitude, it fills him with bitterness when he beholds his devoted children. The tales of his ancestors recall its first distant approaches. The sound of the axe in the neighbouring forest tells him it is at hand ! Under circumstances so awful, I was anxious to snatch up a few slight memorials of this people, before their fate should be finally sealed. It is a part of the destiny of an unlettered people, to write their memorials with the pen of a stranger. They have no alternative, imperfect representation, or blank oblivion.—But of whom are we speaking ? who are these evanescent tribes ? and in what class of created beings is posterity to place them ? ask the *Abenaki*, (whom the humanity of our government still suffers to remain on the coast) he will tell you, describing himself by the name of his nation, that he is *the Man of the land* ; ask the Illinois, he will tell you boldly, he is *Inini* (sometimes pronounced Ilini) *the man* ; ask the Iroquois, he claims to be *onghi onxi*, *the real man* ; ask the numerous nations, who speak the Algonquin tongue, their pretensions advance, for they assert they are *Nishinapek* (their common name) *doubly men* ; ask their Spanish neighbours, they call them *Barbarian infidels* ; ask the American frontier settler, (whom they stile *Kichimucoman*, literally *Long knife*) by him they are denominated *Savages*, the Canadian too affirms *ce font des Sauvages* ; ask the Paus, the Raynals, and those other wise men of Europe, who without ever having seen the smokes of an Indian village take the trouble, at three thousand miles distance, to dogmatize and write volumes upon their nature, powers, and capacities, physical, moral, and intellectual ; these great men will tell you they are *an inferior race of men*. To what opinion shall we hold ? what constitutes a man ? what energies entitle him to rank high in his species ? If a well organized brain, a bosom stored with natural feelings

the too easy supplies of intoxicating poisons, clear lines of demarcation, (including a space of neutral territory between the settlers' frontier and the boundary of the native) would be a useful measure of precaution. With respect to those tribes, which are not yet pressed upon by the advancing tide of population, teach them inoculation to meet epidemic infection, and leave them to nature.



feelings and affections, if a body active and enduring, a passion for sports, a love for manly pleasures, if contempt of danger, the firm grasp of friendship, the fire of eloquence, the devotion to a country, if the combinations more or less varied of these active, heroic, and social virtues, are the characteristics of a man, I do from my soul believe the Indian testimony; *the man of the land is a man, a real man*, and not of that *inferior race of men*, conceived by the philosophers. Observe too at what time this estimate of Indian talent is made, while the Indian is yet in his infancy, and in the gristle; with a scanty agriculture, no pastoral riches, his resource the wilderness: less advanced in the paths of civilized life, than the half-lettered Greek tribes, when they first united under the banners of Agamemnon; those very tribes who a few centuries afterwards replaced the names of Achilles, Ulysses, and Nestor, with those of Epaminondas, Plato, and Homer. I have named Homer but certainly without any profane allusion, the simple reductions here communicated are the first dawnings of genius; such tales and fables as might have passed current at the scæan gate, or beguiled the hours at the ships, or under the tents at the Scamander. Though the age of Homer would have disclaimed them, may they not resemble the amusements of the age of Homer's heroes, the precursors of Homer?

## SECT. II.

### THE SOLITARY HUNTER,

A SERIOUS TALE OF THE INDIANS.

A certain man separated himself from the society of his fellows, and took up his abode in a desert place, in a remote part of the wilderness. His practice was to hunt by day, and to retire at night to his sequestered wigwam. He kept a brother the only one of his race with whom he had any connection, confined in a gloomy cave, which he had hollowed out

for his prison, close adjoining to his own habitation. Him he visited every night, merely to impart a portion of food, sufficient to continue his existence, and immediately after, without any consoling discourse, to mitigate the rigour of his confinement, shut up the entrance of the cave, covered it with leaves and bark, and retired. This unfortunate brother, from having his hair of a fiery red, infectious to the touch, was known among the men of his nation by the name of the red man. After pursuing this savage life for many winters, its unbroken uniformity at length proved so irksome to the solitary hunter, that he resolved to procure himself a female companion; and having first provided his brother with a sufficient quantity of water and dried venison, to satisfy the calls of nature, during his absence; he set out to realize his project. After a journey of many moons, he discovered by the smokes that he was in the neighbourhood of a village. He approached it, but declining to present himself at the house of council, he stopped at a remote hut separated from the other habitations by intervening trees, where finding a solitary woman, he entered, and was received in the house of a widow. She pressed him to seek the usual reception of strangers, by repairing to the village, but he told her it was his desire to remain concealed; and presenting her with some deer's flesh, which he had brought with him for his nights subsistence, he abode there. Ere the morning was yet grey, he arose and departed, and returned after the closing in of night, with a deer which he had killed. A portion of the flesh he reserved for their domestic use, the remainder he informed the widow she might distribute among her friends, taking care to conceal the cause by which, instead of receiving contributions, she was enabled to bestow. The next morning, he having departed as before, the widow repaired to the village and presented her venison to the wife of the chief who was her relation, but without communicating the secret. In the evening her guest appeared, bringing with him two deer of extraordinary excellence. Having power to dispose of them, she the next day (the stranger having left her as before) carried her presents to the village. Attention was now awakened to the source of the widow's wealth, she declined to speak aloud, but gave it to be understood in whispers by the women, that a  
great

great hunter, whom she was bound to conceal, who appeared to come from some very distant country, was the providore of her bounty. The presents of the widow encreased from day to day, till at length their magnitude excited the curiosity of the whole nation, whose joint efforts scarcely equalled the success of this single hunter, notwithstanding their superior knowledge of the best hunting grounds. In conversation the stranger had intimated to his friends that he was unmarried, and desirous to procure himself a wife; this too was communicated as a secret: and at length, as the chief of the village had a daughter to bestow in marriage, and the extraordinary virtues of the stranger offered an advantageous alliance, it was resolved to invade his solitude at the widow's house, and draw him into society. The son of the chief sought and obtained his acquaintance, he suffered himself to be entreated, and at length yielded to the repeated entreaties of his friend, to become an inmate in the chief's family. He there saw the chief's daughter, he found her possessed of those qualities which engaged his affections; returning one day from a successful chase, he communicated his wishes of an alliance to her brother, who without hesitation gave him his sister.\* The festivities attending the marriage were long continued. The feasts were provided by the exertions of the strange hunter, who never failed to return from the forest, richly provided with game. Thus the moons rolled away. At length the stranger thought of his return. His wife's family opposed it in vain, his wife followed him reluctantly. Arrived at the abode of her husband, she found it the seat of solitude, his days were passed at the chase, the shades of the night always preceded his return, and her melancholy and apprehension were encreased, by observing that uniformly after their repast, her husband, as if by stealth, carried with him the tongues and marrow of the animals he had killed, and after a short absence, during which he disposed of them in some unknown place, returned

\* The Indian brother almost exclusively makes his sisters marriages, as he is best acquainted with the character and accomplishments of the young men of his nation with whom he passes his life, this task devolves on him with evident utility,

turned. By his command she obtained for some time from gratifying her curiosity by following his steps upon these occasions. At times when she seemed to be asleep, to try her, he would call out, "your bed is on fire". He had observed, and was satisfied by her obedience. At length stealing after him unnoticed, she saw with horror the barriers of the prison removed, and had just strength enough left to regain her place, when her husband returned; he perceived her agitation, he suspected the cause, and with a voice and look of rage, in dark speeches insinuated the fatal consequences of disobedience to his commands. She passed the night sleepless, the day relieved her from her constraint by the accustomed absence of her husband. Horror however so far overpowered her that she had not courage to stir abroad. He feigning to go to the chase as usual, stopped at a short distance from the wigwam, where he continued motionless during the whole day, with his eyes rivetted on the entrance of the cave. Seeing night arrive without any steps approaching it, he considered his suspicions as unfounded; and returned home at the usual hour, for the first time announcing an unsuccessful chase. His composed looks bespoke confidence and inspired it, and the next day after a night of repose, he took his accustomed course with his accustomed phlegm in pursuit of his prey. His wife's curiosity now overcame her terror, and she obeyed its suggestions by approaching the spot, where by the glimmering light of the fire she had seen her husband descend. As she removed some of the loose bark and leaves, the sound of her feet upon the hollow ground, roused the half torpid senses of the subterraneous inhabitant and drew forth his groans. The voice seemed human; she approached nearer, the voice was human. She removed the bark which covered the mouth of the cave, and beheld a wretch whom she soon recognized for a brother. She learnt his story, she wept over his sufferings, she administered to his wants, her conversation like a charm gave him new existence, and imparting relief she found consolation even in this cave of darkness. When evening approached the bark and leaves were replaced, and the separated wretches now added to their former griefs apprehensions for each other. The tyrant returned, his suspicions were not awakened. From day to day,

### III

day, with fresh delight, the intercourse of the sufferers was renewed. Having gained strength, the emaciated prisoner was at length induced to clamber up the sides of his cavern, to enjoy the warmth of the sun. His ghastly looks and matted hair engaged the humanity of his sister. She separated the clotted knots with which his locks were entangled, and removed the clammy concretions that mantled on his forehead; he returned to his abode of darkness, relieved by her kind offices, and she awaited the approach of night with redoubled apprehensions. Her husband returned, he surveyed her by the light of the fire, he scrutinized her looks, he examined her trembling hands; he observed her fingers stained with an unusual red; she sunk down in an agony of despair. She was only roused from it, to behold the fevered head of her brother, the victim of her kindness, in the hands of his murderer, suspended by his long red hair, and yet palpitating with life. She instinctively rushed forward to the spot; the murderer vanished, terrified by the approach of a woman. The air resounded with his screams. The moon as he fled, discovered his frantic and savage course through the clearings of the woods, till at length he was buried in the thickets. There still might be heard the soundings of the trees, which he wounded as he passed along with the brandished head. He at length struck a hollow tree, the object of his search, when hurling the head with its fiery tresses, to a great height in the air, with a well-directed aim, it was lodged in its descent in the trunk of an ancient oak hollowed by lightning. He then with wolf-like yells, announced his approaching change, and adding to his nature what alone was wanting, the shape and figure of a wolf, took his range with the other beasts of the forest. The extreme of torture with which his wife had been harrowed, abated by degrees in its agonies, as she lay extended near the body of her brother; till exhausted by suffering, she gradually sunk into repose. She awoke composed; the objects around her renewed her tortures. The same instinct which led her to the spot at first, now forced her to abandon it; and she sought a shelter from the horror it presented, in the deepest recesses

recesses of the woods. The sense of pain from the wounds of obstructing brambles first roused her, the frownings of the ravines and precipices awed her, the weakness produced by fatigue and hunger succeeded in recalling her distracted thoughts to the contemplation of her sad condition. Thrown on a bank, exhausted and hopeless, a distant noise attracted her. As it seemed to break in articulate sounds, she turned round towards the quarter from which it proceeded; she listened; she arose; she advanced; she paused; she advanced with a precipitated step; and recognized the voice of her wretched brother. The surprize operating on her enfeebled mind, she forgot for the moment the dreadful catastrophe she had just witnessed, and believed him still alive, unmutilated. Her illusion was destroyed by hearing a narration of the melancholy truth. The voice from the hollow oak, directed her where to find berries. She sat, and was refreshed. She ascended to the hollow of the tree, where the head was enclosed, and letting down a cord of twisted bark, drew it forth with a mixture of horror and delight. She placed it in her bosom: it became her counsellor: it purveyed for her subsistence: it directed her course: it indicated her places of rest. When they halted, she placed it in some elevated place, on a bed of moss, where it seemed to taste repose; when they journeyed, its consolation charmed away fatigue: and it watched over her during the season of darkness. Its power among the forest-tribes was wonderfully manifested. By the directions it gave her, she placed it upon some stock or decayed branch, in the neighbourhood of those beaten paths, by which the deer and Caribou are accustomed to pass. Its imitations of their calls invited their approach. A powerful fascination drew them to the spot. And the victim marked out for a repast, fell instantly dead, penetrated by the glances of the head, each one of which had the power to kill.

The storm was now passed over, and a better world seemed to open through the separating clouds. The wants of hunger supplied, the fears of danger banished, and a composure hitherto never experienced by this woman since her marriage, rendered her situation comparatively enviable.

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It however, fell far short of the fancied charms of society, heightened by privation, and almost present to her senses. The cheerful buzz of the village, the labours of the field sweetened by the converse of her companions, love, friendship, the endearing domestic ties, the sports, the pastimes, the thousand delights of social life, all rushed upon her mind, now relieved from the pressure of urgent suffering; and rendered the uniformity of her mode of living at first irksome, and in the end insupportable. She could not conceal her distractions from her quick-sighted companion. He endeavoured to amuse her by varied conversation, by recitals of adventures real or imagined; he furnished her with the most palatable food; made her drink from the sweetest springs; and led her through the fairest tracts of the forest; but all was in vain. Did he shew her the beauties of the wilderness, she was blind; did he warn her of the dangers of the frequented village, he spoke to the winds. Finding her thoughts distracted almost to the pitch of alienation, he resolved to indulge her in her wishes. And bending their course towards a place of human resort, (which they did under his guidance,) he found by degrees her usual composure return. He availed himself of the change to impress her mind with what he deemed three necessary truths, that his councils were essential to extricate her from the perils which might await her; that she should avoid too strict a connection with seeming but untried friends; and above all, that she should conceal his head from the view of all mortals; upon the observance of which last injunction more especially, the fate of both depended. She clasped the friendly head still closer to her bosom; and associating it with her heart, proceeded first by doubtful, and then beaten paths, through opening forests of sweet maples, ending in cultivated fields covered with corn, to the centre of a spacious village, where every thing she had dreamt of seemed to be realized. She was accosted with kindness by the inhabitants; she was offered refreshment, and accepted it; the kindness of her cementing manners engaged the affections of some of her own sex; who, after some moments repose, led her to a numerous assembly, before one of the war-chief's houses, where the women were engaged

in play; she resolved merely to gratify her curiosity, by observing the players, who had already so far proceeded, that the interest was become lively; some of them having lost their girdles, broches, rings, and other ornaments. Observing that the game was familiar to her, she deviated from her resolution so far as to stake some trinkets, which she still found hanging about her, on the success of the female friends who had so kindly conducted her to the place: till, entering with warmth into the passions of the players, she sat down in the circle, and became herself one of the most conspicuous.\* She resolved however, to indulge herself only for a moment; but finding her first attempt unsuccessful, and wishing to repair it, as she was preparing herself for a second display with redoubled ardor, she disengaged her mantle so far as to discover the fatal head. All was now murmur and astonishment. She arose in confusion; the head dropped from her bosom. She in vain attempted to regain it. Down the declivity of the hill it descended, rolling on with an increased rapidity, till it was received into the river that flowed below.

\* There again her frantic exertions to recover it, proved still unavailing. For by those who anxiously contemplated the spectacle, the head was observed, as she approached it, gradually to assume the form of a bird since seldom seen, save as the forerunner of calamity, whose dusky plumage is surmounted with a tufted crown of red feathers: while the unfortunate pursuer became herself transformed into that species of water-fowl since vulgarly denominated the black-duck; a species so despised, that it is never sought after but to be devoured as food,\* and that only in seasons of extreme famine.

## SECTION

\* The women have seven different games of chance or sleight, which they practice; among the sedentary games the most common is a game of chance with peach or plumb-stones, party-coloured by art.

† The beak, claws and feathers of the eagle, the hawk, the raven, and other birds, furnish the Indians with distinctive badges, to which they attach their good fortune, their inseparable companions in battle, and which they call Implements of war. The spoils  
of



## SECTION III.

## THE FOXES,

## A COMIC FABLE OF THE INDIANS.

The red fox and his kinsman the grey fox, entered into a treaty to hunt together, and it was agreed they should divide their labours. The grey fox was to provide for accommodation, and the red fox was destined for the chase. The red fox, knowing the country through which they were to pass, instructed his associate in the following manner. "As you proceed, you will observe, after a short day's journey, a plain bounded by some hills which lie towards the east; there you are to stop for the night, make your encampment, and await my coming." They then separated, each pursuing his particular destination. The red fox, after a successful days hunting, repaired to the place of rendezvous, but missing his companion, turned back to meet and bring him forward. He found him after a long march, encamped at a short distance from the place of their departure, on the ice, in the midst of a lake, in a situation destitute of wood, water and shelter. The grey fox excused himself by the difficulty of the country, which made the short distance appear considerable; the snow concealing the ice, he took the lake for a plain; and the high banks to the eastward, the only thing like hills in sight, tallied with the directions he had received. The red fox smiled at his simplicity, and the other promised to be more attentive for the future. "To-morrow night," says the red fox, again instructing his companion, "we shall take up our abode in a snug wigwam, in the midst of the forest, to the eastward of the mountains, proceed

## P 2

of the black duck are probably not resorted to for this purpose, as being a bird of ill omen. The bird they most despise is the turkey-buzzard, of the eagle's size, but utterly unwarlike.

