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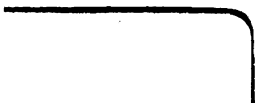
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A CATALOGUE  
OF THE  
PORTSMOUTH COLLECTION OF  
BOOKS AND PAPERS  
WRITTEN BY OR BELONGING TO  
SIR ISAAC NEWTON

**C. J. CLAY AND SONS,  
CAMBRIDGE UNIVERSITY PRESS WAREHOUSE,  
AVE MARIA LANE.**



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*Alexander Green*

A CATALOGUE  
OF THE  
PORTSMOUTH COLLECTION  
OF BOOKS AND PAPERS

WRITTEN BY OR BELONGING TO

SIR ISAAC NEWTON

THE SCIENTIFIC PORTION OF WHICH  
HAS BEEN PRESENTED BY THE EARL OF PORTSMOUTH  
TO THE UNIVERSITY OF CAMBRIDGE



*DRAWN UP BY THE SYNDICATE APPOINTED  
THE 6th NOVEMBER 1872*

CAMBRIDGE  
AT THE UNIVERSITY PRESS  
1888

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## PREFACE.

IT has been long known that Sir Isaac Newton left, at his death, a large mass of papers, consisting partly of copies of his works written out or corrected for the press, partly of notes relating to the various subjects in which he was interested, and of an extensive correspondence with English and Foreign mathematicians. These came immediately on his death into the possession of Mr Conduitt, who married Catharine Barton, Newton's favourite and accomplished niece. By the marriage of their only child to the first Lord Lymington, they passed into the hands of the first Lord Lymington, and we find them in October 1751 in the hands of Mr Saunderson of Sheer Lane, for Lord Lymington<sup>1</sup>. Since that time they have remained in the possession of the Portsmouth family.

Several years ago the present Earl of Portsmouth expressed a wish to present to the University all that portion of the papers and correspondence which related to science, as he felt that these would find a more appropriate home in the Library of Newton's own University than in that of a private individual. Lord Portsmouth entrusted the whole collection of papers to the University, and the present syndicate was appointed to examine, classify, and divide them. This has proved a lengthy and laborious business, as many of the papers were found to be in great confusion—mathematical notes being often inserted in the middle of theological treatises, and even numbered leaves of MSS. having got out of order. Moreover a large portion of the collection has been grievously damaged by fire and damp. The

<sup>1</sup> See Stukeley's *Memoirs* (Surt. Soc., 1887) iii. p. 15.

correspondence, however, is in a very fair condition throughout, and had been arranged in an orderly manner.

On receiving a preliminary report on the contents of the collection, Lord Portsmouth expressed a wish that the papers relating to Theology, Chronology, History, and Alchemy, should be returned to him at Hurstbourne, where they would be carefully preserved. On account of his connection with the Newton family, Lord Portsmouth also naturally wished to have returned to him all the papers relating to private, personal, and family matters. These, however, are comparatively few, and not of much interest, with the exception of a short note from Newton's mother, written to him when a boy at College.

Although till the present time the papers have never been thoroughly examined, they have been looked at and partially used by various persons since Newton's death. When that occurred (in 1727) Dr Pellett was appointed by the executors to examine them and to select such as he deemed fit for publication. A rough catalogue of the papers is appended to a bond given by Mr Conduitt to the administrators of Newton's estate, in which he binds himself to account for any profit he may make by their publication. This list, with some remarks of Dr Pellett, will be found in Hutton's Mathematical Dictionary. All which Dr Pellett deemed fit to be printed were *An Abstract of the Chronology* in 12 half-sheets folio, and *The Chronology of Ancient Kingdoms Amended* in 92 half-sheets folio; and these were printed in 1728 under the care of Mr Conduitt.

The whole collection was inspected by Dr Horsley, who edited in 1779 the well-known edition of Newton's works in five quarto volumes. He left a few unimportant remarks on some of the papers, but he made no use of them in his edition.

It was again placed in the hands of Sir David Brewster, for his second and elaborate life of Newton in 1855; he made some use of the scattered mathematical notes and papers, and printed a considerable portion of the correspondence.

The character of the collection will be made clear by the catalogue which is now put forth. It divides itself (excluding the correspondence) into the heads of Mathematics, Chemistry

and Alchemy, Chronology, History, and Theology. Many of the Mathematical papers contain Newton's preparations for the *Principia*, and notes which spring out of questions that were started by his correspondents. It must be recollected that Newton practically gave up his mathematical studies after 1696, even the superintendence of the second edition of the *Principia* being given to Cotes, and thus that after this date there is little of value in these subjects; and as most of what is contained in them, especially all that relates to the revision of the *Principia*, has been published, there is little to be found beyond what has already appeared.

The case is different, however, with respect to the papers referring to three subjects, viz. 1st, the Lunar Theory, 2nd, the Theory of Atmospheric Refraction, and 3rd, the Determination of the Form of the Solid of Least Resistance.

It is expressly stated by Newton himself that the Lunar Theory as given in his *Principia* is a mere specimen or fragment of the subject, intended to show how some of the more prominent lunar inequalities could be traced to the disturbing action of the Sun, and how their amounts could be calculated approximately by theory.

The only part which is developed with any fulness of detail is that relating to the inequality called the variation, and also that which treats of the motion of the node and the change of inclination of the orbit to the ecliptic.

In a short scholium given in the first edition of the *Principia*, *lib. 1. p. 422* Newton mentions that by similar computations he has found the motion of the moon's apogee, and he states some of the numerical results which he has obtained, but he does not give the calculations themselves, as he considers them too complicated and not sufficiently accurate.

In the second edition this short scholium is replaced by a *2nd ed. p. 421* long one, in which Newton states many of the principal results of the Lunar Theory, partly as found from theory alone and partly as deduced by combining his theory with observation; but he confines himself to results alone, and does not give the method by which these results have been obtained. Unfortunately also, the statement given in the first edition, as to the result which

he had found by theory for the motion of the moon's apogee, is omitted in the new scholium.

It is interesting to find among the papers on the Lunar Theory a good many containing Newton's calculations relating to the inequalities which are described in the above scholium. These papers are unfortunately very imperfect, and they have greatly suffered from fire and damp, but there is enough remaining to give a general idea of Newton's mode of proceeding. The most interesting of these papers relate to the motion of the moon's apogee. Two lemmas are first established which give the motion of the apogee in an elliptic orbit of very small eccentricity due to given small disturbing forces acting, (1) in the direction of the radius vector, and (2) in the direction perpendicular to it.

These lemmas are carefully written out, as if in preparation for the press, and they were probably at first intended to form part of the *Principia*.

Next follows the application of the lemmas to the particular case of the Moon, in which the supposition that the disturbances are represented by changes in the elements of a purely elliptic orbit of small eccentricity would lead to practical inconvenience, and consequently Newton is led to modify that supposition. In the *Principia* he shows that if the moon's orbit be supposed to have no independent eccentricity, its form will be approximately an oval with the earth in the centre, the smaller axis being in the line of syzygies and the larger in that of quadratures, the ratio of these axes being nearly that of 69 to 70. Now when the proper eccentricity of the orbit is taken into account, supposing that eccentricity to be small, Newton assumes that the form of the orbit in which the moon really moves will be related to the form of the oval orbit before mentioned, nearly as an elliptic orbit of small eccentricity with the earth in its focus is related to a circular orbit about the earth in the centre. He then attempts to deduce the horary motion of the moon's apogee for any given position of the apogee with respect to the sun, and his conclusion is that if  $C$  denote the cosine of double the angle of elongation of the sun from the moon's apogee, then the mean hourly motion of the

moon's apogee when in that position is to the mean hourly motion of the moon as

$$1 + \frac{11}{10}C : 238\frac{3}{10}.$$

The investigation on this point is not entirely satisfactory, and from the alterations made in the MS. Newton evidently felt doubts about the correctness of the coefficient  $\frac{11}{10}$  which occurs in this formula.

From this, however, he deduces quite correctly that the mean annual motion of the apogee resulting would amount to  $38^{\circ} 51' 51''$ , whereas the annual motion given in the Astronomical Tables is  $40^{\circ} 41\frac{1}{2}'$ .

The result stated in the scholium to the 1st Edition appears to have been found by a more complete and probably a much more complicated investigation than that contained in the extant MSS.

The papers also contain a long list of propositions in the Lunar Theory which were evidently intended to be inserted in a second edition, upon which Newton appears to have been engaged in 1694. This list, together with the two lemmas on the motion of the apogee mentioned above, will be found in the Appendix.

Halley inserted in the *Philosophical Transactions* of 1721 a Table of Refractions by Newton, without giving any idea of the method of its formation.

Kramp, in his *Analyse des Réfractions*, published in 1799, investigates by a new and powerful analytical method the law of atmospheric refraction for rays in the neighbourhood of the horizon.

On comparing his theoretical results with Newton's Table, he finds a remarkably close agreement, which is enough to show that the Table was also the result of theory, and therefore that Newton must have had some method of his own of solving the difficult problem of horizontal refraction.

Nothing was known of this method, however, until the publication of the correspondence between Newton and Flamsteed by Mr Baily in 1835. In a letter to Flamsteed, dated December 20th, 1694<sup>1</sup>, Newton tries to explain the foundation of

<sup>1</sup> Baily's *Flamsteed* p. 145.

his theory of refraction by giving a theorem from which it is clear that Newton then understood how to form the differential equation to the path of a ray of light through our atmosphere. It is true that, for the sake of greater simplicity in this communication to Flamsteed, Newton restricts the enunciation of his theorem to the particular case where the density decreases uniformly as the height increases, but it is obvious from the form of the enunciation of Newton's theorem that the method is general, provided that the differential of the density which is appropriate to any given law of diminution be employed in finding the corresponding differential of the refraction. In an interesting article in the *Journal des Savants* for 1836, M. Biot directs particular attention to this subject, and tries to reproduce the method which Newton may be supposed to have employed in order to calculate his table of refractions. M. Biot closes his article in the following terms:—

“Il est donc prouvé, par ce qui précède, que Newton a formé l'équation différentielle exacte de la réfraction pour les atmosphères de composition uniforme; qu'il l'a appliquée exactement au cas où les densités des couches sont proportionnelles aux pressions, ce qui rend leur température constante; et qu'enfin, pour ce cas, il a obtenu les vraies valeurs des réfractions à toute distance du zénith, sans avoir eu besoin d'employer les intégrations analytiques qu'il a dû très-vraisemblablement ignorer. Il est donc le créateur de cette théorie importante de l'astronomie physique, qui serait probablement aujourd'hui plus perfectionnée, si l'on avait connu plus tôt ses premiers efforts.”

Judging from Newton's account of the time which he employed in making these calculations, there must have been a considerable mass of papers devoted to them which have not been preserved. Fortunately, however, among the Portsmouth papers we find a detailed calculation of the refraction corresponding to the altitudes  $0^\circ$ ,  $3^\circ$ ,  $12^\circ$  and  $30^\circ$ . In order to make this calculation the path of a ray of light through the atmosphere is divided into a number of parts subtending given small angles at the centre of the earth. Hence are found by the fluxional method quantities which are proportional to the refractions suffered by the ray in passing over the successive

portions of the path, and from these the actual refractions in passing over these portions are derived by making the total horizontal refraction equal to the amount given by observation. It should be remarked that the above calculation requires an approximate knowledge of the path of the ray, whereas this path is at first unknown, and cannot be accurately determined without a knowledge of the refraction itself. Newton solves the difficulty by an indirect method, making repeated approximations to the form of the path, and thus at length succeeding in satisfying all the required conditions.

The papers show that the well-known approximate formula for refraction commonly known as Bradley's was really due to Newton. This formula is only applicable when the object is not very near to the horizon, but the method of calculation employed by Newton is equally valid whatever be the apparent zenith distance.

It is well known that in the *Principia* Newton determines the form of the solid of least resistance, thus affording the first example of a class of problems which we now solve by means of the Calculus of Variations. He there gives what is equivalent to the differential equation to the curve by the revolution of which the above-named solid is generated, without explaining the method by which he has obtained it. Now among the Newton papers we have found the draft of a letter to a correspondent at Oxford, no doubt Professor David Gregory, in which Newton gives a clear explanation of his method, which is very simple and ingenious. The draft has no date, but from internal evidence it was probably written about 1694. A small part of the letter has perished but it is very easy to restore the missing portion. The letter will be found in the Appendix at the end of this preface. It may be remarked that a similar method is immediately applicable to the problem of finding the line of quickest descent.

A great many of the Newton papers relate to the dispute with Leibnitz about the discovery of Fluxions or the Differential Calculus. They show that Newton's feelings were greatly excited on this subject, and that he considered that

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Leibnitz had shown towards him in reference to it great unfairness and want of candour. Newton always maintained that Leibnitz was the aggressor in this dispute, and that he had, by his language in the Leipsic Acts, covertly accused him of plagiarism, whereas he might have known from the correspondence that formerly took place between them, that Newton's method was in his possession long before he himself became acquainted with the Differential Calculus.

On the other hand Leibnitz, without avowing himself the author of the article in the Leipsic Acts, denied that it really bore the meaning attributed to it by Newton, and maintained that Newton had either been deceived by a false friend into imagining that he had been accused of plagiarism, or else that he was not sorry to find a pretext for attributing to himself the invention of the new Calculus, contrary to the avowal he had made in the Scholium in the 1st Edition of the *Principia*.

From a paper by Leibnitz, which has been published by Dr Gerhardt, it appears that the article in the Leipsic Acts, of which Newton complained, was really written by Leibnitz, and it also seems probable that the ambiguity of its language was not unintentional. We cannot wonder, then, that Newton, firmly believing that Leibnitz had charged him with plagiarism, should have experienced a strong feeling of resentment, and should have been induced to retort the charge upon his accuser<sup>1</sup>. It was not unnatural that this embittered feeling should still survive even after the death of Leibnitz.

It is clear from these Portsmouth papers that Newton believed that Leibnitz, during his second visit to England in October 1676, had obtained access to his MS. entitled *De Analysi per Equationes numero terminorum infinitas*, which was in the hands of Collins, and that he had thus been materially assisted in discovering the Differential Calculus. This tract of Newton's is printed in full in the *Commercium Epistolicum*, and is there used merely in order to prove Newton's priority to Leibnitz. It is nowhere asserted or even implied in the *Commercium* that this tract of Newton had ever

<sup>1</sup> In connection with this Newton makes the following quotation from Ovid :  
 "Nec lex est justior illâ, etc." (*Artis Amatoriæ*, l. 656.)

been seen by Leibnitz. There can now be no doubt, however, that Newton was right in thinking that Leibnitz had been shown this MS., since a copy of part of it, in Leibnitz's hand, has been found among the papers of Leibnitz preserved in the Royal Library at Hanover<sup>1</sup>. It is, of course, possible that at the time when this copy was taken Leibnitz was already acquainted in some degree with the Differential Calculus, but it is difficult to acquit him of a want of candour in never avowing in the course of the long controversy respecting the discovery of Fluxions, that he had not only seen this tract of Newton's, but had actually taken a copy of part of it. He must have seen, also, at the same time, that the MS. was an old one, and although it does not contain the pointed letters which Newton sometimes but by no means invariably employed to denote Fluxions, Leibnitz could hardly fail to see, if he was acquainted with the Differential Calculus, that the principle of Newton's method was the same as that of his own. It is repeatedly stated by Newton that what he claims is the first invention of the method, and that he does not dispute about the particular signs and symbols in which the method may be expressed. Again, he often states that although, in the sense which he employs, the method can have but one *inventor*, yet the method may be improved, and the improvements belong to those who make them.

In some of these papers relating to the dispute with Leibnitz, Newton gives us some interesting information respecting the times when several of his discoveries were made. Thus in a passage, which has been quoted by Brewster<sup>2</sup>, he states that he wrote the *Principia* in seventeen or eighteen months, beginning in the end of December 1684, and sending it to the Royal Society in May 1686, excepting that about ten or twelve of the propositions were composed before, viz. the 1st and 11th in December 1679, the 6th, 7th, 8th, 9th, 10th, 12th, 13th and 17th, Lib. I, and the 1st, 2nd, 3rd and 4th, Lib. II, in June and July 1684. The following extract will give an idea of Newton's prodigious mental activity at an earlier period of his life.

<sup>1</sup> See Gerhardt, *Mathem. Schriften Leibnitzens*, I. p. 7.

<sup>2</sup> Brewster's *Life*, Vol. I. p. 471.

