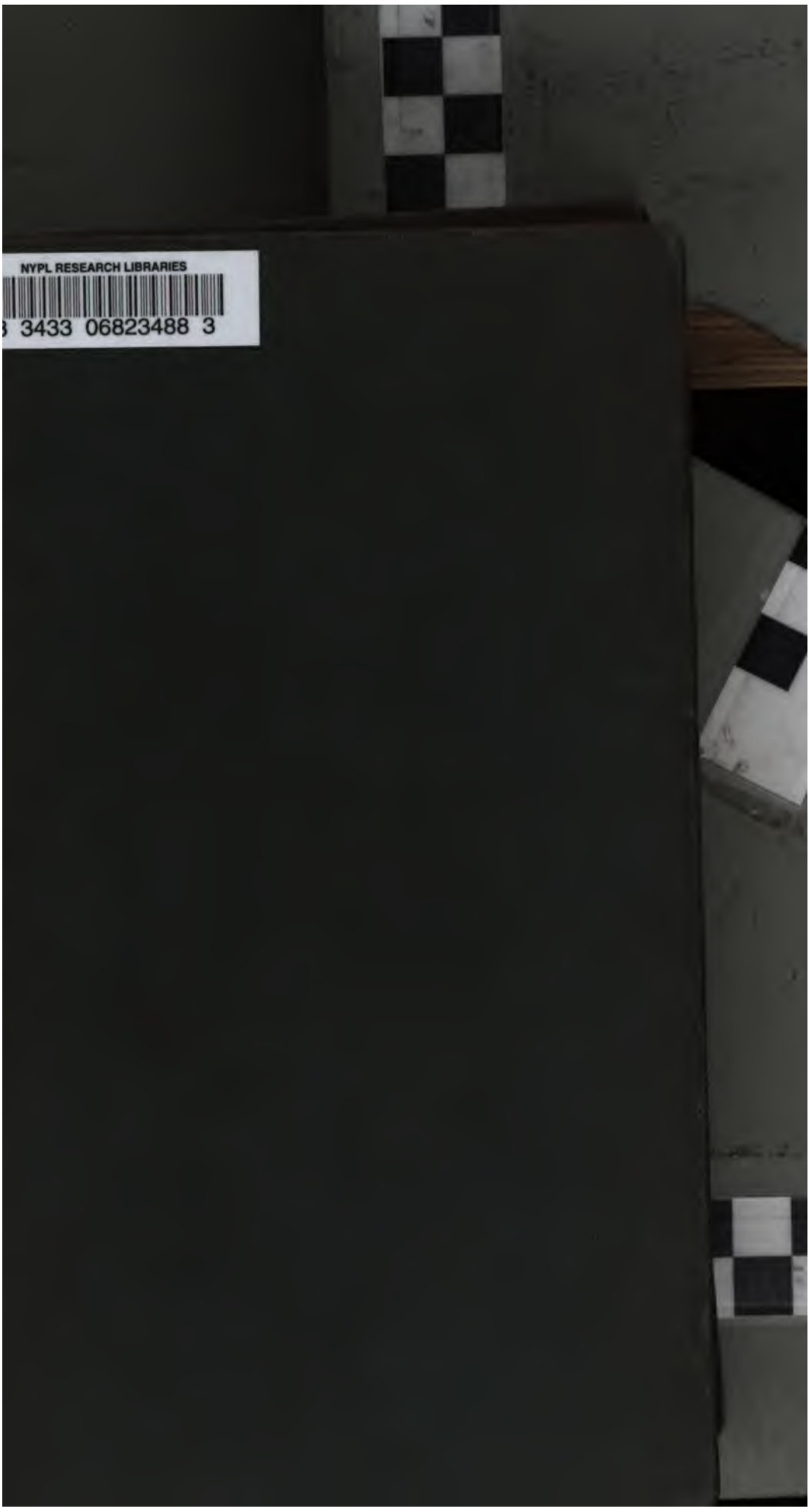

THE

WORKS

OF

THE REV. ISAAC WATTS, D.D.

IN

NINE VOLUMES.

VOL. VIII.

CONTAINING

THE IMPROVEMENT OF THE MIND; GEOGRAPHY AND ASTRONOMY; PHILOSOPHICAL ESSAYS ON VARIOUS SUBJECTS; A BRIEF SCHEME OF ONTOLOGY; AND A DEFENCE AGAINST THE TEMPTATION TO SELF-MURDER.

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CONTENTS OF VOLUME VIII.

THE IMPROVEMENT OF THE MIND.

PART I.

PART II. COMMUNICATION OF USEFUL KNOWLEDGE.

CONTENTS.

GEOGRAPHY AND ASTRONOMY.

PHILOSOPHICAL ESSAYS ON VARIOUS SUBJECTS.

CONTENTS.

A BRIEF SCHEME OF ONTOLOGY.

THE

IMPROVEMENT OF THE MIND;

CONTAINING

A VARIETY OF REMARKS AND RULES

FOR THE

ATTAINMENT and COMMUNICATION of USEFUL KNOWLEDGE,

IN

RELIGION, in the SCIENCES and in COMMON LIFE.

PREFACE

TO

" THE IMPROVEMENT OF THE MIND."

In the last page of the Treatise of Logic which I published many years ago, it is observed, that there are several other things which might assist the cultivation of the mind, and its improvement in knowledge, which are not usually represented among the principles or precepts of that art or science. These are the subjects which compose this book; these are the sentiments and rules, many of which I had then in view, and which I now venture into public light.

The present treatise, if it may assume the honour of that name, is made up of a variety of remarks and directions for the improvement of the mind in useful knowledge. It was collected from the observations which I had made on my own studies, and on the temper and sentiments, the humour and conduct of other men in their pursuit of learning, or in the affairs of life; and it has been considerably assisted by occasional collections in the course of my reading, from many authors and on different subjects. I confess, in far the greatest part, I stand bound to answer for the weaknesses or defects that will be found in these papers, not being able to point to other writers, whence the twentieth part of them is derived.

The work was composed at different times, and by slow degrees. Now and then, indeed, it spread itself into branches and leaves like a plant in April, and advanced seven or eight pages in a week; and sometimes it lay by without growth, like a vegetable in the winter, and did not increase half so much in the revolution of a year.

As these thoughts occurred to me in reading or meditation, or in my notices of the various appearances of things among mankind, they were thrown under those heads which make the present titles of the chapters, and were by degrees reduced to something like a method, such as the subject would admit.

On these accounts it is not to be expected that the same accurate order should be observed either in the whole book, or in the particular chapters thereof, which is necessary in the system of any science, whose scheme is projected at once. A book which has been twenty years in writing, may be indulged in some variety of style and manner, though I hope there will not be found any great difference of sentiment; for wherein I had improved in later years beyond what I had first written, a few dashes and alterations have corrected the mistakes: And if the candour of the reader will but allow what is defective in one place, to be supplied by additions from another, I hope there will be found a sufficient reconciliation of what might seem at first to be scarcely consistent.

The language and dress of these sentiments is such as the present temper of mind dictated, whether it were grave or pleasant, severe or smiling. If there has been any thing expressed with too much severity, I suspect it will be found to fall upon those sneering or daring writers of the age against religion, and against the Christian scheme, who seemed to have left reason, or decency, or both, behind them in some of their writings.

The same apology of the length of years in composing this book, may serve also to excuse a repetition of the same sentiments which may happen to be found in different places, without the author's design; but in other pages it

was intended, so that those rules for the conduct of the understanding which are most necessary, should be set in several lights, that they might with more frequent and more force impress the soul. I shall be sufficiently satisfied with the good humour and lenity of my readers, if they will please to regard these papers as parcels of imperfect sketches, which were designed by a sudden pencil, and in a thousand leisure moments, to be one day collected into landscapes of some little prospects in the regions of learning, and in the world of common life, pointing out the fairest and most fruitful spots, as well as the rocks and wildernesses, and faithless morasses of the country. But I feel age advancing upon me, and my health is insufficient to perfect what I had designed, to increase and amplify these remarks, to confirm and improve these rules, and to illuminate the several pages with a richer and more beautiful variety of examples. The subject is almost endless, and new writers in the present and in following ages may still find sufficient follies, weaknesses and dangers among mankind, to be represented in such a manner as to guard youth against them.

These hints, such as they are, I hope may be rendered some way useful to persons in younger years, who will favour them with a perusal, and who would seek the cultivation of their own understandings in the early days of life. Perhaps they may find something here which may awake a latent genius, and direct the studies of a willing mind. Perhaps it may point out to a student now and then, what may employ the most useful labours of his thoughts, and accelerate his diligence in the most momentous inquiries. Perhaps a sprightly youth may here meet with something to guard or warn him against mistakes, and withhold him at other times from those pursuits which are like to be fruitless and disappointing.

Let it be observed also, that in our age several of the ladies pursue science with success; and others of them are desirous of improving their reason even in common affairs of life, as well as the men: yet the characters which are here drawn occasionally, are almost universally applied to one sex; but if any of the other shall find a character which suits them, they may by a small change of the termination, apply and assume it to themselves, and accept the instruction, the admonition, or the applause which is designed in it.

There is yet another thing which it is necessary my render should be informed of; but whether he will call it fortunate or unhappy, I know not. It is sufficiently evident that the book consists of two parts: The first lays down remarks and rules how we may attain useful knowledge ourselves; and the second, how we may best communicate it to others. These were both designed to be printed in this volume: but a manuscript which hath been near twenty years in hand, may be easily supposed to allow of such difference in the hand-writing, so many lines altered, so many things interlined, and so many paragraphs and pages here and there inserted, that it was not easy to compute the number of sheets that it would make in print: and it now appears, that the remarks and rules about the communication of knowledge being excluded here, they must be left to another volume: wherein will be contained various observations relating to methods of instruction, the style and manner of it, the way of convincing other persons, of guarding youth against prejudices, of treating and managing the prejudices of men, of the use and abuse of authority, of education, and of the various things in which children and youth should be instructed, of their proper business and diversions, and of the degrees of liberty and restraint therein, &c. Of all which I had once designed a more complete treatise; but my years advancing, I now despair to finish it:

The essays or chapters on these subjects being already written, if I am favoured with a tolerable degree of health, will be put to the press, when the favourable acceptance of this first part shall give sufficient encouragement to proceed.

THE IMPROVEMENT OF THE MIND;

CONTAINING

A variety of Remarks and Rules for the Attainment and Communication of Useful Knowledge, in Religion, in the Sciences, and in Common Life.

THE FIRST PART.

Directions for the Attainment of useful Knowledge.

INTRODUCTION.

No man is obliged to learn and know every thing; this can neither be sought nor required, for it is utterly impossible; yet all persons are under some obligation to improve their own understanding, otherwise it will be a barren desart, or a forest overgrown with weeds and brambles. Universal ignorance or infinite errors will overspread the mind, which is utterly neglected and lies without any cultivation. Skill in the sciences is indeed the business and profession but of *a small part of mankind*; but there are many others placed in such an exalted rank in the world, as allows them much leisure and large opportunities to cultivate their reason, and to beautify and enrich their mind with various knowledge. Even *the lower orders of men* have particular callings in life, wherein they ought to acquire a just degree of skill, and this is not to be done well without thinking and reasoning about them.

The common duties and benefits of society, which belong to every man living, as we are social creatures, and even our native and necessary relations to a family, a neighbourhood, or a government, oblige all persons whatsoever to use their reasoning powers upon a thousand occasions; every hour of life calls for some regular exercise of our judgment as to times and things persons and actions; without a prudent and discreet determination in matters before us, we shall be plunged into perpetual errors in our conduct. Now that which should *always be practised*, must at *some time be learnt*.

Besides every son and daughter of Adam has a most important concern in the affairs of a life to come, and therefore it is a matter of the highest moment for every one to understand, to judge, and to reason right about the things of religion. It is in vain for any to say, *we have no leisure or time for it*. The daily intervals of time, and vacancies from necessary labour,

together with the one day in seven in the Christian world, allows sufficient time for this, if men would but apply themselves to it with half as much zeal and diligence, as they do to the trifles and amusements of this life; and it would turn to infinitely better account.

Thus it appears to be the necessary duty and the interest of every person living to improve his understanding, to inform his judgment, to treasure up useful knowledge, and to acquire the skill of good reasoning, as far as his station, capacity and circumstances furnish him with proper means for it. Our mistakes in judgment may plunge us into much folly and guilt in practice. By acting without thought or reason, we dishonour the God that made us reasonable creatures, we often become injurious to our neighbours, kindred or friends, and we bring sin and misery upon ourselves: For we are accountable to God our judge for every part of our irregular and mistaken conduct, where he hath given us sufficient advantages to guard against those mistakes.

It is the design of *Logic* to give this improvement to the mind, and to teach us *the right use of reason in the acquirement and communication of all useful knowledge*; though the greatest part of writers on that subject have turned it into a composition of hard words, trifles and subtleties for the mere use of the schools, and that only to amuse the minds and the ears of men with empty sounds, which flatter their vanity, and puff up their pride with a pompous and glittering shew of false learning; and thus they have perverted the great and valuable design of that science.

A few modern writers have endeavoured to recover the honour of Logic, since that excellent author of the *Art of Thinking* led the way: Among the rest I have presumed to make an attempt of the same kind, in a treatise published several years ago, wherein it was my constant aim to assist the reasoning powers of every rank and order of men, as well as to keep an eye to the best interest of the schools and the candidates of true learning. There I have endeavoured to shew the mistakes we are exposed to in our conception, judgment and reasoning; and pointed to the various springs of them. I have also laid down many *general and particular rules* how to escape error, and attain truth in matters of the civil and religious life, as well as in the sciences. But there are several other observations very pertinent to this purpose, which have not fallen so directly under any of those heads of discourse, or at least they would have swelled that treatise to an improper size; and therefore I have made a distinct collection of them here out of various authors, as well as from my own observation, and set them down under the following heads.

The learned world who has done so much unmerited honour to that *logical* treatise, as to receive it into our two flourishing universities, may possibly admit this as a *second part* or *supplement* to that treatise. And I may venture to persuade myself, that if the common and the busy ranks of mankind, as well as the scholar and the gentleman, would but transcribe such rules into their understanding, and practice them upon all occasions, there would be much more truth and knowledge found among men: And it is reasonable to hope that justice, virtue and goodness would attend as the happy consequents.

CHAP. I.—*General Rules for the Improvement of Knowledge*.*

I. DEEPLY *possess your mind with the vast importance of a good judgment, and the rich and inestimable advantage of right reasoning.* Review the instances of your own misconduct in life; think seriously with yourselves how many follies and sorrows you had escaped, and how much guilt and misery you had prevented, if from your early years you had but taken due pains to judge aright concerning persons, times and things. This will awaken you with lively vigour to address yourselves to the work of improving your reasoning powers, and seizing every opportunity and advantage for that end.

II. *Consider the weaknesses, frailties and mistakes of human nature in general,* which arise from the very constitution of a soul united to an animal body, and subjected to many inconveniences thereby. Consider the many additional weaknesses, mistakes and frailties which are derived from *our original apostacy and fall from a state of innocence*; how much our powers of understanding are yet more darkened, enfeebled, and imposed upon by our senses, our fancies, and our unruly passions, &c. Consider the depth and difficulty of many truths, and the flattering appearances of falsehood, whence arises an infinite variety of dangers to which we are exposed in our judgment of things. Read with greediness those authors that treat of the doctrine of prejudices, prepossessions and springs of error, on purpose to make your soul watchful on all sides, that it suffer not itself as far as possible to be imposed upon by any of them. See more on this subject, *Logic Part II. Chap.* 3. *and Part III. Chap.* 3

* Though the most of these following rules are chiefly addressed to those whom their fortune or their station require to addict themselves to the peculiar improvement of their minds in greater degrees of knowledge, yet every one who has leisure and opportunity to be acquainted with such writings as these, may find something among them for their own use.

III. A slight view of things so momentous is not sufficient. You should therefore contrive and practise some proper methods *to acquaint yourself with your own ignorance*, and to impress your mind with a deep and painful sense of the low and imperfect degrees of your *present knowledge*, that you may be incited with labour and activity to pursue after greater measures. Among others you may find some such methods as these successful.

1. Take a wide survey now and then of the vast and unlimited regions of learning. Let your meditations run over the names of all the sciences, with their numerous branchings, and innumerable particular themes of knowledge; and then reflect how few of them you are acquainted with in any tolerable degree. The most learned of mortals will never find occasion to act over again what is fabled of Alexander the Great, that when he had conquered what was called the Eastern World, he wept for want of more worlds to conquer. The worlds of science are immense and endless.

2. Think what a numberless variety of questions and difficulties there are belonging even to that particular science, in which you have made the greatest progress, and how few of them there are in which you have arrived at a final and undoubted certainty; excepting only those questions in the pure and simple mathematics, whose theorems are demonstrable and leave scarcely any doubt; and yet even in the pursuit of some few of these, mankind have been strangely bewildered.

3. Spend a few thoughts sometimes on the puzzling enquiries concerning *vacuums* and *atoms*, the *doctrine of infinites*, *indivisibles* and *incommensurables* in geometry, wherein there appear some insolvable difficulties: Do this on purpose to give you a more sensible impression of the poverty of your understanding, and the imperfection of your knowledge. This will teach you what a vain thing it is to fancy that you know all things; and will instruct you to think modestly of your present attainments, when every dust of the earth and every inch of empty space surmounts your understanding and triumphs over your presumption. Arithmo had been bred up to accounts all his life, and thought himself a complete master of numbers. But when he was pushed hard to give the square root of the number 2, he tried at it, and laboured long in millesimal fractions, until he confessed there was no end of the inquiry; and yet he learnt so much modesty by this perplexing question, that he was afraid to say, it was an impossible thing. It is some good degree of improvement when we are afraid to be positive.

4. Read the accounts of those vast treasures of knowledge

which some of the dead have possessed, and some of the living do possess. Read and be astonished at the almost incredible advances which have been made in science. Acquaint yourselves with some persons of great learning, that by converse among them, and comparing yourselves with them, you may acquire a mean opinion of your own attainments, and may be thereby animated with new zeal to equal them as far as possible, or to exceed; thus let your diligence be quickened by a generous and laudable emulation. If Vanillus had never met with Scitorio and Polydes, he had never imagined himself a mere novice in Philosophy, nor ever set himself to study in good earnest. Remember this, that if upon some few superficial acquirements you value, exalt and swell yourself as though you were a man of learning already, you are thereby building a most unpassable barrier against all improvement; you will lie down and indulge idleness, and rest yourself contented in the midst of deep and shameful ignorance. *Multi ad scientiam pervenissent si se illuc pervenisse non putassent.*

IV. *Presume not too much upon a bright genius, a ready wit, and good parts,* for this without labour and study will never make a man of knowledge and wisdom. This has been an unhappy temptation to persons of a vigorous and gay fancy, to despise learning and study. They have been acknowledged to shine in an assembly, and sparkle in discourse upon common topics, and thence they took it into their heads to abandon reading and labour and grow old in ignorance; but when they had lost the vivacities of animal nature and youth, they become stupid and sottish even to contempt and ridicule. Lucidas and Scintillo are young men of this stamp; they shine in conversation, they spread their native riches before the ignorant; they pride themselves in their own lively images of fancy, and imagine themselves wise and learned; but they had best avoid the presence of the skilful and the test of reasoning; and I would advise them once a day to think forward a little, what a contemptible figure they will make in age. The witty men have sometimes sense enough to know their own foible, and therefore they craftily shun the attacks of argument, or boldly pretend to despise and renounce them; because they are conscious of their own ignorance, and inwardly confess their want of acquaintance with the skill of reasoning.

V. As you are not to fancy yourself a learned man because you are blessed with a ready wit, so neither must you imagine that large and laborious reading, and a strong memory can denominate you truly wise. What that excellent critic has determined when he decided the question, whether wit or study makes the best poet, may well be applied to every sort of learning——

———*Ego nec studium sine divite vena*
Ne crude quid profit, video, ingenium; alterius sic
Altera poscit opem res, et conjurat amice.—**Hor. de Art. Poet.**

Thus made English:—

Concerning poets there has been contest,
Whether they're made by art or nature best:
But if I may presume in this affair,
Among the rest my judgment to declare,
No art without a genius will avail,
And parts without the help of art will fail:
But both ingredients jointly must unite,
Or verse will never shine with a transcendant light.—Oldham.

It is meditation and studious thought, it is the exercise of your own reason and judgment upon all you read, that gives good sense even to the best genius, and affords your understanding the truest improvement. A boy of strong memory may repeat a whole book of Euclid, yet be no Geometrician; for he may not be able perhaps to demonstrate one single theorem. Memorino has learnt half the Bible by heart, and is become a living concordance and a speaking index to theological folios, and yet he understands little of divinity.

A well furnished library and a capacious memory, are indeed of singular use toward the improvement of the mind; but if all your learning be nothing else but a mere amassment of what others have written, without a due penetration into their meaning, and without a judicious choice and determination of your own sentiments, I do not see what title your head has to true learning above your shelves. Though you have read Philosophy and Theology, Morals and Metaphysics in abundance, and every other art and science, yet if your memory is the only faculty employed, with the neglect of your reasoning powers, you can justly claim no higher character but that of a good historian of the sciences. Here note, Many of the foregoing advices are more peculiarly proper for those who are conceited of their abilities, and are ready to entertain a high opinion of themselves. But a modest humble youth of a good genius, should not suffer himself to be discouraged by any of these considerations. They are designed only as a spur to diligence, and a guard against vanity and pride.

VI. *Be not so weak as to imagine that a life of learning is a life of laziness and ease:* Dare not give up yourself to any of the learned professions unless you are resolved to labour hard at study, and can make it your delight, and the joy of your life, according to the motto of our late Lord Chancellor King. *Labor ipse voluptas.* It is no idle thing to be a scholar indeed. A man much addicted to luxury and pleasure, recreation and pas-

time, should never pretend to devote himself entirely to the sciences, unless his soul be so reformed and refined that he can taste all these entertainments eminently in his closet, among his books and papers. Sobrino is a temperate man and a philosopher, and he feeds upon partridge and pheasant, venison and ragouts, and every delicacy in a growing understanding, and a serene and healthy soul, though he dines on a dish of sprouts or turnips. Languinos loved his ease, and therefore chose to be brought up a scholar; he had much indolence in his temper, and as he never cared for study, he falls under universal contempt in his profession, because he has nothing but the gown and the name.