“ proceed securely by the blazed path, and have every thing ready “ for the evening.” Early the next morning, the grey fox took his departure following the path very diligently, till he came to a place where the fires of the autumn had been busy. After deliberating whether he should stop and wait for further directions, he took the resolution to proceed, and after crossing the burnt tract, over ashes and embers, luckily fell upon the blazed path on the other side. This led him to a hunting encampment. From the smoke he took it to be inhabited, or but lately deserted, and resolved in such a doubtful case, to venture on nothing without the advice of his friend. The red fox having reached the wigwam, was again disappointed in not meeting his associate. He travelled back along the blazed path, and after a tedious march, found him in a hollow tree, nearly opposite the encampment. He perceived at once that his friend had mistaken the hunting camp for a wigwam, but it was now too late, and he was too hungry to turn back, he therefore began to reconnoitre. He looked through the crevices of the bark, and perceived a quantity of venison hung up in a store-hut, the door of which was closed. The light of the fire in the adjoining hut shining through an opening in the common partition, discovered an old man employed in preparing supper for the hunters, who were not yet returned; a side of fat venison hung upon a peg near the place where the old man was sitting. If he broke open the door of the hut, where the hoard was deposited, the noise would create an alarm, which might endanger his being taken; if he attacked the inhabited hut, the danger was more imminent: he resolved upon his plan. He represented the attack of the old man to his companion, as a thing without hazard; “ seize him by the throat,” says he, “ while “ I carry off the venison, and when you have throttled him to your “ satisfaction, follow me.” The grey fox wished by a courageous exploit, to retrieve his late errors. He attacked the old man boldly; surprize at first gave him the advantage: they rolled on the floor, in a sort of worrying warfare, till the poor fox, finding he was likely to get the worst of it, by his superior agility with the help of the little  
breath

breath he had left, got out of his antagonist's clutches half strangled. So soon as the war was waged, the red fox without observation broke open the door of the other hut, and by the time the battle was ended, had succeeded in conveying away several carcases of venison, and the side of a fat bear. He rewarded his grey friend now by the loss of his long fur in many places turned white, with a part of the spoils, after which they retired to rest. In the morning finding upon calculation that the rich store of provisions he had acquired, would last him individually a much longer time than if it were resorted to as a common hoard, by two consumers, he put an end to the treaty: and the grey fox took his leave, indulging reflections on the nature of red foxes and hunting treaties, till the night overtook him, hungry and exhausted. He was then on the margin of a lake, where he observed men's tracks in the snow; these conducted him to a hole in the ice, where the neighbouring inhabitants had set a fishing net. Curiosity led him to examine what success these people were likely to have, and having drawn up the net, secured the contents, replaced it, and loaded himself with as many fish as he could carry, after having devoured as many as he could eat, he returned by the same way, taking care in his return, as he had done in descending, to march in the men's tracks, and make no fox-impressions in the soft snow. After depositing his stock, preparing to go to rest, he was accosted by a wolf; who led by the scent, asked him how he came by his fish, as he had all the indications of having made a wonderful great fish-meal. "Brother wolf," says the fox, who was afraid of his hoard, "come along with me, and I will shew you how you may do as I have done. You have only to go to the hole in the ice, to which these tracks will conduct you; sit down on the hole; you are provided with a much finer tail than mine; thrust it deep into the water, and continue there motionless for some space of time; the fish will at length begin to take hold; and as soon as you find by the weight that you have a sufficient number attached, suddenly draw up your load, and you will have a rich repast; by this method I took almost

" as

“ as many as I could eat in a single haul, your success must be much greater.” The hungry wolf listened with avidity, thanked his benefactor, and in a few moments placed himself in a fishing position, with his tail in the water; where, notwithstanding the intense cold, he remained without motion for a considerable time; expecting to find by the increasing weight, the promised indications of his success. At length, supposing that his feeling was destroyed by the extreme cold, he resolved to see what he had caught: when to his great surprize, he found the hole entirely frozen over; and his tail so firmly enclosed in the ice that all his efforts to disengage it proved abortive. Every moment the effect of cold and hunger was decreasing his force, and adding strength to his fetters and the jests of the fox still added to his tortures. In the morning the countrymen arrived: who seeing the bones and scales of the fish, which had been scattered by the fox, and catching the wolf as it were in the fact, dispatched him with their hatchets, and after unprofitably drawing and resetting their nets, dragged the carcase of the wolf to the shore. The fox with the flesh of the wolf and his stock of fish, lived luxuriously for several days, but the vigilance of the countrymen now awakened, prevented his catching any more fish. He had, however, other resources; he had already picked up some straggling geese and outards, and had more than once visited a roost. But fearing the noise might alarm, he made a safer attack upon the store-hut, where the provisions for the winter were preserved in a frozen state; and continued to live plentifully till approaching one night with his usual caution, he observed a man on the watch. The next day he invited a cousin of his friend the deceased wolf, to partake of the fare he had left, and having excited rather than satisfied his appetite, told him how he came by his dainties, and as soon as the watch was set the next night, having offered his services as a conductor, led the wolf to the opening of the hut, and retired. The alarm was quickly given, the opening was closed, and the howls of the wolf soon satisfied his conductor that his credulous friend was no more. Conceiving they had dispatched the marauder who had so long trespassed

trespasped upon them, the good people relaxed their vigilance, and the fox found means to renew his depredations. He continued them till the diminution made in several heaps of provisions told him that new suspicions must arise to provoke new vigilance. Abandoning this scene therefore, after picking the bones of the wolf, he pursued his journey without any adventure till he overtook on a beaten road, a machine as large as a common wigwam; drawn by a number of horses, and conducted by two men. So soon as he observed the men advance before, he took the opportunity of slipping behind and leaping into the waggon. There he lay perdu, the remainder of the day, feasting, and, when the night closed in, collecting those articles which were most to his taste, dropped them down gently one by one upon the road. Satisfied with his selection he finally leaped from the waggon [himself collected his scattered booty, and retired to a place of safety. He repeated this practice so often, that the men who conducted the teams, ignorant of the thief but resolved to be on their guard, closed up their waggon in such a manner that it was impossible to gain admittance. He then bethought himself of the following stratagem; he advanced by a bye way to a considerable distance before the team, and having rolled himself in the snow, filled his mouth, ears, and nostrils, with blood, which he drew from a fresh wound in one of his legs, he laid himself down in the track where the waggon was to pass, retaining his breath, closing his eyes, lolling out his tongue, and exhibiting every other symptom of death. "A lucky chance," cries one of the countrymen, as the waggon approached the place, "A grey fox dead, we will fling him into the waggon, and take off his skin when we stop to feed." The grey fox played his part so well that he created no suspicions, and in a few moments found himself deposited agreeably to his wishes. As he knew this was the last time he could possibly gain admittance, he made a most provident use of the occasion, and effected his escape just before the waggoners stopped to bait. Finding the dead fox gone and their provisions plundered, they were filled with astonishment, and after many wild conjectures, concluded this to be one of *Machi-Manitoos* frolicks. The store

store the fox had got, enabled him to live well for a whole moon. He then told his story to one of his friends the wolves, and finding his resources nearly exhausted, encouraged the wolf to adopt the same expedient. The wolf was easily persuaded; he lay down personating death in hopes of a rich recompence; when the waggoners forewarned, observing him almost in the same spot where they had been imposed upon by the fox, severed his head from his body, as a just punishment for his intended fraud, and as his skin was of no value, drove their team over him and left him. The fox waited till the road was clear, and then drawing the body aside as his perquisite, resorted to it from time to time to supply his necessities. Observing, as he passed along on his road homewards, a hollow tree, where he had reason to believe there was good store of honey, he addressed himself to a hedge-hog fortunately at hand; and expressed his wonder that he whom the great spirit had armed with a thousand prickles, to defy a thousand stings, should suffer small bees to establish hoards as it were in defiance under his nose. The porcupine felt the insult, bristled up his quills, and was soon introduced by the fox into the hollow tree. The nation was immediately in arms. Every warrior rushed forward to punish the invader. The remotest inmates hastened to the scene of action. While the contest was yet undecided, the fox seizing the moment of uproar, pierced the bark on the side opposite to the opening, and carried away unperceived in secret triumph, the prize they were busy fighting for. Proceeding with his treasures, he was seen and envied by a young fat bear, whose inexperience was equal to his love of honey; "cousin says the fox I have no honey to spare, but if you follow me and venture for it, you may have your fill". The bear followed him to the bottom of a high and steep cliff. There says the fox is a rich treasure pointing to a wasps nest of great size, which was suspended from the rocks near the top of the precipice, but you have neither agility nor courage to attempt it. The bear piqued at being thought sluggish, instantly clambered up a tree, one of the branches of which approached the cliff and flinging himself with violence against the nest, which he grappled with his paws, disengaged it from its fastenings, and fell  
with

with it to the ground. Ten thousand wasps immediately attacked him; his howls re-echoed from the rocks, and alarmed the forest; the stings acutely piercing his bruised body, infused their poison into his veins, and he was soon numbered among the foxes victims. The fame of this exploit spread through the forest, and at length came to the ears of the panther, who invited himself to eat share of the bear. Brother says the fox, who did not much like the looks of his guest, "I have a nobler prey in store than a bears cub, one worthy of you; a young horse highly fed that lies dead in the pasture, but so near his masters habitation, that if we attempted to eat him where he lies, we should be observed: I endeavoured last night by tying my tail to his, to drag him into a safe place in the woods, but after nearly pulling off my brush, I was obliged to desist. Would you but lend your tail for such a service, a tail fitted by its length, its strength, and the pliant joints at its extremity for powerful exertions, we should enjoy a feast in comfort, which now only excites envy." The panther yielded to the instances of the fox, and was led by him to a savannah where a horse lay extended on the grass. The panther turning his hinder parts to the horse without much observation suffered the fox to proceed, who having tied the tails together in such a manner, as that no force could loose them, cried out to the panther, now brother my work is finished, yours is to begin. The panther set himself to pull with such effect, that he dragged the horse several paces. His violence was such that it awoke the horse, who had been all this time fast asleep. The affrighted animal finding himself restrained, was in an instant on his legs. The course of things was quickly changed. The horse galloping at full speed, now dragged the panther, at every turn lashing him with his heels. The astonished panther writhing round to seize the limbs, and flanks of the horse, at once terrified and provoked his antagonist, and exposed himself to galling wounds. At one moment his loins were assailed by the battering hoofs, at another his head and twisted folds of his neck. His paws would sometimes grasp, and his jaws encompass the hams and legs of the horse, but the horse's brisk and bounding movements varying every moment, soon disengaged them from the

grasp. The contest was long though unequal. The panther that never yields, supple, fierce, enduring, all over full of life, seemed to revive the combat after the dashing strokes of the horse, appeared to the have completed his destruction. The fox, at length, having, by an unusual noise, turned the course of the horse among some rocks and trunks of fallen trees, the repeated shocks and lacerations to which the panther was thus exposed, extinguished all remaining sparks of life. The grey fox proud of his exploits, invited the red fox who was just then returning from his expedition to feast on the flesh of the bleeding panther. The red fox complied, reserving some better food which he had brought with him, for a time when there would be no invitations. Still preserving his advantage over his ancient ally, well knowing that whatever pretensions to superiority his friend might have among the other tribes, he could never rank high in the nation of foxes.

#### SECTION IV.

##### AN INSTRUCTIVE FABLE OF THE INDIANS.

The wolf, glutted with the blood of the dam, spared the fawn for a time. It was of a very tender age, and milk-white; He was diverted by its innocent sports, and soon became so dazzled with the beautiful whiteness of its skin, that he wished for nothing so much as to exchange his wolf's garb for a coat of the same colour. He communicated his wishes to his uncle the fox, who assured him, that at the expence of a little pain, the thing was easy; he had only to set fire to the trees, which the last storm had blown down, and so soon as the flames were at their height, pass rapidly from one end to the other, between the rows, and he would certainly come out milk-white. The wolf, despising the pain, got every thing ready; but from his eagerness to improve his beauty, having begun to run the gauntlet before the  
flames



flames had arrived at the fox's pitch, he came out at the further end, neither milk-white as he expected, nor scorched to death as the fox expected, but half suffocated, and without a pile of hair. The fox who, while the business was depending, had been employed in ogling the fawn, as soon as he saw his nephew appear not above half roasted, thought it a convenient time to decamp. The fawn, caught by the kindness of the wolf, omitted to improve a thousand opportunities which the wolf's weakness afforded her, to effect an escape. The moons kept their pace, the wolf gained strength, the fawn grew in stature, and their confidence in each other increased. The wolf's friends observing the fawn's growth, and the wide range he permitted her to take, taxed the wolf with his imprudence. "Do you imagine," cries the wolf, "I am weak enough to think that this fawn which I have reared up to deer's estate, in habits of obedience, will after so much experience of me, dare to play tricks? your fears make you feed upon half-grown skeletons, and tremble at shadows. I judge better; If I let a day pass, after this rawboned fawn shall have added flesh to stature, then impeach my wisdom." The wished-for day at length arrived, and all the beasts and birds were summoned to partake of the wolf's feast, the fox alone excepted. The wolf consulted them about the distribution of the parts. To one the tongue was assigned, to another the heart, to another the hoofs, and by common consent the dung was allotted to the turkey-buzzard. The deer alarmed at the debates, feeling her strength, and recollecting the fate of many a hind and Caribou of her own plump qualities, suddenly betook herself to flight: and just as the council had completed the division of her limbs, the news was brought that she had been seen using them very nimbly in bounding across the plain, and was at that moment entering the woods. "She is taking her accustomed range," cries the wolf, "it is her daily practice, she will presently return." The panther advised speedy measures, and offered his services; the bear and his friends were afraid to trust him; the hare took the fearful side. Thus, while the wolf indulged his hopes, and others their jealousies, the time for an effectual

pursuit was suffered to pass unimproved, and the guests dispersed growling and hungry. The wolf recovering from his dream, at length hit off the scent, and set himself, in good earnest, to recover his prey. He proceeded without coming to fault, till he arrived at an extensive clearing in the woods, where the men were employed pitting their corn. Forgetting that his depredations had made them his enemies, he presumptuously solicited the good offices of these men to discover the deer, which they had the moment before hid in one of the pits, for the purpose of frustrating his pursuit. The advice he received from them his confidence led him to adopt, and, of course, he was led astray. The white deer refreshed, and honestly counselled, proceeded through a safe tract of the forest; and having arrived at and crossed a rapid river, posted herself upon an overhanging cliff on the opposite side. The wolf, after prowling long in vain, was at length brought to his senses, and now resolving to pursue the very opposite path to that he had been advised to take, again fell upon the scent; and urged the chase with such speed, that he reached the bank of the river directly opposite the white deer's cliff, before she had quitted her station. Her image reflected from the cliff, realized the object of his pursuit. The curling motion of the waters, transferred by him to the reflected image, he mistook for the distortions of laughter. Inflamed by the supposed insult, ashamed of his past errors, and resolved now at length to preclude all possibility of escape, he plunged headlong into the water, grasping the shadow of the deer already devoured in imagination. A pointed flint concealed under the surface, received the whole weight of his descending fury. Stunned by the shock, he was incapable of resisting the force of the current, which soon swept him down the neighbouring rapids, and relieved the trembling fawn from her enemy, at the very moment of his most determined vengeance. The white deer departed from the cliff, secure from immediate danger, yet solitary and friendless: but soon after, taking shelter under the branching antlers of a young male of her own species, she exchanged the fawnings of the wolf, for the endearments of a protector.