"In the beginning of the year 1665 I found the method of approximating Series and the Rule for reducing any dignity of any Binomial into such a series. The same year in May I found the method of tangents of Gregory and Slusius, and in November had the direct method of Fluxions, and the next year in January had the Theory of Colours, and in May following I had entrance into the inverse method of Fluxions. And the same year I began to think of gravity extending to the orb of the Moon, and having found out how to estimate the force with which [a] globe revolving within a sphere presses the surface of the sphere, from Kepler's Rule of the periodical times of the Planets being in a sesquialterate proportion of their distances from the centers of their orbs I deduced that the forces which keep the Planets in their Orbs must [be] reciprocally as the squares of their distances from the centers about which they revolve: and thereby compared the force requisite to keep the Moon in her orb with the force of gravity at the surface of the earth, and found them answer pretty nearly. All this was in the two plague years of 1665 and 1666<sup>1</sup>, for in those days I was in the prime of my age for invention, and minded Mathematicks and Philosophy more than at any time since. What Mr Hugen's has published since about centrifugal forces I suppose he had before me. At length in the winter between the years 1676 and 1677<sup>2</sup> I found the Proposition that by a centrifugal force reciprocally as the square of the distance a Planet must revolve in an Ellipsis about the center of the force placed in the lower umbilicus of the Ellipsis and with a radius drawn to that center describe areas proportional to the times. And in the winter between the years 1683 and 1684<sup>3</sup> this Proposition with the Demonstration was entered in the Register book of the R. Society. And this is the first instance upon record of any Proposition in the higher Geometry found out by the method in dispute. In the year 1689 Mr Leibnitz, endeavouring to rival me, published a Demonstration of the same Proposition upon another supposition, but his Demonstration proved erroneous for want of skill in the method."

The above extract has been given here on account of its intrinsic interest, although in writing it so many years after

<sup>1</sup> In 1666 Newton was in the 24th year of his age.

<sup>2</sup> Probably this should be changed to 1679 and 1680.

<sup>3</sup> Probably this should be changed to 1684 and 1685.

the events to which it relates, Newton appears to have made one or two mistakes of date, and probably for this reason has drawn his pen through the entire passage.

Newton's manuscripts on Alchemy are of very little interest in themselves. He seems to have made transcripts from a variety of authors, and, if we may judge by the number of praxes of their contents which he began and left unfinished, he seems to have striven in vain to trace a connected system in the processes described. He has left, however, notes of a number of his own chemical experiments made at various dates between 1678 and 1696. Some of these are quantitative. Those of most interest relate to alloys. He mentions several easily fusible alloys of bismuth, tin and lead, and gives as the most fusible that which contains 5 parts of lead + 7 of tin + 12 of bismuth. He says that an alloy consisting of 2 parts of lead + 3 of tin + 4 of bismuth will melt in the sun in summer. The alloy which goes by his name is not in the proportions of either of these two; but, as he states that tinglas (bismuth) is more fusible than tin, he could not have used pure metal.

The note-book which contains the longest record of his chemical experiments contains also the account of a few optical and other physical experiments and the paper on the decussation of the optic nerve published by Harris and from him by Brewster. Harris, according to Brewster, published from a copy in the Macclesfield Collection; but the copy seems to have been identical with that in this book, except that a paragraph at the end is omitted. Brewster overlooked the paper in this book, though he has quoted from other parts of the book.

The Historical and Theological MSS. cannot be considered of any great value. A great portion of Newton's later years must have been spent in writing and rewriting his ideas on certain points of Theology and Chronology. Much is written out, as if prepared for the press, much apparently from the mere love of writing. His power of writing a beautiful hand was evidently a snare to him. And his fastidiousness as to the expression of what he wrote comes out very curiously in these

papers; thus there are six drafts of the scheme for founding the Royal Society, seven drafts of his remarks on the chronology published under his name at Paris (which made him very angry), many of the Observations on the Prophecies, several of the scheme of mathematical learning proposed for Christ's Hospital, &c.

The four elaborately bound volumes, containing 'the Chronology of Ancient Kingdoms Amended,' the Chronicle to the Conquest of Persia by Alexander, Observations on the Prophecies, and the treatise "De Mundi Systemate," are very remarkable specimens of their author's care in writing out his works, and of his beautiful handwriting (§ vii. 2). They are all contained in Horsley's collection.

It is believed that in the present catalogue nothing has been omitted, and that thus a very fair idea may be obtained of what occupied Newton's time throughout his life. The papers date from his earliest time, giving his accounts when first he began college life as a sizar of Trinity College, and his mathematical notes while still an undergraduate: and they continue till his death. All the papers or books which have been returned to Lord Portsmouth are marked with an asterisk \* in the catalogue. Of the more important letters, which have not been retained by the University, copies have been taken by the permission of Lord Portsmouth, and these are retained with the portion of the MSS. presented by him to the University. In addition to this a copy of Brewster's Life of Newton has been placed with the collection, in which the letters there given have been carefully collated with their originals; so that practically the student of Newton's works has all the scientific correspondence at his command.

H. R. LUARD.  
G. G. STOKES.  
J. C. ADAMS.  
G. D. LIVEING.

CAMBRIDGE,  
26 May 1888.

## APPENDIX TO THE PREFACE.

It may be interesting to give a few extracts from the Newton papers on some of the subjects which have been referred to in the above Preface. These relate to

- I. The form of the Solid of Least Resistance. *Principia*, Lib. II. Prop. 35, Schol.
- II. A List of Propositions in the Lunar Theory intended to be inserted in a second edition of the *Principia*.
- III. The motion of the Apogee in an elliptic orbit of very small eccentricity, caused by given disturbing forces.

### I. ON THE FORM OF THE SOLID OF LEAST RESISTANCE.

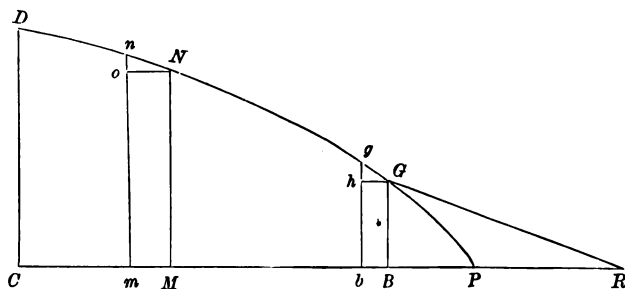
LIB. II., PROP. XXXV. SCHOL., p. 326, 1st Ed.

*Draft of a Letter in Newton's hand, no doubt to Professor David Gregory, and probably written in 1694.*

SIR,

I now thank you heartily both for the very kind visit you made me here and for the errata you gave me notice of in my book and also for your care of Mr Paget's business. The Lem. 1 in the third book I could not recover as tis there stated, but I have don't another way with a Demonstration, and altered very much the Proposition which follows upon it concerning the precession of the Equinox. The whole is too long to set down. The figure which feels the least resistance in the Schol. of Prop. xxxv. Lib. II. is demonstrable by these steps.

1. If upon  $BM$  be erected infinitely narrow parallelograms  $BGhb$  and  $MNom$  and their distance  $Mb$  and altitudes  $MN$ ,  $BG$  be given, and the semi sum of their bases  $\frac{Mm + Bb}{2}$  be also given and called  $s$  and their semi difference  $\frac{Mm - Bb}{2}$  be called  $x$ : and if the lines  $BG$ ,  $bh$ ,  $MN$ ,  $mo$ , butt upon the curve  $nNgG$  in the points  $n$ ,  $N$ ,  $g$ , and  $G$ , and the infinitely little lines  $on$  and  $hg$  be equal to one another and called  $c$ , and the figure  $mnNgGB$  be turned about its axis  $BM$  to generate a solid, and this solid move uniformly in water from  $M$  to  $B$  according to the direction of its axis  $BM$ :



the summ of the resistances of the two surfaces generated by the infinitely little lines  $Gg$ ,  $Nn$  shall be least when  $gG^{gn}$  is to  $nN^{nn}$  as  $BG \times Bb$  to  $MN \times Mm$ .

For the resistances of the surfaces generated by the revolution of  $Gg$  and  $Nn$  are as  $\frac{BG}{Gg^{quad}}$  and  $\frac{MN}{Nn^{quad}}$ , that is, if  $Gg^{quad}$  and  $Nn^{quad}$  be called  $p$  and  $q$ , as  $\frac{BG}{p}$  and  $\frac{MN}{q}$  and their summ  $\frac{BG}{p} + \frac{MN}{q}$  is least when the fluxion thereof  $-\frac{BG \times \dot{p}}{pp} - \frac{MN \times \dot{q}}{qq}$  is nothing, or  $-\frac{BG \times \dot{p}}{pp} = +\frac{MN \times \dot{q}}{qq}$ .

Now  $p = Gg^{quad} = Bb^{quad} + gh^{quad} = ss - 2sx + xx + cc$  and therefore  $\dot{p} = -2s\dot{x} + 2x\dot{x}$ , and by the same argument  $\dot{q} = 2s\dot{x} + 2x\dot{x}$  and therefore  $\frac{BG \times 2s\dot{x} - 2x\dot{x}}{pp} = \frac{MN \times 2s\dot{x} + 2x\dot{x}}{qq}$ , or  $\frac{BG \times s - x}{pp} = \frac{MN \times s + x}{qq}$  and thence  $pp$  is to  $qq$  as  $BG \times s - x$  to  $MN \times s + x$ , that is,  $gG^{gn}$  to  $nN^{nn}$  as  $BG \times Bb$  to  $MN \times Mm$ .

2. If the curve line  $DnNgG$  be such that the surface of the solid generated by its revolution feels the least resistance of any solid with the same top and bottom  $BG$  and  $CD$ , then the resistance of the two narrow annular surfaces generated by the revolution of the [infinitely little lines  $nN$ ] and  $Gg$  is less then if the intermediate solid  $bgNM$  be removed [along  $CB$  without altering  $Mb$ , until  $bg$  comes [to  $BG$ ], supposing as before that  $on$  is equal to  $hg$ ,] and by consequence it is the least that can be, and therefore  $gG^n$  is to  $nN^n$  as  $BG \times Bb$  [is to  $MN \times Mm$ ].

\*[Also if]  $gh$  be equal to  $hG$  so that the angle [ $gGh$  is  $45^\text{degr}$ ] then will  $4Bb^n$  be [to  $nN^n$  as  $BG \times Bb$  is to]  $MN \times Mm$ , and by consequence  $4BG^n$  is to  $GR^n$  as  $BG^n$  is to  $MN \times BR$  or  $4BG^n \times BR$  is to  $GR^\text{cub}$  [as  $GR$  to  $MN$ ].

Whence the proposition to be demonstrated easily follows.

But its to be noted that in the booke pag 327 lin. 7 instead of *Quod si figura DNFB* it should be written *Quod si figura DNFGB*, and that *DNFG* is an uniform curve meeting with the right line  $GB$  in  $G$  in an angle of  $135^\text{degr}$ .

I have not yet made any experiments about the resistance of the air and water nor am resolved to see Oxford this year. But perhaps the next year I may. I had answered your letter sooner but that I wanted time to examin this Theorem and the Lem. 1 in the 3<sup>d</sup> Book. I do not see how to derive the resistance of the air from the ascent of water. The reasoning which must be about it seems too complicate to come under an exact calculus, and what allowance must be made for the retardation of the water by the contact of the pipe or hole at its going out of the vessel is hard to know.

## II. LIST OF PROPOSITIONS APPARENTLY INTENDED TO BE INSERTED IN A 2ND EDITION OF THE PRINCIPIA.

*In Theoria Lunae tractentur hae Propositiones.*

8 PROP. XXV. PROB. v. PAGE 434, PRINCIP.

Orbem Lunae ad aequilibrium reducere.

\* If the altitude of the frustum of the cone spoken of in the preceding paragraph be infinitely small, the semi-angle of the cone becomes equal to  $45^\circ$ . Hence when the total resistance is a minimum, the curve meets the extreme ordinate  $GB$  at an angle of  $45^\circ$ .



## 5 PROP. XXVI.

Aream orbis totius Lunaris in plano immobili descriptam mensi synodico proportionalem esse.

## 6 PROP. XXVII.

Invenire distantiam mediam Lunae a Terra.

## 7 PROP. XXVIII.

Invenire motum medium Lunae.

## 1 PROP. XXIX.

In mediocri distantia Terrae a Sole invenire vires solis tam ad perturbandos motus Lunae quam ad mare movendum.

## 2 PROP.

Invenire vires Lunae ad mare movendum.

## 3 PROP. XXX.

Invenire incrementum horarium areae quam Luna in orbe non excentrico revolvens radio ad terram ducto in plano immobili describit.

## 4 PROP. XXXI.

Ex motu horario Lunae invenire distantiam ejus a terra.

## 10 PROP.

Invenire formam orbis Lunaris non excentrici.

## 11 PROP.

Invenire variationem Lunae in orbe non excentrico.

## 9 PROP.

Invenire aequationem parallacticam.

## 12 PROP.

Invenire formam orbis Lunaris excentrici.

## 13 PROP.

Invenire incrementum horarium areae quam Luna in orbe excentrico revolvens radio ad terram ducto in plano immobili describit.

## 14 PROP.

Invenire variationem Lunae in orbe excentrico.

## PROP.

Invenire aequationem parallaxicam in orbe excentrico.

## PROP.

Invenire parallaxim solis.

## PROP.

Invenire motum horarium Apogaei Lunaris in Quadraturis consistentis.

## PROP.

Invenire motum horarium Apogaei Lunaris in conjunctione et oppositione consistentis.

## PROP.

Ex motu medio Apogaei invenire ejus motum verum.

*De Sole.*

## PROP.

Invenire locum solis.

Ex Solis motu medio et prostaphaeresi dabitur locus centri gravitatis Terrae et Lunae deinde ex hoc loco et parallaxi menstrua (quae in quadraturis Lunae est 20" vel 30" circiter) dabitur locus terrae cum loco opposito solis.

## PROP.

Invenire motum Apheliorum.

## PROP.

Invenire motum nodorum.

Nodus orbium Jovis et Saturni movetur in plano immobili quod transit per nodum illum & secat angulum orbium in ratione corporum in distantias ductorum inverse, id est in ratione equalitatis circiter, existente angulo quem hoc planum continet cum angulo orbis Jovis minore quam angulo altero quem continet cum orbe Saturni. Serventur forte inclinationes orbium omnium ad hoc planum, & quaerantur motus intersectionum quas orbes cum ipso faciunt et habebuntur motus planorum orbium respectu fixarum.

## PROP.

Invenire perturbationes Orbis Saturni ab ejus gravitate in Jovem oriundas.

## PROP.

Invenire perturbationes Orbis Jovis ab ejus gravitate in Saturnum oriundas.

## PROB.

In systemate Planetarum invenire planum immobile.

• A centro solis per orbem Planetarum ducatur linea recta sic ut si Planetæ singuli in minimas suas ab hac linea distantias ducantur, summa contentorum ad unam lineæ partem æquetur summa contentorum ad alteram; et hæc linea jacebit in plano immobili quam proxime.

Vel sic accuratius:

Per solem et orbem Planetarum et commune centrum gravitatis eorum omnium ducatur linea recta sic ut si sol et semisses Planetarum in minimis orbium ab hac linea distantias ad utramque solis partem siti augeantur vel minuantur in ratione distantiarum verarum a centro solis ad distantias mediocres ab eodem centro, deinde ducantur in distantias suas ab hac linea: summa productorum ab una rectæ parte et ab una etiam parte communis centri gravitatis, conjuncta cum summa productorum ex altera utriusque parte æquetur summae productorum reliquorum: jacebit hæc recta in plano immobili, et hujusmodi rectæ duæ planum illud determinabunt.