VII. *Let the hope of new discoveries, as well as the satisfaction and pleasure of known truths, animate your daily industry.* Do not think learning in general is arrived at its perfection, or that the knowledge of any particular subject in any science cannot be improved, merely because it has lain five hundred or a thousand years without improvement. The present age, by the blessing of God on the ingenuity and diligence of men, has brought to light such truths in natural philosophy, and such discoveries in the heavens and the earth, as seemed to be beyond the reach of man. But may not there be Sir Isaac Newtons in every science? You should never despair therefore of finding out that which has never yet been found, unless you see something in the nature of it which renders it unsearchable, and above the reach of our faculties.

Nor should a student in divinity imagine that our age is arrived at a full understanding of every thing which can be known by the scriptures. Every age since the reformation hath thrown some further light on difficult texts and paragraphs of the bible, which have been long obscured by the early rise of antichrist; and since there are at present many difficulties, and darknesses hanging about certain truths of the Christian Religion, and since several of these relate to important doctrines, such as the *Origin of Sin, the Fall of Adam, the Person of Christ, the blessed Trinity, and the Decrees of God, &c.* which do still embarrass the minds of honest and enquiring readers, and which make work for noisy controversy; it is certain there are several things in the bible yet unknown and not sufficiently explained, and it is certain that there is some way to solve these difficulties, and to reconcile these seeming contradictions. And why may not a sincere searcher of truth in the present age, by labour, diligence, study, and prayer, with the best use of his reasoning powers, find out the proper solution of those knots and perplexities which have hitherto been unsolved, and which have afforded matter for angry quarrelling? Happy is every man who shall be favoured of heaven to give a helping hand towards that introduction of the blessed age of light and love.

VIII. *Do not hover always on the surface of things, nor take up suddenly with mere appearances;* but penetrate into the depth of matters, as far as your time and circumstances allow, especially in those things which relate to your own profession.—Do not indulge yourselves to judge of things by the first glimpse, or a short and superficial view of them; for this will fill the mind with errors and prejudices, and give it a wrong turn and ill habit of thinking, and make much work for retraction. Subito is carried away with title pages, so that he ventures to pronounce upon a large octavo at once, and to recommend it wonderfully when he had read half the Preface. Another volume of controversies of equal size, was discarded by him at once, because, it pretended to treat of the Trinity, and yet he could neither find the word *essence* nor *subsistencies*, in the 12 first pages; but Subito changes his opinions of men and books and things so often, that nobody regards him. As for those sciences, or those parts of knowledge, which either your profession, your leisure, your inclination, or your incapacity, forbid you to pursue with much application, or to search far into them, you must be contented with an *historical* and *superficial knowledge* of them, and not pretend to form many judgments of your own on those subjects which you understand very imperfectly.

IX. Once a day, especially in the early years of life and study, *Call yourselves to an account what new ideas, what new proposition or truth you have gained, what further confirmation of known truths, and what advances you have made in any part of knowledge;* and let no day if possible pass away without some intellectual gain: such a course well pursued, must certainly advance us in useful knowledge. It is a wise proverb among the learned, borrowed from the lips and practice of a celebrated painter, *nulla dies sine linea;* let no day pass without one line at least; and it was a sacred rule among the Pythagoreans, that they should every evening thrice run over the actions and affairs of the day, and examine what their conduct had been, what they had done, or what they had neglected; and they assured their pupils, that by this method they would make a noble progress in the path of virtue.

Nor let soft slumber close your eyes,
Before you've recollected thrice
The train of actions thro' the day:
Where have my feet chose out the way?
What have I learnt, where'er I've been,
From all I've heard, from all I've seen?
What know I more that's worth the knowing?
What have I done that's worth the doing?
What have I sought that I should shun?
What duty have I left undone
Or into what new follies run?
These self-enquiries are the road
That leads to virtue and to God.

I would be glad among a nation of Christians, to find young men heartily engaged in the practice of what this heathen writer teaches.

X. *Maintain a constant watch at all times against a dogmatical spirit*: fix not your assent to any proposition in a firm and unalterable manner, till you have some firm and unalterable ground for it, and till you have arrived at some clear and sure evidence; till you have turned the proposition on all sides, and searched the matter through and through, so that you cannot be mistaken. And even where you may think you have full grounds of assurance, be not too early, nor too frequent in expressing this assurance in too peremptory and positive a manner, remembering that human nature is always liable to mistake in this corrupt and feeble state. A *dogmatical spirit* has many inconveniences attending it: as,

1. It stops the ear against all further reasoning upon that subject, and shuts up the mind from all farther improvements of knowledge. If you have resolutely fixed your opinion, though it be upon too slight and insufficient grounds, yet you will stand determined to renounce the strongest reason brought for the contrary opinion, and grow obstinate against the force of the clearest argument. Positivo is a man of this character, and has often pronounced his assurance of the Cartesian vortexes: last year some further light broke in upon his understanding, with uncontrollable force, by reading something of mathematical philosophy; yet having asserted his opinions in a most confident manner, he is tempted now to wink a little against the truth, or to prevaricate in his discourse upon that subject, lest by admitting conviction, he should expose himself to the necessity of confessing his former folly and mistake; and he has not humility enough for that.

2. A *dogmatical spirit* naturally leads us to *arrogance of mind*, and gives a man some airs in conversation, which are too haughty and assuming. Audens is a man of learning, and very good company, but his infallible assurance renders his carriage sometimes insupportable.

A *dogmatical spirit* inclines a man to be *censorious of his neighbours*. Every one of his opinions appears to him written as it were with sun-beams, and he grows angry that his neighbours does not see it in the same light. He is tempted to disdain his correspondents as men of a low and dark understanding, because they will not believe what he does. Furio goes farther in this wild track, and charges those who refuse his notions, with wilful obstinacy and vile hypocrisy: he tells them boldly, that they resist the truth, and sin against their consciences.

These are the men, that when they deal in controversy, delight in reproaches. They abound in tossing about *absurdity* and

stupidity among their brethren: They cast the imputation of *heresy* and *nonsense* plentifully upon their antagonists; and in matters of sacred importance, they deal out their *anathemas* in abundance upon christians better than themselves: they denounce damnation upon their neighbours without either justice or mercy, and when they pronounce sentences of divine wrath against supposed heretics, they add their own human fire and indignation. A dogmatist in religion is not a great way off from a bigot, and is in high danger of growing up to be a bloody persecutor.

XI. Though caution and slow assent will guard you against frequent mistakes and retractions, *yet you should get humility and courage enough to retract any mistake, and confess an error:* frequent changes are tokens of levity, in our first determinations; yet you should never be too proud to change your opinion, nor frighted at the name of changeling. Learn to scorn those vulgar bugbears which confirm foolish man in his own mistakes, for fear of being charged with inconstancy. I confess it is better not to judge, than to judge falsely; and it is wiser to withhold our assent till we see complete evidence; but if we have too suddenly given our assent, as the wisest man does sometimes, if we have professed what we find afterwards to be false, we should never be ashamed nor afraid to renounce a mistake. That is a noble essay that is found among the Occasional Papers, to encourage the world to practise *retractions;* and I would recommend it to the perusal of every scholar and every Christian.

XII. He that would raise his judgment above the vulgar rank of mankind, and learn to pass a just sentence on persons and things, *must take heed of a fanciful temper of mind, and a humourous conduct in his affairs.* Fancy and humour early and constantly indulged, may expect an old age over-run with follies.

The notion of *humourist* is, one that is greatly pleased or greatly displeased with little things, who sets his heart much upon matters of very small importance, who has his will determined every day by trifles, his actions seldom directed by the reason and nature of things, and his passions frequently raised by things of little moment. Where this practice is allowed, it will insensibly warp the judgment to pronounce little things great, and tempt you to lay a great weight upon them. In short this temper will incline you to pass an unjust value on almost every thing that occurs; and every step that you take in this path is just so far out of the way to wisdom.

XIII. For the same reason *have a care of trifling with things important and momentous, or of sporting with things awful and sacred:* do not indulge a spirit of ridicule, as some witty men do on all occasions and subjects. This will as unhappily bias the judgment on the other side, and incline you to pass a low esteem on the most valuable objects. Whatsoever evil

habit we indulge in practice, it will insensibly obtain a power over our understanding, and betray us into many errors. Jocander is ready with his jest to answer every thing that he ars; he reads books in the same jovial humour, and has got the art of turning every thought and sentence into merriment. How many awkward and irregular judgments does this man pass upon solemn subjects, even when he designs to be grave and in earnest? his mirth and laughing humour is formed into habit and temper, and leads his understanding shamefully astray. You will see him wandering in pursuit of a gay flying feather, and he is drawn by a sort of *ignis fatuus* into bogs and mire almost every day of his life.

XIV. *Ever maintain a virtuous and pious frame of spirit;* for an indulgence of vicious inclinations debases the understanding and perverts the judgment. *Whoredom and wine, and new wine, take away the heart* and soul and reason of a man. Sensuality ruins the better faculties of the mind: an indulgence to appetite and passion enfeebles the powers of reason, it makes the judgment weak and susceptive of every falsehood, and especially of such mistakes as have a tendency towards the gratification of the animal; and it warps the soul aside strangely from that stedfast honesty and integrity that necessarily belongs to the pursuit of truth. It is the virtuous man who is in a fair way to wisdom. *God gives to those that are good in his sight, wisdom, and knowledge, and joy;* Eccl. ii. 26.

Piety towards God, as well as sobriety and virtue, are necessary qualifications to make a truly wise and judicious man. He that abandons religion must act in such a contradiction to his own conscience and best judgment, that he abuses and spoils the faculty itself. It is thus in the nature of things, and it is thus by the righteous judgment of God: even the pretended sages among the heathens, *who did not like to retain God in their knowledge, they were given up to a reprobate mind,* an undistinguishing or injudicious mind, so that they judged inconsistently, and practised mere absurdities: Rom. i. 28.

And it is the character of the slaves of antichrist, 2 Thess. ii. 10, &c. that those *who receive not the love of the truth, were exposed to the power of diabolical sleights and lying wonders.* When divine revelation shines and blazes in the face of men with glorious evidence, and they wink their eyes against it, *the God of this world* is suffered to blind them even in the most obvious, common, and sensible things. The great God of heaven for this cause, *sends them strong delusions that they should believe a lie;* and the nonsense of transubstantiation in the popish world is a most glaring accomplishment of this prophecy, beyond ever what could have been thought of or expected among creatures who pretend to reason.

XV. *Watch against the pride of your own reason, and a vain conceit of your intellectual powers, with the neglect of divine aid and blessing.* Presume not upon great attainments in knowledge by your own self-sufficiency: those who *trust to their own understanding* entirely are pronounced fools in the word of God; and it is the wisest of men gives them this character, *he that trusteth in his own heart is a fool*; Prov. xxviii. 26. And the same divine writer advises to *trust in the Lord with all our heart; and not to lean to our own understandings, nor to be wise in our own eyes*; Chap. iii. 5, 7.

Those who with a neglect of religion, and dependence on God, apply themselves to search out every article in the things of God by the mere dint of their own reason, have been suffered to run into wild excesses of foolery, and strange extravagance of opinions. Every one who pursues this vain course, and will not ask for the conduct of God in the study of religion, has just reason to fear he shall be left of God, and given up a prey to a thousand prejudices: that he should be consigned over to the follies of his own heart, and pursue his own temporal and eternal ruin. And even in common studies, we should by humility and dependence engage the God of truth on our side.

XVI. *Offer up therefore your daily requests to God the Father of lights, that he would bless all your attempts and labours in reading, study, and conversation.* Think yourself, how easily and how insensibly by one turn of thought he can lead you into a large scene of useful ideas; he can teach you to lay hold on a clue which may guide your thoughts with safety and ease through all the difficulties of an intricate subject. Think how easily the Author of your beings can direct your motions by his providence, so that the glance of an eye, or a word striking the ear, or a sudden turn of the fancy, shall conduct you to a train of happy sentiments. By his secret and supreme method of government he can draw you to read such a treatise, or to converse with such a person who may give you more light into some deep subject in an hour, than you could obtain by a month of your own solitary labour.

Think with yourself, with how much ease the God of spirits can cast into our mind some useful suggestion, and give a happy turn to your own thoughts, or the thoughts of those with whom you converse, whence you may derive unspeakable light and satisfaction in a matter that has long puzzled and entangled you: he can shew you a path *which the vulture's eye has not seen*, and lead you by some unknown gate or portal, out of the wilderness and labyrinth of difficulties wherein you have been long wandering.

Implore constantly his divine grace to point your inclination to proper studies, and to fix your heart there. He can keep off

emptations on the right-hand and on the left, both by the course of his providence, and by the secret and insensible intimations of his Spirit. He can guard your understanding from every evil influence of error, and secure you from the danger of evil books and men, which might otherwise have a fatal effect, and lead you into pernicious mistakes.

Nor let this sort of advice fall under the censure of the godless and profane, as a mere piece of bigotry or enthusiasm derived from faith and the bible: for the reasons which I have given to support this pious practice of invoking the blessing of God on our studies, are derived from the light of nature as well as revelation. He that made our souls and is the Father of spirits, shall he not be supposed to have a most friendly influence towards the instruction and government of them? The Author of our rational powers can involve them in darkness when he pleases by a sudden distemper, or he can abandon them to wander into dark and foolish opinions when they are filled with a vain conceit of their own light. He expects to be acknowledged in the common affairs of life, and he does as certainly expect it in the superior operations of the mind, and in the search of knowledge and truth. The Latins were taught to say, *A Jove principium musae.* In the works of learning they thought it necessary to begin with God. Even the poets call upon the *muse* as a goodness to assist them in their compositions.

The first lines of Homer in his Iliad and his Odyssey, the first line of Musaeus in his song of Hero and Leander, the beginning of Hesiod in his poem of Works and Days, and several others, furnish us with sufficient examples of this kind; nor does Ovid leave out this piece of devotion as he begins his stories of the Metamorphosis. Christianity so much the more obliges us by the precepts of Scripture to invoke the assistance of the true God in all our labours of the mind, for the improvement of ourselves and others. Bishop Saunderson says, that *study without prayer is atheism*, as well as that *prayer without study is presumption.* And we are still more abundantly encouraged by the testimony of those who have acknowledged from their own experience, that sincere prayer was no hindrance to their studies: they have gotten more knowledge sometimes upon their knees, than by their labour in perusing a variety of authors; and they have left this observation for such as follow, *Bene orasse est bene studuisse.* Praying is the best studying.

To conclude, let industry and devotion join together, and you need not doubt the happy success; Prov. ii. 2. *Incline thine ear to wisdom, apply thine heart to understanding: cry after knowledge, and lift up thy voice; seek her as silver, and search for her as for hidden treasures; then shalt thou understand the*

fear of the Lord, &c. which is the beginning of wisdom. It is the Lord who gives wisdom even to the simple, and out of his mouth cometh knowledge and understanding.

CHAP. II.—*Observation, Reading, Instruction by Lectures, Conversation, and Study compared.*

THERE are *five eminent means or methods* whereby the mind is improved in the knowledge of things, and these are *observation, reading, instruction by lectures, conversation, and meditation ;* which last in a most peculiar manner is called *study.*

Let us survey the general *definition* or *descriptions* of them all.

I. Observation is the notice that we take of all occurrences in human life, whether they are sensible or intellectual, whether relating to persons or things, to ourselves or others. It is this that furnishes us even from our infancy, with a rich variety of ideas and propositions, words and phrases : it is by this we know that fire will burn, that the sun gives light, that a horse eats grass, that an acorn produces an oak, that man is a being capable of reasoning and discourse, that our judgment is weak, that our mistakes are many, that our sorrows are great, that our bodies die and are carried to the grave, and that one generation succeeds another. All those things which we see, which we hear or feel, which we perceive by sense or consciousness, or which we know in a direct manner, with scarcely any exercise of our reflecting faculties or our reasoning powers, may be included under the general name of *observation.*

When this *observation* relates to any thing that immediately concerns ourselves, and of which we are conscious, it may be called *experience.* So I am said to know or experience, that I have in myself a power of thinking, fearing, loving, &c. that I have appetites and passions working in me, and many personal occurrences have attended me in this life.

Observation therefore includes all that Mr. Locke means by *sensation* and *reflection.*

When we are searching out the nature or properties of any being, by various methods of trial ; or when we apply some active powers or set some causes at work, to observe what effects they would produce, this sort of observation is called *experiment.* So when I throw a bullet into water, I find it sinks : and when I throw the same bullet into quick-silver, I see it swims : but if I beat out this bullet into a thin hollow shape like a dish, then it will swim in the water too. So when I strike two flints together, I find they produce fire ; when I throw a seed into the earth, it grows up into a plant.

All these belong to the first method of knowledge, which I call *observation.*

II. Reading is that means or method of knowledge, whereby *we acquaint ourselves with what other men have written or published to the world in their writings.* These arts of *reading* and *writing* are of infinite advantage; for by them we are made partakers of the sentiments, observations, reasonings, and improvements of all the learned world, in the most remote nations, and in former ages, almost from the beginning of mankind.

III. Public or private lectures, are such *verbal instructions as are given by a teacher while the learners attend in silence.* This is the way of learning religion from the pulpit, or of philosophy or theology from the professor's chair or of mathematics by a teacher shewing us various theorems or problems, that is speculations or practices, by demonstration and operation, with all the instruments of art necessary to those operations.

IV. Conversation is another method of improving our minds, wherein *by mutual discourse and enquiry, we learn the sentiments of others, as well as communicate our sentiments to others in the same manner.* Sometimes indeed, though both parties speak by turns, yet the advantage is only on one side; as, when a teacher and a learner meet and discourse together: but frequently the profit is mutual. Under this head of conversation, we may also rank disputes of various kinds.

V. Meditation or study includes all those *exercises of the mind whereby we render all the former methods useful for our increase in true knowledge and wisdom.* It is by meditation we come to confirm our memory of things that pass through our thoughts in the occurrences of life, in our own experiences, and in the observations we make: it is by *meditation* that we draw various inferences and establish in our minds general principles of knowledge. It is by *meditation* that we compare the various ideas which we derive from our senses, or from the operations of our souls, and join them in propositions. It is by *meditation* that we fix in our memory whatsoever we learn, and form our own judgment of the truth or falsehood, the strength or weakness of what others speak or write. It is *meditation* or study that draws out long chains of argument, and searches and finds deep and difficult truths, which before lay concealed in darkness.

It would be a needless thing to prove that our own solitary meditations, together with the few observations that the most part of mankind are capable of making, are not sufficient of themselves to lead us into the attainment of any considerable proportion of knowledge, at least in an age so much improved as ours is, without the assistance of conversation and reading, and other proper instructions that are to be attained in our days. Yet each of these five methods have their peculiar advantages, where-

by they assist each other ; and their peculiar defects, which have need to be supplied by the other's assistance. Let us trace over some of the particular advantages of each.

I. One method of improving the mind is observation, and the advantages of it are these :

1. It is owing to observation that our *mind is furnished with the first, simple and complex ideas.* It is this lays the groundwork and foundation of all knowledge, and makes us capable of using any of the other methods for improving the mind : for if we did not attain a variety of sensible and intellectual ideas by the sensation of outward objects, by the consciousness of our own appetites and passions, pleasures, and pains, and by inward experience of the actings of our own spirits, it would be impossible either for men or books to teach us any thing. It is observation that must give us our first ideas of things, as it includes in it sense and consciousness.

2. All our knowledge derived from observation, whether it be of single ideas or of propositions, is knowledge gotten at first hand. Hereby we see and know things as they are, or as they appear to us ; we take the impressions of them on our minds from the original objects themselves, which give a clearer and stronger conception of things ; these ideas are more lively, and the propositions (at least in many cases) are much more evident. Whereas what knowledge we derive from *lectures, reading*, and *conversation*, is but the copy of other men's ideas, that is, the picture of a picture ; and is one remove further from the original.

3. Another advantage of observation is, that we may gain knowledge all the day long, and every moment of our lives, and every moment of our existence we may be adding something to our intellectual treasures thereby, except only while we are asleep ; and even then the remembrance of our dreamings will teach us some truths, and lay a foundation for a better acquaintance with human nature, both in the powers and in the frailties of it.

II. The next way of improving the mind is by *reading*, and the advantages of it are such as these :

1. By *reading* we acquaint ourselves in a very extensive manner *with the affairs, actions and thoughts of the living and the dead, in the most remote nations, and in most distant ages ;* and that with as much ease as though they lived in our own age and nation. By reading of books we may learn something from all parts of mankind ; whereas by observation we learn all from ourselves, and only what comes within our own direct cognizance ; by conversation we can only enjoy the assistance of a very few persons, viz. those who are near us, and live at the same time when we do, that is, our neighbours and contemporaries : but our knowledge is much more narrowed still, if

we confine ourselves merely to our own solitary reasonings, without much observation or reading: For then all our improvement must arise only from our own inward powers and meditations.

2. By *reading* we learn not only the actions and the sentiments of distant nations and ages, but we transfer to ourselves the knowledge and improvements of the *most learned men, the wisest and the best of mankind,* when or wheresoever they lived: For though many books have been written by weak and injudicious persons, yet the most of those books which have obtained great reputation in the world, are the products of great and wise men in their several ages and nations: whereas we can obtain the conversation and instruction of those only who are within the reach of our dwelling, or our acquaintance, whether they are wise or unwise; and sometimes that narrow sphere scarcely affords any person of great eminence in wisdom or learning, unless our instructor happen to have this character. And as for our own study and meditations, even when we arrive at some good degrees of learning, our advantage for further improvement in knowledge by them, is still far more contracted than what we may derive from *reading*.

3. When we read good authors we learn *the best, the most laboured and most refined sentiments even of those wise and learned men;* for they have studied hard, and have committed to writing their maturest thoughts, and the result of their long study and experience: whereas by conversation, and in some lectures, we obtain many times only the present thoughts of our tutors or friends which (though they may be bright and useful) yet, at first perhaps, may be sudden and indigested, and are mere hints which have arisen to no maturity.

4. It is another advantage of *reading*, that we may *review what we have read;* we may consult the page again and again, and meditate on it at successive seasons in our serenest and retired hours, having the book always at hand: but what we obtain by conversation and in lectures, is oftentimes lost again as soon as the company breaks up, or at least when the day vanishes; unless we happen to have the talent of a good memory, or quickly retire and note down what *remarkables* we have found in those discourses. And for the same reason, and for want of retiring and writing, many a learned man has lost several useful meditations of his own, and could never recal them again.

III. The advantages of verbal instructions by public or private lectures are these:

1. There is something more sprightly, more delightful and entertaining in the living discourse of a wise, a learned, and well-qualified teacher, than there is in the silent and sedentary

practice of reading. The very turn of voice, the good pronunciation, and the polite and alluring manner which some teachers have attained, will engage the attention, keep the soul fixed, and convey and insinuate into the mind, the ideas of things in a more lively and forcible way, than the mere reading of books in the silence and retirement of the closet.