## SECTION V.

## FABULA QUÆDAM INDORUM.

In oris Ontario finitimis, juxta promontorium, isthmi speciem exhibens, quinque fratres ex gente Missisagum orti, castra juncina posuerunt. Coniunctissimi fratres, fratris natu maximi consiliis utentes, qui, ut annis, sic famâ sapientiæ antecellebat. Iis nec boves campestres\*, nec damæ epulas, sed musquosæ† et rari pisces, durus victus. Regiones ultra isthmum positas cæteris penetrare cupientibus, frater dux, Machimanitoolim propitiato instructus, copiam eundi recusabat; regiones lætas, equidem, sed pericula certa demonstrans. Tandem, illo absente, e fratribus duo, prædam quærentes, scopulum in promontorio ad finem terræ positum, excelsum, speculatorium, conscensi, novam regionem oculis percurrunt. Secura omnia vident; delicias certas, famam periculorum mendosam judicant. Caute auribus erectis, terras prohibitas invadere constat. Nec mora, transgrediuntur limitem. Illic viæ patentés, nec insidiis infestæ, pampinis vestita nemora, fontes, opes apum, mintamina,‡ damarum armenta, ubique spectantur; nec defunt castorum vestigia, nec hospitium deest: nam eis hæc stupore quodam animi spectantibus apparet fœmina, regionis domina, quæ blandissime novos hospites aggrediens, manu porrectâ signum dabat amicitiae. Erat autem forma, pulcherrima juventutis donis florens, benevolentiae indicia instructa, dulcissimi amoris ridentibus oculis dispensatrix. Timori nullus locus, incaluere juvenes, atque appropinquabant. Monitus verbis, junior fratrum é locis statim recedit, jussus postredie secretis viis in felicem regionem redire. Abiit amore captus, miser, dulcem sibi reditum spectans. Frater autem felix reginam adit, affatur; et circumdatus teneris formosæ lacertis, vicissim amplectitur, et ad amoris ritus se parat. Exquisito quodam voluptatis sensu hæctenus a juvene inexperto, celebrantur

\* Buffaloe.

† Musk-rats.

‡ Indian corn.

ritus. Sed nova amoris conditio, nam figitur amplexus recedentis juvenis, qui à vi quadam ignota sentit se teneri et attrahi. Corpus autem medium et cætera membra, in membrum illud inclusum transfusa et sensim transformata, in sedem fœminæ voluptatis transeunt, et reconduntur; et recondita non redeunt, sed corpus fœminæ totum virum pedetentim absorpsit. Perit juvenis; nec vox nec forma manebat. Sed, res prorsus mirabilis, ex pabulo novo corpus fœminæ nec grandior nec auctior.

Postridie qui lugens evaserat e sedibus vetitis frater, redibat gaudens. Ruit in delicias. Commisso prælio amoris, quæ fratri, eadem gaudia, victo eadem fata. E fratribus tertius qui pro suis timens, promontorium transeverfus est, luit pœnas audaciæ. Quartus etiam, qui temerè desiderio fratrum motus, isthmi regiones invadere ausus, idem imprudentiæ fructus. Paucis ab hinc diebus, frater natu maximus domum redux, extinctos focos, desertaque castra, vestigia fratrum plurima invenit, recentia nulla. Audaciam et novitatis fitim causas mali suspicatur; certum se reddere optans, donis placaturus, domum Machimanitoi\* petit consultor; qui

\* The different nations of Indians assign different situations to this formidable mansion. The Mississaki, who are the heroes of this fable, have fixed it in the crater of a volcano, situated about midway between Niagara and Toronto, supposed to be about fifteen or sixteen miles distant from lake Ontario, in a difficult tract of country, known only to the Indians. The explosions of this volcano continued for many years; a gentleman, now one of his majesty's supreme Council in upper Canada, who has a house upon the little lake, near the road to Toronto, informed me that the explosions, repeated three or four times a day, and sometimes oftener, gave such a shock to the air, that the China upon the shelves, and the furniture of his house often shook violently. Brandt the Indian chief, compared the noise to the discharge of a battery of heavy cannon. The explosions have ceased ever since the earthquake, which was felt some years ago, and which destroyed one of the cliffs, of Stedman's Island, that separates the two falls of Niagara. The Indians have an invincible objection to conducting any stranger to this spot. Brandt, though possessing influence enough to be chosen chief of their nation, being himself a Mohawk, has often as he told me, solicited this in vain; they believe, that the evil spirit would follow the conductor, with his signal vengeance, and perhaps exterminate their whole nation. Such is Indian superstition! and strange to tell, there indubitably existed a volcano, for a series of years, in a state of explosion, in the center of his Majesty's possessions in Canada, which none of his subjects have ever yet been able to explore, so as to ascertain its exact situation.

qui propitius quærenti occurrit. Ex illo ruinam domûs extinctosque fratres lugens audit, nec narranti deest misericordia. Spem vindictæ, Manitous, remediûm doloris inspirat; atque telum ingens, invictum, quod potentissimum habuit, in corbe magno ex viminibus contexto, repositum, præ se ferens, in terras infestas, supplice subsequente, hostili hocce apparatu instructus, citato pede contendit. Vidit nec erubuit cordata fœmina, nec magnificum malum evadere tentavit; sed novis artibus, æqualem sese prestituram novo huic bello confidens, fortiter se vulneribus exposuit. Loco stat firmus Manitous, et sic impetum reginæ, quæ saltu pedibus corbe dejecto, in telum ruebat, excepit. Illa per aera sublata, suspensa, et usque ad cervicis nexum et medullas penetrata, non penitus transfixa, inter voluptatis et cruciatus limites divisum habuit imperium. Per decem dies noctesque, terra, intacta regina puncto suspensorio agitata et circumvoluta, teli injurias sustinuit. Undecimo autem die mane tenguinæ et impetu et vulneribus, oppressis viribus, lassata, pœnas luens libidinis, vitæ expers, in terram occubuit. Sed nec in illa gens tota periit: defunctæ nulla proles, sorores superstites. Lascivas non terret fors fororis, Juvenes cavete.

Such are the amusements of men, whom some have been led to consider, as limiting their pleasures to the gratification of animal appetite, and incapable of mental enjoyments. Whether the models upon which the Indian imagination works, have been drawn through circuitous channels, from more refined sources, I cannot with a positive certainty assert or deny. My firm conviction is, that their tales and fables, and the whole play of their fancy, are original.\* The power of inventing and embellishing

\* Mr. M'Ilvray and Mr. M'Kenzie, who have resided many years among the north-western Indians, assure me, that the passion for fictions and tales is universal among all those tribes. Though, from their accounts, I am induced to conclude that the imagination is less cultivated, and its productions more rude and monotonous, than among those Indians, who acquire subsistence with more ease, and inhabit a more genial climate. These gentlemen are two of the partners of the Canadian north-west company, who not content with having already enriched geography by important discoveries, have lately added

embellishing fictions among them, stamps a character upon the individuals who possess it, even at this day, not unlike that of the minstrels and early poets. In the Miami nation there is a chief still living, who bears the name of the fabulist, (literally the lying chief,) from his excelling in works of amusement and invention. The subjects, the texture,

added a noble appendage to their establishment as Indian traders, an astronomer and geographer, furnished with fit instruments, and attended by proper assistants. Mr. M'Kenzie as one of that company, explored the great northern lake called Slave-Lake, by Hearne confounded with the Arthapasco, and descending from thence, by a river, which will ever bear his name, followed its course, uninterrupted by falls, for a distance of seven hundred miles down to the northern frozen ocean. Two years afterwards, taking his departure from his established winter station, on the river of Peace, one of those which fall into the Arthapasco river, he proceeded ascending the stream toward its source to the great western chain of mountains, from their sparry rocks, called the stony mountains; and transporting his canoe and instruments across the ridge, descended into one of the streams on the western side, which conducted him into a river of considerable magnitude, running in a south-west direction. This he followed for many days, but finding from its course, and the information of the Indians, that it would carry him so far to the southward, before its discharge into the sea, as to render his return before the winter difficult, he laid up his canoe, deserted the river, and proceeded with his party, consisting of one European, six Canadians, and two Indians, by a direct western overland course, through the territory of some very troublesome native tribes, till he arrived, the first who had traversed the continent of North America, on the shores of the Pacific ocean. About the same time that Mr. M'Kenzie representing a company of British Merchants was employed in descending the great river I have mentioned, from the interior; Captain Vancouvre in the execution of his Majesty's magnificent plans for acquiring a knowledge of our globe, was entering it from the ocean. This is the Columbia, by the Indians called Tacoutch river, whose embouchure lies nearly in latitude 46, and which perhaps pays a larger tribute to the Pacific than any other American river. I have in my possession the observations of latitude and longitude, made by Mr. M'Kenzie, at and after his departure from Peace-River; I have also heard him relate, with that modesty which so much distinguishes him, the particulars of his difficult three month's route. But I refrain from anticipating by more minute details, that account which I have much urged Mr. M'Kenzie to give to the public; and which will come more naturally, and with a greater interest and effect, from his pen, the pen of a discoverer.

Since the above note was read at the Academy, I have seen the publication of Mr. M'Kenzie's work announced.

ture, the manners, the images, the lessons taught, all conspire to shew that their fables and tales are of native origin; and the naiveté, finesse, and spirit with which they are told, still more forcibly prove them to be the spontaneous productions of the soil. Wherever any allusions are made to the customs or inventions derived from the old world, they are decidedly to such only as every Indian may be acquainted with, either from observation in the European settlements he has visited, or from the report of the travellers of his nation.

For these and other Indian productions, I am indebted to interpretation. It was always made in the presence of my friendly chief, and immediately after his narration; and I have this intrinsic evidence of its fidelity, that he took back the story from the looks and gestures of the interpreter, as I often anticipated its general features and the characters introduced, from his manner of telling it. The interpreter was the chief's nephew by adoption, beloved as a son, born of European parents, taken from the western settlements in one of the Indian war-incursions, educated among the Indians, using their customs, and excelling in all their exercises and sports, till chance brought him into an engagement where the party of Indians he fought with, were opposed to a body of militia commanded by his elder brother; who with a rifle ball shattered the arm of his Indian adoptive brother, fighting by his side. Learning from a prisoner the nearly tragical situation he had been placed in, he left the Indians during the continuance of the war, to return in times of peace, in a character which puts it in his power to exercise his benevolence towards them more extensively, than if he still wore the Indian dress. Mr. Wells, in this account of his connection with the Indians, will recognize his own communications.

## SECTION VI.

## SOME IMPERFECT STRICTURES ON INDIAN LANGUAGE.

The Indian languages, such at least as I have heard spoken, are pleasing to the ear. The Algonkin, used by various nations, from the coast of Labrador to the country of the Chipaweyans, (Hearne's) northern Indians, including the Canistino tribes, and many to the westward of the great lakes, is perhaps the most polished, as it is the most generally spoken. This language is copious, and possesses all the qualities that one wishes for in speech;\* from the lips of the women, in their

\* An attention to this and to other native languages, would, I think, have prevented many conjectural derivations of names, and many apparent mistakes which Europeans have fallen into. As this language prevailed on the Labrador side, so I find many traces of it in the names of places, far on the other side of the St. Lawrence; and even in the united states. The inhabitants of the Atlantic coast spoke this language, as I have found by various proofs. Mahingan or *Wolf-Island* in the district of *Maine*, a name still retained, is Algonkin. Casko Bay, in the state of New Hampshire, derives its name from the same source: *Caiscou*, in Algonkin means *Herring-Bay*, for *isk* signifies *a herring*, by the addition of *s* it becomes a verb, *iskes*, which signifies *herrings abound*; and *ka* or *ca* prefixed, as in the Greek, expresses *the place where herrings abound*: a description which is true of that delightful bay at this day. *Kenebeck river* in the same district, is the river of snakes, for *Kenebec*, in Algonkin, signifies a snake. Up this river was the the great passage for the Indians into *Canada*, through a lake which lies between its source and the *Chaudiere*, that falls into the *St. Lawrence*. The real name of this lake is *Mikantic*, or *Passage-Lake*, from *Mikan* a passage or way, marking its situation and use; now called without meaning, *Megan-tick*, as *Missisconi* river and bay, *Missimisconi*, every where blood, from being the seat of the wars between the Iroquois and Algonkin tribes, always hostile, have their name replaced in the last English map, by one utterly insignificant. *Bik, Rock-Island*, in the river *St. Lawrence*, still retains its name. *Quebeck*, at first better written *Kebek* retains its name a little disguised. The distinguishing feature of *Quebec* is the rocky cape, called *Cape Diamond*, by a late traveller stated to be a thousand feet high, but which is  
in



their common intercourse and discourses, it seems a continuation of vocal sounds, very little broken by consonants, and is breathed with a melody and

in reality, by just measurement, four hundred and fifty. Now *Kiskebik*, in the language of the Algonkins, the inhabitants when the Europeans first invaded, signifies the *rocky cape on the river*, a picture in a word. How the learned missionaries, who have been put to such shifts to explain the name of *Quebeck*, overlooked this obvious origin, it is difficult to say. When I mentioned this derivation, and the only objection to it, the suppression of the first syllable, to my friend Pere Le Clere, he told me he thought *Quebeck* had escaped very well, for that in the neighbourhood of the lake of the two mountains, there was a place called in Indian *Kunzunk*, or the fishing place, which the French had changed into *Quinze-Chiens*. Pere Charlevoix has expended much fruitless pains in investigating the origin of the name *Iroquois* given to the five nations. If he had considered that the French, who gave them that name, first stopped at *Quebeck*, and probably took the names and description of the Indians on the upper part of the river, from the Algonkins they met with below, he would have found a natural solution of his doubts. *Iroquoitefi*, he is an *Iroquois*; *Iroqootachimon*, he speaks *Iroquois*; such were the answers of the Algonkin Indians, to the questions put to them, by the French explorers, relative to their neighbours the five nations. Such is the language of the *Montagnois* Indians on the *Saguenay* river, below *Quebeck*, at this day. For explaining the name of *Montreal*, recourse must be had to the *Iroquois*. *Ononto* in their language signifies a mountain, the particle *io* beautiful being added, makes *Onontio* the beautiful mountain. But *Onontio* figuratively used is also the name of a great chief or king. The French translated the name, but adopted part of its original and part of its figurative sense in their translation, so as to make it *Mont-real*, the Royal mountain. The *Ohio* takes its rise in the *Seneca*, (an *Iroquois*) country, and bears an *Iroquois* name. *Ohio!* is an exclamation which signifies *Lo beautiful!* We have preserved the original name; the French have translated it, for they call the river *la belle riviere*. The *Iroquois* language seems to give a rational origin to the name of *Canada*. *Scanada* signifies a lake or *place covered with water*. When we recollect that this country furnishes a water communication with the superior lakes, by *Niagara* and lake *Erie*; another by lake *Toronto* and *Machidack*, and a third by the great *stawa* river, and the lake of the *Nipicini* or watermen. When we observe how the space between *Ontario* and the *stawa* river abounds with small lakes: when we find to the north-east of the *St. Lawrence*, lakes and rivers innumerable communicating with its waters by short portages: when we survey the lands on the south-west of the *St. Lawrence*, held by the French as part of ancient *Canada*: where the *Oneida*, the *Onondago* the *Cayuga* and the *Seneca* lakes form a chain of water communications, while lake *Champlain* and its bays, and the *Chaudiere*, the *Saguenay*, and many other rivers and lakes, open the country nearer the sea. It does not seem extraordinary that this singular country, every where permeable by canoes, should be called *the country of waters*.

and softness not unlike the sweet low notes of birds. In the mouths of the men, it commands a compass of the wildest variety; as if they had followed the course of their own great rivers, copying as they advanced, the liquid sounds of their smooth swift waters, their murmurs and broken noises, the hollow swell of the surge, and the resounding of the cataract. In reality, their descriptions and animated discourses, borrow corresponding expressive tones from all that speaks forcibly and feelingly in nature; and if my conception be right, the Greeks themselves can scarcely furnish any thing more sonorous, nor the Italians more soft. I wish I could make the Indians here speak:\* if I could, I am persuaded

I prefer this derivation to the laboured attempts to derive its name from the Spanish. *Capo di Nada*, *Cape Nothing*, say the learned missionaries, is the origin of the name of *Canada*. I have here interposed some derivations from the Iroquois, whose language and the allied tongue of the *Hurons*, form the only interruption to the dominion of the Algonkin, in the direct line of ascent from the coast by the way of the lakes, into the interior. Above lake *Ontario* we find the wandering tribe called *Missisages*, properly *Missisakis*, which signifies *the dispersed over the land*, the French, I believe, called them *gens de terre*: the famous isle of *Michilimackina*, literally *the great Turtle*, from its resemblance to a floating turtle: lake *Michigan*, or the great lake: the *Outagami*, or *Fox river*: the *Illinois*, or the river of *the men*: the *Missi-sipi* or *wandering river*, or the *Missi-sipi*, *Turkey river*, from *mississic* a wild turkey, which there abound; or *Mitchi-sipi*, *the great river*, the common Indian name: the *Malomini*, or *wild rice* nation, from *malomin*, wild rice, which abounds in their country, improperly called by the French *folles avoines*, *the wild oat* nation, and in our late best maps, called *Monomonis*, improperly, also, as I conceive. Above Lake Superior we find *Nipigan*, the clear water lake, or the sleeping or smooth lake, or perhaps the lake of death: for *nipi* signifies water, *nipa* sleep, and *nipe* death. *Mitigan*, properly translated the lake of the woods, from *mitig* wood; and the *ninipi*, called *Winipig*, which receives the waters from the stony mountains near the *Pacific*, to deliver them to the fetters of the frozen sea of *Hudson*; and which, in the language of the Algonkins, near the Atlantic, is one of the names for the ocean.