### III. ON THE MOTION OF THE APOGEE IN AN ELLIPTIC ORBIT OF VERY SMALL ECCENTRICITY.

*From a somewhat mutilated MS. which seems to have been prepared for the press.*

## LEMMA.

Si Luna  $P$  in orbe elliptico  $QPR$  axem  $QR$ , umbilicos  $S, F$  habente, revolvatur circa Terram  $S$  et interea vi aliqua  $V$  a pondere suo in Terram diversa continuò impellatur versus Terram; sit autem umbilicorum distantia  $SF$  infinitè parva: erit motus Apogæi ab impulsibus illis oriundus ad motum medium Lunæ circa Terram in ratione composita ex ratione duplæ vis  $V$  ad Lunæ pondus mediocre

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latus rectum quod nominabimus  $L$  ad  $2SP + 2PK$ , et divisim  $PF$   
 [erit ad]  $SP$  ut  $L$  ad  $2SP + 2PK - L$ , seu  $PF$  aequalis  $\frac{L \times SP}{2SP + 2PK - L}$ ,

et [eod]em argumento  $Pf$  aequalis  $\frac{L \times SP}{2SP + 2Pk - L}$ . Nam latus

rectum quod sit (per Prop. Lib. 1. Princip.) in duplicata ratione  
 areæ quam Luna radio ad terram ducto singulis temporis particulis  
 describit, et quantitas areæ illius per impulsus vis  $V$  nil mutetur,  
 idem manet in Ellipsi utraque. Cum autem  $2SP$  et  $L$  ob in-

finitè parvam distantiam  $SF$  aequentur, deleatur  $2SP - L$  et erit  
 $FP$  aequalis  $\frac{SP^2}{PK}$  et  $Pf$  aequalis  $\frac{SP^2}{Pk}$  quarum differentia est  $\frac{SP^2 \times lK}{PK^2}$

seu  $lK$ . Est autem  $lK$  ad  $lk$  ut  $SK$  ad  $Pk$ , ideoque (ob infinite  
 parvam  $SF$ ) est  $lK$  infinite minor quam  $lk$  seu  $Ff$ , et propterea  $Ff$   
 perpendicularis est ad  $PK$ . Quare si jungatur  $Ef$ , anguli  $FEf$  &  
 $FPf$ , in segmento circuli per puncta  $P, E, F, f$  transeuntis con-  
 sistentes, aequales erunt inter se. Ideoque cum angulus  $FSf$  sit ad  
 angulum  $FEf$  ut  $FE$  vel  $SE$  ad  $FS$  seu  $2OS$ , et angulus  $FPf$  supra  
 fuerit ad angulum  $PSG$  ut vis  $2V$  ad vim  $P$ : erit ex aequo angulus  
 $FSf$  ad angulum  $PSG$ , id est motus Apogæi ad motum medium  
 Lunæ ut  $2V \times SE$  ad  $P \times SF$  seu  $V \times SE$  ad  $P \times OS$ . Concipe jam  
 numerum impulsuum augeri et intervalla diminui in infinitum ut  
 actiones virium  $V$  et  $P$  reddantur continuæ et constabit Propositio.

Q. E. D.

COROL. Valet Propositio quam proximè ubi excentricitas finitæ  
 est magnitudinis, si modo parva sit.

#### LEMMA.

Si Luna  $P$  in orbe Elliptico  $QPR$  axem  $QR$  et umbilicos  $S, F$   
 habente revolvatur circa Terram, et interea vi aliqua  $W$  a pondere  
 suo diversa secundum lineam distantiae  $SP$  perpendicularem impella-  
 tur; sit autem excentricitas  $OS$  infinite parva: erit motus Aphelii<sup>1</sup> ab  
 impulsu illo oriundus ad motum medium Lunæ in ratione composita  
 ex ratione quadruplae vis  $W$  ad pondus  $P$  et ratione perpendiculi  $PE$   
 ad excentricitatem  $OS$ .<sup>2</sup>

<sup>1</sup> This should be Apogæi.

<sup>2</sup> This should be umbilicorum distantiam  $SF$ .

CAS. 1. Distinguatur enim tempus in particulas aequales et quam minimas, et agat vis  $W$  non continuò sed singulis temporis particulis semel. Sit autem  $T$  velocitas Lunae [in]  $P$  ante impulsus vis  $W$  ibi factum et  $t$  incrementum [velo]citatis ex impulsu et  $L$  latus rectum Orbis Lunaris ante [impulsus]. Et quoniam area quam Luna radio ad Terram [ducto singulis tem]poris particulis aequalibus describit, sit ante impulsus ad eandem aream post impulsus ut  $T$  ad  $T + t$ , et latus rectum (per Prop. xiv. Lib. i. Princip.) sit in duplicata ratione areæ, erit (per Lem. Lib. ii. Princip.)  $\frac{T + 2t}{T} L$  seu  $L + \frac{2t}{T} L$  latus rectum post impulsus. Est autem (ut in

Lemmate superiore)  $\frac{SP \times L}{2SP + 2PK - L}$  longitudo  $PF$  qua Luna distabat ab umbilico superiore ante impulsus; et propterea cum situs lineæ  $PF$ , si modo excentricitas  $SF$  infinitè parva sit, ex impulsu illo nil mutetur, ideoque  $PK$  maneat eadem quæ prius et solum  $L$  mutetur, si producat  $PF$  ad  $\phi$  ut sit  $\phi$  umbilicus superior post impulsus;

erit  $P\phi$  aequalis  $\frac{SP \times \frac{T + 2t}{T} L}{2SP + 2PK - L - \frac{2t}{T} L}$ . De hac longitudine subdu-

catur longitudo ipsius  $PF$  superius inventa, nempe  $\frac{SP \times L}{2SP + 2PK - L}$ , et interea in utraque pro  $2SP + 2PK$  scribatur  $2L$  & manebit differentia  $F\phi$  aequalis  $\frac{4t}{T - 2t} SP$  seu  $\frac{4t}{T} SP$ . Unde longitudo perpendiculari  $\phi g$  quod in diametrum  $QR$  ab umbilico  $\phi$  demittitur, erit  $\frac{4t}{T} PE$ . Jam vero in Lemmate superiore, velocitas quam vis  $V$  impulsu unico generare potest, est ad velocitatem Lunæ ut lineola  $pG$  quam Luna vi impulsus illius dato tempore describere posset ad lineolam  $Pp$  quam Luna velocitate sua data  $T$  eodem tempore describat, id est ut  $Ef$  ad  $PF$ .<sup>1</sup> Ideoque si velocitas prior nominetur  $S$  erit  $Ef$  aequalis  $\frac{2S \times PF}{T}$  ob angulum  $Fpf$  anguli  $Gpp$  duplum, et perpendicularum  $fh$  quod ab umbilico  $f$  in ellipseos axem  $QR$  demittitur aequale  $\frac{2S}{T} EF$ . Proinde cum angulus  $\phi SF$  sit ad angulum  $Fsf$  ut  $\phi g$  ad  $fh$ , et angulus  $Fsf$  ad angulum  $PSp$  ut  $V \times SE$  ad  $P \times OS$ ,

<sup>1</sup> This should be  $pG$  ad  $Pp$ .

erit angulus  $\phi SF$  ad angulum  $PSp$ , hoc est motus Apogaei a vi  $W$  genitus ad motum medium Lunae ut  $\frac{4t}{T} PE$  ad  $\frac{2S}{T} EF$  et  $V \times SE$  ad  $P \times OS$  conjunctim, id est (ob aequales  $EF$  ad  $SE$  et proportionales  $t$  &  $S$ ,  $W$  &  $V$ ) ut  $2W \times PE$  ad  $P \times OS$ . Q.E.D.

COROL. Obtinet etiam Propositio quam proxime ubi [quam minima sit] excentricitas etiamsi non sit infinitè parva.

## SECTION I.

### MATHEMATICS.

#### I. EARLY PAPERS BY NEWTON. (Holograph.)

1. Extracts by Newton  
From Hooke's Micrographia,  
From the History of the Royal Society,  
From the Philosophical Transactions.  
Notes of some Mines in Derbyshire and Cardiganshire.
  2. Scraps and Extracts made by Newton, including two little notes on tangents and musical semi-tones.
  3. A tract in English written in 1666, entitled "To resolve problems by Motion."  
Also short tracts entitled  
De Solutione Problematum per Motum.  
De Gravitate Conicarum.  
Problems of Curves.
  4. Calculation of the Area of the Hyperbola.
  5. On the Laws of Motion.  
On the Laws of Reflection.  
On Motion in a Cycloid.
  6. Problems in Geometrical Optics.
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## II. ELEMENTARY MATHEMATICS. (Holograph.)

1. Observations on the Algebra of Kinckhuysen.
  2. The first Ten Propositions of the 2nd book of Euclid, succinctly enunciated and demonstrated.
  3. Theorem on the Area of a Triangle.
  4. Trigonometria succinctè proposita et nova methodo demonstrata a S<sup>t</sup> Joanne Hareo Arm.
  5. A few MS. leaves, containing Compendium Trigonometriae. It includes Spherical Trigonometry. Intended for learners.
  6. Table of sines to every half degree.
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## III. FLUXIONS.

1. Transcript of a Tract on Fluxions said to have been written by Newton in November, 1666.
  2. Tract relating to the History of Fluxions, transcribed from one which was probably written by Jones.
  3. Part of Newton's method of Fluxions and Infinite Series, with a fragment of the same treatise. (Holograph.)
  4. Part of a Tract on Fluxions.
  5. Some Propositions in Fluxions. ["I think this fragment very proper to be published." Horsley, Oct. 22, 1777.]
  6. Analysis per quantitates fluentes et eorum momenta.
  7. Method of Fluxions and Infinite Series.
  8. On the solution of Fluxional Equations.
  9. Fluxions applied to Curves.
  10. Propositions in the Method of Fluxions (dotted letters employed).
  11. Propositions in Fluxions (dotted letters employed).
  12. An early paper on deducing the subnormal in a curve from a given rational relation between  $x$  and  $y$ , and the converse operation.
  13. Fragments on Fluxions.
  14. Method of Curves and Infinite Series, and application to the Geometry of Curves. Complete all but the 1st leaf.
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## IV. ENUMERATION OF LINES OF THE THIRD ORDER. (Holograph.)

1. An early copy.
2. A later copy.

3. On the curves of the third order, produced by the projections of the Parabola Neiliana.

4. Fragments concerning lines of the third order, and some mistakes of Descartes ["not worth publishing." S. Horsley, Oct. 23, 1777].

#### V. ON THE QUADRATURE OF CURVES. (Holograph.)

1. A copy which appears to be pretty complete.
2. A fragment on the same subject.
3. Scattered papers on the same subject, in great confusion
4. Another fragment on the same.
5. Note on Quadrature of Curves, intended as a Supplement to Section 10 of Book I. of the Principia.
6. Fragment on the Quadrature of Curves whose equations consist of but three terms.

#### VI. PAPERS RELATING TO GEOMETRY. (Holograph.)

1. De Problematum resolutione Synthetica.
2. Geometria. Liber 1. A fragment.
3. Geometry, a fragment on Porisms.
4. Analysis Geometrica.  
Regula Datorum.
5. Newton's Regula Fratrum.
6. Fragment relating to Curves.
7. Geometria Curvilinea and Fluxions.
8. Scraps containing Propositions in Geometry; viz.:
  - (a) To describe a Conic Section through five given points;  
and
  - (b) To describe a Conic Section passing through two points  
and touching three given straight lines.
9. Tract on the construction of Equations, unfinished.
10. On the Properties of Curves.
11. Part of a Treatise on Geometry (in Latin).
12. De Compositione Locorum Solidorum.
13. Solutio Problematis Veterum de Loco Solido.
14. Fragments relating to the writings of the Ancients in general, but especially to the Porisms of Euclid, and the Loci of

Apollonius ["very curious and fit to be published." S. Horsley, Oct. 26, 1777].

15. Remarks on the nature and objects of Arithmetic, Geometry, and Mechanics.

16. A fragment, relating to the Comparison of Curved Surfaces.

# VII. MISCELLANEOUS MATHEMATICAL SUBJECTS. (Holograph, exc. 7.)

1. Problemata Numeralia.

2. Arithmetica Universalis. A chapter on the limits of the roots of equations (see p. 184 of Leyden Ed. of Univ. Arith. 1732).

3. De serierum proprietatibus.

4. On Quadrature by Ordinates.

5. Regula differentiarum &c.

6. Bernouilli's problem on drawing lines cutting a series of curves according to any given law. Phil. Trans. 1716.

7. Errata in Dr Barrow's Conicks and in his Archimedes, with a letter to Newton about the latter Errata.

8. Scraps of calculations.

# VIII. PAPERS CONNECTED WITH THE PRINCIPIA. (Mostly Holograph.)

## A. General.

1. Propositions on Elliptic Motion.

2. A fragment in which Fluxions are employed in finding the Centripetal force in an Orbit.

3. Propositions afterwards included in the Principia, but differently numbered.

4. A small fragment (early) of the Principia.

5. De Motu Corporum.

6. Propositiones De Motu Corporum.

The references do not agree with the Principia.

7. Propositiones de Motu.

Several copies differing somewhat from each other, of which one is printed in Rigaud's "Historical Essay" Appendix, No 1.

8. Corrections to copy of Propositions on Motion forming probably an early draft of part of the Principia.

9. Proposed Corrections probably for 1st Edition of the Principia.

10. On the Resistance of fluids; account of Hauksbee's experiments, with Newton's deductions; chiefly rough notes.

11. Revision of the Principia. Notes relating to Calculation of orbits of Comets.
  12. Additions and Corrections to 1st Edition of the Principia.
  13. Additions and Corrections to the 2nd Edition of the Principia.
  14. Observations and Calculations about Comets.
  15. Draft of part of the Preface to the 1st Edition of the Principia. Not quite as printed, in part fuller.
  16. Preface and Preparations for 3rd Edition of the Principia.
  17. Very rough fragments relating to the Principia.
  18. Miscellaneous Calculations.
  19. Corrections to 1st Edition of the Principia (terribly damaged by fire).
  20. Dr Halley's account of the Principia given to K. James II.
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## IX. PAPERS CONNECTED WITH THE PRINCIPIA.

B. *Lunar Theory.*

1. Papers on the Lunar Theory found in interleaved copy of 1st Edition of Principia (damaged by fire).
2. Propositions prepared to be used in the Lunar Theory (greatly damaged by fire).
3. Fragments on the Lunar Theory (greatly damaged by fire).
4. Propositions in the Lunar Theory, found on loose sheets placed at the end of the interleaved copy of the 1st Edition of the Principia.

These were probably intended to be employed in a 2nd Edition, but the design was not carried out.

5. Notes on the law of change of the Moon's variation according to the change of the Sun's distance; and on the mutual action of Jupiter and Saturn.
6. Unarranged fragments connected with points of the Lunar Theory.
7. On change of the variation in an excentric orbit, and on the motion of the Moon's Apogee.
8. A list of Propositions in the Lunar Theory, prepared for a 2nd Edition of the Principia, but not used.

9. Propositions relating to the Lunar Theory, including a Scholium, differing from that inserted in the 2nd Edition.

10. On the Theory of the Moon.

(Various statements of the principal points of this Theory.)

11. Propositions 'De motu nodorum Lunæ,' prepared for the 3rd Edition of the Principia.

12. Motion of the Moon's Apogee. This consists of two Lemmas, prepared for press; two Propositions, in duplicate; and an imperfect copy of one of these propositions, with a rough draft of an investigation of the horary variation of the Inclination.

The Propositions are not numbered, and therefore they were perhaps intended to be worked up for the 1st Edition.

13. Calculations for forming Lunar Tables.

14. Various Lunar Tables.

15. Comparisons of calculated places of the Moon with Observations.

## X. PAPERS CONNECTED WITH THE PRINCIPIA.

### C. *Mathematical Problems.*

1. To find the True Anomaly from the Mean.
2. Fragment on the Solid of least resistance.
3. Atmospheric Refraction, with detailed calculation of the Refraction at the altitudes  $0^\circ$ ,  $3^\circ$ ,  $12^\circ$  and  $30^\circ$ .
4. Altitudes by the Barometer.

## XI. PAPERS RELATING TO THE DISPUTE RESPECTING THE INVENTION OF FLUXIONS.

1. Apographum Schediasmatis a Newtono olim scripti, 13 Nov. 1665.
2. Printed Title-page of the 1st Edition of the *Commercium Epistolicum*, with proposed additions to the Title of the 2nd Edition.
3. Notes on the Correspondence in Wallis's Works, Vol. 3.
4. Notæ ad Acta Eruditorum.
5. Rough drafts of the Leibnitz Scholium in the 2nd Edition of the Principia, and proposed additions to it.