2. A tutor or instructor, when he paraphrases and explains other authors, can *mark out the precise point of difficulty or controversy*, and unfold it. He can shew you which paragraphs are of the greatest importance, and which are of less moment. He can teach his hearers what authors, or what parts of an author, are best worth reading on any particular subject; and thus save his disciples much time and pains, by shortening the labours of their closet and private studies. He can shew you what were the doctrines of the *ancients* in a *compendium*, which perhaps would cost much labour and the perusal of many books to attain. He can inform you what new doctrines or sentiments are rising in the world, before they come to be public; as well as acquaint you with his own private thoughts, and his own experiments and observations; which never were, and perhaps never will be published to the world, and yet may be very valuable and useful.

3. A living instructor *can convey to our senses those notions with which he would furnish our minds, when he teaches us natural philosophy, or most parts of mathematical learning.* He can make the experiments before our eyes. He can describe *figures* and *diagrams*, point to the *lines* and *angles*, and make out the *demonstration* in a more intelligible manner by sensible means, which cannot be done so well by mere reading, even though we should have the same figures lying in a book before our eyes. A living teacher, therefore, is a most necessary help in these studies.

I might add also, that even where the subject of discourse is *moral*, *logical* or *rhetorical*, &c. and which does not directly come under the notice of our senses, a tutor may explain his ideas by such familiar examples, and plain or simple similitudes, as seldom find place in books and writings.

4. When an instructor in his lectures delivers any matter of difficulty, or expresses himself in such a manner as seems obscure, so that you do not take up his ideas clearly or fully, you have opportunity, at least when the lecture is finished, or at other proper seasons, to *inquire how such a sentence should be understood, or how such a difficulty may be explained and removed.*

If there be permission given to free converse with the tutor, either in the midst of the lecture, or rather at the end of it, con-

cerning any doubts or difficulties that occur to the hearer, this brings it very near to conversation or discourse.

IV. Conversation is the next method of improvement, and it is attended with the following advantages:

1. When we *converse* familiarly with a learned friend, we have his own help at hand to explain to us every word and sentiment that seems obscure in his discourse, and to inform us of his whole meaning, so that we are in much less danger of mistaking his sense; whereas in *books*, whatsoever is really obscure, may also abide always obscure without remedy, since the author is not at hand, that we may enquire his sense.

If we mistake the meaning of our friend in conversation, we are quickly set right again; but in reading we many times go on in the same mistake, and are not capable of recovering ourselves from it. Thence it comes to pass, that we have so many contests in all ages about the meaning of ancient authors, and especially the sacred writers. Happy should we be, could we but converse with Moses, Isaiah, and St. Paul, and consult the prophets and apostles, when we meet with a difficult text? But that glorious conversation is reserved for the ages of future blessedness.

2. When we are discoursing upon any theme with a friend, *we may propose our doubts and objections against his sentiments, and have them solved and answered at once.*—The difficulties that arise in our minds, may be removed by one enlightening word of our correspondent; whereas in reading, if a difficulty or question arise in our thoughts which the author has not happened to mention, we must be content without a present answer or solution of it. Books cannot speak.

3. Not only the doubts which arise in the mind upon any subject of discourse, are easily proposed and solved in conversation, but the very *difficulties we meet with in books and in our private studies*, may find a relief by friendly conference. We may pore upon a knotty point in solitary meditation many months without a solution, because perhaps we have gotten into a wrong tract of thought; and our labour (while we are pursuing a false scent) is not only useless and unsuccessful, but it leads us perhaps into a train of error for want of being corrected in the first step. But if we note down this difficulty when we read it, we may propose it to an ingenious correspondent when we see him; we may be relieved in a moment, and find the difficulty vanish: he beholds the object perhaps in a different view, sets it before us in quite another light, and leads us at once into evidence and truth, and that with a delightful surprise.

4. *Conversation calls out into light what has been lodged in all the recesses and secret chambers of the soul:* by occasional hints and incidents it brings old useful notions into remem-

brance; it unfolds and displays the hidden treasures of knowledge with which *reading*, *observation* and *study* had before furnished the mind. By mutual discourse the soul is awakened and allured to bring forth its hoards of knowledge, and it learns how to render them most useful to mankind. A man of vast reading without conversation, is like a *miser* who lives only to himself.

5. In free and friendly *conversation* our *intellectual powers are more animated, and our spirits act with a superior vigour in the quest and pursuit of unknown truths.* There is a sharpness and sagacity of truth that attends *conversation*, beyond what we find whilst we are shut up reading and musing in our retirements. Our souls may be serene in solitude, but not sparkling, though perhaps we are employed in reading the works of the brightest writers. Often has it happened in *free discourse*, that new thoughts are strangely struck out, and the seeds of truth sparkle and blaze through the company, which in calm and silent reading would never have been excited. By *conversation* you will both give and receive this benefit; as flints when put into motion and striking against each other, produce living fire on both sides, which would never have risen from the same hard materials in a state of rest.

6. In generous *conversation*, amongst ingenious and learned men, we have a great advantage of proposing our private opinions, and of *bringing our own sentiments to the test*, and learning in a more compendious and a safer way what the world will judge of them, how mankind will receive them, what objections may be raised against them, what defects there are in our scheme, and how to correct our own mistakes; which advantages are not so easy to be obtained by our own private meditations: for the pleasure we take in our own notions, and the passion of self-love, as well as the narrowness of our own views, tempt us to pass too favourable an opinion on our own schemes; whereas the variety of *genius* in our several associates, will give happy notices how our opinion will stand in the view of mankind.

7. It is also another considerable advantage of *conversation*, that it furnishes the student with the knowledge of men and the affairs of life, as reading furnishes him with book-learning. A man who dwells all his days among books may have amassed together a vast heap of notions, but he may be a mere scholar, which is a contemptible sort of character in the world. A hermit who has been shut up in his cell in a college, has contracted a sort of mould and rust upon his soul, and all his airs of behaviour have a certain aukwardness in them; but these aukward airs are worn away by degrees in company: the rust and the mould are filed and brushed off by polite conversation. The

scholar now becomes a citizen or a gentleman, a neighbour and a friend; he learns how to dress his sentiments in the fairest colours, as well as to set them in the strongest light. Thus he brings out his notions with honour, he makes some use of them in the world, and improves the theory by the practice.

But before we proceed too far in finishing a bright character by *conversation*, we should consider that something else is necessary besides an acquaintance with men and books: and therefore I add,

V. Mere *lecture*, *reading*, and *conversation*, without *thinking*, are not sufficient to make a man of knowledge and wisdom. It is our own *thought*, and *reflection*, *study* and *meditation*, must attend all the other methods of improvement, and perfect them. It carries these advantages with it:

1. Though observation and instruction, reading and conversation may furnish us with many ideas of men and things, yet it is *our own meditation* and the labour of our own thoughts, that must form our judgment of things. Our own thoughts should join or disjoin these ideas in a proposition for ourselves: it is our own mind that must judge for ourselves concerning the agreement or disagreement of ideas, and form propositions of truth out of them. Reading and conversation may acquaint us with many truths and with many arguments to support them, but it is our own study and reasoning that must determine whether these propositions are true, and whether these arguments are just and solid.

It is confest there are a thousand things which our eyes have not seen, and which would never come within the reach of our personal and immediate knowledge and observation, because of the distance of times and places: These must be known by consulting other persons; and that is done either in their *writings* or in their *discourses*. But after all, let this be a fixed point with us, that it is our own reflection and judgment must determine how far we should receive that which books or men inform us of, and how far they are worthy of our assent and credit.

2. It is *meditation* and *study* that *transfers and conveys the notions and sentiments of others to ourselves*, so as to make them properly our own. It is our own judgment upon them as well as our memory of them, that makes them become our own property. It does as it were concoct our intellectual food, and turns it into a part of ourselves: just as a man may call his limbs and his flesh *his own*, whether he borrowed the materials from the ox or the sheep, from the lark or the lobster; whether he derived it from corn or milk, the fruits of the trees, or the herbs and roots of the earth; it is all now become one substance with himself, and he wields and manages those muscles and limbs for his own proper purposes, which once were the substance

of other animals or vegetables; that very substance which last week was grazing in the field or swimming in the sea, waving in the milk-pail or growing in the garden, is now become part of the man.

3. By *study* and *meditation*, we *improve the hints* that we have acquired by observation, conversation and reading; we take more time in thinking, and by the labour of the mind we penetrate deeper into themes of knowledge, and carry our thoughts sometimes much farther on many subjects, than we ever met with either in the books of the dead or discourses of the living. It is our own *reasoning* that draws out one truth from another, and forms a whole scheme of science from a few hints which we borrowed elsewhere.

By a survey of these things we may justly conclude, that he who spends all his time in hearing lectures, or poring upon books, without observation, meditation or converse, will have but a mere historical knowledge of learning, and be able only to tell what others have known or said on the subject: he that lets all his time flow away in conversation, without due observation, reading, or study, will gain but a slight and superficial knowledge, which will be in danger of vanishing with the voice of the speaker; and he that confines himself merely to his closet and his own narrow observation of things, and is taught only by his own *solitary thoughts, without instruction by lectures, reading, or free conversation*, will be in danger of a narrow spirit, a vain conceit of himself, and an unreasonable contempt of others; and after all, he will obtain but a very limited and imperfect view and knowledge of things, and he will seldom learn how to make that knowledge useful.

These *five methods of improvement* should be pursued jointly, and go hand in hand, where our circumstances are so happy as to find opportunity and conveniency to enjoy them all: though I must give my opinion, that two of them, *reading* and *meditation*, should employ much more of our time than public *lectures* or *conversation* and discourse. As for *observation* we may be always acquiring knowledge that way, whether we are alone or in company. But it will be for our further improvement, if we will go over all these *five methods* of obtaining knowledge more distinctly, and more at large, and see what special advances in useful science we may draw from them all.

CHAP. III.—*Rules relating to Observation.*

THOUGH *observation* in the strict sense of the word, and as it is distinguished from *meditation* and *study*, is the first means of our improvement, and in its strictest sense does not include in it any reasonings of the mind upon the things which we observe,

or inferences drawn from them; yet the motions of the mind are so exceeding swift, that it is hardly possible for a thinking man to gain experiences or observations, without making some secret and short reflections upon them; and therefore in giving a few directions concerning this method of improvement, I shall not so narrowly confine myself to the first mere impressions of objects on the mind by observation; but include also some hints which relate to the first, most easy, and obvious reflections or reasonings which arise from them.

I. *Let the enlargement of your knowledge be one constant view and design in life: since there is no time or place, no transactions, occurrences or engagements in life, which exclude us from this method of improving the mind.* When we are alone, even in darkness and silence, we may converse with our own hearts, observe the working of our own spirits, and reflect upon the inward motions of our own passions in some of the latest occurrences in life; we may acquaint ourselves with the powers and properties, the tendencies and inclinations both of body and spirit, and gain a more intimate knowledge of ourselves. When we are in company, we may discover something more of human nature, of human passions and follies, and of human affairs, vices and virtues, by conversing with mankind, and observing their conduct. Nor is there any thing more valuable than the *knowledge of ourselves, and the knowledge of men*, except it be the *knowledge of God* who made us, and our relation to him as our governor.

When we are in the house or the city, wheresoever we turn our eyes, we see the *works of men*; when we are abroad in *the country*, we behold more of the *works of God*. The skies and the ground above and beneath us, and the animal and vegetable world round about us, may entertain our observation with ten thousand varieties. Endeavour therefore to "derive some instruction or improvement of the mind from every thing which you see or hear, from every thing which occurs in human life, from every thing within you or without you."

Fetch down some knowledge from the *clouds*, the *stars*, the *sun*, the *moon*, and the *revolution of all the planets*: dig and draw up some valuable meditations from the *depths of the earth*, and search them through the vast *oceans of water*: extract some intellectual improvements from the *minerals* and *metals*; from the wonders of nature among the *vegetables*, the *herbs*, *trees*, and *flowers*. Learn some lessons from the birds, and the beasts, and the meanest insect. Read the wisdom of God and his admirable contrivance in them all. Read his almighty power, his rich and various goodness in all the works of his hands.

From the day and the night, the hours and the flying minutes, learn a wise improvement of time, and be watchful to

ships and enmities stand aloof and keep out of the way, in the observations that you make relating to persons and things.

If this rule were well obeyed, we should be much better guarded against those common pieces of misconduct in the observations of men, viz. the false judgments of pride and envy. How ready is envy to mingle with the notices which we take of other persons? How often is mankind prone to put an ill sense upon the actions of their neighbours, to take a survey of them in an evil position, and in an unhappy light? And by this means, we form a worse opinion of our neighbours than they deserve; while at the same time, pride and self-flattery tempt us to make unjust observations on ourselves in our own favour. In all the favourable judgments we pass concerning ourselves, we should allow a little abatement on this account.

V. *In making your observations on persons, take care of indulging that busy curiosity which is ever enquiring into private and domestic affairs, with an endless itch of learning the secret history of families.* It is but seldom that such a prying curiosity attains any valuable ends; it often begets suspicions, jealousies and disturbances in households, and it is a frequent temptation to persons to defame their neighbours. Some persons cannot help telling what they know; a *busy body* is most liable to become a *tatler* upon every occasion.

VI. Let your observations even of persons and their conduct, *be chiefly designed in order to lead you to a better acquaintance with things, particularly with human nature;* and to inform you what to imitate and what to avoid, rather than to furnish out matter for the evil passions of the mind, or the impertinences of discourse, and reproaches of the tongue.

VII. Though it may be proper sometimes to make your observations concerning persons as well as things, the subject of your discourse in learned or useful conversation; *yet what remarks you make on particular persons, especially to their disadvantage, should for the most part lie hid in your own breast,* till some just and apparent occasion, some necessary call of providence lead you of speak of them. If the character or conduct which you observe, be greatly culpable, it should so much the less be published. You may treasure up such remarks of the follies, indecencies, or vices of your neighbours, as may be a constant guard against your practice of the same, without exposing the reputation of your neighbour on that account. It is a good old rule, that "our conversation should rather be laid out on things than on persons;" and this rule should generally be observed, unless names be concealed, wheresoever the faults or follies of mankind are our present theme. Our late Archbishop Tillotson has written a small but excellent discourse on evil speaking, wherein he admirably explains, limits and

applies that general apostolic precept, *Speak evil of no man;* Tit. iii. 2.

VIII. *Be not too hasty to erect general theories from few particular observations, appearances or experiments.* That is what the *logicians* call a *false induction.* When general observations are drawn from so many particulars as to become certain and indubitable, these are jewels of knowledge, comprehending great treasure in a little room; but they are therefore to be made with the greater care and caution, lest errors become large and diffusive, if we should mistake in these general notions. A hasty determination of some universal principles, without a due survey of all the particular cases which may be included in them, is the way to lay a trap for our own understandings in their pursuit of any subject, and we shall often be taken captives into mistake and falsehood. Niveo in his youth observed, that on three Christmas-days together there fell a good quantity of snow, and now he hath writ down in his almanack as part of his wise remarks on the weather, that it will always snow at Christmas. Euron a young lad, took notice ten times that there was a sharp frost when the wind was in the north-east, therefore in the middle of last July, he almost expected it should freeze, because the weather-cocks shewed him a north-east wind; and he was still more disappointed, when he found it a very sultry season.—It is the same hasty judgment, that hath drawn scandal on a whole nation for the sake of some culpable characters belonging to several particular natives of that country; whereas all the Frenchmen are not gay and airy; all the Italians are not jealous and revengeful; nor are all the English over-run with the spleen.

CHAP. IV.—*Of Books and Reading.*

1. THE world is full of books, but there are multitudes which are so ill written they were never worthy any man's reading; and there are thousands more which may be good in their kind, yet are worth nothing when the month or year, or occasion is past for which they were written. Others may be valuable in themselves, for some special purpose or in some peculiar science, but are not fit to be perused by any but those who are engaged in that particular science or business. To what use is it for a divine or physician, or a tradesman, to read over the huge volumes of reports of judged cases in the law? or for a lawyer to learn Hebrew and read the Rabbins? It is of vast advantage for improvement of knowledge and saving time, for a young man to have the most proper books for his reading recommended by a judicious friend.

II. Books of importance of any kind, and especially com-

plete treatises on any subject, should be first read in a more general and cursory manner, to learn a little what the treatise promises, and what you may expect from the writer's manner and skill. And for this end I would advise always that the preface be read, and a survey taken of the table of contents, if there be one, before the first survey of the book. By this means you will not only be better fitted to give the book the first reading, but you will be much assisted in your second perusal of it, which should be done with greater attention and deliberation, and you will learn with more ease and readiness what the author pretends to teach. *In your reading, mark what is new or unknown to you before,* and review those chapters, pages, or paragraphs.—Unless a reader has an uncommon and most retentive memory, I may venture to affirm, that there is scarce any book or chapter worth reading once that is not worthy of a second perusal. At least take a careful view of all the lines or paragraphs which you marked, and make a recollection of the sections which you thought truly valuable.

There is another reason also why I would chuse to take a superficial and cursory survey of a book, before I sit down to read it, and dwell upon it with studious attention; and that is, there may be several difficulties in it which we cannot easily understand and conquer at the first reading, for want of a fuller comprehension of the author's whole scheme. And therefore in such treatises we should not stay till we master every difficulty at the first perusal; for perhaps many of these would appear to be solved when we have proceeded farther in that book, or would vanish of themselves upon a second reading. What we cannot reach and penetrate at first, may be noted down as matter of after consideration and enquiry, if the pages that follow do not happen to strike a complete light on those which went before.

III. If three or four persons agree to read the same book, and each bring his own remarks upon it at some set hours appointed for conversation, and they communicate mutually their sentiments on the subject, and debate about it in a friendly manner, this practice will render the reading any author more abundantly beneficial to every one of them.

IV. If several persons engaged in the same study, take into their hands distinct treatises on one subject, and appoint a season of communication once a week, they may inform each other in a brief manner concerning the sense, sentiments and method of those several authors, and thereby promote each others improvement either by recommending the perusal of the same book to their companions, or perhaps by satisfying their enquiries concerning it by conversation, without every ones perusing it.

V. Remember that your business in reading or in conversa-

tion, especially on subjects of natural, moral, or divine science, is not merely to know the opinion of the author or speaker, for this is but the mere knowledge of history; but your chief business is to consider whether their opinions are right or no, and to improve your own solid knowledge of that subject by meditating on the themes of their writing or discourse. Deal freely with every author you read, and yield up your assent only to evidence and just reasoning on the subject.

Here I would be understood to speak only of human authors, and not of the sacred and inspired writings. In these, our business indeed is only to find out the sense, and understand the true meaning of the paragraph and page, and our assent then is bound to follow, when we are before satisfied that the writing is divine. Yet I might add also, that even this is just reasoning, and this is sufficient evidence to demand our assent. But in the composures of men, remember you are a man as well as they; and it is not their reason but your own, that is given to guide you when you arrive at years of discretion, of manly age and judgment.

VI. Let this therefore be your practice, especially after you have gone through one course of any science in your academical studies; if a writer on that subject maintains the same sentiments as you do, yet if he does not explain his ideas or prove his positions well, mark the faults or defects, and endeavour to do it better, either in the margin of your book, or rather in some papers of your own, or at least let it be done in your private meditations. As for instance:

Where the author is *obscure*, enlighten him; where he is *imperfect*, supply his deficiencies; where he is too *brief* and *concise*, amplify a little, and set his notions in a fairer view; where he is *redundant*, mark those paragraphs to be retrenched; when he *trifles* and *grows impertinent*, abandon those passages or pages; where he *argues*, observe whether his reasons be conclusive; if the conclusion be true, and yet the *argument weak*, endeavour to confirm it by better proofs; where he *derives* or *infers* any propositions *darkly* or *doubtfully*, make the justice of the inference appear, and add further inferences or corollaries, if such occur to your mind; where you suppose he is in a *mistake*, propose your objections, and correct his sentiments; where he *writes so well as to approve itself* to your judgment both as just and useful, treasure it up in your memory, and count it a part of your intellectual gains.

Note, Many of these same directions which I have now given, may be practised with regard to conversation, as well as reading, in order to render it useful in the most extensive and lasting manner.

VII. Other things also of the like nature may be usefully

practised with regard to the authors which you read, viz. If the method of a book be irregular, reduce it into form by a little analysis of your own, or by hints in the margin; if those things are heaped together which should be separated, you may wisely distinguish and divide them. If several things relating to the same subject are scattered up and down separately through the treatise, you may bring them all to one view by references; or if the matter of a book be really valuable and deserving, you may throw it into a better method, reduce it to a more logical scheme, or abridge it into a lesser form; all these practices will have a tendency both to advance your skill in logic and method, to improve your judgment in general, and to give you a fuller survey of that subject in particular. When you have finished the treatise with all your observations upon it, recollect and determine what real improvements you have made by reading that author.

VIII. If a book has no index to it, or good table of contents it is very useful to make one as you are reading it; not with that exactness as to include the sense of every page and paragraph, which should be done if you designed to print it; but it is sufficient in your index to take notice only of those parts of the book which are new to you, or which you think well written, and well worthy of your remembrance or review.

Shall I be so free as to assure my younger friends, from my own experience, that these methods of reading will cost some pains in the first years of your study, and especially in the first authors which you peruse in any science, or on any particular subject; but the profit will richly compensate the pains. And in the following years of life, after you have read a few valuable books on any special subject in this manner, it will be very easy to read others of the same kind, because you will not usually find very much new matter in them which you have not already examined.

IX. If the writer be remarkable for any *peculiar excellencies or defects in his style or manner of writing*, make just observations upon this also; and whatever ornaments you find there, or whatsoever blemishes occur in the language or manner of the writer, you may make just remarks upon them.—And remember, that *one book read over in this manner, with all this laborious meditation, will tend more to enrich your understanding, than the skimming over the surface of twenty authors.*

X. By perusing books in the manner I have described, you will make all your reading subservient not only to the enlargement of your treasures of knowledge, but also to the improvement of your reasoning powers.

There are many who read with constancy and diligence, and yet make no advances in true knowledge by it. They are de-

lighted with the notions which they read or hear, as they would be with stories that are told, but they do not weigh them in their minds as in a just balance, in order to determine their truth or falsehood; they make no observations upon them, or inferences from them. Perhaps their eye slides over the pages, or the words slide over their ears, and vanish like a rhapsody of evening tales, or the shadows of a cloud flying over a green field in a summer's day. Or if they review them sufficiently to fix them in their remembrance, it is merely with a design to tell the tale over again, and shew what men of learning they are. Thus they dream out their days in a course of reading without real advantage. As a man may be eating all day, and for want of digestion is never nourished; so these endless readers may cram themselves in vain with intellectual food, and without real improvement of their minds, for want of digesting it by proper reflections.