\* Were I called upon to give examples of French or Italian poetry, without recurring to their poets, I should recollect the fate of the Ermenonville English Inscriptions, and the French verses of the Germans, and at once decline the task. The Indian lyre is yet unstrung: how then attempt to guess at its musical compass, or discover its possible tones? Conceiving they may serve to gratify curiosity, I set down here some

persuaded I should escape the ordinary censure, that unqualified praise is the offspring and betrayer of ignorant admiration: but it is impossible

some lines which I wrote in Canada, not as Indian poetry, but as an arrangement of Indian words, with *some regard to measure*, which will, at all events, furnish the groundwork for a few remarks on the language. I have subjoined the import of the words in the order in which they stand.

Kinoze Niagara, kes kisis, eaisangsang  
*Sublime Niagara your father (is) the sun, lightnings*

Mingese, mochikindam, nipagan kisanike ;  
*Impetuous, exulting, your bed excavated ;*

Kich-kichi-gami sinenti Chinquichinaban.  
*The great ocean therein laid her down.*

Kin oguin tapia, ki tapi Oguin Awanek ;  
*Your mother she is, you are the parent of exhalations ;*

Kineio Mindokanek wasseiak Konia Kijik  
*Your dews shine the silver of heaven ;*

Seguis ki Animiki, gai fakia ki Onagwan.  
*Fears you the thunder, and loves you the rainbow.*

The chasm at Niagara, the subject of the above lines, which receives the waters of four immense lakes, in its abyss, at first sight strikes the imagination as the stupendous work of some cause still in operation, manifesting its powerful agency by the vibrations of the earth, and the continued concussions of the air. The vapours and exhalations of the tumultuous sea buried in the abyss, collecting in volumes beneath, and ascending from the chasm in fleecy purity, cloathed with light, as it were in a state of splendid resurrection, exhibit dazzling pictures to the eye ; and as they rise into the higher regions of the atmosphere, display the most beautiful work of secondary creation, the formation of clouds: which slowly swelling with the vapour, now almost aerial, after lingering for a time over their source, at length gradually break the silvery filaments which held them, and are drifted into the expanse, making way for successive and still succeeding creations ; thus peopling space with form, and decorating the starry heavens with subordinate splendors. These gave the first awful and sublime impressions, I was conscious of in viewing Niagara. For a moment the cliffs, the falls, the vapours, the clouds, the illuminations, the thunders, seemed to me one harmonious accord of blended pictures and sounds, manifesting and proclaiming aloud, in the colouring and language of nature,

ble to persuade an Indian to repeat deliberately, sentence by sentence, and word for word, those compositions which his rapid imagination bodies

nature, "The heavens and the earth are indissolubly connected; these are their bright "bonds; behold the fountain of the clouds, here the secrets of creation are disclosed, the veil is withdrawn." Till the first solemn and commanding emotions are past, the mind is too full of the effect to pass with a capacity of enjoyment to the details. Curiosity must be suspended; the scene must be abandoned and revisited again and again, before you are left free to analyze it, to separate the awful from the magnificent, and to contrast the beautiful with the grand. At times Niagara seems to suspend its operations and to repose. Its thunders become fallen sounds; its evaporations, scarcely surmounting its cliffs, fade into air; no dazzling illuminations, no formation of clouds; till again of a sudden the great work is resumed, as if the genius of the place were roused. Day after day, and let me add night after night, furnish new and surprising varieties. Every change in the shadows, in the weight of the atmosphere, in the mass of waters, in the illuminations of the sun and moon, stamps Niagara with greatly distinguished features. For several weeks I visited and explored, and almost dwelt upon its scenes, seldom without observing something which I had not before attended to, and never for a moment without a rich recompense. But I have wandered to things from words, of which the following short collection presents many which are harmonious and expressive, whatever may be the errors of their arrangement.

Makua Ispatina, Inini Saki't Otayna,  
*The bear the mountain, man loves the peopled-village,*

Passetina Besheki, gai Sagaegan Wabisi;  
*The extended plain the buffalo, and the wide lake the swan,*

Papimissi Omimi, Nanakesshi nakema,  
*Flits on the wing the dove, echo repeats,*

Pepezigoganzi tattabbe pimoussi Popusqua.  
*The animated horse briskly bounds over the plain.*

I shall make use of these *collections of words* to convey by reference a few observations upon the nature and structure of the Algonkin tongue. *Note 1, Kes* in the first line of the first collection, is a compound; *es* signifies a father, *kes* your father, *nes* my father, *vous*, his father. by the junction of the particles *ni ki* and *e*, properly personal pronouns, often used as possessive. *Note 2, kifs* (the sun) in the first line, *debika* signifies night, and *debika-kifs* the moon, the sun or luminary of the night; hence

*kifs*

dies forth, and colours as it were on the wing. If it was attempted, it would probably no longer be the same glowing picture. Even their orations,

*kifis* is used to denote a month, (a moon) as *wabikon-kifis*, May, the month of flowers: The heavens, as the seat of the great luminary, are called (from *kifis* the sun) *kijik*, a word which occurs in the fourth line: the sky, as it is the boundary of sight, is called *ispimink*, more commonly *spimink*, the high bank, or boundary on high, for *ispi* signifies high, and *gamink* a bank or border; and in composition the first syllable *ga* is sunk. I was pleased with the Indian name for the milky way, *Tchipai-mikan*, the way of the dead or departed spirits. Note 3, The last word in the first line properly signifies *lightning in action*; it is derived from *wassia*, which denotes brightness. *wassiak*, the verb which occurs in the fourth line, is formed from this substantive, by the addition of the single letter *k*. The changing substantives into verbs is constant; thus *pipoon* signifies winter; hence *pipoonichi*, he winters in such a place. *Pipoones* is the plural of *pipoon*; *Mitaffo pipoones* ten winters, hence *mitaffo pipoonessi*, he is ten winters (the Indian phrase, that is *years*) old; thus making the whole sentence verbal, according to a fixed analogy. Note 4, *Nipagan* a bed, in the second line, this is derived from *nipa* sleep, *Nipe* signifies death. Note 5, *kivanike* excavated, the verb is *vanike*, *vanikan* signifies a cave, *vanac* a canoe hollowed out of a tree. *Kivanike* is the past time of the verb, formed by adding *ki* to the present time; for the past time is formed by prefixing *ki* or *gi*, as the future time is marked by adding *ga*, according to an established law. Note 6, *Kichi-kichi-gami* the ocean, in the third line. *Kichi* signifies great, *kichi-gami* the great water or lake, and by duplication, according to a fixed analogy, *kichi-kichi-gami* the ocean. Note 7, *chinquichinaban* she laid her down; *chinquichin* is the verb, *aban* added makes the past imperfect time, (as it is alledged) but certainly a past time, according to a fixed rule of inflection. Note 8, *Sakia* loves, in the last line; this verb illustrates a peculiarity in the language. It can only be used speaking of a person or thing personified, when speaking of inanimate objects or animals, the synonymous verbs, *sagbi* or *sakioo* are used. Thus there are two classes of verbs of the same signification to be applied to different classes of objects, according to certain fixed rules. Note 9, in the second collection of words, *ispatina* a mountain; this is derived from *ispi* high: *ispina* signifies to raise on high; *ispatina* is sometimes elegantly used as a verb, to say *it mountains*, (it rises into mountains,) as we say *it thunders*. Note 10, *wabisi* a swan, in the second line; this is derived from *wali* white; *waban* or *waban* signifies the dawn or point of day, and *wabano* is the expressive name for Lucifer or the morning star. Note 11, *papimissi* he flits on the wing; *pini* signifies a bird, *pimisse* (as if it were *pimisse*) signifies to fly as a bird, *animisse* to fly on one side, *papimisse* to fly hither and thither, to sport on the wing. Note 12, *nakoona* she repeats; hence *na-na-koossii* the name for echo, where, by the repetition of the first

orations, addressed to the representatives of distant sovereigns and states, perish as originals with the breath that gives them utterance, to live in inadequate translation. The familiar use of letters first fixes sounds, by introducing the eloquence of the pen: how then can I exhibit examples of Indian speech? I can form some opinion of the elements of which this favourite language is composed, for I have collected some thousands of their words; but I know the difficulties of their dialects, and the peculiarity of their idiom too well, to exhibit any thing of my own as a *specimen*. Indeed the attainment of any degree of accuracy or facility much less eloquence, in marshalling the words of an unwritten language, must be a work of industry long applied, joined to a peculiar talent for the acquisition of languages. I know enough of the general principles of this language, to say that it is artificial, governed by established rules and analogies, ambitious of elegancies, and admitting them. It derives naturally, it compounds forcibly, it forms diminutives, and possesses the power of verbalizing not only nouns and adverbs, but even sentences, by the addition of one or two letters. *Missi-missi*, every where, *missi-missité*, he is every where; *ka-missi-missité*, that which is every where, (the being which fills all space.) In the last of which combinations, it is obvious that the *ka* occupies the place of the *to* of the Greeks. I have several examples of their verbs, which are regularly inflected by prefixed syllables and varied terminations, without the aid of auxiliaries. Baron *La Hontan* has given one example in his travels, not complete in all the modes, but the only one I have seen in print. He has also given a short vocabulary of words, well selected, most of which are still in use, though his book was printed much above

first syllable, the power of echo seems to be exemplified. *Note 13*, *pe-pezigoganzi*, *pe-zigoganzi* is one of the names for a horse. *Pe-pezigoganzi*, the first syllable repeated, signifies a horse in action; and by the very sound seems to indicate his movements. To these very imperfect remarks I shall only here add, that this language has a dual voice, and two styles or modes of speech; one vulgar, used in ordinary discourse, the other used in council, and solemn narration, each distinguished by its particular words and phrases.

above a century ago. Carter, in his travels, seems to exhibit this as an original collection, for he has transposed, though he has merely transcribed the words, but without informing us that he is a transcriber. From his omitting to add to a list which solicited additions, I conclude that his knowledge of the language was limited. The view given by these writers, of the manners of the more civilized Indians, is less defective than any I have met with. Whatever passes under the eye they have, in general, delineated faithfully. With respect to almost every other object, it is my opinion that Carter is destitute of original merit. Lahontan knew the Indians intimately; he ranks in a higher class, and has given some insight into the Indian character, and the workings of the Indian mind. What is seen by a stranger in a new country, is at the best, but a pageant that amuses. Books and conversation open up the scenes, and furnish new lights; till observation by their aids, ripens into knowledge. Among nations which have not the use of letters, the personal observation of the individual must derive all its aids from a single, often a difficult source, friendly oral communication: accurate and important according to the characters and capacity of the persons resorted to; as the results must prove interesting, exactly in proportion to the value of the objects enquired after, and their power to gratify rational curiosity.

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*Some Considerations on the History of ancient amatory Writers, and the comparative merits of the three great ROMAN Elegiac Poets, OVID, TIBULLUS and PROPERTIUS, by WILLIAM PRESTON, Esq.*

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THE history of poetry ancient and modern, shews us, that *erotic* compositions are not the growth of rude manners, and early ages of society. That such is the fact, cannot be denied; I have endeavoured to account for it, in an essay which has for its subject, the *manners of the heroic ages, as far as they have relation to poetry, and tend to influence and determine its objects, and its style*. In the paper to which I refer, I have attempted to maintain this proposition, by shewing\*, that where savage manners, prevail, which, (with reverence be it spoken) was the case in those ages called *heroic*, love can have no place, as a permanent emotion, or ruling passion, sufficiently fixed to become an object of poetical description, sufficiently important, to engross a large share of influence over the interests of society, to become the theme of a species of poetry devoted to itself, and to secure attention to the popular minstrel, who should make it the ground-work of his song.

This hypothesis certainly seems to be justified by a reference to the history of poetry. Love, for example, is introduced, but

S 2

sparingly

\* It is one of a series of essays, subjoined to a translation of Apollonius Rhodius, by the Author.

springly, in the poems of Homer, that faithful painter of heroic manners. We perceive none of the fine strokes, the soft unfoldings of the enamoured heart, that mark a writer, who has deeply studied the tender emotions. *Hesiod* has nothing of it. There is very little of it in the *Argonautics*, falsely ascribed to *Orpheus*,\* though the event of the poem hinges on a love intrigue. It is surprizing, how little of love we find in the numerous plays, which yet remain of the three great tragedians of *Greece*; and as to the poem falsely ascribed to *Museus*, on the subject of the Loves of Hero and Leander. It is confessedly, the production of an age long subsequent, indeed, to that of the venerable *Museus*, who was the son, according to some, and certainly the disciple of *Orpheus*, and contemporary with *David* the monarch, the bard, and prophet of the *Jews*. *Alcman* or *Alcmaeon*, who seems to have been the first writer, who devoted his talents expressly to amatory compositions, which he wrote in lyric measure, was a native of *Sardis* in *Lydia*, a city and a region then flourishing in commerce, wealth, and splendor, and plunged in all the gratifications of luxury and sensual indulgence. This must have imparted a more than *Asiatic* softness to the manners of the inhabitants; and besides, *Alcman* appears to have flourished, full three hundred years subsequent to *Homer*.† A small fragment of this writer remains; it is cited by *Athenæus*. *Alcman* speaks thus of himself, and, his own feelings, in those lines, which are to be found in *Athenæus*.

The joys which Venus can bestow,  
With sweetness all my soul o'erflow.

Ἔγω μὲ δ' αὖτε Κυπρίδ' ἔκατι  
Γλυκὺς καθιέθων καρδίαν ἰαυτι.

*Alcæus*, the illustrious poet of *Lesbos*, the inventor of that noblest kind of lyric measure, *Alcæic* verse, amidst the various objects, which employed

\* Far from offering the delicate strokes of nature, and feminine feelings, which are found in *Apollonius Rhodius*, *Onomacritus*, the author of this poem represents *Medea* as a bold, forward, and ferocious wanton.