6. Enarratio plenior Scholii præcedentis.
7. Mens Scholii præcedentis.
8. An account of the *Commercium Epistolicum* (several varying copies).
9. Papers relating to the origin of the Dispute.
10. Collations for the History of the Infinitesimal Analysis.
11. Fragment of "An account of the Differential Method from the year 1677 inclusively."
12. History of the Method of Fluxions. (Several copies with varying Titles.)
13. "Historia Methodi Infinitesimalis" (several varying copies), with Corrigenda to the English copy of the "Recensio" published in *Phil. Trans.* Jan., Feb., 1714-5.
14. Annotationes in *Commercium Epistolicum*.
15. Appendix containing Newton's proofs of his priority to Leibnitz, &c. (A fragment.)
16. Newton's Statement of the case in dispute between Leibnitz and himself.
17. Draft (holograph) of Newton's Letter to the Editor of *Memoirs of Literature*, May, 1712 (never published). (See Brewster, ii. 283.)
18. Copy in Newton's hand of Leibnitz's letter to Hans Sloan, 29th Dec., 1711.
19. References to the original letters contained, or intended to be contained, in the *Commercium Epistolicum*.
20. Latin translation (copy) of the *Recensio* given in *Phil. Trans.* No. 342, differing from that given in the Second Edition of the *Commercium Epistolicum*.
21. 'Ad Lectorem,' prefixed to the 2nd Edition of the *Commercium Epistolicum*. (Several drafts.)
22. Latin letter (copy) of John Keill to Hans Sloan. May, 1711.
23. Keill's letter (copy) to John Bernouilli, translated into French after July, 1716, with some notes on it in Newton's hand.
24. Extract from a letter of Leibnitz complaining of an attack on his "bonne foi."
25. Bernouilli's problem in the *Acta Eruditorum* for Oct. 1698.
26. Historical Annotations on the Elogium of Leibnitz.

27. Several drafts of letters of Newton to Des Maizeaux after the death of Leibnitz. (Holograph.)

28. Remarks on Leibnitz's first Letter to the Abbé Conti.

29. Proposed addition to the "Remarks" on Leibnitz's second Letter to the Abbé Conti—after Leibnitz's death. (Des Maizeaux, Vol. 2, pp. 82–106.)

30. Drafts of a letter to a friend of Leibnitz (probably Chamberlayne), defending Keill. Also copy of English translation of Leibnitz's letter to Chamberlayne (in Newton's hand).

31. Copy by Newton of Leibnitz's letter of 9th Ap. 1716, to De Monmort, and draft of Newton's Observations upon it given in Raphson's Hist. of Fluxions, App. p. 111.

32. Newton's observations on the Synopsis given in the Leipzig Acts of Jones's "Analysis per quantitatum Series," &c. (Lond. 1711).

33. Animadversions on Monmort's letter to N. Bernouilli, dated 20th Aug. 1713, and printed in the 2nd Edition of his Analysis upon the play of Hazard.

34. John Bernouilli's letter of 7th June, 1713, with Newton's Observations upon it.

35. Extract from Bernouilli's Notice of July, 1713 (the Charta Volans), and "Remarques sur la dispute entre Mons. Leibnitz et Mons. Newton," &c., with Newton's Observations upon them.

36. Contents of Des Maizeaux's Recueil, &c. Copies of letters which are published in Des Maizeaux's Recueil.

37. Several drafts of an intended Preface to the *Commercium Epistolicum*.

38. Letter of Newton to the Abbé Conti in reply to the Postscript of Leibnitz to the same. This letter refers to the 1st Postscript given in Des Maizeaux.

39. Draft of part of the "Account of the *Commercium Epistolicum*," &c., inserted in the Phil. Trans.

40. Errata in Raphson's History of Fluxions.

41. Unarranged fragments relating to the dispute with Leibnitz.

42. Drafts of Letters of Newton to Varignon and others, relating to Bernouilli's Letter of 7 June, 1713, which had been disavowed by the writer.

## XII. ASTRONOMY.

1. Astronomical communications from Flamsteed, including longitudes and latitudes of stars for 1686, and of 21 stars compared with the comet of 1680.
  2. Lunar distances in 1677 and in 1685, by Flamsteed, with copies of these two papers, one by Newton.
  3. Equations of Moon's Apogee. Table by Newton for Flamsteed. Elements of the Comets of 1472, 1580, 1585, 1652, 1661, 1665, 1672, 1677, and 1686, as calculated by Halley.
  4. Eclipse Tables for a period of 18 years, by Halley.
  5. Observations of Eclipses, sent to Newton from various quarters, with a diagram of the annular eclipse of 1686 by E. de Louville (Paris).
  6. Transits of Satellites of Jupiter and of their shadows across the disc of the planet, observed by Pound at Wanstead.
  7. Table of Declinations of every 5<sup>th</sup> degree of the Zodiac.
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## XIII. HYDROSTATICS, OPTICS, SOUND, AND HEAT.

1. A treatise, with a table, on the Division of a Monochord. Not in Newton's hand, but apparently of his composition. Followed by an extract in his hand "out of Mr Sympson's Division Violist."
2. Scrap relating to the velocity of sound; also on the back a note on the proportionality of mass to weight.
3. Manuscript copy of Newton's Optical writings, and of controversies about them.
4. Latin draft of the Opticks, Book I., Part I. (1 sheet).
5. Answer to objections made to Newton's Optical Theories. Also a scrap with memoranda about the Newtonian telescope.
6. Scrap. Memorandum of observations on the colours of thick plates.
7. Fragments on Light and Heat.
8. Proposed addition to Newton's Opticks.

On the Refraction observed in Iceland Spar, and Note "to the Reader" relating to it.



9. Fragments on Opticks.
  10. Optical experiments.
  11. Figure and description of a sheep's eye. Printed by Brewster i. 420.
  12. Speculations as to the constitution of matter and the nature of the action of heat.
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#### XIV. MISCELLANEOUS COPIES OF LETTERS AND PAPERS.

1. Copies of Letters from Leibnitz, Slusius, &c. to Oldenburgh.
  2. Copies of various Mathematical papers by Tschirnhausen, Leibnitz, Slusius, &c.
  3. "Sur la Cubature du coin Spherique" par M. de Lagny.
  4. Fragments on Mathematical subjects by Cassini, Craig, and Morland.
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#### XV. PAPERS ON FINDING THE LONGITUDE AT SEA.

1. Various proposals for finding the Longitude at Sea.
2. Several drafts of a Report by Newton to the Lords of the Admiralty on the different projects for determining the Longitude at Sea.
3. Draft of a letter by Newton on the same subject.
4. Two shorter drafts of the same letter.

## SECTION II.

### CHEMISTRY.

#### \*I. FIVE PARCELS CONTAINING TRANSCRIPTS FROM VARIOUS ALCHEMICAL AUTHORS IN NEWTON'S HANDWRITING, WITH NOTES AND ABSTRACTS.

(1)

1. Notes out of Philalethes.
2. On Ripley's Vision; 'Sir G. Ripley his letter to K. Ed. IV. unfolded.'
3. 3 tracts. De metallorum metamorphosi, Brevis manductio ad rubinum cælestem, Fons Chemicæ Philosophiæ.
4. Extracts from Raymond Lully.
5. „ „ an author unnamed.
6. „ „ various authors.
7. "Artephius, his secret book."
8. Basil Valentine; on the minerals of Hungary, Carinthia &c., and the conditions of their formation, and on the transmutation of metals and the separation of the three principles, and of vitriol.  
Jodochus a Rehe; Processes for preparing the Philosopher's stone from MSS. in possession of Dr Twysden. Copies of 4 letters from Faber to Dr Twysden, 1673—4, recounting success of experiments in preparing spirits of mercury.  
Notes on Faber's work.
9. Hermes. Tabula smaragdina et commentarium.
10. The same in English.
11. "The Epitome of the treasure of health written by Edvardus generosus Anglicus innominatus, who lived A. D. 1562."
12. Hadrian Mynsicht. Aureum seculum redivivum. Testamentum de philosophorum lapide. Both in hexameters.

13. Ex Turba philosophorum.
14. Preparatio Mercurii, ex MSS. Philosophi Americani.
15. Liber Mercuriorum Corporum. On the back an explanation of the symbols in it.
16. 47 Alchemical recipes, the work of an old Priest, viz. B.
17. Ex Rosario magno.
18. Emblemata Michaelis Maieri, comitis Germani.
19. Of chemical authors and their writings.
20. Collectiones ex novo lumine chemico.
21. Ex codicillo R. Lullii (Colon. 1563).
22. Notes mythological and alchemical.
23. Account of furnaces, &c.
24. Extracts from Flamel and several other authors.
25. A page of references to a work not named.
26. Loca difficilia in novo lumine Chymico explicata.
27. Extracts: clavis aureæ portæ, medulla Alchemiæ, de Lapide vegetabili, Pupilla Alchemiæ, &c.
28. Basil Valentini Currus triumphalis antimonii,
29. Alphabetical explanation of common chemical words.
30. Miscellaneous references.
31. Abstract of a treatise on Nature's obvious laws and processes in vegetation.
32. 'Out of Schroder's Pharmacopœia.'

## (2)

1. The book of N. Flamel, in English.
2. The metamorphoses of the planets, with two folios of notes which are in the nature of memoranda of points adverted to in the treatise.
3. Maier's tracts:
  - Symbola aureæ mensæ duodecim nationum (an account of chemical writers in 12 books).
  - Lusus serius. (On the medicinal virtues of mercury, tutty, &c.)
  - Atalanta fugiens.
  - Viatorium. (A chemical interpretation of some parts of ancient mythology.)
  - Septimana philosophica, 6 days, 7th day wanting.

4. *Notanda chymica*. Out of Maier (1 f.).
5. *Regulæ...de lapide philosophico* authore anon. and Maier's figures prefixed to Valentine's keys (1 f.).
6. *Ex Epistola* Edm. Dickenson ad Theodorum Mundanum (2 f.).
7. *Tabula Smaragdina* and other extracts. *Hieroglyphica Planetarum* (1 f.).
8. Extracts apparently from Van Helmont. On the 3rd page, last line but two, occurs "*Terra juxta parallelos rotunda est, juxta meridianos ovalis. Hallucinatur.*"
9. Notes chiefly from Philalethes on Ripley.
10. On Ripley's gates (2 f.).
11. Ripley expounded (2 f.).
12. Notes on Ripley (an abstract).
13. *Thesaurus thesaurorum*, in English (1 f.).
14. A key to Snyders.
15. *Sententiæ notabiles expositæ* (1 f.).
16. *Sententiæ luciferæ et conclusiones notabiles* (4 f.). A note relating to mint affairs on top of first page.
17. *Practica Mariæ Prophetissæ in artem Alchemicam* (1 f.).
18. *De igne sophorum et materia quam calefacit* (1 f.) extr. from various authors.
19. *Notanda chemica* from various authors (1 f.).
20. *De secreto solutionis* (1 f.) from various authors.
21. The three fires. The work with sol vulgar. The several works (1 f.).
22. "*Clavis.*"
23. Extracts from various authors, chiefly alchemical, but some notes also about the occurrence of minerals (1 f.).
24. Verses at the end of B. Valentine's mystery of the microcosm.
25. The standing of the glass for the time of Putrefaction. The hunting of the Green Lyon, in verse, with some notes by Newton.
26. "Pearce the black monck upon the Elixir" (verse).
27. "Out of Bloomfield's Blossoms, and a short work that beareth the name of Sir George Ripley."
28. Extracts from Norton's ordinal, Chaucer's tale of the Chanon's yeoman, the work of Richard Carpenter, Dastin's dream.
29. Several questions concerning the Philosopher's stone, no author named (1 f.).

30. Observations of the matter in the glass, Authore Anonymo ; also a recipe for an elixir (1 f.).
31. Sendivogius explained (4 f.).
32. The same in Latin, an abstract (2 f.).
33. Epistola ad veros Hermetis discipulos. S. Didier.
34. The seven chapters of Hermes, with part of an unfinished letter on the back.
35. Latin letter communicated by Frederick duke of Holstein, 1656, giving an account of the death of a Jewish magician, of his oratory, instruments, perpetual fire in a crystal, &c. with no writer's name (1 f.).

## (3)

1. Jodochus a Rehe. Procédé universelle.
2. Artephius, de arte occulta lib. secretus.
3. Abstract of Flamel's account of his hieroglyphics with a sketch of the figures.
4. Novum lumen Chymicum Sendivogii (abstract).
5. Extracts from Joh. Spagnetus. Enchiridion Physicæ, arcanum Hermeticæ Philosophiæ opus.
- 6., Extracts from Norton's Ordinal, Dastin's dream, Black monk, the hunting of the Green Lyon, Ripley, &c.
7. Ex Augurelli Chrysopœia, and the Marrow of Alchemy.
8. Extracts from Ripley and others. Tabula Smaragdina, and De metallorum metamorphosi (a leaf missing at the beginning).
9. Observanda. Instructio de Arbore Solari. Arca Arcani. Epistola Grassei. Occultæ naturæ mysterium. Appendix ad aurum potabile. Lucerna salis philosophorum. Auriga chemicus. Rosarium magnum.
10. Snyders' Commentatio de Pharmaco Catholico.
11. References to B. Valentine's works, his process, 12 keys, and Extracts from his Testament.
12. Miscellaneous Notes and quotations.
13. Note of information received from a Londoner as to precautions in preparation of the philosopher's stone. Mar. 3, 1695—6.
14. Notes de scriptoribus chemicis.
15. Notes and memoranda relating to alchemy (2 f.).

16. Table of contents of some work on Alchemy.
17. Notes and memoranda (2 f.).
18. Abstract of some work, with commencement of a letter to Mr Proctor an attorney relating to a bond of Mr Tongue to Newton on the back.
19. Annotationes, being extracts from several works.
20. Account of S. Didier's keys, and what various other authors have written on the same subject. This seems to be an attempt to co-ordinate the accounts of processes described mystically by the several authors (5 f.).
21. Chemical nomenclature of the Egyptians, and a praxis of alchemy extracted from various authors, with a duplicate folio partly cancelled.
22. De mineralibus. Extracts from Geber and others.  
References and extracts (one on the back of a letter).
23. Diagram of lapis philosophicus cum rotis elementaribus.
24. Memoranda about chemicals.
25. Notes of some process. On the back of memoranda of sums owing from Mr George Gates, Mr Day, and Richard Rawlins.
26. Receipt for some compound of sulphur, mercury, antimony and silver, apparently with a view to multiplication of the silver.
27. Alchemical receipts.
28. Receipts for medicines, ink, etc.
29. Table of contents of some work.
30. Part of a treatise, containing  
Lapidis compositio, out of L. Ventura,  
Elementorum conversio, from the same,  
Regimen ignis, from the same and Is. Hollandus,  
Materia, out of Philalethes and others,  
Decoctio, Regimen Mercurii, Saturni, Jovis, Lunæ, Veneris,  
Martis, et Solis, out of various authors, and a rough copy of part of the Decoctio.
31. Another treatise in the form of extracts from various authors, some parts repeated, altered, and fragmentary; part Latin, part English, but no original matter.
32. Tables of contents to a similar treatise.
33. Another treatise, apparently earlier, edges partly burnt.

34. Table of contents, with a chapter de virga mercurii.
35. A collection of nine papers in a cover (originally ten), consisting of notes and extracts, the 10th paper, of ancient hieroglyphics, missing.
36. Three odd papers on the Regimen.

## (4)

1. A common-place book, in paper cover, containing notanda and sententiæ notabiles from various alchemical authors. Greater part blank.

2. A list of chemical authors.

3. Several Indices Chemicæ.

4. De peste. Van Helmont.

5. Note as to Terra lemna, and Terra sigillata, with Leibnitz's address.

6. List of books on Chemistry with shelf-marks (perhaps in Trinity Library).

7. An alchemical recipe headed "Roth Mallor's work." On the back of the folio a recipe for making aqua regia from calcium chloride and aqua fortis, and for another menstruum which seems to be a solution of antimony chloride. The 2nd Period (a part of the foregoing recipe), but not in Newton's hand.

8. Notes of reference to some alchemical works. Diagrams of furnaces. Sundry recipes for making clay for furnaces and lutes. Note that "for rectifying spirits and ethereal oyles, nothing is better than the bladder of an ox or hogg," and a recipe for calcining gold which seems only getting it into a fine powder.

9. Dr Goddard's experiments of refining gold with antimony, extracted from Phil. Trans.

10. Part of a letter ordering some one to procure for Newton from Hamburg various metallic ores. On the back a note about something being true when angles due to difference of refraction are taken small enough, and a recipe for some plaster.

11. Notes of stannic chloride, and some chemical reactions.

12. An alchemical experiment, not in Newton's hand, which seems part of some larger work. There is a note in Newton's hand on it relating to quantities obtained in some distillation.

(5)

1. Anagrams of "Isaacus Newtonus" on draft of a letter to the Council about some matter at the Mint. Note of quotations in *ludo puerorum*, *scala philosophorum*, and *rosario*.

2. Directions as to some details of an alchemical process given by a Londoner acquainted with Mr Boyle and Dr Dickinson. On the back the beginning of a letter in which mention is made of Mr Pepys asking Sir I. N. for a method of finding the longitude at sea.

3. List of Alchemical works. A classification of the same with dates. On the back an account of gold and silver moneys coined since Christmas (no year), in which the guinea is put at 21s. 6d.