XI. Be diligent therefore in observing these directions.—Enter into the sense and argument of the authors you read, examine all their proofs, and then judge of the truth or falsehood of their opinions; and thereby you shall not only gain a rich increase of your understandings by those truths which the author teaches, when you shall see them well supported, but you shall acquire also by degrees an habit of judging justly, and of reasoning well, in imitation of the good writer, whose works you peruse.

This is laborious indeed, and the mind is backward to undergo the fatigue of weighing every argument and tracing every thing to its original. It is much less labour to take all things upon trust; believing is much easier than arguing. But when Studentio had once persuaded his mind to tie itself down to this method which I have prescribed, he sensibly gained an admirable facility to read, and judge of what he read, by his daily practice of it, and the man made large advances in the pursuit of truth; while Plumbinus and Plumeo made less progress in knowledge, though they had read over more folios. Plumeo skimmed over the pages like a swallow over the flowery meads in May. Plumbinus read every line and syllable, but did not give himself the trouble of thinking and judging about them.—They both could boast in company of their great reading, for they knew more titles and pages than Studentio, but were far less acquainted with science.

I confess those whose reading is designed only to fit them for much talk, and little knowledge, may content themselves to run over their authors in such a sudden and trifling way; they may devour libraries in this manner, yet be poor reasoners at last, and have no solid wisdom or true learning. The traveller who walks on fair and softly in a course that points right, and

examines every turning before he ventures upon it, will come sooner and safer to his journey's end, than he who runs through every lane he meets, though he gallop full speed all the day.—The man of much reading and a large retentive memory, but without meditation, may become, in the sense of the world, a knowing man; and if he converses much with the ancients, he may attain the fame of learning too; but he spends his days afar off from wisdom and true judgment, and possesses very little of the substantial riches of the mind.

XII. *Never apply yourselves to read any human author with a determination before-hand either for or against him, or with a settled resolution to believe or disbelieve, to confirm or to oppose whatsoever he saith*; but always read with a design to lay your mind open to truth, and to embrace it wheresoever you find it, as well as to reject every falsehood, though it appear under ever so fair a disguise. How unhappy are those men who seldom take an author into their hands, but they have determined before they begin, whether they will like or dislike him! They have got some notion of his name, his character, his party, or his principles, by general conversation, or perhaps by some slight view of a few pages: and having all their own opinions adjusted before-hand, they read all that he writes with a prepossession either for or against him. Unhappy those who hunt and purvey for a party, and scrape together out of every author, all those things, and those only which favour their own tenets, while they despise and neglect all the rest!

XIII. Yet take this caution. I would not be understood here, as though I persuaded a person to live without any settled principles at all, by which to judge of men and books and things; or that I would keep a man always doubting about his foundations. The chief things that I design in this advice, are these three:

1. That after our most necessary and important principles of science, prudence and religion, are settled upon good grounds, with regard to our present conduct and our future hopes, we should read with a just freedom of thought, all those books which treat of such subjects as may admit of doubt and reasonable dispute. Nor should any of our opinions be so resolved upon, especially in younger years, as never to hear or to bear an opposition to them.

2. When we peruse those authors who defend our own settled sentiments, we should not take all their arguings for just and solid: but we should make a wise distinction betwixt the corn and the chaff, between solid reasoning and the mere superficial colours of it; nor should we readily swallow down all their lesser opinions because we agree with them in the greater.

3. That when we read those authors which oppose our most *certain* and established principles, we should be ready to receive

any informations from them in other points, and not abandon at once every thing they say, though we are well fixed in opposition to their main point of arguing.

——*Fas est, et ab hoste doceri.* VIRG.

Seize upon truth where'er 'tis found,
Amongst your friends amongst your foes,
On Christian or on Heathen ground;
The flower's divine where'er it grows:
Neglect the prickles, and assume the rose.

XIV. What I have said hitherto on this subject, relating to books and reading, must be chiefly understood of that sort of books, and those hours of our reading and study, whereby we design to improve the intellectual powers of the mind with natural, moral, or divine knowledge. As for those treatises which are written to direct or to enforce and persuade our practice, there is one thing further necessary; and that is, that when our consciences are convinced that these rules of prudence or duty belong to us, and require our conformity to them, we should then call ourselves to account, and enquire seriously whether we have put them in practice or no; we should dwell upon the arguments, and impress the motives and methods of persuasion upon our own hearts, till we feel the force and power of them inclining us to the practice of the things which are there recommended.

If folly or vice be represented in its open colours, or its secret disguises, let us search our hearts, and review our lives, and enquire how far we are criminal; nor should we ever think we have done with the treatise till we feel ourselves in sorrow for our past misconduct, and aspiring after a victory over those vices, or till we find a cure of those follies begun to be wrought upon our souls.

In all our studies and pursuits of knowledge, let us remember that virtue and vice, sin and holiness, and the conformation of our hearts and lives to the duties of true religion and morality, are things of far more consequence than all the furniture of our understandings, and the richest treasures of mere speculative knowledge; and that because they have a more immediate and effectual influence upon our eternal felicity or eternal sorrow.

XV. There is yet another sort of books, of which it is proper I should say something while I am treating on this subject; and these are *history, poesy, travels, books of diversion or amusement*; among which we may reckon also little *common pamphlets, news-papers*, or such like: for many of these, I confess once reading may be sufficient, where there is a tolerable good memory.

Or when several persons are in company, and one reads to the rest such sort of writings, once hearing may be sufficient;

provided that every one be so attentive, and so free as to make their occasional remarks on such lines or sentences, such periods or paragraphs as in their opinion deserve it. Now all those paragraphs or sentiments deserve a remark, which are new and uncommon, are noble and excellent for the matter of them, are strong and convincing for the argument contained in them, are beautiful and elegant for the language or the manner, or any way worthy of a second rehearsal; and at the request of any of the company let those paragraphs be read over again. Such parts also of these writings as may happen to be remarkably stupid or silly, false or mistaken, should become subjects of an occasional criticism, made by some of the company; and this may give occasion to the repetition of them for confirmation of the censure, for amusement or diversion.

Still let it be remembered, that where the historical narration is of considerable moment, where the poesy, oratory, &c. shine with some degrees of perfection and glory, a single reading is neither sufficient to satisfy a mind that has a true taste of this sort of writings; nor can we make the fullest and best improvement of them without proper reviews, and that in our retirement as well as in company. Who is there that has any gout for polite writings that would be sufficiently satisfied with hearing the beautiful pages of Steele or Addison, the admirable descriptions of Virgil or Milton, or some of the finest poems of Pope, Young, or Dryden, once read over to them, and then lay them by for ever?

XVI. Among these writings of the latter kind, we may justly reckon short *miscellaneous essays* on all manner of subjects: such as the *Occasional Papers*, *the Tattlers*, *the Spectators*, and some other books that have been compiled out of the weekly or daily products of the press, wherein are contained a great number of bright thoughts, ingenious remarks, and admirable observations, which have had a considerable share in furnishing the present age with knowledge and politeness.

I wish every paper among these writings could have been recommended both as innocent and useful. I wish every unseemly idea and wanton expression had been banished from amongst them, and every trifling page had been excluded from the company of the rest when they had been bound up in volumes. But it is not to be expected, in so imperfect a state, that every page or piece of such mixed public papers should be entirely blameless and laudable. Yet in the main it must be confessed, there is so much virtue, prudence, ingenuity and goodness in them, especially in eight volumes of Spectators, there is such a reverence of things sacred, so many valuable remarks for our conduct in life, that they are not improper to lie in parlours, or summer-houses, or places of usual residence, to entertain our thoughts in any moments of leisure, or vacant hours

nt occur. There is such a discovery of the follies, iniquities, d fashionable vices of mankind contained in them, that we ay learn much of the humours and madnesses of the age, and e public world, in our own solitary retirement, without the nger of frequenting vicious company, or receiving the mortal fection.

XVII. Among other books which are proper and requisite, order to improve our knowledge in general, or our acquaint-ce with any particular science, it is necessary that we should furnished with *Vocabularies* and *Dictionaries* of several sorts, z. Of *common words*, *idioms* and *phrases*, in order to explain eir sense; of *technical words* or the terms of art, to shew eir use in arts and sciences; of *names of men*, *countries*, *wns*, *rivers*, &c. which are called historical and geographical ctionaries, &c. These are to be consulted, and used upon ery occasion; and never let an unknown word pass in your ading, without seeking for its sense and meaning in some of ese writers.

If such books are not at hand, you must supply the want of em, as well as you can, by consulting such as can inform you: d it is useful to note down the matters of doubt and enquiry in me pocket-book, and take the first opportunity to get them re-lved either by persons or books when we meet with them.

XVIII. Be not satisfied with the mere knowledge of the st authors that treat of any subject, instead of acquainting urselves thoroughly with the subject itself. There is many a ung student that is fond of enlarging his knowledge of books, d he contents himself with the notice he has of their title-page, hich is the attainment of a bookseller rather than a scholar. ch persons are under a great temptation to practise these two llies. (1.) To heap a great number of books at greater ex-nce than most of them can bear, and to furnish their libraries finitely better than their understandings. And (2.) when they ve got such rich treasures of knowledge upon their shelves, ey imagine themselves men of learning, and take a pride in lking of the names of famous authors, and the subjects of hich they treat, without any real improvement of their own inds, in true science or wisdom. At best, their learning aches no farther than the indexes and tables of contents, while ey know not how to judge or reason concerning the matters ntained in those authors.

And indeed how many volumes of learning soever a man ssesses, he is still deplorably poor in his understanding, till he s made these several parts of learning his own property, by ading and reasoning, by judging for himself, and remember-g what he has read.

strange to them, their understandings are greatly entertained and improved by the occurrence of many things which were unknown to them before, they admire the treatise, and commend the author at once; whereas, if they had but attained a good degree of skill in that science, perhaps they would find that the author had written very poorly, that neither his sense nor his method was just and proper, and that he had nothing in him but what was very common or trivial in his discourses on that subject.

Hence it comes to pass, that Cairo and Faber who were both bred up to labour and unacquainted with the sciences, shall admire one of the weekly papers, or a little pamphlet that talks pertly on some critical or learned theme, because the matter is all strange and new to them, and they join to extol the writer to the skies; and for the same reason a *young academic* shall dwell upon a Journal or an observator that treats of *trade* and *politics* in a dictatorial style, and shall be lavish in praise of the author. While at the same time, persons well skilled in those different subjects hear the impertinent tattle with a just contempt; for they know how weak and aukward many of those little diminutive discourses are; and that those very papers of *science*, *politics*, or *trade*, which were so much admired by the ignorant, are perhaps, but very mean performances; though it must be also confessed, there are some excellent essays in those papers, and that upon science as well as trade.

V. But there is a danger of mistake in our judgments of books on the other hand also: for when we have made ourselves masters of any particular theme of knowledge, and surveyed it long on all sides, there is perhaps scarce any writer on that subject who much entertains and pleases us afterwards, because we find little or nothing new in him; and yet in a true judgment perhaps, his sentiments are most proper and just, his explications clear, and his reasonings strong, and all the parts of the discourse are well connected and set in a happy light; but we knew most of those things before, and therefore they strike us not, and we are in danger of discommending them.

Thus the *learned* and the *unlearned*, have their several distinct dangers and prejudices ready to attend them in their judgment of the writings of men. These which I have mentioned are a *specimen* of them, and indeed but a *mere specimen*; for the prejudices that warp our judgment aside from truth, are almost infinite and endless.

Yet I cannot forbear to point out two or three more of these follies, that I may attempt something toward the correction of them, or at least, to guard others against them.

There are some persons of a forward and lively temper, and who are fond to intermeddle with all appearances of knowledge,

good sense nor good language in it. Whereas, alas, if our opinions of things were certain and infallible truth, yet a silly author may draw his pen in the defence of them, and he may attack even gross errors with feeble and ridiculous arguments. Truth in this world is not always attended and supported by the wisest and safest methods; and error, though it can never be maintained by just reasoning, yet may be artfully covered and defended: an ingenious writer may put excellent colours upon his own mistakes. Some *Socinians*, who deny the atonement of Christ, have written well, and with much appearance of argument for their own unscriptural sentiments, and some writers for the *Trinity* and *satisfaction of Christ* have exposed themselves and the sacred doctrine, by their feeble and foolish manner of handling it. Books are never to be judged of merely by their subject, or the opinion they represent, but by the justness of their sentiments, the beauty of their manner, the force of their expression, or the strength of reason, and the weight of just and proper argument which appears in them.

But this folly and weakness of trifling instead of arguing, does not happen to fall only to the share of Christian writers: there are some who have taken the pen in hand to support the *deistical* or *antichristian* scheme of our days, who make big pretences to reason upon all occasions, but seem to have left it quite behind them when they are jesting with the bible, and grinning at the books which we call sacred. Some of these performances would scarcely have been thought tolerable, if they had not assaulted the christian faith, though they are now grown up to a place among the admired pens. I much question whether several of the *rhapsodies* called the *characteristics*, would ever have survived the first edition, if they had not discovered so strong a tincture of *infidelity*, and now and then cast out a profane sneer at *our holy religion*. I have sometimes indeed been ready to wonder, how a book in the main so loosely written, should ever obtain so many readers amongst men of sense. Surely they must be conscious in the perusal, that sometimes a *patrician* may write as idly as a man of *plebeian* rank, and trifle as much as an old school-man, though it is in another form. I am forced to say, there are few books that ever I read, which made any pretences to a great genius, from which I derived so little valuable knowledge as from these treatises. There is indeed amongst them a lively pertness, a parade of literature, and much of what some folks now-a-days call *politeness*; but it is hard that we should be bound to admire all the reveries of this author, under the penalty of being unfashionable.

IV. Another mistake which some persons fall into is this. When they read a treatise on a subject with which they have but little acquaintance, they find almost every thing new and

the things of religion, having no more knowledge, nor taste of any thing of inward piety, than a hedgehog or a bear has of of politeness.

When I had written these remarks, Probus, who knew all these four gentlemen, wished they might have opportunity to read their own character as it is represented here. Alas! Probus, I fear it would do them very little good, though it may guard others against their folly: for there is never a one of them would find their own name in these characters if they read them, though all their acquaintance would acknowledge the features immediately, and see the persons almost alive in the picture.

VIII. There is yet another mischievous principle which prevails among some persons in passing a judgment on the writings of others, and that is, when from the secret stimulation of vanity, pride or envy, they despise a valuable book, and throw contempt upon it by wholesale: and if you ask them the reason of their severe censure, they will tell you perhaps, they have found a mistake or two in it, or there are a few sentiments or expresions not suited to their tooth and humour. Bavius cries down an admirable treatise of philosophy, and says there is atheism in it, because there are a few sentences that seem to suppose *brutes to be mere machines.* Under the same influence, Momus will not allow *Paradise Lost* to be a good poem, because he had read some flat and heavy lines in it, and he thought Milton had too much honour done him. It is a paltry humour that inclines a man to rail at any human performance because it is not absolutely perfect. Horace would give us a better example.

Sunt delicta quibus nos ignovisse velimus,
Nam neque chorda sonum reddit quem vult manus et mens,
Nec semper feriet quodcunque minabitur arcus:
Atque ubi plura nitent in carmine, non ego paucis
Offendor maculis, quas aut incuria fudit,
Aut humana parum cavit natura. Hor. de Art. Poet.

Thus Englished:

Be not too rigidly censorious:
A string may jar in the best master's hand,
And the most skilful archer miss his aim:
So in a poem elegantly writ
I will not quarrel with a small mistake,
Such as our nature's frailty may excuse. Roscommon.

This noble translator of Horace, whom I here cite, has a very honourable opinion of Homer in the main, yet he allows him to be justly censured for some grosser spots and blemishes in him.

For who without aversion ever look'd
On holy garbage' tho' by Homer cook'd,
Whose railing heroes, and whose wounded gods,
Make some suspect he snores as well as nods.

Such wise and just distinctions ought to be made when we pass a judgment on mortal things, but envy condemns by wholesale. *Envy is a cursed plant;* some fibres of it are rooted almost in every man's nature, and it works in a sly and imperceptible manner, and that even in some persons who in the main are men of wisdom and piety. They know not how to bear the praises that are given to an ingenious author, especially if he be living and of their profession, and therefore they will, if possible, find some blemish in his writings, that they may nibble and bark at it. They will endeavour to diminish the honour of the best treatise that has been written on any subject, and to render it useless by their censures, rather than suffer their envy to lie asleep, and the little mistakes of that author to pass unexposed. Perhaps they will commend the work in general with a pretended air of candour, but pass so many sly and invidious remarks upon it afterward, as shall effectually destroy all their cold and formal praises*.

IX. When a person feels any thing of this *invidious humour* working in him, he may by the following considerations attempt the correction of it. Let him think with himself how many are the beauties of such an author whom he censures, in comparison of his blemishes, and remember that it is a much more honourable and good-natured thing to find out peculiar beauties than faults: true and *undisguised candour* is a much more amiable and divine talent than accusation. Let him reflect again, what an easy matter it is to find a mistake in all human authors, who are necessarily fallible and imperfect.

I confess where an author sets up himself to ridicule *divine* writers and things sacred, and yet assumes an air of sovereignty and dictatorship, to exalt and almost deify all the Pagan *ancients*, and casts his scorn upon all the *moderns*, especially if they do but savour of miracles and the gospel, it is fit the admirers of this author should know that nature and these ancients are not the same, though some writers always unite them. Reason and nature never made these ancient heathens their standard, either of art or genius, of writing or heroism. Sir Richard Steele in his little essay, called *The Christian Hero*, has shewn our Saviour and St. Paul in a more glorious and transcendent light, than a Virgil or a Homer could do for their Achilles, Ulysses, or Æneas; and I am persuaded if Moses and David had not been inspired writers, these very men would have ranked them at least with Herodotus and Horace, if not given them the superior place.

* I grant when wisdom itself censures a weak and foolish performance, it will pass its severe sentence, and yet with an air of candour, if the author has any thing valuable in him: but envy will oftentimes imitate the same favourable airs, in order to make its false cavils appear more just and credible, when it has a mind to snarl at some of the brightest performances of a human writer.

Casimire, who is not in danger now and then of such extravagancies: but still they should not be admired or defended, if we pretend to pass a just judgment on the writings of the greatest men.

Milton is a noble genius, and the world agrees to confess it; his poem of *Paradise Lost* is a glorious performance, and rivals the most famous pieces of antiquity; but that reader must be deeply prejudiced in favour of the poet, who can imagine him equal to himself through all that work. Neither the sublime sentiments, nor dignity of numbers, nor force or beauty of expression are equally maintained, even in all those parts which require grandeur or beauty, force or harmony. I cannot but consent to Mr. Dryden's opinion, though I will not use his words, that for some scores of lines together, there is a coldness and flatness, and almost a perfect absence of that spirit of poesy which breathes, and lives, and flames in other pages.

XI. When you hear any person pretending to give his judgment of a book, consider with yourself whether he be a capable judge, or whether he may not lie under some unhappy bias or prejudice, for or against it, or whether he has made a sufficient enquiry to form his justest sentiments upon it. Though he be a man of good sense, yet he is incapable of passing a true judgment of a particular book, if he be not well acquainted with the subject of which it treats, and the manner in which it is written, be it verse or prose; or if he hath not had opportunity or leisure to look sufficiently into the writing itself.

Again, though he be never so capable of judging on all other accounts, by the knowledge of the subject, and of the book itself, yet you are to consider also, whether there be any thing in the author, in his manner, in his language, in his opinions, and his particular party, which may warp the sentiments of him that judgeth, to think well or ill of the treatise, and to pass too favourable or too severe a sentence concerning it.

If you find that he is either an unfit judge because of his ignorance, or because of his prejudices, his judgment of that book should go for nothing. Philographo is a good divine, an useful preacher, and an approved expositor of scripture, but he never had a taste for any of the polite learning of the age: he was fond of every thing that appeared in a devout dress, but all verse was alike to him: he told me last week there was a very fine book of poems published on the three christian graces, *Faith*, *Hope*, and *Charity*; and a most elegant piece of oratory on the four last things, *Death*, *Judgment*, *Heaven* and *Hell*. Do you think I shall buy either of those books merely on Philographo's recommendation.

CHAP. VI.—*Of living Instructions and Lectures of Teachers and Learners.*

I. THERE are few persons of so penetrating a genius, and so just a judgment, as to be capable of learning the arts and sciences without the assistance of *Teachers*. There is scarce any science so safely and so speedily learned, even by the noblest genius and the best books, without a tutor. His assistance is absolutely necessary for most persons, and it is very useful for all beginners. Books are a sort of dumb teachers, they point out the way to learning; but if we labour under any doubt or mistake, they cannot answer sudden questions, or explain present doubts and difficulties: this is properly the work of a living instructor.

II. There are very few tutors who are sufficiently furnished with such universal learning, as to sustain all the parts and provinces of instruction. The sciences are numerous, and many of them lie far wide of each other; and it is best to enjoy the instruction of two or three tutors at least, in order to run through the whole *Encyclopedia* or *Circle of Sciences*, where it may be obtained; then we may expect that each will teach the few parts of learning which are committed to his care in greater perfection. But where this advantage cannot be had with convenience, one great man must supply the place of two or three common instructors.

III. It is not sufficient that instructors be competently skilled in those sciences which they profess and teach; but they should have skill also in the art or method of teaching, and patience in the practice of it.

It is a great unhappiness indeed, when persons by a spirit of party or faction, or interest, or by purchase, are set up for tutors, who have neither due knowledge of science, nor skill in the way of communication. And alas, there are others, who with all their ignorance and insufficiency, have self-admiration and effrontery enough to set up themselves: and the poor pupils fare accordingly, and grow lean in their understandings. And let it be observed also, there are some very learned men who know much themselves, but have not the talent of communicating their own knowledge; or else they are lazy, and will take no pains at it. Either they have an obscure and perplexed way of talking, or they shew their learning uselessly, and make a long periphrasis on every word of the book they explain, or they cannot condescend to young beginners, or they run presently into the elevated parts of the science, because it gives themselves greater pleasure, or they are soon angry and impatient, and cannot bear with a few impertinent questions of young, inquisitive, and sprightly genius;

or else they skim over a science in a very slight and superficial survey, and never lead their disciples into the depths of it.

IV. A good tutor should have characters and qualifications very different from all these. He is such a one as both can and will apply himself with diligence and concern, and indefatigable patience to effect what he undertakes; to teach his disciples, and see that they learn to adapt his way and method as near as may be to the various dispositions, as well as to the capacities of those whom he instructs, and to enquire often into their progress and improvement.