† Saxii Vol. 1, Pa. 15.

employed his sublime, but versatile *genius*, stooped, at times, to unbend himself, with the erotic muse. It is to be observed, that he lived full two generations later than *Alcman*, and that the island of which he was a native, flourished, in commerce and wealth. It had a number of famous and opulent cities,\* and was the abode of pleasure, or rather of unrestrained licentiousness. *Lesbos* produced a succession of men of genius, who transmitted to each other the honour, of excelling the other natives of *Greece*, in the art of music. *Sappho* was also a native of the island, and cotemporary with *Alcaeus*, who is said, to have been inspired with a passion for her. It is not wonderful, that poetical genius, inspiring the tender bosom of a female, soft and empaffioned, like that of *Sappho*, and fostered, and cherished, by the voluptuous air of a bland and delicious climate, and the soft fascination of that abode of pleasure, and license, where every thing around breathed the indulgence of sense, and amorous delight, should have produced the most lively and affecting descriptions of the emotions of love. Nor was this charming talent confined, among females, to *Sappho*: the fair sex in *Greece*, seems about this time, to have been very generally inspired. The learned *Olearius* has written a dissertation, on the poetesses of antiquity; and their number, according to him, is very considerable! Nine of them, in particular, equal in number to the Muses, and worthy of being compared to them, emulated the reputation of the best poets of the other sex; their names were *Sappho*, *Myrtis*, *Prexilla*, *Erinna*, *Corinna*, *Nossis*, *Myro*, *Telephilla* and *Anyta*. They are all recorded, in the following verses of *Antipater*,

Ταυτὲ θεογλωσσῶ Ἐλικῶν ἰθρεψὲ γυναικῶσ  
 Ὑμνικῆσ, καὶ μακεδῶν περὶ τῆσ σκοπεῖσθ,  
 Πηρεΐλλαν, μίτρα, Αὐτῆσ σῆμα, θῆλει Ὀμηροῦ  
 Λεσβιαδῶν Ὑαφῶ κοσμοῦ εὐπλοκαμῶν  
 Ἡρῆταν, Τηλεσιλλαν ἀγακλεῶσ, καὶ σὲ, Κοριννα,  
 Θυρῖν Ἀθηναῖησ ἀσπίδα μέλφμεναι.  
 Νοσσιδᾶ θηλυγλωσσῶσ, ἰδὲ γλυκεραχέα μίρριν  
 Πασαῶσ ἁενηῶν ἐργαλιδᾶσ σελιδῶν,  
 Ἐνεα μὲν μῦθοσ μέγαθ' ὕρανθ, ἐνεαδ' αὐλασ<sup>3</sup>  
 Ταῖσ ἴκεσ θνατοῖσ ἀφθῖον εὐφροσύνην.

These

\* As *Mitylene*, *Pyrrha*, *Methymna*, *Aresba*, *Eressus*, and *Antissa*.

These *Helicon* and the *Pierian* rock,  
 Nurtur'd with song divine, immortal minds  
 Of heav'n-taught women! with *Presilla*, *Myro*  
 And *Anyta*, who equall'd in renown  
 The *Chian* father of heroic song;  
*Sappho*, that ornament of *Lesbian* dames,  
*Erinna*, *Telephilla*, and *Corinna*,  
 Who sang the shield of *Pallas*, *Noësis* fair,  
 With *Myro* sweet of song.—All these abound  
 In wreaths, that ever bloom. These heav'n endow'd,  
 A second choir of Muses; these the earth  
 Produc'd, as sources of divine delight.

In his *Tusculan* diputations, Lib. 4th. 33, Cicero mentions *Ibycus Rheginus*, as the poet who surpassed all others, in the ardor of his amorous feelings,

Maxime vero omnium flagrasse amore *Ibycum*.

And this poet speaks of himself, and his mastery on the topic of love, in elated and magnificent terms, in some verses, which have been preserved by *Athenæus*. I have attempted to give the reader a faint idea of their spirit and purport, by the following imitation.

#### VERSES OF IBYCUS RHEGINUS.

Naiads soft, *Cydonian* maids,  
 When the leaf embrowns the shades,  
 When the birds their carol sing,  
 Pour the streamlets from the spring.  
 Vernal gales awake the vine,  
 Leaves to spread, and tendrils join,  
 Bid the little suckers grow,  
 Soon with racy juice to flow.—  
 In that season, maidens fair  
 To the crystal streams repair,  
 Virgin gardens of delight,  
 Kind of heart, in feature bright.—  
 These are they that wing the dart.  
 These are they that fire my heart.—  
 Wakeful love within my breast,  
 Never never gives me rest.

Not a season, not an hour  
 Frees me from the tyrant's pow'r.  
 Like the Thracian winds that fly,  
 Like the lightning from the sky,  
 Swift his arrows pierce the soul,  
 Swift enflame with fierce controul;  
 From such objects of desire,  
 Madding rage, consuming fire,  
 Mock the senses with illusion,  
 Fill the spirit with confusion,  
 Dreadful offspring of delight,  
 He confounds me in his might.  
 All my thoughts and wishes filling,  
 Waking pangs, desires instilling,  
 Cruel tyrant of the breast,  
 Never does he give me rest.

*Mimnermus*,\* the inventor of elegiac composition, whom *Horace* scruples not to place above *Callimachus*; *Mimnermus*, who thought and wrote with so much nature, amenity, and tenderness, and in such an easy and flowing style, was rather younger than *Sappho*. He was a native of *Asiatic Greece*, (having been born in *Smyrna*, or, according to other accounts, in *Golophon*, a country which, perhaps, surpassed all others, in luxury, softness of manners, and amorous indulgence.) The few fragments† which yet remain, of this amiable and admired poet, breathe the spirit of the voluptuary; and show that love and the pursuit of pleasure predominated in his soul; and formed the business of his life. "Love and sport," says he, "form all the charm of existence; let us love and sport.

" Si *Mimnermus* uti censet sine amore jocisque  
 " Nil est jucundum, vivas in amore jocisque."

HORACE.

With more seriousness, reflection, and pathos, than *Anacreon*, he was equally the poet of love and dissipation. As a writer, he appears

10

\* See Saxius.

† See Brunk's *Analecra*, Vol. 1st.

to have posselt copiousness, grace, and a true poetical spirit. He is placed in the same degree of eminence, among amatory writers, that *Homer* holds among the ancient bards of epic song. He must have painted the seducing emotions of love in the most glowing colours, and with a master's hand; since the best judge imaginable says,

“ Plus in amore valet *Mimnermi*,  
“ Versus *Homero*.

*Propertius, L. 4, Eleg.*

It is said by *Solinus*, that the *Asiatics* were as remarkable for genius as for luxury. “ *Ingenia Asiatica inclyta per gentes fecere poetæ* “ *Anacreon, Mimnermus, et Antimachus.*” Nor is it surprising. *Asia Minor* was the country on earth the most beautiful, the most diversified, the most susceptible of improvement, and most capable of supporting a great population. No country has coasts more winding, or more numerous, safe and spacious harbours.

*Anacreon*, the voluptuous, the elegant and amorous *Anacreon*, was another offspring and ornament of that charming region, *Ionia*, in which every thing respired voluptuousness. He was born at *Teios*, about two ages subsequent to *Mimnermus*. With similar talents and propensities to those of that master of love and poetry, he felt all the force of the climate, all the influence of the moral causes, that prevailed in *Ionia*, to relax the virtue, and fascinate the mind. “ Have we not felt,” says *Barthelemy*,\* “ a delicious languor insinuate itself into our souls, and throw “ us, if I may so speak, into the intoxication of happiness? Such is “ the influence of the climate of *Ionia*, and as moral causes, far from “ correcting, have only tended to encrease it, the *Ionians* are become “ the most effeminate, but, at the same time, are to be numbered “ among the most amiable people of *Greece.*” The gay and amorous disposition, and the love of pleasure infused into the poet at his birth, fostered by every breath he drew, in that bewitching climate, confirmed by education, and the example of all around him in his native country, were

\* Travels of *Anacharsis*, speaking in the person of the philosopher.

were gratified; and expanded by full indulgent, in the elegant *but* dissolute enjoyments of the *Samian* court, where his disposition and talents recommended him to the protection and friendship of *Polycrates*, the sovereign of the *island*.

Long subsequent to those writers, whom I have mentioned, was *Theocritus*, who painted pastoral scenes, and pastoral manners, with so much truth and simplicity, and did such ample justice to the tender emotions of the young and enamoured heart. He lived when society had attained a degree of refinement and elegance, the manners of men, a measure of luxurious softness, differing somewhat in form and kind, but fully equal to what prevails at the present day among the most refined and polished nations. Although the *Sicilian* poet delighted in rustic subjects, his education, his habits of life, and his muse were by no means rustic: he joins the manners of *Arcadia*, with the softness and refinement of a court. No writer is more successful in painting the fond wishes, the ardent aspirations, the languor and imperious dominion of love, possessing the young and artless bosom with impetuous and irresistible influence; the entire abandonment of the heart and wishes, to the controul of this delightful and fascinating passion. This is accompanied by a smooth and melodious versification, a sweetness and simplicity of language, an unaffected ease of construction, all rendered more charming and engaging, by the use of the Doric dialect, so replete with unstudied and rustic sweetness. We are carried back by enchantment, into *Arcadian* times. We listen to the shepherd's pipe, whose stops are attempered by the hands of love himself. Thus contracted is the catalogue of the ancient *Grecians*, who have written professedly on the subject of love.

I am sensible that in some of the assertions, I have made, I differ in some measure from that elegant and accomplished writer, Sir *William Jones*, who in his commentaries on *Asiatic Poetry*, (Cap. 15, de *Poesi Amatoriâ*,—Works, vol. 2, page 543,) seems to consider amatory poetry as being one of the first productions of the human intellect, and equally the offspring and the delight of every stage of society, from the rudest to the most

polished. I do not apprehend that the position, which he has laid down, in such latitude, is warranted by experience, or the history of human intellect, or human society. I do not think that it is supported, by the quotations and instances adduced by the amiable author himself. I apprehend, that he is rather too eager to press the more ancient Greek poets into the service of love, and that he does not sufficiently distinguish, as I would wish the reader to do, between the strains of the voluptuary and the sensualist, and the poetry of love. The *Greek* poets to whom he refers, as *Alcman* and *Ibycus*, and perhaps a few passages, in the dramatic writers, in the way of general reflection on the universal dominion and power of love, do not, by any means, support his position to the extent in which it is advanced, of the universal and early prevalence of love poetry, even in the first and rudest stages of society. The Greek poets in question, wrote when society was very far advanced, when politeness and luxury had reached a very high pitch, and in countries, too, where politeness and luxury peculiarly prevailed. Such instances, therefore, do not illustrate or support his opinion. And besides, I cannot bring myself to give the names of amatory poets on such writers as *Alcman*, *Ibycus*, or *Anacreon*, who devoted their muses to pleasure and sensual enjoyments, and sung the charms of mirth and revelry, and indiscriminate indulgence with the fair sex, without entering into the bosom like *Sappho*, and painting the tumults of desire, the emotions of passion;—as well might we give the title of erotic poets, to such modern writers, as *Chaulieu*, *La Fare*, and *Greecourt*.

It is true that the influence of beauty is universal, that there is no race so savage and uncultivated; no breast so dull and gloomy, as to be insensible to its enchanting splendour. This, no doubt, is true in a certain degree, but in the manners of the heroic ages are many peculiar circumstances which serve to guarantee men in that state of society, against the sweet seductions of love. Sir *William Jones* quotes \* *Carciasso*, to shew that the *Peruvians* excelled in amatory poetry, and most expressive love songs. But it will occur to the recollection of every

\* See Sir William Jones, *Poeseos Asiaticae Comment.* Cap. 15, de *Poesi Amatoriâ*, Works, vol. 2. page 543.



every reader, that the Peruvians, of whom he speaks were in a very advanced state of society, and a high degree of cultivation; and the happy government under which they resided, must have added to the softness of their dispositions, and the amenity of their manners.

Sir William Jones, also refers to the specimens of *Lapland* poetry, which have been preserved in *Scheffer*, as further proofs of the universal dominion of love; but it is to be observed, with respect to the Laplanders, that they form an exception to the general rules, drawn from the observations made on other tribes of men, and to the conclusions, which may arise on a view of the general history of human nature; their situation being very peculiar, and calculated to produce in them an extraordinary and early mildness of manner, and an inordinate propensity to certain pleasures. Their situation was and is such as to exempt them altogether from being in the heroic state, that is to say, from the state of warfare, spoil, and rapine. Their country affords nothing to invite hostile aggression. Simple in their mode of life, bounded in their wishes, attached with enthusiasm to their native country, mild in their tempers, small in stature, and possessing very little bodily strength, they have neither the disposition nor the ability to commit violence, or invade their neighbours. The state of indolence to which they are doomed during the long continuance of their polar night, disposes them to an indulgence in all the sensual enjoyments their state affords. Ease and indolence have ever been the fruitful parents of love and amatory compositions, and a number of these people being collected together in their subterraneous habitations, or assembled in their sledges, on the snow, to beguile the hours with various amusements, the two sexes thus assembled for the purposes of mirth and enjoyment, and the being as happy as they could, were disposed to conciliate the affections of each other, by every means they could devise, and on these occasions, songs of love were not forgotten. Besides, it must be remembered, that the *Laplanders*, whose amorous ditties are thus preserved, are to be considered, as being in a sort of pastoral state; their rein-deer constituted their wealth, and at this day, in fact, the

mode of life, the occupations and amusements of this mild and harmless race appear to have undergone very little change, during a long succession of ages. The reader will find an interesting account of the present state, and existing manners of the *Laplanders*, in a lively and entertaining work entitled, “ Letters from *Scandinavia*.\*”

I shall not here mention such a writer as *Meleager Gadareus*,† as claiming a title to the palm of erotic poetry: notwithstanding the beauty and elegance of his compositions, and his having devoted his strains exclusively to the effusions of passion. It would be a profanation of the name of love, to apply it to the licentious and unblushing muse, and the criminal desires of this writer. The reader will please to recollect, that I wish to distinguish between the poetry of the voluptuary and the lover. He will perceive, that the latter has more of sentiment and less of sensuality, and to this alone should I be disposed to allow the name of erotic poetry, and still less am I inclined to concede it to those polluted rhymes, that prostitute the muses in the service of vice, obscenity, and licentiousness.

Neither do I speak of the swarm of comparatively modern novelists of the *Milesian* school, the spawn of corrupted literature, and degenerate times: but of the classical and pure ages of Grecian learning.

As I have already observed, that, on consideration of the manners of the heroic ages, of ancient Greece, the reader will find many strong reasons, which may lead him to think, that erotic poetry could not flourish, nay, could scarcely have been known, in that state and period of society: so, it seems to be very manifest, that, in succeeding ages, the democratic institutions, and republican forms of government, which were established in general through most states of Greece, provided

\* This work though a compilation, has a great air of originality.

† *Meleager* the *Gadarenian*, a *Syrian* by birth, flourished about 96 years before *Christ*. See *Fabric. Bibl. Græc* c. 28, pa. 682, vol. 2. *Saxxii Onomast*: v. 1. p. 142. The works of *Meleager* are chiefly short epigrams, replete as well with licentiousness, as with taste and elegance. Their number is considerable; they are to be found in the first volume of *Brunck's Analeſta*.

ed equally unfavourable to the dominion of the softer feelings, and to the prevalence, and scientific consideration of love, its arts, and its pursuits. This originated, partly, from the severity of republican manners and institutions, which encouraged a pride of spirit, an arrogance of demeanour, and overbearing temper; and augmented the natural sternness of nature, indeed, I shall not scruple to call it the ferocity, which, I think, on a fair perusal of their history, will appear to be generally imputable to the ancient *Greeks*. Republican forms of government, disposing and admitting every person to take a part in public affairs, furnish a superior degree of occupation for the mind, and this kind of occupation is, above all other circumstances, unfavourable to the dominion of love, and the submission of the spirit to the seducing encroachments of the soft feelings. The cause of love is little advanced, the empire of the gentler sex is not much promoted by the *Athenian* Muses. In the majestic and gigantic compositions of the fierce and indignant *Æschylus*, that father of tragedy, whose bold aspiring genius was nurtured amidst dangers, and scenes of horror, in camps, and fighting fields, we could not reasonably expect many displays of the softer emotions. He dares to meet the furies, face to face, to drag them in all their horrors on the stage.

We are more surpris'd, when we discover, that in the remains of *Sophocles*, the prince of the *Greek* tragedians, there is not a single play, which turns on the passion of love; nor does there appear to have been any piece of the amorous character, among the numerous works of that writer, which have perished.\* *Euripides*, who affected to choose  
pathetic

\* He is said to have produced no less than ninety plays; the titles of many of them are preserved.

In the *Iphigenia in Aulis*, which offers so fair an occasion for it, there is very little of love. The *Medea*, which gives a fine picture of resentment and jealous rage, and the *Alceſtis*, which gives a beautiful representation of maternal tenderness and conjugal affection, do not, I apprehend, form any exception to the general position.