4. Another list of Alchemical authors with dates.

5. Another list of Alchemical authors, with extracts from Act of Parl. 5 Car. II., on coinage, on the back.

6. Extracts "*ex lumine de tenebris*."

7. A treatise on Chemistry, extracted from various authors, similar to nos. 18, 31, above; with some odd papers partly duplicates.

8. Two chapters apparently of another such treatise, headed "*Reductio et sublimatio*" (2 fol.), and "*Separatio elementorum*" (1 fol.) compiled as before.

9. Recipes for cements. Address of 2 stampmakers. Mathematical diagrams and lists of alchemical works.

10. *Opus Galli Anonymi*. With a note by Newton "*Simile est hoc opus operi Fabri...*" It gives a recipe for the Philosopher's stone and medicine but it does not state what the material operated on is; the preparation consists in repeated digestions and distillations.

11. Alchemical operations—references to the pages of several books.

12. *Experimenta Raymundi* (2 fol.).

13. *Observationes* (heads of Alchemical process).

14. *Ex Fabri Hydrographo Spagyrico* (1 f.).

15. *Ex Hercule prochymico* (1 f.).

16. *Miscellanea* from Raymund and others (1 f.).

17. *The Regimen*, in seven aphorisms and notes thereon (2 f.).

18. *Index chemicus* (commencement only).

19. Various extracts from alchemical works (9 f.).

N.

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20. Out of 'La Lumière sortant des Ténèbres' [above, no. 6], and commentary thereon (1 f.), but incomplete.
21. Fragment out of some treatise with pictures—no beginning or end.
22. Recipes for lutes, with some addresses on the back.
23. Recipes for some alchemical medicines, with address of a druggist.
24. Other alchemical operations, one a translation, and one not in Newton's hand.
25. Abstract of Yarworth's "Processus"—incomplete, extending to Chap. v.
26. An alchemical tract entitled "Manna," not in Newton's hand, but with additions and notes at the end in his hand.
27. Recipe for Regulus Martis; on the back some arithmetical calculation.
28. Copy (not in Newton's handwriting) of a letter from Mr John Casswell, Oxford, Oct. 14, 1694, to Mr John Flamsteed, giving an account of some observations on magnetism.
29. Account of a method for making aqua fortis and for refining silver, in Conduitt's hand.
30. "Experimentum Bellini."
31. *Theatrum Astronomiæ Terrestris*.

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\*II.

Packet marked VI. containing the following papers on Alchemy:

1. Some alchemical receipts, not in Newton's hand.
2. Queries, not in Newton's hand.
3. A medicine to transmute copper, ditto.
4. Alchemical receipts, ditto.
5. To make artificial pearl, ditto.
6. No. 73. An incomplete copy (76 pp.) of Yarworth's "Processus," not in Newton's hand.

N.B.—The several copies of Yarworth are not identical.

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## \*III.

Two bound MS. copies of Yarworth's "Processus," both incomplete.

A MS. book on Alchemy, containing

The apocalyps or revelation of the secret spirit, by an unknown author.

Quotations from divers writers on alchemy.

An unknown author upon the philosopher's stone.

Ex epistolâ Johannis pauperis.

De Alkymiaë veritate

δε Λαπιδιβυς &c.

The breefe of Sir Edward Vere's book. Aug. 18, 1610.

## IV. NOTES OF EXPERIMENTS, ALL IN NEWTON'S HAND.

1. Dec. 10. 1678 to Jan. 15. Subliming antimony with salammoniac. Alloying antimony with lead and other metals. (No definite result of value.)

2. Jan. 1679—80. Subliming antimonial sublimate with lead antimoniate &c. Jan. 22. Action of nitric acid and salammoniac on antimony sulphide &c. and further sublimations. (Most of these experiments are roughly quantitative.)

3. Feb. 1679—80. Fusing antimony with vitriol and other things. Sublimation of various metals by help of antimony and salammoniac &c. Action of oil of vitriol on galena, of nitric acid on sublimate of antimony, and others of a like kind.

4. Aug. 1682. Similar experiments; some on lead ore, others on an alloy of tin and bismuth which he seems to call Diana.

5. July 10 (no year), "vidi \*philosophicum." Sublimations of calx albus with salammoniac.

6. April 26, 1686. On a volatile salt of zinc (apparently the chloride), and on an alloy derived from ores of iron, antimony, tin, lead, and bismuth. May 16. "On ven. vol."

7. Mar. 5, 1690—1 and Mar. 16. On some bismuth compounds and the action of aqua fortis on alloys of tin and bismuth and zinc.

8. Experiments and observations, Dec. 1692 and Jan. 1692—3. Working of barm. He says "in distilling new wine before fermentation, the flegm rises first, and then the spirit, but after fermentation, the spirit rises before the flegm." Other experiments. Comparison of the fusibility of alloys of lead, tin, and bismuth, in which is given

as the most fusible an alloy of 5 of lead + 7 of tin + 12 of bismuth. April 1693 and June 1693, further experiments.

9. April 1695. Experiments with antimony and ores of iron, copper, and tin, and sublimations with salammoniac. Feb. 1695—6, sublimations of antimony with iron ore.

10. Notes of Chemical Experiments, without date:

Action of aqua fortis on antimony sulphide, &c.

Sublimation of alloy of antimony and lead with salammoniac, &c.

Experiments on lead ore and other things.

Do. on copper &c.

Other experiments.

11. De metallo ad conficiendum speculum componendo et fundendo. Printed by Brewster, ii. 535.

#### V. MISCELLANEOUS NOTES.

1. Notes on Magnetism. It does not appear whence they are taken. The observations (some of which are erroneous) do not seem to be Newton's, though here and there remarks upon them seem to be his.

2. De Natura Acidorum, with a copy. This is printed in Horsley's Newton, iv. pp. 397—400.

3. Eleven points for enquiry in Physics.

4. De Gemmis in genere, notes, mostly from Berquen, Boethius, Tavernier, and Boyle. Index of refraction in diamonds is given  $\frac{41}{100}$  on the authority of Halley. On p. 3 is mentioned a very fragile and soft western Topaz which he found to have a specific gravity 4.27, though the sines of refraction were as 14 to 23 (could this be Baryte?). On p. 7 he deduces from the cleavage that gems are crystallized like salts from juices which turn to stone. At the end are the gold and silver standards of different countries.

5. De Gemmis. Other notes mostly included in the preceding, but on p. 1 are given reasons for thinking the diamond coagulated from a fluid and fat substance, which he does not seem to have incorporated in the preceding.

6. Of Gemms. Part of the foregoing in English.

7. Extracts from Berquen.

8. Odd notes on gems.

9. Gemmarum pretia.

## VI. A MANUSCRIPT NOTE-BOOK

containing

On the fly-leaf—Notes of the value, hardness and other qualities of gems.

pp. 1 to 22, of colours. Articles 1—5 from Boyle's experiments and considerations touching colour, 1664.

Arts. 6 to 21, experiments with prisms; 22 and 26 on internal reflection at or near the critical angle; 27 to 43 on effects of thin plates of air between glasses.

44—47, further experiments with prisms; 48, colours from admixture; 49, reflection at two contiguous surfaces of glass; 50, colours of thin plates of glass, soap-bubbles, &c.; 51—53, on colours by internal reflection in spheres of water; 54, effect of oblique rays on the size of the spot at contact of 2 glasses; 55, diminished reflection of glass in water; 56 and 57, light reflected from powders, &c.; 58—62, effects of distorting the eye-ball; 63, coloured impressions of objects remaining when the eye is no longer directed to them; 64, on the action of the retina and optic nerve (quoted by Brewster i. 432 from Harris, omitting the last paragraph), and on p. 22, notes of the thickness of vibrations of light.

p. 22, notes from Boyle on increased sensitiveness of sight and hearing produced by sickness. Of vegetable substances precipitating vitriol black.

p. 23, a receipt for ink.

pp. 25—41, extracts from Boyle "on the mechanical origin of Heat and Cold," Oxford, 1675. The observations on p. 25 as to the expansion of glass, and those on the elasticity of springs are not in Boyle on Heat and Cold. The book quoted in the MS. is called the "History of Cold," which is not the title of the 1675 edition, but forms part of the title in the collected works.

p. 45, quotations from Boyle. Some incomplete trials of the height at which a thermometer stands in several substances—melting wax, tin, lead, &c. on Mar. 10, 1692—3. An experiment for determining the expansion of air by heat, also that of linseed oil (Brewster, ii. 366).

p. 49, extracts from Boyle's new experiments touching the spring of the air. At the bottom of this page and on

p. 50, account of experiments on flame—with conclusion that flame and vapour differ only as bodies red-hot and not red-hot.

p. 51, guesses heat to be made by division of parts, for when two particles are parted it makes the æther rush in betwixt them and so vibrate. Receipt for making Phosphorus (Brandt's).

pp. 53—60, blank ; pp. 61—65, extracts from Boyle on formes.

p. 65, extracts from Starkey's Pyrotechny asserted.

p. 66, note of a petrifying spring in Peru, from a Spanish treatise translated by the Earl of Sandwich.

pp. 57—70, blank ; pp. 71—80, extracts from Boyle on formes.

p. 80, experiments on the extraction of mercury from the nitrate and from corrosive sublimate by various other metals.

pp. 81, 82, receipts for making regulus of antimony by different metals.

p. 83, notes of alloys which fuse at low temperatures, and others which give a crystalline mass from fusion. Notes of the action of aquafortis, and of salammoniac, on salt, and oil of tartar or potassium carbonate ; and of crude tartar on the same, and of tartarum vitriolatum (potassium bisulphate) on same : with

p. 84, the remark that some *fools* call the result of the last reaction magisterium tartari vitriolati.

note, that salammoniac is less volatile than muriatic acid or ammonium carbonate, which seems to explain a quotation from D. von der Becke which follows.

note of calcination of lead with salt of antimony and salammoniac and of volatilization of arsenical tin when heated with corrosive sublimate and salammoniac.

pp. 85—92, extracts from Boyle.

pp. 93—100, sundry receipts and extracts on various chemical reactions, chiefly from Boyle.

p. 101, receipts for making sundry preparations of antimony. Note of the action of corrosive sublimate on various ores.

p. 102, notes of experiments in the preparation of regulus of antimony.

p. 103, do. and of action of corrosive sublimate on antimony, silver, and mercury ; of the heat produced by mixing oil of vitriol with water or spirit of wine ; of the preparation of ether and oil of wine—not differing much from the account quoted on p. 64.

pp. 104, 105, note of warmth emitted on mixing water with spirit of antimony, and of sundry chemical reactions—the last on

saturation of spirit of antimony by different substances has blanks left for the quantities.

pp. 106, 107, other chemical experiments. Note of composition of fusible metal "which in summer will melt in the sun," with the (erroneous) remark that tinglas is more fusible than tin.

pp. 108—112, chemical experiments chiefly on preparations of antimony and scoria of regulus. Some of these (e.g. p. 111) are marked with an *N* in the margin.

p. 113, action of distilled liquor of antimony on salts of lead, iron and copper; action of heat on tartarised antimony.

p. 114, action of spar on distilled liquor of antimony, vinegar, and aquafortis, and of salt from clay of lead mines on do.; action of nitre on antimony.

pp. 115, 116, action of oil of vitriol on lead ore, and of an antimonial sublimate on several substances.

pp. 117—120, experiments with a substance to which the name "ven. vol." is given.

p. 121, note, that on May 10, 1681, and on the 14th and 15th he comprehended sundry alchemical names. This note has been scratched out, apparently in consequence of its having nothing to do with the subject of the other notes, but it is not certain that the foregoing experiments have not something to do with it.

p. 122, another note, that on May 18 he completed the solution of the alchemical symbol of the caduceus, followed by experiments on June 10 on sublimation of green and blue vitriol with salamoniac and the resulting sublimate with lead ore. Perhaps these experiments on sublimation were designed to test his interpretation of some alchemical symbols.

pp. 123 sqq. to 126, account of experiments in May and June, 1682; on sublimation of some salts with salammoniack, and some metals and alloys with the same, and with antimony.

pp. 127 to 130, June 26, 1682, and July 4, 1682, account of experiments on obtaining regulus from mixture of lead ores, antimony and bismuth; and others similar.

p. 131, experiments on the action of various reguluses with spirit (? of salt).

pp. 132—4, other experiments on sublimation—the date, Tuesday, July 19, is given on p. 133; this must have been in 1683.

pp. 135 sqq., Feb. 29, 1683—4. An experiment in which he prepared the chlorides of mercury.

pp. 140 sqq., further experiments on "the net" which seems to contain iron and copper, and others of a similar kind. On p. 149 is the date, Friday, May 23.

p. 150, experiments on the spirit of zinc, Apr. 26, 1686.

pp. 151 to 158, experiments on some alloys of copper, antimony and iron, and continued on p. 267.

pp. 159 to 193, extracts from Boyle on the medical virtues of saline and other preparations.

pp. 194 to 206, blank; p. 207, extracts from Boyle on volatile salts of animal and vegetable substances.

pp. 209—223, extracts from Starkey's Pyrotechny asserted—on alkalies.

pp. 224 to 242, blank, except some headings.

pp. 243—4, some extracts from "Secrets Revealed" and other alchemical works.

pp. 245 to 260, blank, except heading.

p. 261, some references to alchemical works. pp. 262—4, blank.

p. 265, recipe for ether, and its uses in medicine.

p. 266, some recipes for medicines.

pp. 267, 8, continuation of experiments from p. 158. On this page is mentioned a liquor which dissolves the tinctures out of gold, silver, &c. and leaves only a white calx—but no directions for preparing it. Further experiments.

pp. 269—283, on regulus of antimony and alloys; similar in character to the former: rest of book blank, except 3 pages at end, where is a list of prices of some chemicals in 1687 and again in 1693, and some notes of sublimation of vitriol with salammoniac.

### \* SECTION III.

#### CHRONOLOGY.

1. Chapter v. of the Chronology of Ancient Kingdoms amended. A description of the Temple of Solomon. (Horsley's Newton, v. pp. 236 seqq.)
2. Transcript of part of the work on Chronology.
3. Considerations about rectifying the Julian Calendar.
4. Considerations about the Julian Calendar.
5. On the Chronology of the Egyptians, of the Gospel, &c. (confused).
6. Seven drafts (all in Newton's hand) of his remarks on the Chronology published under his name at Paris.
7. Some notes on the "Chronologie Abrégée."
8. Dedication (in French) of Newton's Chronology to the Queen.



## \* SECTION IV.

### HISTORY.

*Papers on various historical subjects, chiefly of the reign of James II., relating to the Father Francis business, &c.*

1. Certain arguments collected out of the Scriptures, out of the Civill Law, and the Common, exhibited to the Queen's Majestie by some of both houses against the Queen of Scots. Anno 13 Elizabeth.

2. An instance of Queen Elizabeth's power of dispensing with Acts of Parliament offered to the consideration of the Gentlemen of the University of Cambridge.

3. An argument perswading that the Queen's Majestie ought to have in conscience a great care of the safety of her own person.

4. A copy of the association and Act of Parliament enforcing it in the reign of Queen Elizabeth.

5. Royal Commission of James II. for a search and examination into the statutes of the Universities, Cathedral bodies, Grammar Schools, and other Ecclesiastical corporations.

6. The answer of the Vice-chancellor and Senate of the University of Cambridge to the question why they did not admit Alban Francis to the degree of M.A.

7. The answer to some questions propounded by the Lord Chancellor at the appearance of the Vice-chancellor and deputies of the Senate of the University of Cambridge before the Lords Commissioners. May 7, 1687. (5 copies.)

8. Sentence of deposition of the Vice-chancellor, J. Pechell, Master of Magdalene. 7 May, 1687.

9. An account of the Cambridge case, and all the proceedings thereon, ending with the sentence on Dr. Pechell.

10. An apology for the Church of England with relation to the spirit of persecution for which she is accused.

11. A letter of the Rev. F. Peter Jesuite, Almoner to the King of England, written to the Rev. F. le Chaise, confessor to the most Christian King, touching the present affairs of England. (2 copies.)

12. Copie d'une lettre d'un Jesuite de Leige écrit a un Jesuite de Friburge, le 2 Fevr. 1687. In Latin. (2 copies.)

13. The draft of an act for the better prevention of illegal exaction of money from the subject and preservation of the right and freedom of the subjects of this realm.

14. Notes of an argument in the case of Godden versus Sir Edw. Hales. 16 June, 1686.

15. The answer of the Fellows of S. Mary Magdalen College, [Oxford], to the question why they did not elect and admit Mr. Anthony Farmer to be President of the same College in the room of Dr. Clarke deceased, in compliance with his Majesties Letters mandatory.