And he should take particular care of his own temper and conduct, that there be nothing in him or about him which may be of ill example; nothing that may savour of a haughty temper, a mean and sordid spirit; nothing that may expose him to the aversion or to the contempt of his scholars, or create a prejudice in their minds against him and his instructions: but, if possible, he should have so much of a natural candour and sweetness mixt with all the improvements of learning, as might convey knowledge into the minds of his disciples with a sort of genteel insinuation and sovereign delight, and may tempt them into the highest improvements of their reason by a resistless and insensible force. But I shall have occasion to say more on this subject, when I come to speak more directly of the *methods of the communication of knowledge.*

V. The *learner* should attend with constancy and care on all the instructions of his *tutor*; and if he happens to be at any time unavoidably hindered, he must endeavour to retrieve the loss by double industry for time to come. He should always recollect and review his lectures, read over some other author or authors upon the same subject, confer upon it with his instructor or with his associates, and write down the clearest result of his present thoughts, reasonings, and enquiries, which he may have recourse to hereafter, either to re-examine them, and to apply them to proper use, or to improve them further to his own advantage.

VI. A *student* should never satisfy himself with bare attendance on the lectures of his *tutor*, unless he clearly takes up his sense and meaning, and understands the things which he teaches. A *young disciple* should behave himself so well as to gain the affection and the ear of his *instructor*, that upon every occasion he may with the utmost freedom ask questions, and talk over his own sentiments, his doubts and difficulties with him, and in an humble and modest manner desire the solution of them.

VII. Let the *learner* endeavour to maintain an honourable opinion of his *instructor*, and heedfully listen to his *instructions*, as one willing to be led by a more experienced guide: and though he is not bound to fall in with every sentiment of his tutor, yet he

should so far comply with him, as to resolve upon a just consideration of the matter, and try and examine it thoroughly with an honest heart, before he presume to determine against him. And then it should be done with great modesty, with an humble jealousy of himself, and apparent unwillingness to differ from his tutor, if the force of argument and truth did not constrain him.

VIII. It is a frequent and growing folly in our age, *that pert young disciples soon fancy themselves wiser than those who teach them:* at the first view, or upon a very little thought, they can discern the insignificancy, weakness, and mistake of what their teacher asserts. The youth of our day, by an early petulency, and pretended liberty of thinking for themselves, dare reject at once, and that with a sort of scorn, all those sentiments and doctrines which their teachers have determined, perhaps after long and repeated consideration, after years of mature study, careful observation, and much prudent experience.

IX. It is true, teachers and masters are not infallible, nor are they always in the right; and it must be acknowledged, it is a matter of some difficulty for younger minds to maintain a just and solemn veneration for the *authority and advice of their parents, and the instructions of their tutors*, and yet at the same time to secure to themselves a *just freedom in their own thoughts.*—We are sometimes too ready to imbibe all their sentiments without examination, if we reverence and love them; or, on the other hand, if we take all freedom to contest their opinions, we are sometimes tempted to cast off that love and reverence to their persons which God and nature dictate. Youth is ever in danger of these two extremes.

X. But I think I may safely conclude thus: though the authority of a teacher must not absolutely determine the judgment of his pupil, yet young and raw and unexperienced learners should pay all proper deference that can be, to the instructions of their parents and teachers, short of absolute submission to their dictates. Yet still we must maintain this, that they should never receive any opinion into their assent, whether it be conformable or contrary to the tutor's mind, without sufficient evidence of it first given to their own reasoning powers.

CHAP. VII.—*Of learning a Language.*

THE first thing required in reading an author, or in hearing lectures of a tutor is, that you well understand the *language* in which they write or speak. *Living languages*, or such as are the native tongue of any nation in the present age, are more easily learnt and taught by a few rules, and much familiar converse, joined to the reading some proper authors. The dead

languages are such as cease to be spoken in any nation; and even these are more easy to be taught (as far as may be) in that method wherein *living languages* are best learnt, that is, partly by rule, and partly by rote or custom. And it may not be improper in this place to mention a few directions for that purpose.

I. *Begin with the most necessary and most general observations and rules which belong to that language, compiled in the form of a grammar;* and these are but few in most languages. The regular declensions and variations of nouns and verbs, should be early and thoroughly learnt by heart, together with twenty or thirty of the plainest and most necessary rules of *syntax*.

But let it be observed, that in almost all languages, some of the very commonest *nouns* and *verbs* have many irregularities in them; such are the common auxiliary verbs *to be*, and *to have*, *to do*, and *to be done*, *&c.* The *comparatives* and *superlatives* of the words *good*, *bad*, *great*, *much*, *small*, *little*, *&c.* and these should be learnt among the first rules and variations, because they continually occur. But as to other words which are less frequent, let but few of the *anomalies* or irregularities of the tongue be taught among the general rules to young beginners.—These will better come in afterwards to be learnt by advanced scholars in a way of notes on the rules, as in the Latin Grammar called the Oxford Grammar, or in Ruddiman's Notes on his Rudiments, &c. Or they may be learnt by examples alone, when they do occur; or by a larger and more complete system of grammar, which descends to the more particular forms of speech; so the *heteroclite* nouns of the Latin tongue, which are taught in the school-book called *Quæ Genus*, should not be touched in the first learning of the rudiments of that tongue.

II. As the grammar by which you learn any tongue should be very short at first, so *it must be written in a tongue with which you are well acquainted*, and which is very familiar to you.—Therefore I much prefer even the common English Accidence (as it is called) to any grammar whatsoever written in Latin for this end. The English accidence has doubtless many faults; but those editions of it which were printed since the year 1728, under the correction of a learned professor, are the best; or the English Rudiments of the Latin Tongue, by the learned North Briton Mr. Ruddiman, which are perhaps the most useful books of this kind which I am acquainted with; especially because I would not depart too far from the ancient and common forms of teaching, which several good grammarians have done, to the great detriment of such lads as have been removed to other schools.

The tiresome and unreasonable method of learning the

Latin tongue by a grammar with Latin rules, would appear even to those masters who teach it so, in its proper colours of absurdity and ridicule, if those very masters would attempt to learn the Chinese or Arabic tongue, by a grammar written in the Arabic or the Chinese language. Mr. Clarke of Hull has said enough in a few pages of the preface to his new grammar 1723, to make that practice appear very irrational and improper; though he has said it in so warm and angry a manner that it has kindled Mr. Ruddiman to write against him, and to say what can be said to vindicate a practice, which, I think, is utterly indefensible.

III. *At the same time when you begin the rules, begin also the practice.* As for instance, when you decline, *musa*, *musae*, read and construe the same day some easy Latin author by the help of a tutor, or with some English translation; chuse such a book whose style is simple, and the subject of discourse is very plain, obvious, and not hard to be understood; many little books have been composed with this view, as *Corderius' Colloquies*, some of Erasmus' little writings, the sayings of the wise men of Greece, Cato's moral distichs, and the rest which are collected at the end of Mr. Ruddiman's English grammar, or the Latin Testament of Castellio's translation, which is accounted the purest Latin, &c. These are very proper upon this occasion, together with Æsop's and Phœdrus' Fables, and little stories, and the common and daily affairs of domestic life written in the Latin tongue. But let the higher poets, and orators and historians, and other writers whose language is more laboured, and whose sense is more remote from common life, be rather kept out of sight till there be some proficiency made in the language.

It is strange, that masters should teach children so early Tully's Epistles or Orations, or the poems of Ovid or Virgil, whose sense is oftentimes difficult to find, because of the great transposition of the words; and when they have found the grammatical sense, they have very little use of it, because they have scarce any notion of the ideas and design of the writer, it being so remote from the knowledge of a child: whereas little common stories and colloquies, and the rules of a child's behaviour, and such obvious subjects, will much better assist the memory of the words by their acquaintance with the things.

IV. Here it may be useful also, to appoint the learner *to get by heart the more common and useful words*, both *nouns* and *adjectives*, *pronouns* and *verbs*, out of some well formed and judicious vocabulary. This will furnish him him with names for the most familiar ideas.

V. As soon as ever the learner is capable, *let the tutor converse with him in the tongue* which is to be learned, if it be a

living language, or if it be Latin, which is the living language of the learned world ; thus he will acquaint himself a little with it by *rote* as well as by *rule*, and by living practice as well as by reading the writings of the dead. For if a child of two years old by this method learns to speak his mother-tongue, I am sure the same method will greatly assist and facilitate the learning of any other language to those who are older.

VI. Let the chief lessons and the chief exercises of schools, *v. c.* where the Latin is learnt, (at least for the first year or more) be the nouns, verbs, and general rules of syntax, together with a mere translation out of some Latin author into English ; and let scholars be employed and examined by their teacher, daily, in reducing the words to their original or theme, to the first case of nouns or first tense of verbs, and giving an account of their formations and changes, their *syntax* and dependencies, which is called *parsing*. This is a most useful exercise to lead boys into a complete and thorough knowledge of what they are doing. The English translations, which the learner has made, should be well corrected by the master, and then they should be translated back again for the next day's exercise by the child into Latin, while the Latin author is withheld from him : but he should have the Latin words given him in their first case and tense ; and should never be left to seek them himself from a dictionary : and the nearer he translates it to the words of the author whence he derives his English, the more should the child be commended Thus will he gain skill in two languages at once. I think Mr. Clarke has done good service to the public by his translations of Latin books for this end. But let the foolish custom of employing every silly boy to make *themes* of *declamations* and *verses* upon moral subjects in a strange tongue, before he understands common sense even in his own language, be abandoned and cashiered for ever.

VII. As the learner improves, let him " acquaint himself with the anomalous words, the irregular declension of nouns and verbs, the more uncommon connections of words in syntax, and the exceptions to the general rules of grammar ;" but let them all be reduced, as far as possible, to those several original and general rules which he has learned, as the proper rank and place to which they belong.

VIII. While he is doing this, it may be " proper for him to converse with authors which are a little more difficult, with historians, orators, and poets, &c." but let his tutor inform him of the Roman or Greek customs which occur therein. Let the lad then translate some parts of them into his mother tongue, or into some other well-known language, and thence back again into the original language of the author. But let the verse be translated into *prose*, for *poesy* does not belong to *grammar*.

IX. By this time he will be able to *acquaint himself with*

me of the special emphasis of speech, and the peculiar idioms of the tongue. He should be taught also the special beauties and ornaments of the language: and this may be done partly by the help of authors who have collected such idioms, and cast them into an easy method, and partly by the judicious remarks which his instructor may make upon the authors which he reads, wheresoever such peculiarities of speech or special elegancies occur.

X. Though the labour of learning all the lessons by heart, that are borrowed from poetical authors which they construe, is an unjust and unnecessary imposition upon the learner, yet he must take the pains to *commit to memory the most necessary, if not all the common rules of grammar*, with an example or two under each of them: and some of the select and most useful periods or sentences in the Latin or Greek author which he reads, may be learnt by heart, together with some of the choicer lessons out of their poets; and sometimes whole episodes out of heroic poems, &c. as well as whole odes among the lyrics may deserve this honour.

XI. Let this be always carefully observed, that "the learners perfectly understand the sense as well as the language of all those rules, lessons, or paragraphs which they attempt to commit to memory." Let the teacher possess them of their true meaning, and then the labour will become easy and pleasant; whereas to impose on a child to get by heart "a long scroll of unknown phrases or words, without any ideas under them," is a piece of useless tyranny, a cruel imposition, and a practice fitter for a jackdaw or a parrot than for any thing that wears the shape of a man.

XII. And here, I think, I have a fair occasion given me to consider that question which has been often debated in conversation, viz. "Whether the teaching of a school full of boys to learn Latin by the Heathen poets," as Ovid in his Epistles, and the silly fables of his Metamorphoses; Horace, Juvenal, and Martial in their impure odes, satires, and epigrams, &c. is so proper and agreeable a practice in a Christian country.

XIII. (1.) "I grant the language and style of those men who wrote in their own native tongue, must be more pure and perfect" in some nice elegancies and peculiarities, than modern writers of other nations who have imitated them; and it is owned also, that the beauties of their poesy may much excel: but in either of these things, boys cannot be supposed to be much improved or injured by one or the other.

XIV. (2.) It shall be confest too, that "modern poets in every living language, have brought into their works so many words, epithets, phrases, and metaphors," from the heathen fables and stories of their gods and heroes, that in order to understand these modern writers, it is necessary to know a little of

those ancient follies: but it may be answered, that a good dictionary, or such a book as the Pantheon or History of those Gentile Deities, &c. may give sufficient information of those stories, so far as they are necessary and useful to school-boys.

XV. (3.) I will grant yet further, that lads who are designed to make great scholars or divines, may by reading these Heathen poets, be taught better to "understand the writings of the ancient fathers against the Heathen religion:" and they learn here "what ridiculous fooleries the Gentile nations believed" as the articles of their faith, "what wretched and foul idolatries they indulged and practised as duties of religion, for want of the light of divine revelation." But this perhaps may be learnt as well either by the Pantheon, or some other collection, at school; or after they have left the school, they may read what their own inclinations lead them to, and whatsoever of this kind may be really useful for them.

XVI. But the great question is, "Whether all these advantages which have been mentioned, will compensate for the long months and years that are wasted among their incredible and trifling romances, their false and shameful stories of the gods and goddesses and their amours, and the lewd heroes and vicious poets of the Heathen world?" Can these idle and ridiculous tales be of any real and solid advantage in human life? Do they not too often defile the mind with vain, mischievous and impure ideas? Do they not stick long upon the fancy and leave an unhappy influence upon youth? Do they not tincture the imagination with folly and vice very early, and pervert it from all that is good and holy.

XVII. Upon the whole survey of things it is my opinion, that for almost all boys who learn this tongue, it would be much safer to be taught Latin poesy (as soon and as far as they can need it) from those excellent translations of David's Psalms, which are given us by Buchanan in the various measures of Horace; and the lower classes had better read Dr. Johnston's Translation of these Psalms, another elegant writer of the Scots nation, instead of Ovid's Epistles; for he has turned the same psalms perhaps with greater elegancy into *elegiac* verse, whereof the learned W. Benson, Esq; has lately published a noble edition, and I hear that these psalms are honoured with an increasing use in the schools of Holland and Scotland. A stanza, or a couplet of these writers would now and then stick upon the minds of youth, and would furnish them infinitely better with pious and moral thoughts, and do something towards making them good men and Christians.

XVIII. A little book collected from the Psalms of both these translators, Buchanan and Johnston, and a few other Christian poets, would be of excellent use for schools to begin their in-

structions in Latin poesy; and I am well assured this would be richly sufficient for all those in lower rank, who never design a learned profession, and yet custom has foolishly bound them to learn that language.

But lest it should be thought hard to cast Horace and Virgil, Ovid and Juvenal entirely out of the schools, I add, if here and there a few lyric odes, or pieces of satires, or some episodes of heroic verse, with here and there an epigram of Martial, all which shall be clear and pure from the stains of vice and impiety, and which may inspire the mind with noble sentiments, fire the fancy with bright and warm ideas, or teach lessons of morality and prudence, were chosen out of those ancient Roman writers for the use of the schools, and were collected and printed in one moderate volume or two at the most, it would be abundantly sufficient provision out of the Roman poets for the instruction of boys in all that is necessary in that age of life.

Surely Juvenal himself would not have the face to vindicate the masters who teach boys his 6th *satire*, and many paragraphs of several others when he himself has charged us,

Nil dictu fœdum, visuque hæc limina tangat
Intra quæ puer est. Sat. 14.

Thus Englished:

Suffer no lewdness, nor indecent speech
Th' apartment of the tender youth to reach.
Dryden.

Thus far in answer to the foregoing question.

But I retire; for Mr. Clarke of Hull, in his treatise of Education, and Mr. Philips, preceptor to the Duke of Cumberland, have given more excellent directions for learning Latin.

XIX. When a language is learnt, "if it be of any use at all it is a pity it should be forgotten again." It is proper, therefore to take all just opportunities *to read something frequently in that language*, when other necessary and important studies will give you leave. As in learning any tongue, dictionaries which contain words and phrases should be always at hand: so they should be ever kept within reach by persons who would remember a tongue which they have learnt. Nor should we at any time content ourselves with a doubtful guess at the sense or meaning of any words which occur, but consult the dictionary, which may give us certain information, and thus secure us from mistake. It is mere sloth which makes us content ourselves with uncertain guesses; and indeed this is neither safe nor useful for persons who would learn any language or science, or have a desire to retain what they have acquired.

XX. *When you have learnt one or many languages ever so perfectly, take heed of priding yourself in these acquisitions:* they are but mere treasures of words, or instruments of true

and solid knowledge, and whose chief design is to lead us into an acquaintance with things, or to enable us the more easily to convey those ideas, or that knowledge to others. An acquaintance with the various tongues is nothing else, but a relief against the mischief which the building of Babel introduced: and were I master of as many languages as were spoken at Babel, I should make but a poor pretence to true learning or knowledge, if I had not clear and distinct *ideas*, and useful notions in my head under the *words* which my tongue could pronounce. Yet so unhappy a thing is human nature, that this sort of knowledge of sounds and syllables is ready to puff up the mind with vanity, more than the most valuable and solid improvements of it. The pride of a *grammarian or a critic*, generally exceeds that of a *philosopher*.

CHAP. VIII.—*Of enquiring into the Sense and Meaning of any Writer or Speaker, and especially the Sense of the Sacred Writings.*

It is a great unhappiness that there is such an ambiguity in words and forms of speech, that the same sentence may be drawn into *different significations*; whereby it comes to pass, that it is difficult sometimes for the reader exactly to hit upon the ideas which the writer or speaker had in his mind. Some of the best rules to direct us herein are such as these:

I. *Be well acquainted with the tongue itself, or language wherein the author's mind is expressed.* Learn not only the true meaning of each word, but the sense which those words obtain when placed in such a particular situation and order. Acquaint yourself with the peculiar power and emphasis of the several modes of speech, and the various idioms of the tongue. The secondary ideas which custom hath superadded to many words, should also be known, as well as the particular and primary meaning of them, if we would understand any writer. See Logic, Part I. Chap. 4, Sec. 3.

II. *Consider the signification of those words and phrases*, more especially in the same nation, or near the same *age* in which that writer lived, and in what sense they are used by authors of the same nation, opinion, sect, party, &c.

Upon this account, we may learn to interpret several phrases of the New Testament out of that version of the Hebrew Bible into Greek, which is called the *Septuagint*; for though that version be very imperfect and defective in many things, yet it seems to me evident, that the holy writers of the New Testament made use of that version many times in their citation of texts out of the Bible.

III. *Compare the words and phrases in one place of an*

author, with the same or kindred words and phrases used in other places of the same author, which are generally called parallel places; and as one expression explains another which is like it, so sometimes a contrary expression will explain its contrary. Remember always that a writer best interprets himself: and as we believe the Holy Spirit to be the supreme agent in the writings of the Old Testament and the New, he can best explain himself. Hence that theological rule arises, that "scripture is the best interpreter of scripture;" and therefore *concordances,* which shew us parallel places, are of excellent use for interpretation.

IV. *Consider the subject of which the author is treating,* and by comparing other places where he treats of the same subject, you may learn his sense in the place which you are reading, though some of the terms which he uses in those two places may be very different. And on the other hand, if the author uses the same words where the subject of which he treats is not just the same, you cannot learn his sense by comparing those two places, though the mere words may seem to agree, for some authors, when they are treating of a quite different subject, may use perhaps the same words in a very different sense, as St. Paul does the words *faith,* and *law,* and *righteousness.*

V. *Observe the scope and design of the writer:* enquire into his aim and end in that book, or section, or paragraph, which will help to explain particular sentences: for we suppose a wise and judicious writer directs his expressions generally toward his designed end.

VI. When an author speaks of any subject occasionally, *let his sense be explained by those places where he treats of it distinctly and professedly:* Where he treats of any subject in mystical or metaphorical terms, explain them by other places, where he treats of the same subject in terms that are plain and literal: Where he speaks in an oratorical, affecting, or persuasive way, let this be explained by other places where he treats of the same theme in a doctrinal or instructive way: Where the author speaks more strictly, and particularly on any theme, it will explain the more loose and general expressions: Where he treats more largely, it will explain the shorter hints and brief intimations: And wheresoever he writes more obscurely, search out some more perspicuous passages in the same writer, by which to determine the sense of that obscurer language.

VII. Consider not only the person who is introduced speaking, *but the persons to whom the speech is directed,* the circumstances of time and place, the temper and spirit of the speaker, as well as the temper and spirit of the hearers: in order to interpret scripture well, there needs a good acquaintance with the Jewish customs, some knowledge of the ancient Roman and

Greek times and manners, which sometimes strike a strange and surprising light upon passages which before were very obscure.

VIII. In particular propositions, the sense of an author may be sometimes *known by the inferences which he draws from them;* and all those senses may be excluded which will not allow of that inference. Note, This rule indeed is not always certain in reading and interpreting human authors, because they may mistake in drawing their inferences; but in explaining scripture it is a sure rule; for the sacred and inspired writers always make just inferences from their own propositions. Yet even in them we must take heed we do not mistake an allusion for an inference, which is many times introduced almost in the same manner.

IX. If it be a matter of controversy, the true sense of the author is sometimes known *by the objections that are brought against it.* So we may be well assured, the Apostle speaks against our *justification in the sight of God by our own works of holiness;* in the 3d, 4th, and 5th chapters of the Epistle to the Romans, because of the objection brought against him in the beginning of the 6th chapter, viz. *What shall we say then? shall we continue in sin that grace may abound?* which objection could never have been raised, if he had been proving our justification by our own works of righteousness.

X. In matters of dispute, take heed of *warping* the sense of the writer to your own opinion, by any latent prejudices of *self-love* and a *party-spirit.* It is this reigning principle of prejudice and party, that has given such a variety of senses both to the sacred writers and others, which would never have come into the mind of the reader, if he had not laboured under some such prepossessions.

XI. For the same reason take heed of the prejudices of *passion, malice, envy, pride or opposition to an author,* whereby you may be easily tempted to put a false and invidious sense upon his words. Lay aside therefore a carping spirit, and read even an adversary with attention and diligence, with an honest design to find out his true meaning; do not snatch at little lapses and appearances of mistake, in opposition to his declared and avowed meaning: nor impute any sense or opinion to him which he denies to be his opinion, unless it be proved by the most plain and express language.

Lastly, Remember that you *treat every author, writer or speaker, just as you yourselves would be willing to be treated by others,* who are searching out the meaning of what you write or speak; and maintain upon your spirit an awful sense of the presence of God, who is the judge of hearts, and will punish

those who by a base and dishonest turn of mind wilfully pervert the meaning of the sacred writers, or even of common authors, under the influence of culpable prejudices. See more, Logic, Part I. Chap. 6. Sec. 3. *Directions concerning the Definition of Names.*

CHAP. IX.—*Rules of Improvement by Conversation.*

I. IF we would improve our minds by *conversation*, it is a great happiness *to be acquainted with persons wiser than ourselves*. It is a piece of useful advice therefore, to get the favour of their conversation frequently, as far as circumstances will allow: and if they happen to be a little reserved, use all obliging methods to draw out of them what may increase your own knowledge.