The beautiful portraiture of the amorous irresolution of *Phædrus*, in the *Eunuch*, and the delightful description of the appearance and feelings of *Philumena*, in the *Self-Tormentor*,

pathetic subjects, and excelled, in painting distressful scenes, and the emotions excited by them, has but one tragedy founded on love, and that is grounded on a subject little favourable to the passion of love, in general, or to the attachment to the fair sex.—The incestuous passion of *Phædra* for her step-son. In the plays of *Terence*, which, being translated or imitated from *Menander*, must be supposed to contain a faithful picture of *Athenian* manners, and that too, when they were at the highest pitch of refinement, the passion of love is treated in a very coarse manner, and the conduct of men to the fair sex is very deficient, in politeness, gallantry, and tenderness. Such was the state of society in the republics of the continent of proper *Greece*. The case was far different, in *Ionia*, and the different *Greek* islands, which were, in general, subject to some form of regal domination, either under the *Persian* monarchy, and its satraps, or little sovereigns of their own. The writers in these countries saw the splendour of regal pomp, and the luxury of a court, in every state and city, forming a strong contrast to the simplicity of republican manners, which lavished all splendour and greatness on the public edifices, and monuments, and confined the habitations, expences, and pleasures of the citizens, within narrow and parsimonious bounds. The inhabitants of the islands and *Asiatic Greece*, deprived of the exercise of power, a trust, of which their native indolence rendered them little capable, were easily consoled for the loss, by their being relieved from the cares of government, the burthens of civil duties, and consigned to the full and uninterrupted enjoyment, of the wealth, that flowed in upon them, as it were spontaneously, and those pleasures, luxuries and amusements, to which the natural gaiety of their tempers, and the influence of a soft and relaxing climate irresistibly disposed them.

It is observable, that the *Lydian* measure or style of musical composition was the most effeminate and voluptuous of all those, which were known to the *Greeks*; as is observed by *Dryden*,

Softly

*Tormentor*, do not countervail the general character I have given of the *Athenian* muses; since other passages of equal delicacy and feeling do not occur; and any conclusion which might be drawn from these, is counteracted by the coarse picture of manners, which *Terence* uniformly gives us, except in these instances.

Sofly sweet in *Lydian* measures,  
Thus he footh'd his soul to pleasures-

The *Roman* language, however, and the elegant, the luxurious and gallant court of *Augustus* were destined to exhibit amatory poetry, in its full perfection, in the persons of the three great poets, *Ovid*, *Tibullus* and *Propertius*. These celebrated and justly admirable cotemporaries, though they treat on a common subject, show much originality of genius and manner, and differ, in a singular and striking degree, from each other; while the critical reader stands suspended, and is doubtful, on which he shall bestow the preference, and at last bestows it, rather according to his peculiar taste and fancy, than from a decided conviction of the real superiority of the writer, whom he thus prefers.

*Ovid*, *Tibullus* and *Propertius* have this in common, that they did not merely produce light and occasional amorous effusions, the offspring of carelessness, chance and leisure. They seem, to have given their whole souls and affections to the pursuits of love; to have made that passion the grand object of their lives; the great and favourite subject of their muse. This admirable triumvirate appeared, in fact, to have looked on their amatory compositions, with the conscious pride of genius; and to have considered them as the surest foundations of their pretensions to poetical reputation. In forming this judgment of their own pretensions and talents, they were perfectly well founded; for, in their productions consecrated to love, they shew an energy and talent, a care, a study, a correctness of composition, and a knowledge of the human heart, a feeling of all the doubts and uncertainties, the pains and pleasures, the hopes and fears of the delightful but tormenting passion, which they celebrate, such as scarcely ever has been equalled in any language, and certainly never has been surpassed.

*Ovid* surpasses his rivals and contemporaries, in fancy, gaiety, ingenuity, and wit; *Tibullus*, in nature, pathos, real tenderness, sweetness, ease and unaffected simplicity; *Propertius* excels, in sublimity, loftiness of manner, dignity and refinement of sentiment, purity of passion, and  
learning,

learning, in which last respect, he sometimes however, runs riot, and may justly incur the censure of pedantry. But, let us examine their pretensions more in detail.

Nature was uncommonly liberal to *Ovid*: his spirit is lively and fertile, his fancy is rich, and abounding in the most beautiful images, his expression is easy, flowing and abundant, ever seeming to outrun his thoughts, copious as they are. With these great qualities, he seems to have been one of the first, who spoiled the pure taste of the *Romans*. He is lavish in flowers and ornaments, in sallies of imagination, in conceits and points of wit; in his morality, he is most relaxed and vicious, in his taste and sentiments, the least pure and delicate of the triumvirate. Many of his subjects are licentious, many immoral, in the highest degree, and not only scattered passages, but entire compositions are such, as are highly offensive to decency, and must shock the modest reader. Others, again, are gay and volatile, light and fanciful, like those airy and playful sallies, in which the French poets, and *Prior* among *English* writers, so much excelled. The most considerable and finished productions of *Ovid*, on the subject of love, are his *Heroides* or love epistles written in the persons of eminent females of antiquity, as *Phædra*, *Hermione*, *Ænone*, and his *Art of Love*, a composition which equals any thing that we know in ancient or modern poetry, in address, gay and sportive pleasantry, not unmixed with covert satire, a knowledge of the world, and a perfect acquaintance with the foibles and propensities of the fair-sex. His *Amores*, or books of occasional love elegies, are the most interesting part, however, of *Ovid's* writings. They give the most perfect image of his temper, disposition, and manner of life, and are those productions in which he admits of the most direct and fair comparison, with *Tibullus* and *Propertius*. Nor are these elegies the most interesting parts of the works of *Ovid*, merely with respect to the poet himself, they tend to bring us acquainted, with the private life, the manners, the dispositions and habits, not of him only, but of all the courtly and dissipated part of the *Roman* people, in general. We read them, with the lively sensations of pleasures,  
which

which attend every faithful picture of society and manners. The reader will find instances of the light sportive manner of *Ovid*, in the 14th elegy of the first book, to console his mistress, whose tresses had fallen off, through too much care of them.

Dicebam medicare tuos defiste capillos,  
Fingere quam possis jam tibi,  
Nulla coma est, &c.

Forbear to stain the honours of thy head,  
Rash maid forbear, how often have I said.  
My words were scorn'd; and now no hairs remain,  
For impious hands, unhappy maid, to stain.

The reader will be amused, to see how much ingenuity and learning the poet bestows on this important subject. The fourth of the second book, that he loves women of every form and complexion, the sentiments of which have been imitated over and over again, by succeeding poets; and the sixth of the same book, on the death of a Parrot, show how much *Ovid* excelled in trifling agreeably.

*Pittacus* eois imitatrix ales ab *Indis*,  
Occidit, exequias ite frequenter aves;  
Ite piæ volucres, et plangite pectora pennis,  
Et rigido teneras ungue notale genas, &c. &c. &c.

'Tis past and done, the parrot lives no more,  
That imitative bird from *India's* shore.  
In flocks attend, his obsequies to grace,  
With pious sorrows, all ye plummy race.  
In mournful action be your woes confess,  
With sounding pinions beat the feeling breast,  
And rend your ruffled plumes, like flowing hair,  
And mark with cruel claws the visage fair.

The fourth elegy of the first, the seventh of the same, to appease his mistress, whom he had beaten. The seventh of the second book, in which he clears himself to his mistress, from the suspicion of loving

her waiting-maid, give us curious pictures of *Roman* manners, and of the degree of coarseness and indelicacy, which even then prevailed, in the midst of refinement and luxury. The very next elegy to *Cypassis*, the girl in question, is written with much pleasantry, and uncommon ingenuity, and shews that the suspicions of *Corinna*, her mistress, were not without foundation. In his beautiful elegy on the death of *Tibullus*, where the pathos of the sentiment, vies with the elegance of the plan, and the graces of composition; the poet has proved how much he could have excelled in the grave and tender departments of poetry, had he been sufficiently sober and sedate to confine himself to them. But, though infinitely superior in talents, and amiable accomplishments, to the English nobleman of profligate memory, in dissolute manners, and unblushing profligacy, poor *Ovid* seems to have been the *Rochester* of the court of *Augustus*. What shall we say of the poet and his mistress, when we come to the fourteenth elegy of the second book, *In Amicam, quod abortum ipsa fecerit?* What shall we say of the depravity of the *Roman* people, even in the time of *Augustus*, when an act of such serious delinquency, a subject of so much horror and abomination could be thought a fit theme of witty sallies and poetical embellishments? And we find, that, although the poet addresses the woman he loves, on this tragical and revolting topic, he not only forbears to show any indignation, but even displays a mind at ease, and a degree of levity, and exhausts his ingenuity, in a variety of amusing and far-fetched common places, on the occasion.

Let us now, turn from *Ovid*, and cast our eyes on a writer, of a very different character, and disposition.

*Tibullus* was not less amiable and gentle, in his manners and disposition than in his muse. The graces of his appearance, the charms of his conversation, and poetical productions rendered him the distinguished favourite of many of the most illustrious persons in *Rome*, among others, of *Messala Corvinus*, of whom he speaks, with a mixture of affection and veneration. It is a convincing proof of the gentle temper and engaging disposition of *Tibullus*, that he was most entirely be-  
loved



loved by the poets, who were his contemporaries. *Horace* addresses him, in the most familiar and affectionate manner,\* and his death is lamented by *Ovid*, in strains of the most pathetic poetry, where the friendship of the writer is not less conspicuous, than his genius, in the beautiful elegy which begins,

Memnona si mater, mater ploravit Achillem, &c.

The style of *Tibullus* is uncommonly pure and perfect; and his versification is easy, sweet and flowing; They reflect an image of the mild and candid mind, the gentle disposition, and refined taste of the writer. In every line we see the feeling heart, the sympathetic softness, the captivating tenderness, the unambitious love of rural scenes, rural pleasures, and domestic enjoyments in modest and humble privacy, of this sweet and unsophisticated child of nature. There is no writer, who expresses so perfectly the sentiments and wishes of the young and tender heart, incapable of disguise, undebauched by commerce with a selfish and unfeeling world. Even the *English* reader may be able to judge, whether this is a just character of the natural and amiable *Tibullus*. His manner of writing and thinking are rendered familiar even to the unlettered reader, through the medium of *Hammond's* Elegies, which are nothing more than elegant translations of select passages from the Latin author; and of the late version of *Grainger*.

Quam juvat immites ventos audire cubantem,  
Et dominam tenero continuasse sinu,  
Aut gelidas Hibernus aquas cum fuderit austere  
Securum somnos, imbre juvante sequi.

What joy to hear the tempest howl in vain,  
And clasp a fearful mistress to my breast:  
Or lull'd to slumber by the beating rain,  
Secure and happy sink at last to rest.

*Hammond.*

\* Ode 33, Book 1st. *Albi* ne doleas, &c.

O quantum est auri pereat, potiusque smaragdī,  
 Quam fiat ob nostras ulla puella vias!  
 Te bellare decet terrā, Messala marique,  
 Ut domus hostiles præferat exuvias.  
 Me retinent vinctum formosæ vincla puellæ,  
 Et sedeo duras janitor ante fores.  
 Non ego laudari curo mea Delia: tecum  
 Dummodo sim, quæso fœgnis, inersque vocer.

Et te dum liceat teneris retinere lacertis,  
 Mollis et inculca fit mihi somnus humo.

Ferreo ille fuit, qui, te cum possit habere,  
 Malluerit prædas stultus et arma sequi.

Te spectem suprema mihi cum venerit hora,  
 Te teneam moriens deficiente manu.

However, we may admire the tenderness and sweet simplicity of this poet, the truth and nature of his sentiments, the purity of his language, it must be admitted, that we do not find in him the dignified and ennobling *platonism* of love poetry; and that *Tibullus* dwells merely on external graces. Dissolved in love and tenderness, his whole spirit is possessed with the image of his *Delia*, but mental accomplishments make no part of that image. He wishes for nothing so ardently as the happiness of possessing her, but never speaks of the pleasures resulting from the rational intercourse of two polished minds, or the consciousness of being beloved by a woman of merit.

*Propertius* seems most nearly to approach *Petrarch*, in violence of passion, and energy of expression; his elegies soar to an higher pitch than those of *Tibullus*, and display greater force of thought, with a more extensive knowledge of the world, more fancy and learning, with a great variety of contending passions. His suspicions are easily awakened, and as easily calmed. His writings are filled alternately with the most poignant reproaches, and the most passionate expressions of fondness. He knows no bound, no moderation in his feelings; for ever ingenious to torment himself, for ever tost by a raging storm of jealousy

jealousy or love; we behold in him a fierce ardour of desire, an impetuous burst of passion not unlike what *Shakespeare* has painted in his *Moor of Venice*.

Excellent wretch! Perdition catch my soul,  
But I do love thee—and when I love thee not,  
Chaos is come again.—

Multa prius vasto labantur flumina ponto;  
Annis et inverfus duxerit ante vias.—  
An mihi sit major caræ custodia matris?  
An siæ te, vitæ cura sit ulla meæ?  
Tu mihi sola domus, tu *Cynthia*, sola parentes;  
Omnia tu nostræ tempora lætitiæ.

Sooner the flood its downward course shall change,  
The day-star sooner from its orbit range,—  
Dearer than she from whom my being came;  
Dearer than genial light and vital flame;  
Thou art my kindred, parents, friends alone,  
Thou only comfort that my days have known.

Juro tibi per ossa matris, et ossa parentis;  
(Si fallo, cinis heu sit mihi uterque gravis,)  
Me tibi ad extremas manfurum vita tenebras,  
Ambos una fides auferet, una dies.

Shades of my buried fire, and mother, hear,  
And blast with curses if I falsely swear.  
My love, thou darling, shall to death extend;  
One faith, one hour the mutual throb shall end.

Non adeo leviter nostris puer hæsit ocellis,  
Ut meus oblito pulvis amore vacet.

Not mine the soul that glows with feeble fires,  
Not mine the love that in the grave expires.

*Tibullus* is like a soft and gentle shower, stealing on the heart of his mistress, and melting it by degrees. *Propertius* is a fierce and rapid torrent, bearing down and hurrying away every obstacle, with re-  
refistless

fiftlefs fury. The latter of thefe poets appears to have loved a woman of great fpirit and accomplifhments; but of a temper as violent as his own. He feems to fpeak, with admiration of the former, with a degree of awe and terror, of the ftormy burfts of the latter.

Cum tibi præfertim *Phæbus* fua carmina donet,  
Aoniamque libens *Calliopea* Iyam,  
Unica nec defit jucundis gratia verbis,  
Omnia quæque *Venus*, quæque *Minerva* probat.

*Phæbus* on thee his darling ftrain beftows;  
On thee the willing mufe th' *Aonian* lyre,  
Tun'd by the graces ev'ry accent flows,  
Thine, *Pallas*' gifts, with *Cytherea*'s fire.

Hæc fed forma mei, pars eft extrema furoris,  
Sunt majora quibus *Baffe* perire juvat.

Yet *Baffus*, is her bright, her matchlefs frame,  
The meaneft object of the boundlefs flame.

Quantum quod pofito formosè faltat *Iaccho*,  
Egit ut evantes dux *Ariadne* choros.  
Et quantum *Æolio* cum tentat carmina pleetro,  
Par *Aganippeæ* ludere docta lyræ.

'Tis thine, when virgins thrud the mazy dance,  
'Tis thine, unrivall'd in the dance to move;  
When o'er the lyre thy flying fingers glance,  
It fpeaks, it thrills, it breathes the foul of love.

Hæc tibi, contulerunt cœleftia munera Divi;  
Hæc tibi, ne matrem forte dediffe putes.  
Non, non humani funt partus talia dona,  
Ifta decem menses non peperere bona.

The Gods, the Gods thefe heavenly gifts beftow'd;  
Nor from thy mother fuch endowments came.  
No mortal birth fo bright a fpirit show'd,  
Nor nine months teen matur'd fo fair a frame.

Of her temper he speaks in the following terms, while he warns his friend of the sufferings he must encounter, should he presume to address this mistress.

Non impune feres, sciet hæc infana puella;  
Et tibi non tacitis vocibus erit.