16. The attempt of Dr. Fairfax to be heard before the commissioners, June 13, 1687. Followed by a second draft of the answer of the Vice-President and other Fellows of S. Mary Magdalen, Oxon., and a piece of a letter to the E. of Sunderland.

17. Reasons for subscribing the Oxford Address by the Clergy of the diocese.

18. 14 Directions in aid of the king's government.

19. Notes upon the dispensing power.

20. The case of the Bishops' courts.

21. A series of extracts from the Decretals, &c. "Principis mandata contemnent quomodo puniantur."

22. A paper beginning, "His Majesties promise is no argument for abrogating the Laws." On the other side, some "Rules" respecting Acts for Liberty of Conscience, Election of Parliaments, &c.

23. Some queries concerning liberty of conscience directed to William Penn and Henry Care.

24. The petition of the seven Bishops. (3 copies.)

25. Notes out of the Diary of the Parliament, 1660.

26. Address of the Lord-Lieutenant, Gentlemen, and Freeholders of the County of Cambridge to William of Orange.

27. The Bishop of London's Protestation.

28. The Bishop of London's narrative of the proceedings against him before the High Commissioners, August, 1686.

29. Letter of Newton to ———, 19 Feb. 1687-8, on the mandamus to admit Father Francis to M.A.

30. Notes of Egyptian mythology, out of Plutarch.

do. do. Theology, from various authors.

Mythological notes, do. (3 f.).

31. The original of Monarchies, chapter 1.

32. Antiquarian Fragments.

On the Tyrrhenians, &c.

## \* SECTION V.

### MISCELLANEOUS PAPERS, CHIEFLY ON THEOLOGICAL SUBJECTS.

1. The question stated about abstaining from Blood, in Newton's hand.
2. Prophecies concerning Christ's second coming, chiefly a collection of texts, followed by some extracts from the Talmud, &c., in five sheets: all in Newton's hand.
3. Irenicum, or Ecclesiastical Polyty tending to peace. Two separate drafts, both in Newton's hand. Part printed by Brewster, ii. 526.
4. Quæres regarding the word *ὁμοουσίος*. Printed by Brewster, ii. 532.
5. Extract by Newton Ex Marci Maximi Cæsaraugustani in Hispaniis Episcopi Chronico.
6. Draft in Newton's hand on the rise of the Apostasy in point of religion.
7. Chronological notes, notes on the site of the seven churches of Asia, &c., in Newton's hand.
8. Extracts by Newton "out of Cudworth," two sheets.
9. Profession of faith by Roman Bishops and Presbyters.
10. Loose papers with notes on the Prophecies, and other Theological notes and extracts, with some relating to Chronology, almost all in Newton's hand.
11. Paradoxical questions concerning the morals and actions of Athanasius and his followers. All in Newton's hand. Partly printed by Brewster, ii. 342.
12. A collection of papers, apparently being the draft of a work on "Religion," the chapters headed "a short scheme of the true religion," "of the religion of the Jews and Christians," "of the rise of the R. C. church in ecclesiastical dominion." All in Newton's hand. Brewster, ii. p. 347.

13. Note in Newton's hand, "God made and governs the world, &c." Printed by Brewster, ii. 354.

14. A sermon on 2 Kings xvii. 15, 16, in Newton's hand.

15. *Lexici Prophetici pars secunda*, in quibus agitur De forma sanctuarii Judaici. This is a treatise in Latin on the Temple of Solomon.

16. Miscellaneous extracts from Maimonides, Irenæus adversus hæreses, and some notes partly mythological.

17. (1), (2), (3). Three drafts of the observations on the Prophecies of Holy Writ, written on loose sheets, backs of letters, &c.

(1) Contains also two sheets of *Spicilegia variantium lectionum* in *Apocalypsi*.

(2) Contains also various observations on the way of printing the book.

(3) Contains also a Synopsis of the Synchronism of the *Apocalypse*.

18. Some chapters of the work on the Corruption of religion, the Host of Heaven, &c.

19. A bundle containing

(1) Collections for the work on the Prophecies.

(2) A treatise divided into chapters against the R. C. Church.

(3) Attempt to form a universal language. This contains also a genealogical tree of the Newton family, and at the other end an English and Latin phrase-book, not in N.'s hand.

(4) A treatise in Latin on the "Tuba quarta" of the *Apocalypse*.

20. *Corruptelæ duorum celebrium in sacris literis locorum historica narratio*; vid. 1 John v. 7, 1 Tim. III. 16. Amstelædami, 1709.

This is a Latin version of the first part of the "Historical account of two notable corruptions of Scripture," published in the 5th volume of Horsley's Newton, p. 495. It is not in Newton's hand, but contains a few corrections by him. Though the title speaks of two texts, it only treats of the first: it is however complete, ending with *finis*. It is rather fuller than the English treatise, e.g. the Slavonick version of the passages, which is only alluded to in the English (Horsley, p. 504), is written out in this Latin MS.

Also a short note on 1 Joh. v. 7.

21. *Decretum Synodi Orientalium*.

22. Several chapters of the work on the Church, its corruptions, &c., with three drafts of a table of contents.

23. On the language of the Prophecies—paged—perfect.

24. On the Origin of all religion, with other chapters of the Theological works (imperfect).

25. Transcript of part of a work on the Prophecies, paged from 25 to 173, imp. at both ends.

26. *Variantes Lectiones Apocalypticæ.*

27. *Latin Theological Treatises*, all imperfect.

28. A bundle containing

(1) *Introductio continens Apocalypseos rationem generalem.*

(2) *Procœmium historiæ ecclesiasticæ.*

(3) *De monachismo.*

(4) *Historia de concilio Nicen.*

(5) A treatise beginning "*Fidei vero formula,*" &c.

(6) *Extr. ex Sibyllinorum oraculis.*

These are all perfect.

(7) *De annis prædicationis Christi* (imperfect).

29. Rough drafts of some of the chapters of the work on the Prophecies.

30. Some chapters of the treatise on "The working of the mystery of Iniquity," "the Host of Heaven," &c.

31. Of the original of pious frauds. Paradoxical questions—in a wretched state.

32. The synchronism of the three parts of the prophetick interpretation, with other loose sheets on the prophecies.

33. Several chapters of the work on the Prophecies, written out fairly for the press, others not included in that work.

34. On the Papacy and the prophecies relating thereto.

35. Loose papers concerning worship, the Irenicum, &c.

36. Preparations in English and Latin for the work on the Revelation : hopelessly confused.

37. A treatise on the Revelation in English, imperfect, with several copies of parts. The beginning (containing the introduction) is complete.

38. *Miscellaneous Theological notes and extracts.*

39. *Theologiæ Gentilis Origines Philosophicæ.*

40. Theological scraps.

## SECTION VI.

### LETTERS.

#### I.

##### CORRESPONDENCE WITH OLDENBURG.

Oldenburg to Newton,	Jan. 18, 1672.
Newton to Oldenburg,	March 26, 1672.
„ „	March 30, 1672.
Oldenburg to Newton,	Early in April, 1672.
Newton to Oldenburg,	April 13, 1672, in reply to the above.
Oldenburg to Newton,	May 2, 1672.
Newton to Oldenburg,	May 4, 1672.
„ „	May 21, 1672.
Oldenburg to Newton,	July 2, 1672.
Newton to Oldenburg,	July 11, 1672.
Oldenburg to Newton,	Sept. 24, 1672.
„ „	June 4, 1673.
„ „	June 7, 1673.
„ „	Sept. 14, 1673.
Newton to Oldenburg,	Feb. 19, 1676.
„ „	Sept. 2, 1676, Brewster, i. 129. On planting cyder-trees, with a copy.
„ „	Nov. 28, 1676.
Oldenburg to Newton,	Jan. 2, 1677.

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#### II.

##### CORRESPONDENCE WITH COLLINS AND WALLIS.

Newton to Collins,	Aug. 20, 1672, on a logarithmick ruler.
Collins to Newton,	July 5, 1671, with draft of Newton's answer.
„ „	Aug. 31, 1676.
„ „	Sept. 9, 1676.
Collins to Wallis,	no date.

Copy of Newton's letters to Oldenburg, dated June 13 and Oct. 24, 1676, made for Wallis.

Another copy, somewhat mutilated, of the same letters.

Draft of Newton's letter to Wallis about them.

Draft of a later letter to Wallis containing corrections to typographical errors in Wallis's printed account of Newton's method in Vol. 2, and Newton's remarks on his own and Leibnitz's letters printed in Vol. 3.

Wallis to Newton, April 10, 1695. Copy. Edleston, p. 300.

" " April 30, 1695. Published in Brewster,  
Vol. ii. p. 427.

" " May 30, 1695.

" " July 3, 1695.

" " July 1, 1695, on Leibnitz's letter of 28 May.  
Brewster, ii. 429.

" " Jan. 9, 1698-9.

Extract of two letters from Wallis concerning a change in the Calendar, June 13, 30, 1699.

### III.

#### LETTERS FROM ARTHUR STORER TO Dr BABINGTON AND TO NEWTON,

Containing some Astronomical Tables, and Communications  
respecting the Comets of 1680 and 1682.

Arthur Storer to Mr Newton, Boothby, Aug. 10, 1678, with Table showing hourly Altitude and Azimuth of the "North Star."

Arthur Storer to Mr Newton, London, Sept. 4, 1678, with Table of the Sun's Azimuth.

Arthur Storer to Dr Babington; London, Sept. 19, 1678.

Arthur Storer to Dr Babington, Oct. 1, 1678, with an Astronomical Table "to find the Sun or any Star's Altitude," &c.

Arthur Storer to Dr Babington, from Patuxant River in Maryland, April 18, 1681, about the Comet of 1680 as observed in Maryland.

Arthur Storer to Mr Isaac Newton, from Patuxant River in Maryland, April 26, 1683, with observations of a Comet which appeared in Maryland, Aug. 14, 1682, till Sept. 12, 1682.



## IV.

## CORRESPONDENCE WITH FLAMSTEED.

Flamsteed to Newton, Dec. 15, 1680.  
 Flamsteed to Crompton (for Newton) March 7, 1680-1,  
 with an extract in Newton's hand from a letter of Flamsteed dated  
 Feb. 12th, 1680-1.

Newton to Flamsteed, April 12, 1681.  
 Draft of Newton to Flamsteed, April 16, 1681, pr. by  
 Brewster, ii. 455.

Draft of Newton to Flamsteed } imperfect. Dec. 29, 1681.  
 Canterbury, Dec. 29th,

The above all relate to the comet of 1680.

Flamsteed to Newton, Dec. 27, 1684.

" " Jan. 5, 1684-5.

" " Jan. 27, 1684-5.

" " Sept. 26, 1685.

" " Oct. 10, 1685.

" " Sept. 9, 1686.

Flamsteed to Mr Glen, April 10, 1693. Concerning earth-  
 quakes. Copy made for Newton, with  
 a note concerning Flamsteed's star-  
 maps.

Flamsteed to Newton, Sept. 7, 1694.

" " Oct. 11, 1694. (Printed in Baily's  
 Flamsteed, p. 134.)

" " Oct. 25, 1694.

" " Oct. 29, 1694.

" " Nov. 3, 1694.

" " Nov. 27, 1694.

" " Dec. 10, 1694.

" " Dec. 31, 1694.

" " Jan. 18, 1694-5.

" " Jan. 29, 1694-5.

" " Feb. 7, 1694-5.

" " March 2, 1694-5.

" " March 21, 1694-5.

" " April 20, 1695.

" " April 27, 1695.

" " May 6, 1695.

" " July 2, 1695.

Flamsteed to Newton,	July 13, 1695.
" "	July 18, 1695.
" "	July 23, 1695.
" "	Aug. 4, 1695.
" "	Aug. 6, 1695.
" "	Sept. 19, 1695.
" "	Jan. 11, 1696.
" "	Sept. 4, 1697.
" "	Dec. 10, 1697.
" "	Dec. 29, 1698. Note by Flamsteed of the no. of observations of planets taken between 1675 and 1689.
Flamsteed to Dr Wallis,	Dec. 20, 1698. Printed copy of Latin letter.
Flamsteed to Newton,	Jan. 2, 1698-9.

## V.

## GREGORY TO NEWTON.

David Gregory to Newton,	June 9, 1684.
" "	Sept. 2, 1684.
" "	August 27, 1691.
" "	Oct. 10, 1691.
" "	Nov. 7, 1691.
" "	Nov. 7, 1691.
" "	Nov. 26, 1691.
" "	Sept. 24, 1694.
" "	Dec. 23, 1697.
" "	Sept. 30, 1702.
Newton to Gregory (draft),	no date, about 1691.

## VI.

LETTERS FROM HALLEY TO NEWTON RELATING TO  
THE PUBLICATION OF THE FIRST EDITION OF  
THE 'PRINCIPIA.'

May 22, 1686.	Printed in Brewster's Life of Newton,
	Append. 8 & 12 to Vol. i. p. 438
June 29, 1686.	" " " " p. 446

June 7, 1686.	Printed in Brewster's Life of Newton,			
	Append. 8 & 12 to Vol. i p. 472			
Oct. 14, 1686.	"	"	"	p. 473
Feb. 24, 1686-7.	"	"	"	p. 474
March 7, 1686-7.	"	"	"	p. 475
March 14, 1686-7.	"	"	"	p. 476
April 5, 1687.	"	"	"	p. 477
July, 5, 1687.	"	"	"	Vol. ii. p. 111

## VII.

## HALLEY TO NEWTON ABOUT COMETS' ORBITS.

Halley to Newton,	Sept. 7, 1695.
" "	Sept. 28, 1695.
" "	early in Oct. 1695.
" "	Oct. 15, 1695, with observations of a Comet May 1665.
Newton to Halley,	Oct. 17, 1695, with draft of same letter.
Halley to Newton,	Oct. 21, 1695.
Draft of a letter by Newton to Halley.	
Halley to Newton,	Feb. 16, 1725.
Newton to Halley,	March 1, 1725, with draft of same letter.
A calculation of Halley relating to the Comet of 1680—on a separate sheet.	

## \*VIII.

HALLEY TO NEWTON AND MOLYNEUX, RELATING  
TO THE CHESTER MINT.

Halley to Newton,	Nov. 28, 1696.
" "	Feb. 13, 1697.
" "	August 2, 1697.
" "	Dec. 30, 1697.
Halley to Molyneux,	July 21, 1697.
" "	July 31, 1697.
" "	August 25, 1697.

## IX.

COTES'S LETTERS TO NEWTON, MOSTLY PUBLISHED  
IN EDLESTON'S CORRESPONDENCE OF NEWTON  
AND COTES,

Together with three Letters and a Memorandum by Robert Smith  
relating to the foregoing letters and the publication of Cotes's works.

			Edleston.
			Page
Cotes to Newton.	April 15, 1710,	...	8
" "	April 29, "	...	12
" "	May 7, "	...	16
" "	May 20, "	...	20
" "	June 1, "	...	25
" "	June 11, "	...	28
" "	June 30, "	...	31
" "	Sept. 21, "	...	34
	imperfect in Edleston.		
" "	Oct. 5, "	referred to in p.	37
" "	Oct. 26, "	" "	"
" "	March 31, 1711	"	40
" "	June 4, "	" "	"
" "	June 9, "	"	42
	only a fragment in Edleston.		
" "	June 23, "	...	44
Crownfield (printer)			
to Newton	July 11, 1711		
Cotes to Newton.	July 19, "	...	50
" "	July 30, "	...	52
" "	Sept. 4, "	...	54
" "	Oct. 25, "	not in Edleston.	
" "	Feb. 7, 1711—12	...	57
" "	Feb. 16, "	...	61
" "	Feb. 28, "	...	75
" "	March 13, "	...	79
" "	April 14, 1712	...	91
" "	April 15, "	...	93
" "	April 26, "	...	100
	May in MS. wrongly.		
" "	May 1, "	...	103
" "	May 3, "	...	106

	Edleston.
	Page
Cotes to Newton, May 13, 1712	... 114
" " Aug. 10, "	... 121
" " Aug. 17, "	... 127
" " Aug. 28, "	... 132
" " Sept. 6, "	... 136
" " Sept. 15, "	... 140
" " Oct. 23, "	... 143
Cotes to Bentley. March 10, 1712—13	... 149
" " Dec. 22, 1713	... 166

Cotes to Newton. April 29, 1715, On the Eclipse of the Sun, 22nd April, partly given in Edleston, p. 179.