II. Whatsoever company you are in, *waste not the time in trifles and impertinence*. If you spend some hours amongst children, talk with them according to their capacity: mark the young buddings of infant reason; observe the different motions and distinct workings of the animal and the mind, as far as you can discern them; take notice by what degrees the little creature grows up to the use of his reasoning powers, and what early prejudices beset and endanger his understanding. By this means you will learn how to address yourself to children for their benefit, and perhaps you may derive some useful philosophemes or theorems, for your own entertainment.

III. If you happen to be in company with a merchant or a sailor, a farmer or a mechanic, a milk-maid or a spinster, lead them into a discourse of the matters of *their own peculiar province or profession*; for every one knows, or should know, his own business best. In this sense a common mechanic is wiser than a philosopher. By this means you may gain some improvement in knowledge from every one you meet.

IV. *Confine not yourself always to one sort of company*, or to persons of the same party or opinion, either in matters of learning, religion, or the civil life, lest if you should happen to be nursed up or educated in early mistake, you should be confirmed and established in the same mistake, by conversing only with persons of the same sentiments. A free and general conversation with men of very various countries and of different parties, opinions, and practices (so far as it may be done safely) is of excellent use to undeceive us in many wrong judgments which we may have framed, and to lead us into juster thoughts. It is said when the King of Siam, near China, first conversed with some European merchants, who sought the favour of trading on his coast, he enquired of them some of the common appear-

ances of summer and winter in their country; and when they told him of water growing so hard in their rivers, that men, and horses, and laden carriages passed over it, and that rain sometimes fell down almost as white and light as feathers, and sometimes almost as hard as stones, he would not believe a syllable they said: for *ice*, *snow*, and *hail*, where names and things utterly unknown to him, and to his subjects in that hot climate: he renounced all traffic with such shameful liars, and would not suffer them to trade with his people. See here the natural effects of gross ignorance.

Conversation with foreigners on various occasions, has a happy influence to enlarge our minds, and to set them free from many errors and gross prejudices we are ready to imbibe concerning them. Domicillus has never travelled five miles from his mother's chimney, and he imagines all outlandish men are *Papishes*, and worship nothing but a cross. Tityrus the shepherd, was bred up all his life in the country, and never saw Rome; he fancied it to be only a huge village, and was therefore infinitely surprised to find such palaces, such streets, such glittering treasures and gay magnificence as his first journey to the city shewed him, and with wonder he confesses his folly and mistake.

So Virgil introduces a poor shepherd,

Urbem quam dicunt Romam Meliboee, putavi
Stultus ego huic nostrae similem, quo saepe solemus
Pastores ovium teneros depellere foetus, &c.

Thus Englished:

Fool that I was, I thought imperial Rome
Like market-towns, where once a week we come,
And thither drive our tender lambs from home.

Conversation would have given Tityrus a better notion of Rome, though he had never happened to travel thither.

V. *In mixed company among acquaintance and strangers endeavour to learn something from all.* Be swift to hear, but be cautious of your tongue, lest you betray your ignorance, and perhaps offend some of those who are present too. The scripture severely censures those *who speak evil of the things they know not*. Acquaint yourself therefore sometimes with persons and parties which are far distant from your common life and customs: this is a way whereby you may form a wiser opinion of men and things. *Prove all things and hold fast that which is good*, is a divine rule, and it comes from the Father of light and truth. But young persons should practise it indeed with due limitation and under the eye of their elders.

VI. *Be not frightened nor provoked at opinions different from your own.* Some persons are so confident they are in the right, that they will not come within the hearing of any notions

but their own: they canton out to themselves a little province in the intellectual world, where they fancy the light shines, and all the rest is darkness. They never venture into the ocean of knowledge, nor survey the riches of other minds, which are as solid and as useful, and perhaps are finer gold than what they ever possessed. Let not men imagine there is no certain truth but in the sciences which they study, and amongst that party in which they were born and educated.

VII. *Believe that it is possible to learn something from persons much below yourself.* We are all short-sighted creatures; our views are also narrow and limited; we often see but one side of a matter, and do not extend our sight far and wide enough to reach every thing that has a connection with the thing we talk of: *We see but in part, and know but in part,* therefore it is no wonder we form not right conclusions, because we do not survey the whole of any subject or argument. Even the proudest admirer of his own parts might find it useful to consult with others, though of inferior capacity and penetration. We have a different prospect of the same thing (if I may so speak) according to the different position of our understandings towards it: a weaker man may sometimes light on notions which have escaped a wiser, and which the wiser man might make a happy use of, if he would condescend to take notice of them.

VIII. It is of considerable advantage when we are pursuing any difficult point of knowledge, *to have a society of ingenious correspondents at hand, to whom we may propose it;* for every man has something of a different genius and a various turn of mind, whereby the subject proposed will be shown in all its lights, it will be represented in all its forms, and every side of it be turned to view, that a juster judgment may be framed.

IX. To make conversation more valuable and useful, whether it be in a designed or accidental visit, among persons of the same or of different sexes, after the necessary salutations are finished, and the stream of common talk begins to hesitate, or runs flat and low, let some one person take a book which may be agreeable to the whole company, and by common consent let him read in it ten lines, or a paragraph or two, or a few pages, till some word or sentence gives an occasion for any of the company to offer a thought or two relating to that subject. Interruption of the reader should be no blame, for conversation is the business; whether it be to confirm what the author says, or to improve it, to enlarge upon or to correct it, to object against it, or to ask any question that is a-kin to it; and let every one that please add their opinion and promote the conversation. When the discourse sinks again, or diverts to trifles, let him that reads pursue the page, and read on further paragraphs or pages, till

some occasion is given by a word or sentence for a new discourse to be started, and that with the utmost ease and freedom. Such a method as this would prevent the hours of a visit from running all to waste; and by this means, even among scholars, they will seldom find occasion for that too just and bitter reflection, *I have lost my time in the company of the learned.*

By such practice as this, young ladies may very honourably and agreeably improve their hours, while one applies herself to reading, the others employ their attention, even among the various artifices of the needle: but let all of them make their occasional remarks or inquiries. This will guard a great deal of that precious time from modish trifling, impertinence or scandal, which might otherwise afford matter for painful repentance.

Observe this *rule in general*, whensoever it lies in your power to lead the conversation, *let it be directed to some profitable point of knowledge or practice*, so far as may be done with decency; and let not the discourse and the hours be suffered to run loose without aim or design: and when a subject is started, pass not hastily to another, before you have brought the present theme of discourse to some tolerable issue, or a joint consent to drop it.

X. *Attend with sincere diligence while any one of the company is declaring his sense of the question proposed*; hear the argument with patience, though it differ ever so much from your sentiments, for you yourself are very desirous to be heard with patience by others who differ from you. Let not your thoughts be active and busy all the while to find out something to contradict, and by what means to oppose the speaker, especially in matters which are not brought to an issue. This is a frequent and unhappy temper and practice. You should rather be intent and solicitous to take up the mind and meaning of the speaker, zealous to seize and approve all that is true in his discourse; nor yet should you want courage to oppose where it is necessary; but let your modesty and patience, and a friendly temper, be as conspicuous as your zeal.

XI. When a man speaks with much freedom and ease, and gives his opinion in the plainest language of common sense, *do not presently imagine you shall gain nothing by his company.*— Sometimes you will find a person who in his conversation or his writings delivers his thoughts in so plain, so easy, so familiar and perspicuous a manner, that you both understand and assent to every thing he saith, as fast as you read or hear it; hereupon some hearers have been ready to conclude in haste, surely "this man saith none but common things. I knew as much before, or I could have said all this myself." This is a frequent mistake.

Pellucido was a very great genius; when he spoke in the senate he was wont to convey his ideas in so simple and happy a manner as to instruct and convince every hearer, and to inforce the conviction through the whole illustrious assembly; and that with so much evidence, that you would have been ready to wonder, that every one who spoke had not said the same things; but Pellucido was the only man that could do it, the only speaker who had attained this art and honour. Such is the writer of whom *Horace* would say,

———Ut sibi quivis,
Speret idem, sudet multum, frustraque laboret
Ausus idem. De Art. Poet.

Smooth be your style, and plain and natural,
To strike the sons of *Wapping* or *Whitehall;*
While others think this easy to attain,
Let them but try, and with their utmost pain
They'll sweat and strive to imitate in vain.

XII. If any thing seem dark in the discourse of your companion, so that you have not a clear idea of what is spoken, *endeavour to obtain a clearer conception of it by a decent manner of enquiry.* Do not charge the speaker with obscurity either in his sense or his words, but intreat his favour to relieve your own want of penetration, or to add an enlightening word or two, that you may take up his whole meaning. If difficulties arise in your mind, and constrain your dissent to the things spoken, "represent what objections some persons would be ready to make against the sentiments of the speaker," without telling him you oppose. This manner of address carries something more modest and obliging in it, than to appear to raise objections of your own by way of contradiction to him that spoke.

XIII. When you are forced to differ from him who delivers his sense on any point, yet "agree as far as you can, and represent how far you agree;" and if there be any room for it, explain the words of the speaker in such a sense to which you can in general assent and so agree with him; or at least by a small addition or alteration of his sentiments shew your own sense of things. It is the practice and delight of a candid hearer, to make it appear how unwilling he is to differ from him that speaks. Let the speaker know that it is nothing but truth constrains you to oppose him, and let that difference be always exprest in few and civil, and chosen words, such as give the least offence. And be careful always to take Solomon's rule with you, and let your correspondent fairly finish his speech before you reply; for *he that answereth a matter before he heareth it, it is folly and shame unto him;* Prov. xviii. 13. A little watchfulness, care, and practice, in younger life, will render all these things more easy, familiar, and natural to you, and will grow into habit.

XIV. As you should carry about with you a constant and sincere sense of your own ignorance, *so you should not be afraid nor ashamed to confess this ignorance*, by taking all proper opportunities to ask and enquire for farther information; whether it be the meaning of a word, the nature of a thing, the reason of a proposition, the custom of a nation, &c. never remain in ignorance for want of asking.

Many a person had arrived at some considerable degree of knowledge, if he had not been full of self-conceit, and imagined that he had known enough already, or else was ashamed to let others know that he was unacquainted with it. God and man are ready to teach the meek, the humble, and the ignorant; but he that fancies himself to know any particular subject well, or that will not venture to ask a question about it, such a one will not put himself into the way of improvement by inquiry and diligence. A fool may be *wiser in his own conceit than ten men who can render a reason*, and such a one is very likely to be an everlasting fool; and perhaps also it is a silly shame renders his folly incurable.

Stultorum incurata pudor malus ulcera celat. Hor. Epist. 16. Lib. 1.

In English thus:

If fools have ulcers and their pride conceal 'em,
They must have ulcers still, for none can heal 'em.

XV. Be not too forward, especially in the younger part of life, *to determine any question in company with an infallible and peremptory sentence*, nor speak with assuming airs, and with a decisive tone of voice. A young man in the presence of his elders should rather hear and attend, and weigh the arguments which are brought for the proof or refutation of any doubtful proposition; and when it is your turn to speak, propose your thoughts rather in way of enquiry. By this means your mind will be kept in a fitter temper to receive truth, and you will be more ready to correct and improve your own sentiments, where you have not been too positive in affirming them. But if you have magisterially decided the point, you will find a secret unwillingness to retract, though you should feel an inward conviction that you were in the wrong.

XVI. It is granted indeed, that a season may happen, when some bold pretender to science, may assume haughty and positive airs to assert and vindicate a gross and dangerous error, or to renounce and vilify some very important truth; and if he has a popular talent of talking, and there be no remonstrance made against him, the company may be tempted too easily to give their assent to the impudence and infallibility of the presumer. They may imagine a proposition so much vilified can never be true, and that a doctrine which is so boldly censured and renounced can never be defended. Weak minds are too ready to persuade themselves, that a man would never talk with so much assurance

unless he were certainly in the right and could well maintain and prove what he said. By this means truth itself is in danger of being betrayed or lost, if there be no opposition made to such a pretending talker.

Now in such a case even a wise and a modest man may assume airs too, and repel insolence with its own weapons. There is a time, as Solomon the wisest of men teaches us, when *a fool should be answered according to his folly, lest he be wise in his own conceit*, and lest others too easily yield up their faith and reason to his imperious dictates. Courage and positivity are never more necessary than on such an occasion. But it is good to join some argument with them of real and convincing force, and let it be strongly pronounced too.

When such a resistance is made, you shall find some of these bold talkers will draw in their horns, when their fierce and feeble pushes against truth and reason are repelled with pushing and confidence. It is pity indeed that truth should ever need such sort of defences; but we know that a triumphant assurance hath sometimes supported gross falsehoods, and a whole company have been captivated to error by this means, till some man with equal assurance has rescued them. It is pity that any momentous point of doctrine should happen to fall under such reproaches, and require such a mode of vindication; though if I happen to hear it, I ought not to turn my back and to sneak off in silence, and leave the truth to lie baffled, bleeding and slain. Yet I must confess, I should be glad to have no occasion ever given me to fight with any man at this sort of weapons, even though I should be so happy as to silence his insolence, and obtain an evident victory.

XVII. *Be not fond of disputing every thing* Pro and Con, nor indulge yourself to shew your talent of attacking and defending. A logic which teaches nothing else, is little worth. This temper and practice will lead you just so far out of the way of knowledge, and divert your honest enquiry after the truth which is debated or sought. In set disputes, every little straw is often laid hold on to support our own cause; every thing that can be drawn in any way to give colour to our argument is advanced, and that perhaps with vanity and ostentation. This puts the mind out of a proper posture to seek and receive the truth.

XVIII. *Do not bring a warm party-spirit into free conversation*, which is designed for mutual improvement in the search of truth. Take heed of allowing yourself in those self-satisfied assurances, which keep the doors of the understanding barred fast against the admission of any new sentiments. Let your soul be ever ready to hearken to further discoveries, from a constant and ruling consciousness of our present fallible and imperfect

state; and make it appear to your friends, that it is no hard task for you to learn and pronounce those little words, *I was mistaken*, how hard soever it be for the bulk of mankind to pronounce them.

XIX. As you may sometimes raise enquiries for your own instruction and improvement, and draw out the learning, wisdom and fine sentiments of your friends, who perhaps may be too reserved or modest; so at other times if you perceive a person unskilful in the matter of debate; you may by questions aptly proposed in the Socratic method, lead him into a clearer knowledge of the subject; then you become his instructor in such a manner as may not appear to make yourself his superior.

XX. *Take heed of affecting always to shine in company above the rest*, and to display the riches of your own understanding or your oratory, as though you would render yourself admirable to all that are present. This is seldom well taken in polite company; much less should you use such forms of speech as should insinuate the ignorance or dulness of those with whom you converse.

XXI. Though you should not affect to flourish in a copious harangue and diffusive style in company, yet *neither should you rudely interrupt and reproach him that happens to use it:* but when he has done speaking, reduce his sentiments into a more contracted form; not with a shew of correcting, but as one who is doubtful whether you hit upon his true sense or no. Thus matters may be brought more easily from a wild confusion into a single point; questions may be sooner determined, and difficulties more readily removed.

XXII. *Be not so ready to charge ignorance, prejudice, and mistake upon others*, as you are to suspect yourself of it: and in order to shew how free you are from prejudices, learn to bear contradiction with patience: let it be easy to you to hear your own opinion strongly opposed, especially in matters which are doubtful and disputable amongst men of sobriety and virtue. Give a patient hearing to arguments on all sides, otherwise you give the company occasion to suspect that it is not the evidence of truth has lead you into this opinion, but some lazy anticipation of judgment; some beloved presumption, some long and rash possession of a party-scheme, in which you desire to rest undisturbed. If your assent has been established upon just and sufficient grounds, why should you be afraid to let the truth be put to the trial of argument?

XXIII. "Banish utterly out of all conversation, and especially out of all learned and intellectual conference, every thing that tends to provoke passion, or raise a fire in the blood." Let no sharp language, no noisy exclamation, no sarcasms or biting jests be heard among you; no perverse or invidious consequences

be drawn from each other's opinions, and imputed to the person: Let there be no wilful perversion of another's meaning; no sudden seizure of a lapsed syllable to play upon it, nor any abused construction of an innocent mistake: suffer not your tongue to insult a modest opponent that begins to yield; let there be no crowing and triumph, even where there is evident victory on your side. All these things are enemies to friendship, and the ruin of free conversation. The impartial search of truth requires all calmness and serenity, all temper and candour: mutual instruction can never be attained in the midst of passion, pride and clamour, unless we suppose in the midst of such a scene there is a loud and penetrating lecture read by both sides on the folly and shameful infirmities of human nature.

XXIV. Whensoever therefore any unhappy word shall arise in company that might give you a reasonable disgust, *quash the rising resentment, be it ever so just*, and command your soul and your tongue into silence, lest you cancel the hopes of all improvement for that hour, and transform the learned conversation into the mean and vulgar form of reproaches and railing. The man who begun to break the peace in such a society, will fall under the shame and conviction of such a silent reproof, if he has any thing ingenuous about him. If this should not be sufficient, let a grave admonition, or a soft and gentle turn of wit, with an air of pleasantry, give the warm disputer an occasion to stop the progress of his indecent fire, if not to retract the indecency and quench the flame.

XXV. *Inure yourself to a candid and obliging manner in all your conversation*, and acquire the art of pleasing address, even when you teach as well as when you learn, and when you oppose as well as when you assert or prove. This degree of politeness is not to be attained without a diligent attention to such kind of directions as are here laid down, and a frequent exercise and practice of them.

XXVI. If you would know *what sort of companions you should select for the cultivation and advantage of the mind, the general rule is*, choose such as by their brightness of parts and their diligence in study, or by their superior advancement in learning, or peculiar excellency in any art, science or accomplishment, divine or human, may be capable of administring to your improvement; and be sure to maintain and keep some due regard to their moral character always, lest while you wander in quest of intellectual gain, you fall into the contagion of irreligion and vice. No wise man would venture into a house infected with the plague, in order to see the finest collections of any *virtuoso in Europe*.

XXVII. Nor is it every sober person of your acquaintance, no, nor every man of bright parts, or rich in learning, that is

fit to engage in free conversation for the enquiring after truth. Let a person have ever so illustrious talents, yet *he is not a proper associate for such a purpose, if he lie under any of the following infirmities.*

(1.) If he be exceedingly reserved, and hath either no inclination to discourse, or no tolerable capacity of speech and language for the communication of his sentiments. (2.) If he be haughty and proud of his knowledge, imperious in his airs, and is always fond of imposing his sentiments on all the company. (3.) If he be positive and dogmatical in his own opinions, and will dispute to the end; if he will resist the brightest evidence of truth rather than suffer himself to be overcome, or yield to the plainest and strongest reasonings. (4.) If he be one who always affects to outshine all the company, and delights to hear himself talk and flourish upon a subject, and make long harangues, while the rest must be all silent and attentive. (5.) If he be a person of a whiffling and unsteady turn of mind who cannot keep close to a point of controversy, but wanders from it perpetually, and is always solicitous to say something, whether it be pertinent to the question or no. (6.) If he be fretful and peevish, and given to resentment upon all occasions; if he knows not how to bear contradiction; or is ready to take things in a wrong sense; if he is swift to feel a supposed offence, or to imagine himself affronted, and then break out into a sudden passion, or retain silent and sullen wrath. (7.) If he affect wit on all occasions, and is full of his conceits and puns, quirks or quibbles, jests and repartees; these may agreeably entertain and animate an hour of mirth, but they have no place in the search after truth. (8.) If he carry always about with him a sort of craft, and cunning, and disguise, and act rather like a spy than a friend. Have a care of such a one as will make an ill use of freedom in conversation, and immediately charge heresy upon you, when you happen to differ from those sentiments which authority or custom has established.

In short, you should avoid the man in such select conversation, who practises any thing that is unbecoming the character of a sincere, free and open searcher after truth.

Now though you may pay all the relative duties of life to persons of these unhappy qualifications, and treat them with decency and love, so far as religion and humanity oblige you, yet take care of entering into a free debate on matters of truth or falsehood in their company, and especially about the principles of religion. I confess, if a person of such a temper happens to judge and talk well on such a subject, you may hear him with attention and derive what profit you can from his discourse; but he is by no means to be chosen for a free conference in matters of enquiry and knowledge.

XXVIII. While I would persuade you to beware of such

persons, and abstain from too much freedom of discourse amongst them, it is very natural to infer that *you should watch against the working of these evil qualities in your own breast*, if you happen to be tainted with any of them yourself. Men of learning and ingenuity will justly avoid your acquaintance, when they find such an unhappy and unsociable temper prevailing in you.

XXIX. To conclude: when you retire from company, then *converse with yourself in solitude, and enquire what you have learnt for the improvement of your understanding, or for the rectifying your inclinations*, for the increase of your virtues, or the meliorating your conduct and behaviour in any future parts of life. If you have seen some of your company candid, modest, humble in their manner, wise and sagacious, just and pious in their sentiments, polite and graceful, as well as clear and strong in their expression, and universally acceptable and lovely in their behaviour, endeavour to impress the idea of all these upon your memory, and treasure them up for your imitation.

XXX. If the laws of reason, decency, and civility, have not been well observed among your associates, *take notice of these defects for your own improvement:* and from every occurrence of this kind, remark something to imitate or to avoid, in elegant, polite, and useful conversation. Perhaps you will find that some persons present have really displeased the company by an excessive and too visible an affectation to please, that is, by giving loose to servile flattery, or promiscuous praise; while others were as ready to oppose and contradict every thing that was said. Some have deserved just censure for a morose and affected taciturnity, and others have been anxious and careful lest their silence should be interpreted a want of sense, and therefore they have ventured to make speeches, tho' they had nothing to say which was worth hearing. Perhaps you will observe, that one was ingenious in his thoughts and bright in his language, but he was so top full of himself, that he let it spill on all the company; that he spoke well indeed, but that he spoke too long, and did not allow equal time or liberty to his associates. You will remark that another was full charged to let out his words before his friend had done speaking, or impatient of the least opposition to any thing he said. You will remember that some persons have talked at large, and with great confidence, of things which they understood not, and others counted every thing tedious and intolerable that was spoken upon subjects out of their sphere, and they would fain confine the conference entirely within the limits of their own narrow knowledge and study. The errors of conversation are almost infinite.