Yet not unpunish'd—should my *Cynthia* know  
The trait'rous act, 'twere to thy shame and woe.—  
What storms of anger, what vindictive fire!  
What poignant words that wit and rage inspire!

Quid tibi vis infane? meos sentire furores?  
Infelix properas ultima nosse mala!  
Non est illa vagis similis collata puellis,  
Molliter irasci non sciet illa tibi.

What madness! feel a passion for my fair!  
'Tis tumult, woe, delirium, and despair.—  
Unlike the maids, that common minds engage;  
Hers high-born worth, and hers vindictive rage.—  
No vulgar pride within her bosom glows,  
Her wretched lovers prove no vulgar woes.

*Propertius* successfully employs mythology and fable, for the embellishment of his compositions, and unites purity of expression, with the delicacy and charms of sentiment. As I cannot but think there is much similarity of genius, so there seems to be a similarity of fortunes between *Propertius* and *Petrarch*. *Propertius* and *Petrarch* each seem to have felt more pain than pleasure from his passion. It is probable, that *Cynthia* and *Propertius* rendered each other very uneasy, by mutual jealousy, and violence of temper.

Nec jam pallorem toties mirabere nostrum,  
Aut curæ sim toto corpore nullus ego.

Thou shalt not wonder, that this hue of death,  
O'er spreads my cheek, and fails my lab'ring breath,  
That all my limbs their wonted aid refuse,  
And on my temples hang the sickly dews.

Me dolor et lachrymæ merito fecere peritum.—

Anguish and tears have made me learned in love.

Ferte per extremas gentes et ferte per undas,  
Qua non ulla meum fœmina norit iter.

Bear me to deserts, waft me o'er the main,  
From perjur'd woman far, and far from pain!

In his elegy to *Gallus*, who had some design of rivalling him, in the affections of *Cynthia*, he says,

Sed pariter miseri focio cogemur amore,  
Alter in alterius mutua flere sinu.  
Quare quid possit mea *Cynthia*, desine, *Galle*,  
Quærere: non impune illa rogata venit.

Then we with kindred care and love possess,  
Shall pour our sorrows on each others breast;  
Then seek not, *Gallus*, seek not thou to know  
My *Cynthia's* charms, nor sell thy days to woe.—

He concludes an elegy to his friend *Tullus*, with saying,

Tum tibi si qua mei veniet non immemor hora,  
Vivere sub duro fidere certus eris.

If to thy friend a fond remembrance strays,—  
That friend in sorrow wears his ling'ring days.

and in the third elegy of the first book, he introduces his mistress expostulating with him, in a passionate and jealous strain; which shews that their uneasiness was mutual.

*Propertius* seems to be the only writer, among the antients, who had any notion of the dignity and value of the female character, or the heightening and improvement, that the pleasures of love receive from sentiment, and the intercourse of mind. He is one of the first poets, who intimate that a tender attachment may subsist, independent of mere  
personal

personal attractions and external charms, and founded in nobler motives, than meer sensual desires; he too, is perhaps the first, who intermixes grave morality with the language of passion. Speaking of the accomplishments *quæque Venus quæque Minerva probat*, he says,

His tu semper eris nostræ gratissima vitæ,  
Tædia dum miseræ sint tibi luxuriæ.

By these alone, supreme and uncontroll'd,  
Thy soft dominion o'er my spirit hold.

Me laudent doctæ solum placuisse puellæ.

Mine, mine the boast to please a learned fair.

Non ego sum formæ tantum mirator honestæ,  
Nec si qua illustres scemina jactet avos.  
Me juvat, in gremio doctæ legisse puellæ;  
Auribus et puris scripta probasse mea.

My bosom burns not for external grace;  
Nor flames, at splendors of a noble race.  
I prize the charms, that wit and taste dispense;  
When joys of reason heighten those of sense.  
I woo the muse, on *Cynthia's* breast reclin'd,  
In *Cynthia's* smile mature applause I find.—

Carmina tam sancte nulla puella colit.

No maid with such a high and sacred awe,  
The treasures of the heavenly muse reveres.—

In that beautiful elegy, the seventh of the fourth book, where he describes the shade of *Cynthia* appearing to him after her death: he makes her address him with this tender and benevolent request.

Sed tibi nunc mandata damus, si forte moveris,  
Si te non totum Chloridos herba tenet,  
Nutrix in tremulis ne quid desideret annis,  
*Parthenie*: patuit, nec tibi avara fuit.

Delitiæque meæ Latris cui nomen ab usu est,  
Ne speculum dominæ porrigat illa novæ.

If *Cynthia's* mem'ry to thy soul is dear,  
Her last request, her parting words revere;  
My nurse was friendly to thine early love;  
When I am fled, thy bounty let her prove.—  
On the last verge of weary life's decline,  
To guard her trembling age from want be thine.—  
Thy bounty let my fav'rite *Latris* share,  
With gen'rous hand reward her duteous care.

*Propertius* seems every where to be deeply impressed, with the conscientious dignity of song, to be a man of great refinement, full of virtuous feelings, and honest principles. There is throughout his writings, blended with the most passionate and intoxicating expressions of love, a noble strain of morality, and bitter investive against the luxury and vices of the age, in which he lived. In his first elegy, he laments, with animated feeling and good sense, that the disdain and cruelty of his mistress had driven him to a course of idle dissipation, and vicious society.

Donec me docuit castas odisse puellas,  
Improbus, et nullo vivere consilio.

Unhappy love depriv'd my wandering soul,  
To hate the modest fair, and reason's wife controul.

The poets descants, with much indignation and energy, on the luxury and immodesty in dress and furniture of the *Romans* of his time. He thus expostulates with his mistress, on her too great sollicitude to adorn her person.

Quid juvat ornato procedere vita capillo.  
Et tenuous coâ veste movere sinus?  
Aut quid *Orontæ* crines perfundere myrrhâ,  
Teque peregrinis vendere muneribus?  
Naturæque decus mercato perdere cultu,  
Nec sinere in propriis membra nitere bonis?

Why



Why are thy locks with so much labour dress'd?  
 What studied care reveals the snowy breast?  
 Why wafts *Arabia* clouds of fragrance round?  
 Why seek in foreign toys the power to wound?  
 Oh why should art the boast of nature hide?  
 And charms like thine be sacrific'd to pride?—  
 Trust me, thy beauties ask no heightening pains;  
 And naked love the borrow'd charm disdains.

Speaking of the native and unaffected loveliness of the beauties of antiquity, he says,

Sed facies aderat nullis obnoxia gemmis,  
 Qualis *Apelleis* color est tabulis,  
 Non illis studium vulgo conquirere amantes,  
 Illis ampla fatis forma pudicitia.

No glare of gems obscur'd the native grace,  
 A roseate hue adorn'd the blooming face.  
 No study theirs, to lure th'unguarded heart,  
 Virtue their charm, and nature all their art.

In elegy the eleventh, Book the first, address'd to *Cynthia* at *Baia*, a famous watering place, the *Brighton* of classical times, the poet address'd that lady, in a strain of anxious and tender solicitude, mixed with serious reflexion.

Tu modo quamprimum corruptas desere *Baias*,  
 Multis ista dabunt littora diffidium,  
 Littora quæ fuerunt castis inimica puellis.  
 Ah! pereant *Baia* crimen amoris aquæ!

Oh fly the guilty shore, th'evenom'd air,  
 That wafts divorces to the wedded pair;  
 Ye heavens, from *Baia*, modest virgins guide,  
 Lest drowning honour perish in the tide!

He moralises thus, on the indecent paintings with which the fashionables, and opulent voluptuaries of *Rome*, in his time, were accustomed to cover their walls.

Tempa pudicitæ quid opus statuiffe puellis,  
 Si cuius nuptæ quilibet esse libet ?  
 Quæ manus obscenas depinxit prima tabellas,  
 Et posuit casta turpia visa domo,  
 Illa puellarum ingenuos corruptit ocellos,  
 Nequitæque suæ noluit esse rudes.

Why teach the tender maid a graceful shame;  
 If wedded dames unbounded licence claim ?  
 When painters first licentious deeds pourtray'd,  
 And guilty scenes along the walls display'd,  
 Applauding vice beheld the labour rise,  
 Th'unchaste creation stain'd the modest eyes ;  
 The virgin kindled, as the artist wrought,  
 And sighs unhallow'd spoke infected thought.

Et si me invito discedis *Cynthia*, *Româ*,  
 Lætor quòd sine me devia rara colis.  
 Nullus erit castis juvenis corruptor in agris,  
 Qui te blanditiis non sinat esse probam.

*Cynthia*, with thee, my life and spirit fled,  
 When thou art absent, I am worse than dead.  
 Yet better thus my soul your loss sustains,  
 While rural scenes you haunt, and lonely plains.  
 In those chaste dwellings, no seductive tongue  
 Shall plighted vows and sacred friendship wrong.

*Propertius* seems to be a most determined enemy to the general custom of painting, which prevailed among the *Roman* ladies. Some of his reflections on the subject, are equally sensible and gallant.

Ut natura dedit sic omnis recta figura  
 Turpis Romano Belgicus ore color.  
 Illi sub terris fiant mala multa puellæ.  
 Quæ mentita suas vertit inepta comas.  
 De me, mi poteris certe formosa videri ;  
 Mi formosa fatis, si modo sæpe venis.

Shall human art presume, with impious hand,  
 To mend the work almighty wisdom plann'd?  
 Incongruous monsters thus may rise to view,  
 The *Roman* feature, with the *Flemish* hue,—  
 Ill fare the foolish maid, whose senseless pride,  
 From art solicits charms, that heav'n denied;  
 O'er the fair flowing honours of the head,  
 Whose hands profane the tints fallacious spread.—  
 All charms to me in *Cynthia* seem combin'd,  
 Charms more than human, let her prove but kind.

This moral and virtuous spirit is accompanied by a generous disdain of wealth and pomp, of which the author takes occasion to profess his disregard, while he occasionally exclaims against the fordid selfishness and avaricious spirit of the *Roman* females.

Tu mea compones, et dices, ossa *Properti*,  
 Hæc tua sunt, eheu! tu mihi certus eras.  
 Certus eras, eheu! quamvis nec sanguine avito  
 Nobilis, et quamvis non ita dives eras.

Thou to the grave my poor remains shall trust,  
 And say, "O earth, lie lightly o'er his dust.  
 "Nor hoarded wealth, nor proud illustrious line,  
 "But artless truth and generous love were thine.

Quæritis, unde avidis nox fit pretiosa puellis,  
 Et venere exhaustæ damno quærantur opes.  
 Certa quidem tantis causa est manifesta ruinis,  
 Luxuriæ nimium libera facta via est.

Oh why for gain are soft endearments sold,  
 While angry Cupid mourns the lust of gold?  
 One fatal cause, with sweet delusive song,  
 The syren luxury enchants the throng.

Nulla est poscendi, nulla reverentia dandi,  
 Aut si qua est, pretio tollitur ipsa mora,  
 Auro pulsa fides, auro venalia jura,  
 Aurum lex sequitur, mox sine lege pudor.

No shame witholds the brib'd and bribing hand ;  
 But bold corruption guides th'unblushing band.  
 For gold our faith, for gold our rights are fold,  
 For gold our laws, our virtuous shame for gold.

The reader, who is familiar with the writings of *Petrarch*, will collect many similar sentiments and passages, and a kindred strain of virtuous indignation and energetic reproof, in the productions of that noble poet. Such, for example, is the sonnet,

La gola e' il sonno e l'otiose piume  
 Hanno del mondo ogni virtù sbaudita,  
 Ond' e dal corso suo quasi smarrita,  
 Nostra natura vinta dal costume.  
 Et e si spento ogni benigno lume,  
 Del ciel per cui s'informa humana vita,  
 Che per cosa mirabile s'adita  
 Chi vuol far d' Ellicona fiume.  
 Qual vaghezza di Lauro qual di mirto?  
 Povera e nuda vai Filosofia,  
 Dice la turba al vil guadagno intesa,  
 Pochi compagni avrai per l'altra via.

The glutton banquet, sloth and pleasure's song,  
 Have every virtue chas'd from human kind,  
 And loos'd the sinews of the mighty mind.  
 The tyrant fashion bears the soul along ;  
 The rays of God, that dwelt the crowd among,  
 Are hid from man, to *Stygian* glooms resign'd.  
 What meed, what honours shall the laurel find ?  
 Or what the myrtle, from the sordid throng ?  
 And thou, divine Philosophy, whose lore  
 In trances rapt the spirit to the skies,  
 How lost ! how abject in these iron days !

In many other passages of this exalted writer, the reader will find strong expressions of his generous disdain of the corruptions and degraded spirit of the times.

As

As *Petrarch* strongly resembled *Propertius*, in his feeling all the importance and elevation of the character of a lover and a poet: so, these authors rejoice alike, in a sort of mysticism, compounded of the inspirations and enthusiasm of love and poetry. They exult in their sufferings, they make a merit of their voluntary self-abandonment, of their sacrifices of peace and comfort. They pride themselves, in the being as much distinguished by their sorrows as their genius. It is a favourite topic with them, to represent how much the character of a lover, and a sincere and ardent passion, tend to sublime the thoughts above selfish and sordid cares; how the devoted attachment to a virtuous and high-minded woman contributes to purify the heart, and affections; to enoble the wishes; to reclaim the warm and unrestrained feelings of youth, even through their own ardour, from low and sensual libertinism, from frivolous amusements, and the pursuit of base and unworthy objects. *Propertius* is the only poet of antiquity, who seems to view love in this advantageous light, and to speak of the fair sex, with something like rapturous deference, and true refinement. Such language and sentiments seemed to grow out of the manners of chivalry; and, in fact, *Propertius* deserves to be studied as an extraordinary phenomenon, who shews, in a period when they were generally unknown, the sentimental dignity, or rises to the spiritual devotion, which finds, in the love for one, an antidote against the allurements of the rest of the sex; a preservative of general morality, an incentive to new exertions of genius, and industry, and new motives for valuing reputation and fame, not for the sake of self alone, but, in the hope of becoming more worthy of the beloved object. All this was well understood in the times of *Petrarch*, but was little known at the court of *Augustus*.

We meet also, in *Propertius* and *Petrarch* a concurrence in a sort of voluntary humiliation and self-abasement, which reveres at a distance,  
awe-struck

awe-struck and confounded, approaches the beloved object, with reverential sentiments, generally appropriated to the divinity, considers love as its own reward, and the mere pleasure of loving and dwelling in rapture on tender sentiments, as superior to all the sensual gratifications of vulgar spirits.

In almost every page of *Petrarch*, passages occur, which justify the comparison I have drawn between him and *Propertius*.

*Sonnet 27.*

Ma per me lasso tornano piu grave,  
Sospiri chi del cor profondo tragge  
Quella ch'al ciel se ne porto le chiavi.

O nostra vita ch'e si bella in vista,  
Com perde agevolmente in una mattina,  
Quel che'n molt' anni a gran pena s'acquista.

Hard fate of man, on whom the heav'ns bestow  
A drop of pleasure for a sea of woe ;  
Ah life of care, in fears, or hopes consum'd !  
Vain hopes, that wither ere they well have bloom'd !

*Sonnetto 17.*

Lasso il mio loco e'n questa ultima schiera,  
Ch' I non son forte ad aspettar la luce  
Di questa donna, e non so fare schermi  
Di luoghi tenebrofi e d'ore tarde.  
Pero con gli occhi lagrimosi l'infermi  
Mio destino a vederla mi conduce,  
E so ben ch' io vo dietro a quel che m'arde.

—————a voi non piace  
Mirar si basso con la mente altera.

Canzone 3, has much resemblance to some of the elegies of *Propertius*.

Miro penfoso le crudele stelle,  
 Chi m' hanno fatto di fenfibil terra ;  
 E maledico il di ch' i' vidi 'l fole,  
 Che mi fa in vifta un uom nudrito in felva.

*Canzone 4.*

Di ch' io fon fatto a molta gente efempio,  
 Benche 'l mio duro fcempio  
 Sia fcritta altrove fi, che mille penne,  
 Ne fon gia ftanche, e quasi in ogni valle,  
 Rimbombi 'l fuon de miei gravi martiri,  
 Ch'acquiftan fede alla penofa vita,  
 Allor che fulminato e morto giacque  
 Il mio fperar che troppo alto montava,  
 Che perch' io non fapea dove ne quando  
 Mel ritrovaſſi, folo lagrimando, &c.