Robert Smith to Newton, relating to the publication of Cotes's works, Dec. 23, 1718; Aug. 12, 1720.

Robert Smith to John Conduitt, Esq<sup>r</sup>., Feb. 4, 1732—3, asking for the loan to him of the foregoing letter of Cotes on the Eclipse.

Also a memorandum dated June 6, 1738, acknowledging the receipt of certain letters of Cotes to Newton lent to him by Mrs Conduitt.

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### X.

#### ROUGH DRAFTS OF SOME OF NEWTON'S LETTERS TO COTES.

The letters in Edleston and the pages to which these drafts relate are given in the following list :

Letter VI.	.....	page 14
" VIII.	.....	" 19
" XI.	.....	" 24
" XIII.	.....	" 27
" XV.	.....	" 30
" XLII.	.....	" 83
" XLIII.	.....	" 89
" XLVI.	.....	" 94—98
" LXL.	.....	" 129
" LXXXI.	.....	" 154

This is rather fuller than the letter printed by Edleston.

Letter LXXXII. .... page 156

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## XI.

## KEILL TO NEWTON.

Keill to Newton, April 3, 1711.

Copy of Keill's answer to the letter "pro eminente Mathematico," in the *Journal Littéraire*, 29th July, 1713.

Keill to Newton, Nov. 9, 1713.

" " Feb. 8, 1713-4. Answer in Edleston, *Correspondence of Newton and Cotes*, p. 169, dated April 2.

Johnson to Keill, Feb. 9, 1713-4.

Keill to Newton, April 20, 1714. Answer in Edleston, p. 170.

" " May 2, 1714.

" " May 14, 1714.

(Draft of a letter from Newton to Keill dated May 15, 1714, is printed in Edleston, p. 176.)

Keill to Newton, May 17, 1714.

" " May 21, 1714.

" " May 25, 1714.

" " June 2, 1714.

" " June 24, 1714.

" " Aug. 6, 1714.

" " Oct. 29, 1715.

" " Nov. 10, 1715.

" " May 17, 1717.

" " May 23, 1718.

(On the back of Keill's letter of Oct. 29, 1715, there is a scrap in Newton's hand in answer to an objection of Bernouilli.)

## XII.

PEMBERTON'S LETTERS TO NEWTON WHILE EDITING  
THE 3RD EDITION OF THE 'PRINCIPIA.'

Pemberton to Newton, Feb. 11, 1723-4.

" " Feb. 18, 1723-4.

" " May 17, 1725.

" " Monday, May 31, 1725.

" " Tuesday Morning, June 22, 1725.

" " July 17, 1725.

" " Feb. 9, 1725-6.

Besides these, 16 undated letters and 7 sheets of queries.

## \*XIII.

LETTERS FROM N. FACIO DUILIER  
TO NEWTON AND OTHERS.

- N. Facio Duillier to Newton, Nov. 17, 1692.  
 " " Nov. 22, 1692.  
 " " May 4, 1693.  
 " " June 15, 1717.  
 " " April 1, 1724.  
 N. Facio Duillier to Conduitt, Aug. 8, 1730 (with proposed  
 Epitaphs on Newton).  
 N. Facio Duillier to Conduitt, Aug. 12, 1730.  
 " " Aug. 26, 1730.  
 Abstract of Facio's Letter to Dr Worth, Jan. 26, 1731-2.  
 N. Facio Duillier to Conduitt, April 5, 1732.  
 , " April 10, 1732.  
 " " April 12, 1732, with enclosed  
 petition to the king.  
 Petition to the Commons.  
 A printed copy of a Latin Eclogue on Newton by M. Facio de  
 Duillier.

## \*XIV.

## MISCELLANEOUS LETTERS.

1. Venan(?) to Huyghens, Aug. 20, 1664.
2. Borellius to Wallis (Latin), Dec. 6, 1670.
3. Collins to Borellius, Junii 8, 1672.
4. Robert Hooke to Newton, Feb. 1675-6. Brewster, i. 140.
5. Newton to Hook (on thin plates), Feb. 5, 1675-6. Brewster,  
i. 141.
6. Thomas Burnet to Newton, Jan. 13, 1680-81.
7. Newton to Thomas Burnet, s. d. (Jan. 1680-1?). Brewster,  
ii. 447.
8. Boyle to Newton, Aug. 19, 1682.
9. Newton to — Jan. 11, 1687-8 (dated, but not signed).  
Brewster, ii. 546.

10. Gilbert Clerke to Newton, on difficulties in the Principia,  
26 Sept. 1687, with draft of Newton's answer.  
Gilbert Clerke to Newton, Oct. 3, 1687.  
" " " Nov. 7, 1687.  
" " " Nov. 21, 1687.
11. John Locke to Newton, July 26 [1692]. Brewster, ii. 461.
12. Richard Bentley to Newton, Feb. 18, 1692-3. Brewster,  
ii. 463.
13. John Mill to Newton, Nov. 7, 1693. Brewster, ii. 472.
14. Samuel Pepys to Newton, Dec. 21, 1693. Brewster, ii. 471.
15. Nath. Hawes to Newton, May 29, 1694.
16. Basnage de Bonval to Newton, Aug. 22 (no year), De la  
Haye.
17. Charles Montague to Newton, March 19, 1695 (offering the  
mastership of the Mint). Brewster, ii. 191.
18. Cassini to Newton, April 6, 1698, on the Satellites of  
Saturn.
19. Truchet to Newton (no date), acknowledgment of a copy of  
Newton's Optics translated into French.
20. T. Horne to Newton, Aug. 22 (no year).
21. John Hockett to Newton, Sept. 14, 1699 (asking interest for  
his son at Trinity, with some chron. notes of Newton on the back).
22. ————— to Lady Norris, proposing marriage (copy in  
Conduitt's hand), 1703-4. Brewster, ii. 211.
23. Lord Halifax to Newton, March 17 [1704-5]. Brewster,  
ii. 216.
24. Lord Halifax to Newton, May 5, 1705. Brewster, ii. 217.
- 25, 26. Two drafts of Newton's letter to a friend at Cambridge,  
about the election [1705]. Brewster, ii. 215.
27. Draft of part of a letter from Newton to [F. Godolphin?]  
[1705.]
28. D. Gregory to Newton, Sept. 16, 1707, about the Scottish  
coinage.
29. R. Bentley to Newton, June 10, 1708. Brewster, ii. 248.
30. " " Oct. 20, 1709. Brewster, ii. 250.
31. Remond de Monmort to Newton, Feb. 16, 1709-10.
32. " " " to Newton, giving an account of the  
quarrel between Drs Sloane and Woodward, about stones in the  
gall-bladder, March 28, 1711. Brewster, ii. 244.



33. J. Derham to Newton, Feb. 20, 1712—3. Brewster, ii. 519.
34. R. Bentley to Newton, July 1 [1713]. Brewster, ii. 254.
35. The Abbé Bignon to Newton, Nov. 30, 1713.
- 36, 37. Draft of a letter from Newton to the Abbé Bignon, with a copy by Conduitt.
38. Varignon to Newton, Dec. 5, 1713.
39. R. Bentley to Newton, Jan. 6, 1713—4.
40. J. Derham to Newton, about his physico-theology, May 11, 1714 (with some notes by Newton on Osiris, the length of the year, etc.).
41. John Chamberlayne to Newton, May 20, 1714.
42. Fontenelle to Newton, June 9, 1714.
43. A. Menzikoff to Newton, asking admission to the Royal Society, Aug. 23, 1714.
44. Three drafts of Newton's answer, Oct. 21, 1714.
45. John Chamberlayne to Newton, Oct. 28, 1714.
46. „ „ „ „ (no date) Friday morning.
47. Varignon to Newton, Nov. 18, 1714.
48. Fontenelle to Newton, Feb. 4, 1714—5. Brewster, ii. 518.
49. Sir Alex. Cunningham to Newton, Feb. 21, 1716. Venice.
50. Draft of letter from Newton to Bernouilli about the omission of his name from the list of Fellows of the Royal Society.
51. Brook Taylor to Newton, April 22, 1716. Brewster, ii. 509.
52. Sir Alex. Cunningham to Newton, May 1, 1716. Venice.
53. Conti to Newton, Dec. 10, 1716. Brewster, ii. 434.
54. Letter of Remond de Montmort to Newton, dated Paris, Feb. 25, 1716—7.
55. John Bernouilli to R. de Monmort, Apr. 8, 1717 (copy, with an addition by Newton). Brewster, ii. 437.
56. Nich. Bernouilli to Newton, May 31, 1717.
57. Fontenelle to Chamberlayne, July 6, 1717 (extract in Mrs Barton's hand). Brewster, ii. 289.
58. Remond de Monmort to Newton, March 27, 1718.
59. Letter from Brook Taylor to Mr Innys, dated Aug. 12, 1718, containing an extract of a letter from M. Riccati to M. Poleni forwarded by M. Montmort, 5 Aug. 1718.
60. Newton to Varignon, Oct. 13, 1718. Draft.

61. Varignon to Newton, Nov. 17, 1718.
62. Remond de Monmort to Taylor, Dec. 18, 1718. (Copy.)  
Brewster, ii. 511.
63. Varignon to Newton, July 26, 1719.
64. Newton to Varignon, 1719. Draft. Answer to 63, printed  
Maccl. Corres. Vol. II. p. 436.
65. James Stirling to Newton, Aug. 17, 1719. Brewster, ii. 516
66. A. H. de Sallengre to Newton, Sept. 22, 1719.
67. Joh. Bernouilli to Newton, Dec. 21, 1719. Brewster, ii. 504.
68.       "       "       Newton, III. Non. Quintil. [July 5] 1719.  
Brewster, ii. 502.
69. Joh. Bernouilli to Newton. Copy of latter part of do. in  
Newton's hand.
70. Varignon to Newton, after April 28, 1720.
71.       "       "       "       Nov. 28, 1720. Brewster, ii. 496.
72. James Wilson to Newton, Dec. 15, 1720 (signed A. B.).  
Brewster, ii. 440.
73. Rizzetti to the Royal Society, containing objections to  
Newton's Optical Experiments (s. d.).  
Also a letter of Rizzetti to Christino Martinello, of Venice, on the  
same subject.
74. James Wilson to Newton, Jan. 21, 1720—1. Brewster,  
ii. 443.
75. Cotet to Newton, on the edition of Newton's Opticks  
printing at Paris, Aug. 16, 1721.
76. G. J. Gravesande to Newton, Aug. 18, 1721.
77. Varignon to Newton, Sept. 18, 1721.
78.       "       "       "       Oct. 2, 1721.
79. Letter from Hen. Fr. Daguesseau to Newton, Oct. 1721.
80. Varignon to Newton, Dec. 9, 1721.
- 81, 82. Varignon to Bernouilli, 2 copies, April 4, 1722.
83. Varignon to Newton, April 4, 1722.
84.       "       "       "       April 28, 1722.
85.       "       "       "       Aug. 4, 1722.
86. Newton to Varignon. Draft reply to 83.
87.       "       "       "       July (?) 13, 1722.

88, 89. Newton to Varignon. Draft. About August, 1722.  
2 copies.

90. Fontenelle to Newton, Nov. 22, 1722.

91. Draft of a letter from Newton to Fontenelle. No date.

92. Newton to Varignon, Dec. 13, 1722. Draft.

93. Letter from Newton to some one at Paris about Varignon's picture after Varignon's death, which took place Dec. 23, 1722. Brewster, p. 295.

94. Joh. Bernouilli to Newton, Feb. 6, 1723. Brewster, ii. 507.

95. Philip Naudé to Newton, on the Calculus, Feb. 6, 1723-4.

96. De L'Isle to Newton, thanking him for his election to the Royal Society, April 2, 1724.

97. G. Cavelier to Newton, on the publication of his Chronology, May 11, 1724.

98. A. F. Marsili to Newton, Aug. 1724.

99. De L'Isle to Newton, Dec. 21, 1724.

100. A. F. Marsili to Newton, March 11, 1724-5.

101. G. Cavelier to Newton, March 20, 1724-5, about publication of his Chronology.

102. J. T. Desaguliers to Newton, April 29, 1725.

103. Jombert to Newton, Sept. 12, 1725. (2 copies.)

104. Draft of a letter from Newton to Daguesseau on Bernouilli's letter, complaining of being called 'eques errationis.'

105. Colin Maclaurin to Newton, Oct. 25, 1725. Brewster, ii. 385.

106. Fontenelle to Newton, acknowledging the receipt of the third edition of the Principia, July 14, 1726.

107. Thomas Mason to Conduitt, March 23, 1726-7.

108. J. Craig to Conduitt, April 7, 1727, partly printed by Brewster, ii. 315.

109. William Stukeley to Dr Mead, June 26, 1727-July 15, 1727, four sheets, written consecutively, but sent at intervals.

110. W. Stukeley to Conduitt, July 15, 1727.

111. " " " July 22, 1727.

112. Memorandums relating to Sir I. N. given to A. Demoiivre by Conduitt, Nov. 1727.

## \* XV.

## LIST OF THE LETTERS OF NEWTON, MOSTLY PUBLISHED IN THE MACCLESFIELD CORRESPONDENCE.

These are fair copies.

				No.
Newton to Collins	Jan. 1669	Maccl. Corr.	CCXXIV	
" "	Feb. 6, 1669	" "	CCXXV	
" —	Feb. 23, 1668-9	" "	CCXXVI	
and comment by Collins				
Newton to Aston	May 18, 1669	" "	CCXXVII	
" Collins	Feb. 18, 1669-70	" "	CCXXVIII	
" "	July 11, 1670	" "	CCXXIX	
" "	July 16, 1670	" "	CCXXXI	
" "	Sept. 27, 1670	" "	CCXXXIII	
" "	July 20, 1671	" "	CCXXXIV	
" Oldenburg	Jan. 6, 1671-2	" "	CCXXXV	
" "	Jan. 18, 1671-2	" "	CCXXXVI	
" "	Jan. 29, 1671-2	" "	CCXXXVII	
" "	Feb. 10, 1671-2	" "	CCXXXVIII	
" "	Feb. 20, 1671-2	" "	CCXXXIX	
" "	March 26, 1672	Phil. Trans. No. 82, p. 4032		
" "	March 30, 1672	" " No. 82, p. 4034		
" "	April 13, 1672	" " No. 83, p. 4059		
" "	May 4, 1672	" " No. 83, p. 4057		
" "	May 21, 1672	not in Phil. Trans.		
" Collins	May 25, 1672	Maccl. Corr.	CCXLI	
" Oldenburg	June 19, 1672	" "	CCXLII	
" "	July 6, 1672	" "	CCXLIII	
" "	July 11, 1672	Phil. Trans. No. 88, p. 5084		
" "	a long letter on Optics in reply to Mr Hook's "Considerations".			
" Collins	July 13, 1672	Maccl. Corr.	CCXLV	
" Oldenburg	July 13, 1672	" "	CCXLVI	
" Collins	July 30, 1672	" "	CCXLVII	
" Oldenburg	Sept. 21, 1672	" "	CCXLIX	
" "	March 8, 1673	" "	CCLI	
" Oldenburg?	April 3, 1673	" "	CCLII	
" "	in answer to Hugenius' letter of Jan. 14, 1673.			
Newton to Collins	April 9, 1673	" "	CCLIII	
" "	May 20, 1673	" "	CCLIV	

Newton to Collins	Sept. 17, 1673	Maccl. Corr.	CCLV
" "	Nov. 17, 1674	" "	CCLVIII
" Oldenburg	Dec. 9, 1674	" "	CCLIX
[printed Dec. 5 in Macc. Corr.]			
" Dary	Jan. 22, 1675	Maccl. Corr.	CCLX
" Collins	July 24, 1675	" "	CCLXI
" "	Aug. 27, 1675	" "	CCLXII
" Oldenburg	Dec. 14, 1675	" "	CCLXIII
" "	Dec. 21, 1675	" "	CCLXIV
" "	Jan. 10, 1675-6	" "	CCLXV
" "	Feb. 15, 1675-6	" "	CCLXVII
" "	Feb. 19, 1676		
" "	June 13, 1676.	Latin letter for Leibnitz.	
		Comm. Epist. p. 131	
" Collins	Sept. 5, 1676	Maccl. Corr.	CCLXIX
" Oldenburg (?)	Oct. 24, 1676	" "	CCLXX
" Oldenburg	Nov. 18, 1676	" "	CCLXXIII
" "	Nov. 28, 1676		

## SECTION VII.

### BOOKS.

\*1. A Theological Common-place Book, written from both ends, in Newton's hand.