XXXI. By a view of such irregularities as these, you may learn to avoid those follies and pieces of ill conduct which spoil good conversation, or make it less agreeable and less useful;

and by degrees you will acquire that delightful and easy manner of address and behaviour in all useful correspondences, which may render your company every where desired and beloved; and at the same time among the best of your companions you may make the highest improvement in your intellectual acquisitions, that the discourse of mortal creatures will allow, under all our disadvantages in this sorry state of mortality. But there is a day coming, when we shall be seized away from this lower class in the school of knowledge, where we labour under the many dangers and darknesses, the errors and the incumbrances of flesh and blood, and our conversation shall be with angels, and more illuminated spirits in the upper regions of the universe.

CHAP. X.—*Of Disputes.*

I. UNDER the general head of *Conversation for the Improvement of the Mind*, we may rank the practice of disputing; that is, when two or more persons appear to maintain different sentiments, and defend their own, or oppose the other's opinion in alternate discourse by some methods of argument.

II. As these disputes often arise in good earnest, where the two contenders do really believe the different propositions which they support; so sometimes they are appointed as mere trials of skill in academies, or schools, by the students: sometimes they are practised, and that with apparent fervour, in courts of judicature by lawyers, in order to gain the fees of their different clients, while both sides perhaps are really of the same sentiment with regard to the cause which is tried.

III. In common conversation, disputes are often managed without any forms of regularity or order, and they turn to good or evil purposes, chiefly according to the temper of the disputants. They may sometimes be successful to search out truth, sometimes effectual to maintain truth, and convince the mistaken, but at other times a dispute is a mere scene of battle in order to victory and vain triumph.

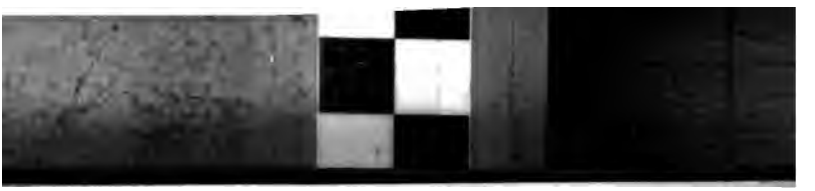
IV. There are some few general rules which should be observed in all debates whatsoever, if we would find out truth by them, or convince a friend of his error, even though they be not managed according to any settled forms of disputation: and as there are almost as many opinions and judgments of things as there are persons, so when several persons happen to meet and confer together upon any subject, they are ready to declare their different sentiments, and support them by such reasonings as they are capable of. This is called debating, or disputing, as is above described.

V. When persons begin a debate, *they should always take care that they are agreed in some general principles or propositions*, which either more nearly or remotely affect the question in hand; for otherwise they have no foundation or hope of convincing each other; they must have some common ground to stand upon while they maintain the contest. When they find they agree in some remote propositions, then let them search farther, and enquire how near they approach to each other's sentiments; and whatsoever propositions they agree in, let these lay a foundation for the mutual hope of conviction. Hereby you will be prevented from running at every turn to some original and remote propositions and axioms, which practice both entangles and prolongs a dispute. As for instance, if there was a debate proposed betwixt a *protestant* and a *papist*, whether there be such a place as *purgatory?* Let them remember that they both agree in this point, that *Christ has made satisfaction or atonement for sin*, and upon this ground let them both stand, while they search out the controverted doctrine of *purgatory* by way of conference or debate.

VI. The *question should be cleared from all doubtful terms and needless additions;* and all things that belong to the *question* should be expressed in plain and intelligible language. This is so necessary a thing, that without it, men will be exposed to such sort of ridiculous contests as was found one day between the two unlearned combatants Sartor and Sutor, who assaulted and defended the doctrine of transubstantiation with much zeal and violence: but Latino happening to come into their company, and enquiring the subject of their dispute, asked each of them what he meant by that long hard word transubstantiation. Sutor readily informed him that he understood *bowing at the name of Jesus.* But Sartor assured him that he meant nothing but *bowing at the high altar:* "No wonder then, said Latino, that you cannot agree, when you neither understand one another, nor the word about which you contend." I think the whole family of the Sartors and Sutors would be wiser if they avoided such kind of debates, till they understood the terms better. But alas! even their wives carry on such conferences; the other day one was heard in the street, explaining to her less learned neighbour, the meaning of *metaphysical* science; and she assured her, that as *physics* were medicines for the body, so metaphysics was *physic* for the soul: upon this they went on to dispute the point how far the *divine* excelled the *doctor.*

Auditum admissi risum teneatis amici?
Ridentem dicere verum quid vetat? Hor.

Can it be faulty to repeat
A dialogue that walked the street?
Or can my gravest friends forbear
A laugh, when such disputes they hear?



VII. And not only the sense and meaning of the words used in the question should be settled and adjusted between the disputants, but the *precise point of enquiry should be distinctly fixed*; the question in debate should be limited precisely to its special extent, or declared to be taken in its more general sense. As for instance, If two men are contending *whether civil government be of divine right or no*; here it must be observed, the question is not whether *monarchy* in one man, or a *republic* in multitudes of the people, or an *aristocracy* in a few of the chief, is appointed of God as necessary; but whether civil government in its most general sense, or in any form whatsoever, is derived from the will and appointment of God? Again, The point of enquiry should be limited further. Thus, the question is not whether government comes from the will of God by the light of revelation, for that is granted; but whether it is derived from the will of God by the light of reason too. This sort of specification or limitation of the question, hinders and prevents the disputers from wandering away from the precise point of enquiry.

It is this trifling humour or dishonest artifice of changing the question, and wandering away from the first point of debate, which gives endless length to disputes, and causes both the disputants to part without any satisfaction. And one chief occasion of it is this; when one of the combatants feels his cause run low and fail, and is just ready to be confuted and demolished; he is tempted to step aside to avoid the blow, and betakes him to a different question: thus, if his adversary be not well aware of him, he begins to entrench himself in a new fastness, and holds out the siege with a new artillery of thoughts and words. It is the pride of man which is the spring of this evil, and an unwillingness to yield up their own opinions, even to be overcome by truth itself.

VIII. Keep this always therefore upon your mind, as an everlasting rule of conduct in your debates to find out truth, that a *resolute design, or even a warm affectation of victory, is the bane of all real improvement, and an effectual bar against the admission of the truth which you profess to seek.* This works with a secret, but a powerful and mischievous influence in every dispute, unless we are much upon our guard. It appears in frequent conversation: every age, every sex, and each party of mankind are so fond of being in the right, that they know not how to renounce this unhappy prejudice, this vain love of victory. When truth with bright evidence is ready to break in upon the disputant, and to overcome his objections and mistakes, how swift and ready is the mind to engage wit and fancy, craft and subtlety, to cloud and perplex and puzzle *the truth, if possible?* How eager is he to throw in some *impertinent question* to divert from the main subject? How swift

to take hold of some occasional word, thereby to lead the discourse off from the point in hand? So much afraid is human nature of parting with its errors, and being overcome by truth. Just thus a hunted *hare* calls up all the shifts that nature hath taught her, she treads back her mazes, crosses and confounds her former track, and uses all possible methods to divert the scent, when she is in danger of being seized and taken. Let *puss* practise what nature teaches; but would one imagine that any rational being should take such pains to avoid truth, and to escape the improvement of his understanding?

IX. When you come to a dispute, in order to find out truth, *do not presume that you are certainly possessed of it beforehand.* Enter the debate with a sincere design of yielding to reason, on which side soever it appears. Use no subtle arts to cloud and entangle the question; hide not yourself in doubtful words and phrases; do not affect little shifts and subterfuges to avoid the force of an argument; take a generous pleasure to espy the first rising beams of truth, though it be on the side of your opponent: endeavour to remove the little obscurities that hang about it, and suffer and encourage it to break out into open and convincing light; that while your opponent, perhaps, may gain the better of your reasonings, yet you yourself may triumph over error, and I am sure that is a much more valuable acquisition and victory.

X. *Watch narrowly in every dispute, that your opponent does not lead you unwarily to grant some principle or proposition, which will bring with it a fatal consequence,* and lead you insensibly into his sentiment, though it be far astray from the truth: and by this wrong step you will be, as it were, plunged into dangerous errors before you are aware. Polonides in free conversation led Incauta to agree with him in this plain proposition, that the blessed God has too much justice in any case to punish* any being who is in itself innocent; till he not only allowed it with an unthinking alacrity, but asserted it in most universal and unguarded terms. A little after Polonides came in discourse to commend the virtues, the innocence, and the piety of our blessed Saviour; and thence inferred, *it was impossible that God should ever punish so holy a person who was never guilty of any crime:* then Incauto espied the snare, and found himself robbed and defrauded of the great doctrine of the atonement by the death of Christ, upon which he had placed his immortal hopes according to the gospel. This taught him to bethink himself what a dangerous concession he had made in so universal a manner, that *God would never punish any being who was innocent,* and he saw it needful to recall his

* *The word "punish" here signifies, "to bring some natural evil upon a person on account of moral evil done."*

words, or to explain them better, by adding this restriction or limitation, viz. Unless this innocent being were some way involved in another's sin, or stood as a voluntary surety for the guilty:" by this limitation he secured the great and blessed doctrine of the sacrifice of Christ for the sins of men, and learnt to be more cautious in his concessions for time to come.

Two months ago Fatalio had almost tempted his friend Fidens to leave off prayer, and to abandon his dependence on the providence of God in the common affairs of life, by obtaining of him a concession of the like kind. Is it not evident to reason, says Fatalio, that God's immense scheme of transactions in the universe, was contrived and determined long before you and I were born? Can you imagine, my dear Fidens, that the blessed God changes his original contrivances, and makes new interruptions in the course of them so often as you and I want his aid, to prevent the little accidents of life, or to guard us from them? Can you suffer yourself to be persuaded, that the great Creator of this world takes care to support a bridge which was quite rotten, and to make it stand firm a few minutes longer till you had rode over it? Or will he uphold a falling tower while we two were passing by it, that such worms as you and I are might escape the ruin?

But you say, *you prayed for his protection in the morning, and he certainly hears prayer.* I grant he knows it: but are you so fond and weak, said he, as to suppose that the universal Lord of all had such a regard to a word or two of your breath, as to make alterations in his own eternal scheme upon that account? Nor is there any other way whereby his providence can preserve you in answer to prayer, but by creating such perpetual interruptions, and changes in his own conduct according to your daily behaviour.

I acknowledge, says Fidens, there is no other way to secure the doctrine of divine providence in all these common affairs; and therefore I begin to doubt, whether God does or ever will exert himself so particularly in our little concerns.

Have a care, good Fidens, that you yield not too far: take heed lest you have granted too much to Fatalio. Pray let me ask of you, could not the great God, who grasps and surveys all future and distant things in one single view—could not he from the beginning foresee your morning prayer for his protection, and appoint all second causes to concur for the support of that crazy bridge, or to make that old tower stand firm till you had escaped the danger? Or could not he cause all the mediums to work so as to make it fall before you come near it? Can he not appoint all his own transactions in the universe, and every *event in the natural* world, in a way of perfect correspondence *with his own fore*-knowledge of all the events, actions and ap-

pearances of the moral world in every part of it? Can he not direct every thing in nature, which is but his servant, to act in perfect agreement with his eternal prescience of our sins, or of our piety? And hereby all the glory of providence, and our necessary dependence upon it by faith and prayer, are as well secured, as if he interposed to alter his own scheme every moment.

Let me ask again: Did not he in his own counsels or decrees appoint thunders and lightnings, and earthquakes, to burn up and destroy Sodom and Gomorrah, and turn them into a dead sea, just at the time when the iniquities of these cities were raised to their supreme height? Did he not ordain the fountains of the deep to be broken up, and overwhelming rains to fall down from heaven, just when a guilty world deserved to be drowned; while he took care of the security of righteous Noah, by an ark which should float upon that very deluge of waters? Thus, he can punish the criminal when he pleases, and reward the devout worshipper in the proper season, by his original and eternal schemes of appointment, as well as if he interposed every moment anew. Take heed, Fidens, that you be not tempted away by such sophisms of Fatalio, to withhold prayer from God, and to renounce your faith in his providence. Remember this short and plain caution of the subtle errors of men. Let a snake but once thrust in his head at some small unguarded fold of your garment, and he will insensibly and unavoidably wind his whole body into your bosom, and give you a pernicious wound.

XI. On the other hand, *when you have found your opponent make any such concession as may turn to your advantage in maintaining the truth, be wise and watchful to observe it, and make a happy improvement of it.* Rhapsodus has taken a great deal of pains to detract from the honour of Christianity, by sly insinuations, that the sacred writers are perpetually promoting virtue and piety by promises and threatenings; whereas, "neither the fear of future punishment, nor the hope of future reward can possibly be called good affections, or such as are the acknowledged springs and sources of all actions truly good." He adds further, that "this fear, or this hope, cannot consist in reality with virtue or goodness, if it either stands as essential to any moral performance, or as a considerable motive to any good action;" and thus he would fain lead Christians to be ashamed of the gospel of Christ, because of its future and eternal promises and threatenings, as being inconsistent with his notion of virtue; for he supposes virtue should be so beloved and practised for the sake of its own beauty and loveliness, that all other motives arising from rewards or punishments, fear or hope, do really take away just so much from the very nature of virtue as their influence reaches to; and no part of those good practices are re-

ally valuable, but what arises from the mere love of virtue itself, without any regard to punishment or reward.

But observe in two pages afterwards, he grants that "this principle of fear of future punishment, and hope of future reward, how mercenary and servile soever it may be accounted, is yet in many circumstances a great advantage, security and support to virtue; especially where there is danger of the violence of rage or lust, or any counter-working passion, to control and overcome the good affections of the mind."

Now the rule and practice of Christianity, or the gospel, as it is closely connected with future rewards and punishments, may be well supported by this concession. Pray, Rhapsodus, tell me, if every man in this present life, by the violence of some counter-working passion, may not have his good affections to virtue controlled or overcome? May not therefore his eternal fears and hopes be a great advantage, security, and support to virtue in so dangerous a state and situation, as our journey through this world towards a better? And this is all that the defence of Christianity necessarily requires.

And yet further, let me ask our *rhapsodist*, "if you have nothing else, Sir, but the beauty and excellency, and loveliness of virtue to preach and flourish upon before such sorry and degenerate creatures as the bulk of mankind are, and you have no future rewards or punishments with which to address their hope and fears, how many of these vicious wretches will you ever reclaim from all their varieties of profaneness, intemperance and madness? How many have you ever actually reclaimed by this smooth soft method, and these fine words? What has all that reasoning and rhetoric done which have been displayed by your predecessors, the Heathen moralists, upon this excellency and beauty of virtue? What has it been able to do towards the reforming of a sinful world? Perhaps now and then a man of better natural mould has been a little refined, and perhaps also there may have been here and there a man restrained or recovered from injustice and knavery, from drunkenness and lewdness, and vile debaucheries, by this fair reasoning and philosophy: but have the passions of revenge and envy, of ambition and pride, and the inward secret vices of the mind been mortified merely by this philosophical language? Have any of these men been made new creatures, men of real piety and love to God?

"Go dress up all the virtues of human nature in all the beauties of your oratory, and declaim aloud on the praise of social virtue, and the amiable qualities of goodness, till your heart or your lungs ache, among the looser herds of mankind, and you will ever find, as your Heathen fathers have done before, that the wild passions and appetites of men are too violent to be restrained by such mild and silken language. You may as well

build up a fence of straw and feathers to resist a cannon-ball, or try to quench a flaming grenado with a shell of fair water, as hope to succeed in these attempts. But an *eternal heaven, and an eternal hell,* carry divine force and power with them: "this doctrine from the mouth of Christian preachers has begun the reformation of multitudes: this gospel has recovered thousands among the nations from iniquity and death. They have been awakened by these awful scenes to begin religion, and afterwards their virtue has improved itself into superior and more refined principles and habits by divine grace, and risen to high and eminent degrees, though not to a consummate state. The blessed God knows human nature much better than Rhapsodus doth, and has throughout his word appointed a more proper and more effectual method of address to it by the passions of hope and fear, by punishments and rewards.

If you read on four pages further in these writings, you will find the author makes another concession. He allows that "the master of a family using proper rewards and gentle punishments towards his children, teaches them goodness, and by this help instructs them in a virtue which afterwards they practise upon other grounds, and without thinking of a penalty or a bribe: and this, says he, is what we call a liberal education and a liberal service."

This new concession of that author may also be very happily improved in favour of Christianity. What are the best of men in this life? They are by no means perfect in virtue; we are all but children here under the great Master of the family, and he is pleased by hopes and fears, by mercies and corrections to instruct us in virtue, and to conduct us onward towards the sublimer and more perfect practice of it in the future world, where it shall be performed, as in his own language, perhaps *without thinking of penalties and bribes.* And since he has allowed that this conduct may be called "a liberal education, and a liberal service," let christianity then be indulged the title of a "liberal education" also, and it is admirably fitted for such frail and sinful creatures, while they are training up towards the sublimer virtues of the heavenly state.

XII. When you are engaged in a dispute with a person of very different principles from yourself, and you cannot find any ready way to prevail with him to embrace the truth by principles which you both freely acknowledge, *you may fairly make use of his own principles to shew him his mistake, and thus convince or silence him, from his own concessions.*

If your opponent should be a Stoic philosopher, or a Jew, you may pursue your argument in defence of some Christian doctrine or duty against such a disputant, by axioms or laws borrowed either from Zeno or Moses. And though you do not en-

ter into the enquiry how many of the laws of Moses are abrogated, or whether Zeno was right or wrong in his philosophy; yet if from the principles and concession of your opponent, you can support your argument for the gospel of Christ, this has been always counted a fair treatment of an adversary, and it is called *Argumentum ad hominem*, or *Ratio ex concessis*. St. Paul sometimes makes use of this sort of disputation, when he talks with Jews or Heathen philosophers; and at least he silences if not convinces them: which is sometimes necessary to be done against an obstinate and clamorous adversary, that just honour might be paid to truths which he knew were divine, and that the only true doctrine of salvation might be confirmed and propagated among sinful and dying men.

XIII. *Yet great care must be taken lest your debates break in upon your passions, and awaken them to take part in the controversy.* When the opponent pushes hard, and gives just and mortal wounds to our own opinion, our passions are very apt to feel the strokes, and to rise in resentment and defence. Self is so mingled with the sentiments which we have chosen, and has such a tender feeling of all opposition which is made to them, that personal brawls are very ready to come in as seconds, to succeed and finish the dispute of opinions. Then noise and clamour and folly appear in all their shapes, and chase reason and truth out of sight.

How unhappy is the case of frail and wretched mankind, in this dark or dusky state of strong passion and glimmering reason? How ready are we, when our passions are engaged in the dispute, to consider more what loads of nonsense and reproach we can lay upon our opponent, than what reason and truth require in the controversy itself. Dismal are the consequences mankind are too often involved in by this evil principle; it is this common and dangerous practice, that carries the heart aside from all that is fair and honest in our search after truth, or the propagation of it in the world. One would wish from one's very soul, that none of the Christian fathers had been guilty of such follies as these.

But St. Jerome fairly confesses this evil principle, in his apology for himself to Pammachius, *that he had not so much regarded what was exactly to be spoken in the controversy he had in hand; as what was fit to lay a load on Jovinian.* And indeed I fear this was the vile custom of many of the writers even in the church-affairs of those times. But it will be a double scandal upon us in our more enlightened age, if we will allow ourselves in a conduct so criminal and dishonest. Happy souls, who keep such a sacred dominion over their inferior and animal powers, and all the influences of pride, and secular interest, that the sensitive tumults, or these vicious influences never rise

to disturb the superior and better operations of the reasoning mind!

XIV. These general directions are necessary, or at least useful in all debates whatsoever, whether they arise in occasional conversation, or are appointed at any certain time or place; whether they are managed with or without any formal rules to govern them. But there are three sorts of disputation, in which there are some forms and orders observed, and which are distinguished by these three names, viz. Socratic, Forensic, and Academic, that is, the disputes of the schools.

Concerning each of these it may not be improper to discourse a little, and give a few particular directions or remarks about them.

CHAP. XI.—*The Socratical Way of Disputation.*

I. THIS method of dispute derives its name from Socrates, by whom it was practised, and by other philosophers in his age, long before Aristotle invented the particular forms of syllogism in mood and figure, which is now used in scholastic disputations.

II. The Socratical way is managed by *questions* and *answers* in such a manner as this, viz. If I would lead a person into the belief of a heaven or hell, or a future state of rewards and punishments, I might begin in some such manner of enquiry, and suppose the most obvious and easy answers.

Q. Does not God govern the world?

A. Surely he that made it governs it.

Q. Is not God both a good and a righteous governor?

A. Both these characters doubtless belong to him.

Q. What is the true notion of a good and righteous governor?

A. That he punishes the wicked and rewards the good.

Q. Are the good always rewarded in this life?

A. No surely, for many virtuous men are miserable here, and greatly afflicted.

Q. Are the wicked always punished in this life?

A. No certainly, for many of them live without sorrow, and some of the vilest of men are often raised to great riches and honour.

Q. Wherein then doth God make it appear that he is good and righteous?

A. I own there is but little appearance of it on earth.

Q. Will there not be a time then when the tables shall be turned, and the scene of things changed, since God governs mankind righteously?

A. Doubtless there must be a proper time, wherein God will make that goodness and that righteousness to appear.

Q. If this be not before their death, how can it be done?

A. I can think of no other way, but by supposing man to have some existence after this life.

Q. Are you not convinced then, that there must be a state of reward and punishment after death?

A. Yes surely, I now see plainly that the goodness and righteousness of God as governor of the world, necessarily require it.

III. Now the advantages of this method are very considerable.

1. It represents the *form of a dialogue or common conversation*, which is a much more easy, more pleasant, and a more sprightly way of instruction, and more fit to excite the attention and sharpen the penetration of the learner, than solitary reading or silent attention to a lecture. Man being a sociable creature, delights more in conversation, and learns better this way, if it could always be wisely and happily practised.

2. This method *hath something very obliging in it*, and carries a very humble and condescending air, when he that instructs seems to be the enquirer, and seeks information from him who learns.

3. *It leads the learner into the knowledge of truth as it were by his own invention*, which is a very pleasing thing to human nature; and by questions pertinently and artificially proposed, it does as effectually draw him on to discover his own mistakes, which he is much more easily persuaded to relinquish when he seems to have discovered them himself.

4. It is managed in a great measure *in the form of the most easy reasoning*, always arising from something asserted or known in the foregoing answer, and so proceeding to enquire something unknown in the following question, which again makes way for the next answer. Now such an exercise is very alluring and entertaining to the understanding, while its own reasoning powers are all along employed; and that without labour or difficulty, because the querist finds out and proposes all the intermediate ideas or middle terms.