Poiche Madonna da pietà coumofſa,  
 Degno mirarmi riconobbe e vide  
 Gir de pari la pena col peccato, &c.

Spirto dogliofo errante mi rimembra,  
 Per fpelunche deferte e pellegrine  
 Pianſi molt' anni il mio sfrenato ardire.  
 E fe pur s'arma talor a dolerſi  
 L'anima a cui rien manco  
 Conſiglio——

The reader will find ſomething of a ſimilar *platonifm* in love, the ſame kind of ardent amorous devotion, in the productions of the oriental poets, particularly the *Persians* and *Arabians*, who cultivated poetry, in general, with enthufiafm, and who abound, in amatory compositions, who ſhew an uncommon tendernefs and refinement, and have attained an acknowledged excellence and pre-eminence in this manner of writing. The reader will find a curious illuſtration of this obſervation, in the firſt volume of the *Afiatic Reſearches*, page 46, where, in an eſſay on the *orthography* of *Afiatic* words, a ſtory is introduced, extracted from one of the many poems on the loves of *Mejnum* and *Leila*, the *Romeo* and

*Juliet of the East*, and accompanied by a literal translation, by Sir *William Jones*.

The man who had inebriated himself with milk from the nipple of anguish, who had been nourished in the lap of affection.

*Meynun* mad with the bright hue and fair face of *Laili*, himself a dark mole on the cheek of the desert, having found the way to the mansion of love became fixed as the threshold on the door of love's palace.

Over his head the form of the madness had cast her shadow, the tale of his passion was loudly celebrated.

A powerful prince reigned in *Arabia*, possessing worldly magnificence and riches.

He had seen the depredations of grief through absence from a beloved object; he had plucked many a black-spotted flower from the garden of love.

Even in his infancy he had felt the pain of separation: the bitter taste of that poison remained on his palate.

When he learned the story of that afflicted lover, he instantly gave an order to a slave,

Saying, make thy head like thy feet, in running towards *Najd*; go with celerity, like a violent wind.

Bring speedily with thee to my presence, her who has stolen the heart of *Meynun*, with a glance.

The stripling ran, and in a short time brought *Laili*, that empress in the dominion of beauty.

To another slave the prince gave this order: Run thou also into the desert.

Go to that ornament of frantic lovers, *Mejnum*, the illuminated taper of love.

Bring quickly before me that enflamed youth, that heart-consumed, anguish-pierced lover.

The



The boy went, and returned in the twinkling of an eye, accompanied by that ruler in the territories of love.

When the prince looked at him, he beheld a wretch in bondage to the misery of desire.

Madness had fixed her abode on his head; he was clothed as a vest with the wounds of separation.

His locks flowed like a mantle over his body, his only sandal was the callus of his feet.

In his hair stuck a comb of *Arabian* thorns; a robe of sand from the desert covered his back.

O thou, said the prince, who hast been lost in the valley of sorrow, dost thou not wish me to give thee the object of thy passion?

To exalt thee with dignity and power, to bring *Laile* before thee gratifying thy soul.

No, no, answered he, far is it from my wish, that an atom should be seen together with the sun.

“The pain of my love for *Leila* is sufficient for me. To enjoy her presence thus would be injustice.

“To gratify this contemptible soul of mine, a single ray from that bright luminary would be enough.

He spake and ran towards the desert, his eye weeping, and his eyelids raining tears.”

*Propert. El. 7. Lib. 1st.*

Nec tantum ingenio quantum servire dolori,  
Cogor et ætatis tempora duri queri,  
Hic mihi conteritur vitæ modus, hæc mea fama est,  
Hinc cupio nomen carminis ire mei.

It is evident, that in the period, which produced those distinguished rivals,\* in the poetry of love, the finest feelings and the most elegant luxury must have prevailed; the tender passion must have diffused

\* Propertius, Tibullus, and Ovid.

fused its influence extensively, been attentively studied and perfectly understood. In fact, the three admirable writers of whom I speak, may be considered as, having established a new dynasty, in the region of poetry, as having made the sentiment of love, the pains and pleasures of that passion. Distinct and adequate objects of the muse; thus they reigned in this new province, which they had conquered for their own, with supreme sway and mastery: and displayed an excellence, which has not been surpassed, in modern times, and has only been equalled in fame, by the illustrious *Petrarch*, whose romantic destiny, however, has contributed not a little to heighten the lustre and renown of his poetical beauties.

I cannot presume to flatter myself, that there is very much novelty in the foregoing remarks. Many of them, I believe, have been anticipated by other writers; but the reader will not, as I imagine, be displeas'd, to see the scattered observations, which have been applied to these poets, collected, in somewhat of a regular and detailed comparison of their respective merits. As the genius of love poetry appeared first with them, it seems also to have vanish'd with them, and lain dormant for a considerable time, until it reviv'd with the spirit of chivalry, and was diffus'd, and rendered illustrious, by the example and influence of a number of gallant and amorous potentates. Then, undoubtedly were the golden days of love and poetry. But to attend the amatory muse, in her progress to this apotheosis, must be the province of a future essay.



ANTIQUITIES.

Vol. IX.

A

1917

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AN INSCRIPTION *on an ancient sepulchral Stone or Monument in the Church-yard of KILLCUMMIN, near KILLALLA, in the County of Mayo; with some Remarks on the same. By the Rev. JAMES LITTLE.—Read June 21st, 1802.*



A PERSUASION of the antiquity of this monument, and of its affording some evidence as to the progress of the arts in this kingdom in the middle ages, induced me to make a draught of the stone, and of the characters inscribed on it; as in the annexed scheme: which is as faithfully delineated, as could well be done by a person unskilled in the art of drawing, and not having the help of a pantograph for that purpose. The characters on it are, however, represented, as to their relative size, shape, and position, with an accuracy fully sufficient for their being understood and decyphered; because, from the hardness and durability of the stone, (which is a grit or freestone), on which they are largely and judiciously engraved, fulcated or *en creux*, as it is called, they remain now as distinct and legible as they ever were.

The stone is reputed among the country people in the neighbourhood, to be of an antiquity reaching beyond any oral tradition, farther than its being the monument of Saint Commyn, from whom they suppose the church and parish to be denominated, and who was there interred; and as such it is by them regarded with peculiar veneration.

Though I leave to others the task of explaining the inscription, for which few persons are less qualified than I am, I must yet beg leave

to offer my own conjecture about the meaning of it; because it is from hence I am inclined to think it worth a description.

I suppose then that the characters are to be read, not regularly in each of the four compartments, in the stone separately, not yet in lines across the adjoining compartments laterally, but by alternate couplets of lines on each side, in the following order, viz.

O R T	<i>a p</i>
	<i>m a I</i>
<i>a n</i>	
<i>n</i> ✠	<i>m</i>
	I C §
C T	

And I understand them to denote as follows:

Obiit R T (Ricardus vel Rodericus, &c. Toole vel Teigue, &c.)

\*Allæ (i. e. Killallæ) Princeps. Maii imo.

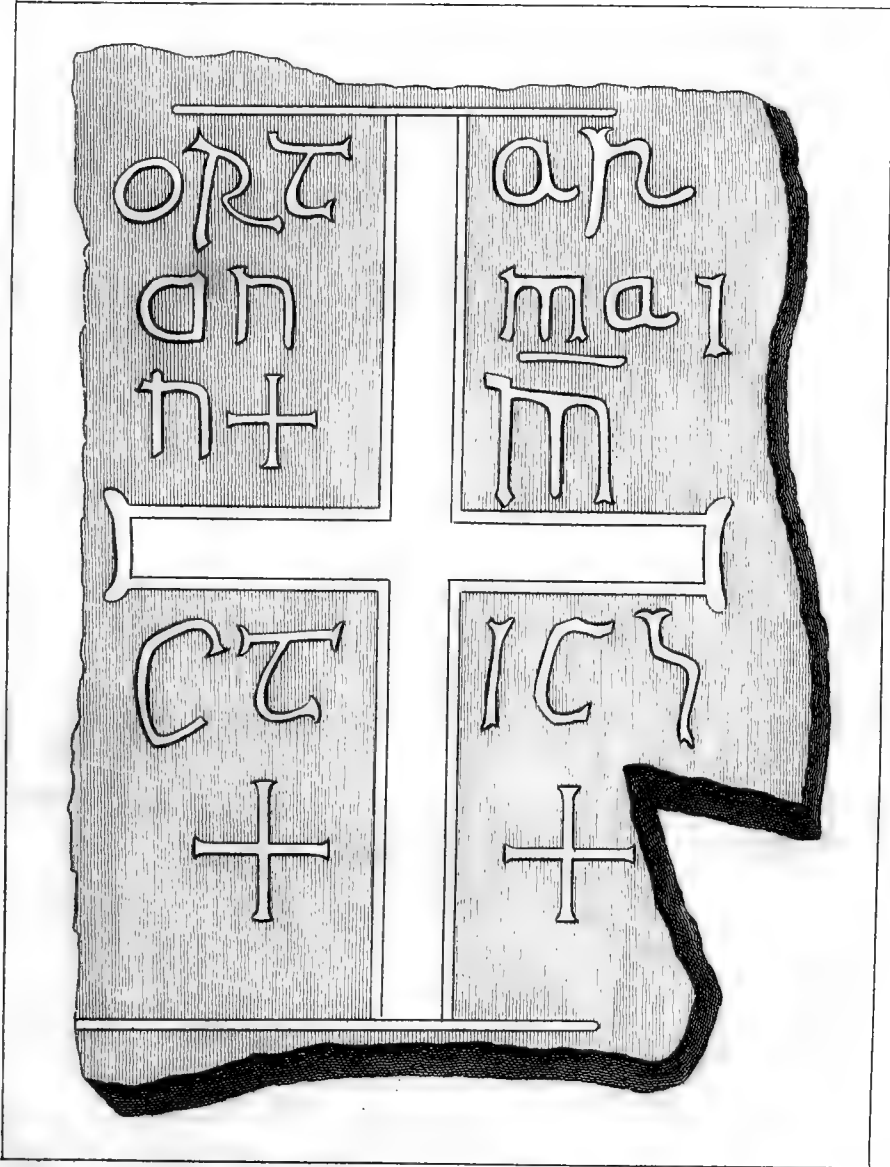
ANNO + (Crucis) Millefimo imo Centesimo § (i. e. secundo vel quinto).

The letters *a p*, which are here supposed to mean Allæ princeps, should perhaps be rendered Allæ præcentor or prebendarius, and may have belonged to the Saint, who might have been the præcentor, or a prebendary of the chapter of the see of Killallæ,† and the initials of his real name beeu R. T; and he might have afterward received the name of Commyn from the church of Killcummin in which he officiated: and then the inscription may run (in English) thus,

“ Died

\* The Latin name of Killalla is Alla, or rather Aladia.

† One of the prebends of the see is called Ardagh (Ardagia.)



1875





“ Died R. T. (suppose Ricard or Roderic Toole or Teigue, &c.) prince (or precentor) of Killalla, on May the 1st, in the year of the Crofs 1102.”

The letters C. T. I suppose to be the initials of the name of the son or successor of R. T. who erected the monument to the memory of the latter. These four only are capital letters.

There is a piece broken from the lower part of the stone; but it is evident there were never any characters inscribed on it.

Now whatever doubt may be entertained as to the meaning of the rest of the inscription, I think there can be none as to the date, excepting in the last figure or mark §, which I take to be the Arabic numeral character or figure 2, or perhaps 5: and I am induced to think so, for these reasons.

1. It is not a letter of the Roman alphabet, as all others in the inscription are, the date excepted; and one cannot, in this instance, suppose a mixture of Greek and Roman letters.

2. It resembles most the antique form of the figure 2, among the Arabic characters, which the learned Doctor Wallis gives us in his history of Algebra, chap. 3d. as written in the manuscripts of *Johannes a sacro Bosco*, and other writers in the twelfth and thirteenth centuries.

3. The character I, after the letters *m a*, and also that before the letter C, in the upper and lower compartments, on the right hand rather resemble the form of the figure 1, than that of the Roman letter I.

4. Doctor Wallis has, (in the place above quoted), produced instances, shewing that about the time of the first introduction of the Saracenic numeral characters into these countries, it was not unusual in manuscripts, to write the dates partly in literal, and partly in numeral characters, as is done here.

Before the art of printing had afforded a model for the shape of letters, there was a licence for that variety in the form of them, (as in manuscripts), which is observable in some of the letters here: our sculptor hath accordingly displayed such fancy in this respect, as shews  
him

him to have been well acquainted with the fashion of writing, i. e. to have been a literate person; and the reader will perhaps be more disposed to acquiesce in his fantastical disposition of the lines in the inscription, as I have supposed the order of them; if he can, in this instance, as well as in that of the mixture of literal and numeral characters, bring himself to think with Doctor Wallis, "That this doth rather favour the simplicity of that age, not very nice in such things especially amongst the mechanics), than any design of imposture." See Lowthorp's Abridgment of Phil. Transf. Vol. 1st, p. 108.

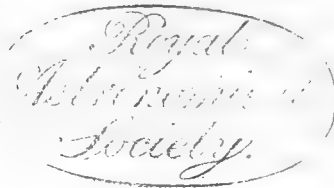
Unless, therefore, I am mistaken in this explication of the monument, it affords evidence of the highest kind, to prove: first, that in the eleventh century, and before any English colony had settled in Ireland, there were there many persons, not only of the clergy, (who, in those days, were not stone-cutters), but also of the lower order of mechanics, to whom letters were familiar; for it is hardly to be supposed that an epitaph would be written in a language very generally unknown. And secondly, that the revival of letters and the arts commenced at least as early in this country, as in any other of Western Europe, Spain excepted: seeing that the Arabic numeral characters were received here from the Moors in Spain, sooner than perhaps any where else; for Doctor Wallis, who endeavours to prove, in opposition to the opinion of Vossius,\* and the literati on the continent, that these characters came into use in England, before the thirteenth century; is obliged to refer to the manuscript writings of some individuals, in support of this; and could hear of no inscription, containing such characters, except one in a private house, with the date 1133. A monument is indeed mentioned in the above-cited place in the Phil. Transf. to have the characters 1090, engraved on it: but it is ambiguous, not only as being simply a date without an inscription, and having the form of the characters different from those then used; but also as being perhaps intended like the former, for the information and satisfaction of the single family to which  
it

\* See Vossius de Scientiis, Math. c. 8. pag. 34: Ed. Amst.

it belonged, and not for general use and instruction, which, perhaps, it could not answer, as being generally unintelligible. So that the monument I am describing may be the oldest extant designed for *public* reading, on which the numeral characters are inscribed, as being commonly known and in use.

But should the reader reject this explication of the figure or mark in question, and suppose it to be the Greek numeral letter ζ *sanpi*, often written like the Hebrew 7, and used to denote the number 90, (according to which, the date of the inscription would be 1190); this would indicate a yet higher degree of literature in this country, at that period, as shewing an acquaintance not only with Greek, as well as Latin letters, but also with the mathematical uses of the former in computation. The learning of a people is improperly estimated by magnificent monuments of the arts; which arise from the opulence and luxury, produced by commerce: but letters are independent on these, and may have been highly cultivated here; though, as happened to other nations, (for instance the Carthaginians), war and revolutions, in destroying books, destroyed all vestiges of learning. If sumptuous edifices and sculptures are to be made the criterion of a nation's proficiency in science, it may be hereafter supposed, that the modern Scotch were an ignorant people, and the ancient Palmyrenians the most learned of nations.

Longinus declares the contrary; and the thing is so remote from fact, that we are directed to adopt a different opinion; that luxury, and savage rusticity are equally unfavourable to learning and genuine civilization: men being, in both these states of society, alike occupied with pursuits and amusements, which have no relation to study and intellectual attainments.



1. The first part of the document  
describes the general situation  
of the country and the  
state of the economy.

The second part of the document  
describes the state of the  
economy and the state of  
the country.

The third part of the document  
describes the state of the  
economy and the state of  
the country. The fourth part  
describes the state of the  
economy and the state of  
the country.