2. Four folio MS. volumes, bound in red morocco, and labelled "John Conduitt," entirely in Newton's hand.

(1) The Chronology of Ancient Kingdoms amended. Horsley, v. pp. 28—263.

(2) i. A short chronicle from the first memory of things in Europe to the conquest of Persia by Alexander the Great. Printed twice by Horsley, v. pp. 3—27 and pp. 267—291.

ii. Another copy of the Chronology of Ancient Kingdoms amended.

(3) Observations on the Prophecies. Horsley, v. pp. 297—491.

(4) De motu Corporum Liber Secundus.

This is the treatise De Mundi Systemate. Horsley, iii. pp. 180—242.

\*3. A volume of extracts on Alchemical subjects, in Newton's hand.

4. (1) A copy of the 1st edition of the Principia, interleaved with notes in Newton's hand. Among the leaves inserted is the preface to the 3rd edition. In a miserable plight from damp and ill-treatment.

(2) A copy of the second edition of the Principia, interleaved with notes and additions in Newton's hand.

5. A MS. copy of a portion of the Arithmetica Universalis, apparently an early copy.

6. A copy of Schooten's edition of Des Cartes' Geometry, Lugd. 1649, with a few notes in Newton's hand.

7. A short treatise on the beginning of Algebra, in Newton's hand: at the other end are extracts from Quintus Curtius, and a long prayer, and a sermon on Lev. xix. 18, not in N.'s hand.

8. A common-place book written from both ends, with "Isaac Newton, Trin. Coll. Cant. 1661," in the beginning.

This contains, at one end, Definitions from Aristotle's Organon, an abridgement of the Physiologia peripatetica of John Magirus, and some Astronomical notes by Newton: at the other, Sentences from Aristotle's Ethicks, Annotationes ex Eustachii Ethic., Axiomata,

Epitome G. J. Vossii partionum oratoriarum, a note on the word *Idea*, Remarks on "Quæstiones quædam Philosophicæ," details of the observation of the comet of 1664, of the effect of sunlight on the eyes, etc.

\*9. A copy of "Secrets revealed, or an open entrance to the shut palace of the King," &c., by W. C., London, 1669, with notes in Newton's hand.

\*10. A bound MS. book containing at one end memoranda of Newton's expenses at College, and at the other a short outline of Trigonometry and Conic Sections in Newton's hand.

11, 12. Two MS. note books, bound, containing a Compendium of Elementary Mathematics, apparently made by St John Hare. In one of the volumes Abotesley is added to the name, and the following "Sibi, non aliis hæc." To the other volume the date 1675 is given after the name.

13. Lettres de M. Leibnitz and M. le Chevalier Newton sur l'invention des Fluxions et du Calcul Differentiel.

This is a proof of part of the 1st edition of Desmaizeaux's Recueil, with corrections. (Several pages are wanting at the end.)

14. A college note-book, written from both ends, containing early exercises—extraction of the square and cube root, elementary Geometry, &c.—followed by annotations of Wallis's *Arithmetica Infinitorum*. This is preceded by a note of Newton's fixing by an entry in his account-book the date of the annotations as being in the winter 1664—5, at which time he says he found the method of infinite series. Also notes on music, chances, &c.

This is the note-book referred to in Brewster's *Life of Newton*, Vol. i. p. 22.

15. Proof sheets of the edition of Newton's *Opticks*, with a few MS. additions by Newton.

16. An early copy (MS.) of the *Lectiones Opticæ*, Jan. 1669.

17. A book, containing the commencement of a work on Hydrostatics, the greater part consisting of a dissertation partly metaphysical, partly theistic, on the constitution of matter, motion, the Cartesian philosophy, etc.

18. A common-place book, written originally by B. Smith, D.D., with calculations by Newton written in the blank spaces. This contains Newton's first idea of Fluxions.

## SECTION VIII.

### MISCELLANEOUS PAPERS.

\*1. Copy of the agreement relating to Sir I. Newton's MSS.  
Copy of bond given by Conduitt in relation to Sir I. Newton's papers.  
An account of John Conduitt's right to the MSS. of Sir I. Newton.

2. Six drafts (all in Newton's hand) of a scheme for establishing the Royal Society.

3. Two printed copies of Newton's letter to the Abbé Conti dated Feb. 26, 1716, with remarks of Newton on the letter of Leibnitz to the Abbé Conti—the latter dated  $\frac{18}{29}$  May 1716 (printed in Des Maizeaux. Recueil, Tome ii. pp. 20, 82, 107).

4. Advertisement of the Book "De Systemate Mundi" in Conduitt's hand, with memoranda and modern letters on Newton's life.

5. On Education, &c.

On educating youth in the Universities.

Testimonial to Mr David Gregory for Astr. Prof. at Oxford.

Dr Gregory on the method of teaching in the Colleges in Scotland.

Two Chapters on Cosmography.

Beginning of "the Elements of Mechanicks."

6. Systema Mundi.

7. Miscellaneous.

An account of the System of the World described in Mr Newton's principles of Philosophy.

8. Astronomia, cap. 1, 2, 3, 4. This contains a drawing and description of a quadrant or sextant for measuring angles by reflexion.

9. Phænomena 1—15.

10. Scheme of Observations recommended to a traveller.

\*11. Papers relating to legal matters.

12. General proportions for the parts of a ship.

\*13. Estimates of the expenses of Government in 1668 and 1675, and a chronological tree of the royal family 1689.

N.



\*14. John Conrad de Hatzfeld on a scheme for Perpetual Motion.

List of proposed machines by le Sieur Balesme, with fragments on finding the Longitude.

15. Extracts from Phil. Trans. and other fragmentary Papers.

Graphical construction by Newton relating to the conjunction of Jupiter and Saturn, &c.

\*16. Fragments of the *Historia Cælestis*.

\*17. "Barometri altitudines per totum itineris mei Alpini decursum." June 25—July 13. No author's name or year.

\*18. Testimonial for E. Paget, M.A., \*Trin., as a person fit to teach navigation to the King's satisfaction. 3 April, 1682.

19. A scheme of Mathematical learning proposed for Mr Stone's foundation (at Christ's hospital). Several drafts.

20. Newton's remarks on this.

21. Draft of his letter on the subject.

22. Long letter by Newton in answer.

\*23. Two drafts of a paper headed, The case of Trin. Coll., on the fellowship dividends.

\*24. Henricus Sextus, apparently a College or University declamation.

\*25. A Latin phrase-book, under the heads of English words in alphabetical order, the first word *abate*, the last *conduct*. At the other end are extracts from Epiphanius, S. Augustine, &c.

\*26. Phrases from Terence's *Andria*, with occasional translations.

\*27. Miscellaneous fragments relating to personal matters. The packet contains a torn scrap of a letter from Newton's mother to him, 6 May, 1665, and one from Catharine Conduitt to Newton.

28. A Problem in Chances, not in Newton's hand.

\*29. A Demonstration in French on the Quadrature of the Circle, by Dan Waeijwel of Amsterdam.

\*30. Scraps.

## SECTION IX.

### CORRESPONDENCE, ARTICLES OF AGREEMENT, &c. ABOUT THE PUBLICATION OF FLAMSTEED'S OBSERVATIONS, &c.

Catalogue of Manuscripts of Tycho Brahe.

Draft of Latin letter to Roemer relating to Tycho's observations;  
similar letter in English; both in Newton's handwriting.

Arbuthnot to [Newton]? July 30, 1706.

Letter from Newton and the other Referees to Prince George of  
Denmark concerning the publication of Flamsteed's observations,  
Jan. 23, 1705.

Two drafts of Articles of Agreement made between the Referees  
and Mr John Flamsteed.

Flamsteed to Newton, Oct. 25, 1705.

„ „ April 10, 1708.

Copy of an Order sent to Mr Flamsteed, July 14, 1708.

Flamsteed to Sir Christopher Wren, July 19, 1708.

The Referees to Sir Isaac Newton.

Account of the expense of printing Mr John Flamsteed's Obser-  
vations.

Order to pay £125 to Flamsteed for his first Catalogue of fixed  
stars.

Receipt for the same from Ja. Hodgson.

Flamsteed to Newton, April 23, 1716 (asking for the return of  
his MSS.) printed in Baily's Flamsteed p. 322.

Order by Queen Anne for the appointment of a Board of Visitors  
of the Royal Observatory dated Dec. 12, 1710.

Drafts of Correspondence relating thereto.

Petition to the Queen of the President, Council and Fellows of  
the Royal Society of London, for the grant of a new place of Meeting.

## \* SECTION X.

### I. CORRESPONDENCE BETWEEN CONDUITT AND FONTENELLE ABOUT THE ÉLOGE.

Conduitt to Fontenelle,	27th March, 1727. O. S.
Fontenelle to Conduitt,	14th April, 1727. N. S.
Conduitt to Fontenelle,	No date given, but must be about 21st July, 1727.
„ „	31st July, 1727.
„ „	5th October, 1727. O. S.
Fontenelle to Conduitt,	15 Nov. 1727. N. S.
Conduitt to Fontenelle,	23rd Nov. 1727.
„ „	1st Jan. 1727-8.

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The above are inclosed in a portion of Mists' Weekly Journal for Saturday, April 8, 1727, containing Reflections occasioned by the Death of Sir I. Newton.

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### II. Conduitt's Memoirs of Sir I. Newton, sent to Fontenelle for the Éloge.

1. English copy, containing 29 numbered pages, No. 21 repeated, and 1 page of corrections.
2. French copy, containing 27 pages. This includes a translation of the account of Newton's funeral from the London Gazette of 4th April, 1727.

### III. A copy of the London Gazette for 4th April, 1727, containing the account of Sir I. Newton's funeral.

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## \* SECTION XI.

### DRAFTS OF FRAGMENTS OF CONDUITT'S INTENDED LIFE OF SIR I. NEWTON.

1. 42 pages, giving an account of Newton's life to the time of his going to Cambridge.
2. 35½ pages, containing a more finished copy of the same. [This was intended to be followed by an account of the state of Philosophy when Newton began his discoveries.]
3. Four copies of suggestions addressed to some one from whom Conduitt expected to obtain a popular account of the state of philosophy when Sir I. Newton first appeared, and also a similar account of his discoveries, and of the improvements that several persons have made in various parts of them. 7½ pages.
4. 16 pages, relating to his life and work at Cambridge.
5. 17 pages of Miscellanea, containing anecdotes, &c.
6. 17 pages relating to Newton's character.
7. 2 copies, each about 1½ page, on his love and gratitude to his mother.
8. 2 pages on Sir I. Newton's manual dexterity.
9. 2 copies of 2 pages, each on the same subject, illustrated by a custom in the house of Austria.
10. Paper with date 31st of August, 1726, containing 4 large and 4 small pages, containing anecdotes of Newton, relating to various times.
11. 2 pages, containing an account of a conversation of Conduitt with Newton, on Sunday the 7th March, 1724-5.
12. 2 pages, containing various scraps from Newton's note-books.
13. Scrap of 4 small pages, on Newton's dispute with Hook.
14. Scrap of 2 small pages, in glorification of Newton.
15. Scrap of 1½ large pages, containing rough notes relating to Newton's last illness, and brief references to anecdotes.
16. A compliment on Pope.
17. Sketch of a preface.
18. Extracts from Journal books of the R. Soc. relating to the late Sir I. Newton with a letter from W. Rutty, R. S. Sec. to Conduitt.

Dates of what passed at the University (so endorsed by Conduitt).

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## \* SECTION XII.

### LETTERS AND MEMORANDA, RELATING TO NEWTON, AFTER HIS DEATH.

1. Thomas Mason to Conduitt, 13 March, 1726-7.
2. J. Craig to Conduitt, 7 Apr. 1727, partly printed by Brewster, ii. 315.
3. Wm. Stukeley to Conduitt, 26 June, 1727.
4. Wm. Stukeley to Dr Mead, 26 June, 1727—15 July, 1727 (four sheets written at intervals).
5. Dr Mead to Conduitt, 7 July, 1727.
6. Wm. Stukeley to Conduitt, 15 July, 1727.
7. Wm. Stukeley to Conduitt, 22 July, 1727.
8. Memoranda of Newton, given by A. Demoivre to Conduitt, Nov. 1727 (in Conduitt's hand).
9. Draft of a letter from Conduitt to A. Pope, 8 Nov. 1727, enclosing
  10. The dedication to the Queen of Sir I. N.'s chronology, and
  11. An account of the chief events of Newton's life.
12. A. Pope to Conduitt, 10 Nov. 1727, printed by Brewster, ii. 521.
13. Nicholas Wickins to Prof. Smith, 16 Jan. 1727-8, printed by Brewster, ii. 88.
14. W. Stukeley to Conduitt, 16 Jan. 1727-8.
15. Humphrey Newton to Conduitt, 17 Jan. 1727-8, printed by Brewster, ii. 91.
16. J. Conduitt to ———, 6 Feb. 1727-8, printed by Brewster, i. viii.
17. W. Stukeley to Conduitt, 13 Feb. 1727-8.
18. Humphrey Newton to Conduitt, 14 Feb. 1727-8, printed by Brewster, ii. 95.
19. W. Stukeley to Conduitt, 29 Feb. 1727-8.
20. J. Conduitt to ———, 4 June, 1729 ; see Brewster i. x. n<sup>l</sup>.
21. Bp. Sherlock to ———, 10 June, 1731.
22. Note of Newton's elections at the Royal Society.
23. Nevil Maskelyne to Dr Horsley, with remarks on Horsley's ed. of Newton, by one Robison, 8 May, 1782.
24. Seward to Horsley, s. d.
25. W. Derham's account of conversations with Newton.
26. Account of Newton's mother, "given me [Conduitt] by Mrs Hutton, whose maiden name was Aiscough."

## \* SECTION XIII.

### PAPERS ON NEWTON'S FAMILY MATTERS, AND ON THE MINT.

1. Statement of Lord Halifax's legacy to Mrs Barton, and of the transfer from the Executor George Lord Halifax, giving the date of the trust, 26 October, 1706. With some notes on Miracles.
2. An account of what his majesty may lose by renewing for seven years the contract with Cornwall and Devonshire for Tynn.
3. An account of the gold and silver coined at the Mint, from 1713 to 1715, with some notes on Repentance at the back.
4. Draft of a letter to the Lords Commissioners of the Treasury with this account, some notes on the Controversy on Fluxions at the back.
5. The accounts of Mr Ambrose Warren, Agent for the Trustees, &c., of the charity of his Grace Thomas Archbishop of Canterbury, founded at the Tabernacle by Golden Square, for the quarter ending Christmas, 1700.
6. Paper of calculations, apparently for the Mint.
7. Proposal for a medal to commemorate the Union of England and Scotland.
8. Various letters and fragments on family matters.
9. Pedigree and papers relating to his family, all in Newton's hand excepting the pedigree, which is a copy.

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## \* SECTION XIV.

### BOOKS AND PAPERS NOT BY NEWTON.

1. *Essaies and Meditations concerning morality and religion.* The first part. A folio, with no author's name, written in the same hand throughout.
2. Sir C. Wren's cipher, describing three instruments proper for discovering the longitude at sea. In Halley's hand. Printed by Brewster, ii. p. 263.

3. Drawing of the arms of the Swinfords of Swinford, with some notes. In Mrs Barton's hand.
4. Catherine Conduitt's will, 9 July, 1731.
5. Epitaph on F——s Ch——is (Charteris).
6. Epigrammes écrites en vieux Gaulois en imitation de Clement Marot, per Mons. Rousseau. Copied at Geneva, 1709.
7. Problem in Spherical Trigonometry, in French.
8. A scheme of the Longitude, signed Laurans.
9. Several copies (printed) of Leibnitz's Charta volans. 29 July, 1713.
10. An abridgement of a Manuscript of Sir Robert Southwell's concerning travelling. Writt. 1658, Feb. 20. Written from the other end are "Chansons Françaises."
11. A MS. of Cicero de Senectute, about 1480.
12. Treatise in French, on the Infinite Divisibility of Matter. No name; handwriting unknown.
13. Metaphysical Speculations on Astronomy. No name; hand unknown; of no interest.
14. Viaticum Nautarum, or the Sailor's Vade Mecum, by Robert Wright, B.A., formerly of Jesus College in Cambridge.
15. Œdipus Sphingi, Auctore R. P. Nicolas Augustino Venetiis, 1709. (Incomplete.)
16. A MS. book on the Motions of the Secondary Planets, divided into six chapters.
17. Elementary calculations and figures relating to Spherical Trigonometry, possibly by St John Hare.

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\*SECTION XV.

Complimentary letters to Newton from distinguished foreigners.

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