IV. There is a method very near a-kin to this which has much obtained of late, viz. *writing controversies by questions only*, or confirming or refuting any position, or persuading to or dehorting from any practice by the mere proposal of *queries*.—The answer to them is supposed to be so plain and so necessary, that they are not expressed because the query itself carries a convincing argument in it, and seems to determine what the answer must be.

V. If Christian catechisms could be framed in the manner

of a Socratical dispute by question and answer, it would wonderfully enlighten the minds of children, and it would improve their intellectual and reasoning powers, at the same time that it leads them into the knowledge of religion; and it is upon one account well suited to the capacity of children; for the questions may be pretty numerous, and the querist must not proceed too swiftly towards the determination of his point proposed, that he may with more ease, with brighter evidence, and with surer success, draw the learner on to assent to those principles step by step, from whence the final conclusion will naturally arise. The only inconvenience would be this, that if children were to reason out all their way entirely into the knowledge of every part of their religion, it would draw common catechisms into too large a volume for their leisure, attention or memory. Yet those who explain their catechisms to them may, by due applicationand forethought, instruct them in this manner.

CHAP. XII.—*Of Forensic Disputes.*

I. THE Forum was a public place in Rome, where lawyers and orators made their speeches before the proper judge in matters of property, or in criminal cases to accuse or excuse, to complain or defend; thence all sorts of disputations in public assemblies or courts of justice, where several persons make their distinct speeches for or against any person or thing whatsoever, but more especially in civil matters, may come under the name of *forensic disputes.*

II. This is practised not only in the *courts of judicature,* where a single person sits to judge of the truth or goodness of any cause, and to determine according to the weight of reasons on either side; but it is used also in *political senates or parliaments, ecclesiastical synods, and assemblies* of various kinds.

In these assemblies, generally one person is chosen *chairman or moderator,* not to give a determination to the controversy, but chiefly to keep the several speakers to the rules of order and decency in their conduct; but the final determination of the questions arises from the *majority of opinions or votes* in the assembly, according as they are or ought to be swayed by the superior weight of reason appearing in the several speeches that are made.

III. The method of proceeding is usually in some such form as this. The first person who speaks when the court is set, opens the case either more briefly or at large, and proposes the case to the judge or the chairman, or moderator of the assembly, and gives his own reasons for his opinion in the case proposed.

IV. This person is succeeded by one, or perhaps two or several more, who paraphrase on the same subject, and argue on the same side of the question; they confirm what the first has spoken, and urge *new reasons* to enfore the same; then those who are of a different opinion, stand up and make their several speeches in a succession, opposing the cause which others have maintained, giving *their reasons* against it, and endeavouring to refute the arguments whereby the first speakers have supported it.

V. After this, one and another rises up to make their *replies* to vindicate or to condemn, to establish or to confute what has been offered before on each side of the question; till at last, according to the rules, orders, and customs of the court or assembly, the controversy is decided, either by a *single judge or the suffrage of the assembly.*

VI. Where the question or matter in debate consists of several parts, after it is once opened by the first or second speaker, sometimes those who follow take each of them a *particular part of the debate*, according to their inclination or their prior agreement, and apply themselves to argue upon that single point only, that so the whole *complexion* of the debate may not be thrown into confusion by the variety of subjects, if every speaker should handle all the subjects of debate.

VII. Before the final sentence or determination is given, it is usual to have the reasons and arguments which have been offered on both sides, summed up and represented in a more compendious manner; and this is done either by the appointed *judge of the court*, or the *chairman*, or some *noted person* in the assembly, that so judgment may proceed upon the fullest survey of the whole subject, that as far as possible in human affairs nothing may be done contrary to truth or justice.

VIII. As this is a practice in which multitudes of gentlemen, besides those of the learned professions, may be engaged at least in their maturer years of life, so it would be a very proper and useful thing to introduce this custom into our academies, viz. to propose cases, and let the students debate them in a *forensic* manner in the presence of their tutors. There was something of this kind practised by the Roman youth in their schools, in order to train them up for orators, both in the *forum* and in the *senate*. Perhaps Juvenal gives some hints of it when he says,

——————— *et nos*
Consilium dedimus Syllae, privatus ut altum
Dormiret ——————————

Where with men-boys I strove to get renown,
Advising Sylla to a private gown,
That he might sleep the sounder. Sat. 1.

Sometimes these were assigned to the boys as single subjects of a theme or declamation; so the same poet speaks sarcastically to *Hannibal*,

> ——— *I demens, et saevas curre per Alpes,*
> *Ut pueris placeas et declamatio fias.* Sat. 10.
>
> Go climb the rugged *Alps*, ambitious fool,
> To please the boys, and be a theme at school.

See more of this matter in Kennet's Antiquities of Rome, in the second *Essay* on the Roman Education.

CHAP. XIII.—*Of Academic or Scholastic Disputation.*

THE common methods in which *disputes* are managed in the *Schools of Learning*, are these, viz.

I. The tutor appoints a question in some of the sciences to be debated among his students: one of them undertakes to *affirm* or to *deny* the question, and to defend his assertion or negation, and to answer all objections against it; he is called the *respondent*; and the rest of the students in the same class, or who pursue the same science, are the *opponents*, who are appointed to dispute or raise objections against the proposition thus affirmed or denied.

II. Each of the students successively in their turn becomes the *respondent* or the defender of that proposition, while the rest oppose it also successively in their turns.

III. It is the business of the *respondent* to write a thesis in Latin, or short discourse of the question proposed; and he either affirms or denies the question according to the opinion of the tutor, which is supposed to be the truth, and he reads it at the beginning of the dispute.

IV. In his discourse (which is written with as great accuracy as the youth is capable of) he explains the terms of the question, frees them from all ambiguity, fixes their sense, declares the true intent and meaning of the question itself, separates it from other questions with which it may have been complicated, and distinguishes it from other questions which may happen to be a-kin to it, and then pronounces in the *negative* or *affirmative* concerning it.

V. When this is done, then in the second part of his discourse, he gives his own strongest arguments to confirm the proposition he has laid down, that is, to vindicate his own side of the question: but he does not usually proceed to represent the objections against it, and to solve or answer them; for

It is the business of the other students to raise objections in disputing.

VI. *Note*, In some schools, the *respondent* is admitted to talk largely upon the question with many flourishes and illustrations, to introduce great authorities from ancient and modern writings for the support of it, and to scatter Latin reproaches in abundance on all those who are of a different sentiment. But this is not always permitted, nor should it indeed be ever indulged, lest it teach youth to reproach instead of reasoning.

VII. When the *respondent* has read over his thesis in the school, the junior student makes an objection, and draws it up in the regular form of a syllogism: the *respondent* repeats the objection, and either denies the major or minor proposition directly, or he distinguishes upon some word or phrase in the major or minor, and shews in what sense the proposition may be true, but that *that* sense does not affect the question; and then declares that in the sense which affects the present question the proposition is not true, and consequently he denies it.

VIII. Then the *opponent* proceeds by another syllogism to vindicate the proposition that is denied: again the *respondent* answers by denying or distinguishing. Thus the disputation goes on in a *series or succession of syllogisms and answers*, till the *objector* is silenced, and has no more to say.

IX. When he can go no further, the next student begins to propose his objection, and then the third and the fourth, even to the senior, who is the last *opponent*.

X. During this time, the tutor sits in the chair as President or Moderator, to see that the rules of disputation and decency be observed on both sides; and to admonish each disputant of any irregularity in their conduct. His work is also to illustrate and explain the answer or distinction of the *respondent* where it is obscure, to strengthen it where it is weak, and to correct it where it is false; and when the *respondent* is pinched with a strong objection, and is at a loss for an answer, the *moderator* assists him, and suggests some answer to the objection of the *opponent*, in defence of the question, according to his own opinion or sentiment.

XI. In public disputes, where the *opponents* and *respondents* chuse their own side of the question, the *moderator's* work is not to favour either disputant; but he only sits as president to see that the laws of disputation be observed, and a decorum maintained.

XII. Now the *laws of disputation*, relate either to the *opponent*, or to the *respondent*, or to both. The *laws obliging the opponent* are these,

1. That he must *directly contradict the proposition of the respondent*, and not merely attack any of the arguments whereby the *respondent* has supported that proposition: for it is one thing to *confute a single argument* of the *respondent*, and another to *confute the thesis* itself. 2. (Which is a-kin to the former) he must contradict or oppose the very *sense and intention* of the proposition as the *respondent* has stated it, and not merely oppose the words of the thesis in any other sense; for this would be the way to plunge the dispute into ambiguity and darkness to talk beside the question, to wrangle about words, and to attack a proposition different from what the *respondent* has espoused which is called *Ignoratio elenchi*. 3. He must propose his argument in a plain, short, and syllogistic form, according to the rules of logic, without flying to fallacies or sophisms; and as far as may be, he should use categorical syllogisms. 4. Though the *respondent* may be attacked either upon a point of his own concession, which is called *Argumentum ex concessis*, or by reducing him to an absurdity, which is called *Reductio ad absurdum*, yet it is the neatest, the most useful, and the best sort of disputation where the *opponent* draws his objections from the nature of the question itself. 5. Where the *respondent* denies any proposition, the *opponent* if he proceed, must directly vindicate and confirm that proposition, that is, he must make that proposition the conclusion of his next syllogism. 6. Where the *respondent* limits or distinguishes any proposition, the *opponent* must directly prove his own proposition in that sense, and according to that member of the distinction in which the *respondent* denied it.

XIII. The *laws that oblige the respondent* are these:

1. To repeat the argument of the opponent in the very same words in which it was proposed, before he attempts to answer it. 2. If the syllogism be false in the logical form of it, he must discover the fault according to the rules of logic. 3. If the argument does not directly and effectually oppose his thesis, he must shew this mistake, and make it appear that his thesis is safe, even though the argument of the opponent be admitted: or at least, that the argument does only aim at it collaterally, or at a distance, and not directly overthrow it, or conclude against it. 4. Where the *matter* of the opponent's objection is faulty in any part of it, the *respondent* must grant what is true in it, he must deny what is false, he must distinguish or limit the proposition which is ambiguous or doubtful; and then granting the sense in which it is true, he must deny the sense in which it is false. 5. If an *hypothetic* proposition be false, the *respondent* must deny the consequence: if a disjunctive, he must deny the disjunction: if a categoric or relative, he must simply deny it. 6. It is sometimes allowed for the *respondent* to use an

indirect answer after he has answered directly: and he may also shew how the opponent's argument may be retorted against himself.

XIV. The *laws that oblige both disputants* are these:

1. Sometimes it is necessary there should be a mention of certain *general principles* in which they both agree, relating to the question, that so they may not dispute on those things which either are or ought to have been first granted on both sides. 2. When the state of the controversy is well known, and plainly determined and agreed, *it must not be altered* by either disputant in the course of the disputation; and the *respondent* especially should keep a watchful eye on the *opponent* in this matter. 3. Let neither party *invade the province of the other*; especially let the *respondent* take heed that he does not turn *opponent*; except in retorting the argument upon his adversary, after a direct response; and even this is allowed only as an illustration or confirmation of his own response. 4. Let each *wait with patience till the other has done speaking*. It is a piece of rudeness to interrupt another in his speech.

Yet though the disputants have not this liberty, the moderator may do it, when either of the disputants break the rules, and he may interpose so far as to keep them to order.

XV. It must be confessed there are some advantages to be attained by academical disputation. It gives vigour and briskness to the mind thus exercised, and relieves the langour of private study and meditation. It sharpens the wit and all the inventive powers. It makes the thoughts active, and sends them on all sides to find arguments and answers both for opposition and defence. It gives opportunity of viewing the subject of discourse on all sides, and of learning what inconveniences, difficulties and objections attend particular opinions. It furnishes the soul with various occasions of starting such thoughts as otherwise would never have come into the mind. It makes a student more expert in attacking and refuting an error, as well as in vindicating a truth. It instructs the scholar in the various methods of warding off the force of objections, and of discovering and repelling the subtle tricks of sophisters. It procures also a freedom and readiness of speech, and raises the modest and diffident genius to a due degree of courage.

XVI. But there are some very grievous inconveniences that may sometimes overbalance all these advantages. For many young students by a constant habit of disputing, grow impudent and audacious, proud and disdainful, talkative and impertinent, and render themselves intolerable by an obstinate humour of maintaining whatever they have asserted, as well as by a spirit of contradiction, opposing almost every thing that they hear. The disputation itself often awakens the passions of ambition,

emulation and anger; it carries away the mind from that calm and sedate temper which is so necessary to contemplate truth.

XVII. It is evident also, that by frequent exercises of this sort, wherein *opinions true and false* are argued, supported and refuted on both sides; the mind of man is led by insensible degrees to an uncertain and fluctuating temper, and falls into danger of a *sceptical humour*, which never comes to an establishment in any doctrines. Many persons by this means become much more ready to oppose whatsoever is offered in searching out truth; they hardly wait till they have read or heard the sentiment of any person, before their heads are busily employed to seek out arguments against it. They grow naturally sharp in finding out difficulties: and by indulging this humour, they converse with the dark and doubtful parts of a subject so long, till they almost render themselves incapable of receiving the full evidence of a proposition, and acknowledging the light of truth. It has some tendency to make a youth a *carping critic*, rather than a *judicious* man.

XVIII. I would add yet further, that in these disputations the *respondent* is generally appointed to maintain the supposed truth, that is, the *tutor's opinion*. But all the *opponents* are busy and warmly engaged in finding arguments against the truth. Now if a sprightly young genius happens to manage his argument so well as to puzzle and gravel the *respondent*, and perhaps to perplex the moderator a little too, he is soon tempted to suppose his argument unanswerable, and the truth entirely to lie on his side. The pleasure which he takes in having found a sophism which has great appearance of reason, and which he himself has managed with such success, becomes perhaps a strong prejudice to engage his inward sentiments in favour of his argument, and in opposition to the supposed truth.

XIX. Yet perhaps it may be possible to reduce *scholastic disputations* under such a guard, as may in some measure prevent most of these abuses of them, and the unhappy events that too often attend them: for it is pity that an exercise which has some valuable benefits attending it, should be utterly thrown away, if it be possible to secure young minds against the abuse of it; for which purpose some of these directions may seem proper.

XX. "General directions for scholastic disputes."

1. *Never dispute upon mere trifles, things that are utterly useless to be known, under a vain pretence of sharpening the wit:* for the same advantage may be derived from solid and useful subjects, and thus two happy ends may be attained at once. Or if such disputations are always thought dangerous in important matters, let them be utterly abandoned.

2. *Do not make infinite and unsearchable things the matter of dispute,* nor such propositions as are made up of mere words

without ideas, lest it lead young persons into a most unhappy habit of *talking without a meaning*, and boldly determine upon things that are hardly within the reach of human capacity.

Let not obvious and known truths, or some of the most plain and certain propositions be bandied about in a disputation, for a mere trial of skill: for he that opposes them in this manner, will be in danger of contracting a habit of opposing all evidence, will acquire *a spirit of contradiction*, and pride himself in a power of resisting the brightest light, and fighting against the strongest proofs: this will insensibly injure the mind, and tends greatly to an universal scepticism. Upon the whole, therefore, the most proper subjects of dispute seem to be those questions, which are not of the very highest importance and certainty, nor of the meanest and trifling kind: but rather the intermediate questions between these two; and there is a large sufficiency of them in the sciences. But this I put as a mere proposal, to be determined by the more learned and prudent.

4. It would be well if every dispute could be so ordered, as to be a means of *searching out truth, and not to gain a triumph.* Then each disputant might come to the work without bias and prejudice, with a desire of truth, and not with ambition of glory and victory. Nor should the aim and design of the *respondent* be to avoid artfully and escape the difficulties which the *opponent* offers, but to discuss them thoroughly, and solve them fairly if they are capable of being solved. Again, let the *opponent* be solicitous not to darken and confound the responses that are given him by fresh subtleties; but let him bethink himself whether they are not a just answer to the objection, and be honestly ready to perceive and accept them, and yield to them.

5. For this end, *let both the respondent and opponent use the clearest and most distinct and expressive language in which they can clothe their thoughts.* Let them seek and practise brevity and perspicuity on both sides, without long declamations, tedious circumlocutions, and rhetorical flourishes. If there happen to be any doubt or obscurity on either side, let neither the one nor the other ever refuse to give a fair explication of the words they use.

6. *They should not indulge ridicule, either of persons or things in their disputations.* They should abstain from all banter and jest, laughter and merriment. These are things that break in upon that philosophical gravity, sedateness and serenity of temper which ought to be observed in every search after truth. However, an argument on some subjects may be sometimes clothed with a little pleasantry, yet a jest or witticism should never be used instead of an argument, nor should it ever be suffered to pass for a real and solid proof. But especially if the subject be sacred or divine, and having nothing in it comical or

ridiculous, all ludicrous turns and jocose or comical airs should be entirely excluded, lest young minds become tinctured with a silly and profane sort of ridicule, and learn to jest and trifle with the awful solemnities of religion.

7. *Nor should sarcasm and reproach, or insolent language ever be used among fair disputants.* Turn not off from things to speak of persons. Leave all noisy contests, all immodest clamours, brawling language, and especially all personal scandal and scurrility to the meanest part of the vulgar world. Let your manner be all candor and gentleness, patient and ready to hear, humbly zealous to inform and be informed: you should be free and pleasant in every answer and behaviour, rather like *well-bred gentlemen* in polite conversation, than like *noisy* and *contentious wranglers.*

8. If the *opponent* sees victory to incline to his side, let him be content to shew the force of his argument to the intelligent part of the company, "without too importunate and petulent demands of an answer," and without insulting over his antagonist, or putting the modesty of the *respondent* to the blush. "Nor let the respondent triumph over the opponent, when he is silent and replies no more." On which side soever victory declares herself, let neither of them manage with such unpleasing and insolent airs, as to awaken those evil passions of pride, anger, shame or resentment on either side, which alienate the mind from truth, render it obstinate in the defence of an error, and never suffer it to part with any of its old opinions. In short, when truth evidently appears on either side, "let them learn to yield to conviction." When either party is at a *nonplus*, let them confess the difficulty, and desire present assistance or further time and retirement to consider of the matter, and not rack their present invention to find out little shifts to avoid the force and evidence of truth.

9. Might it not be a safer practice, in order to attain the best ends of disputation, and to avoid some of the ill effects of it, if the *opponents* were sometimes engaged on the side of truth, and produced their arguments in opposition to error? And what if the *respondent* was appointed to support the error, and defend it as well as he could, till he was forced to yield at least to those arguments of the *opponent's* which appear to be really just and strong and unanswerable?

In this practice, the *thesis* of the *respondent* should only be a fair stating of the question, with some of the chief objections against the truth proposed and solved.

Perhaps this practice might not so easily be perverted and abused to raise a *cavilling*, *disputative*, and *sceptical* temper in the minds of youth.

I confess in this method which I now propose, there would

be one among the students, viz. the *respondent*, always engaged in the support of supposed error: but all the rest would be exercising their talents in arguing for the supposed truth: whereas in the common methods of disputation in the schools, especially where the students are numerous, each single student is perpetually employed to oppose the truth and vindicate error, except once in a long time when it comes to his turn to be *respondent*.

10. Upon the whole, it seems necessary that these methods of disputation should be learnt in the schools, in order to teach students better to defend truth, and to refute error, both in writing and conversation, where the scholastic forms are utterly neglected.

But after all, the advantage which youth may gain by disputations depends much on the *tutor* or *moderator:* he should manage with such prudence both in the disputation and at the end of it, as to make all the *disputants* know the very point of controversy, wherein it consists; he should manifest the fallacy of sophistical objections, and confirm the solid arguments and answers. This might teach students how to make the art of disputation useful for the searching out the truth and the defence of it, that it may not be learnt and practised only as an art of wrangling which reigned in the schools several hundred years, and divested the growing reason of youth of its best hopes and improvements.

CHAP. XIV.—*Of Study or Meditation.*

I. IT has been proved and established in some of the foregoing chapters, *that neither our own observations, nor our reading the labours of the learned, nor the attendance on the best lectures of instruction, nor enjoying the brightest conversation,* can ever make a man truly knowing and wise, without the labours of his own reason in surveying, examining, and judging concerning all subjects upon the best evidence he can acquire. A good genius, or sagacity of thought, a happy judgment, a capacious memory, and large opportunities of observation and converse, will do much of themselves towards the cultivation of the mind, where they are well improved: but where to the advantage of learned lectures, living instructions, and well chosen books, diligence and study are superadded, this man has all human aids concurring to raise him to a superior degree of wisdom and knowledge.

Under the preceding heads of discourse, it has been already declared how our own *meditation* and *reflection* should examine, cultivate and improve all other methods and advantages of enriching the understanding. What remains in this chapter is to give some further occasional hints how to employ our own

thoughts, what sort of subjects we should meditate on, and in what manner we should regulate our studies, and how we may improve our judgment, so as in the most effectual and compendious way to attain such knowledge as may be most useful for every man in his circumstances of life, and particularly for those of the learned professions.

II. The first direction for youth is this, *learn betimes to distinguish between words and things.* Get clear and plain ideas of the things you are set to study. Do not content yourselves with mere words and names, lest your laboured improvements only amass a heap of unintelligible phrases, and you feed upon husks instead of kernels. This rule is of unknown use in every science. But the greatest and most common danger is in the sacred science of theology, where *settled terms and phrases* have been pronounced *divine and orthodox*, which yet have had no meaning in them. The *scholastic divinity* would furnish us with numerous instances of this folly: and yet for many ages all *truth* and all *heresy* have been determined by such senseless tests, and by words without ideas: such Shibboleths as these have decided the secular fates of men; and bishoprics or burning, mitres or faggots have been the rewards of different persons, according as they pronounced these consecrated syllables or not pronounced them. To defend them, was all piety and pomp and triumph; to despise them, to doubt or deny them, was torture and death. A thousand thank-offerings are due to that providence which has delivered our age and our nation from these absurd iniquities? O that every specimen and shadow of this madness were banished from our schools and churches in every shape!

III. *Let not young students apply themselves to search out deep, dark and abstruse matters, far above their reach*, or spend their labour in any peculiar subjects, for which they have not the advantages of necessary antecedent learning, or books, or observations. Let them not be too hasty to know things above their present powers, nor plunge their enquiries at once into the depths of knowledge nor begin to study any science in the middle of it; this will confound rather than enlighten the understanding: such practices may happen to discourage and jade the mind by an attempt above its power, it may balk the understanding, and create an aversion to future diligence, and perhaps by despair may forbid the pursuit of that subject for ever afterwards; as a limb overstrained by lifting a weight above its power, may never recover its former agility and vigour; or if it does, the man may be frighted from ever exerting his strength again.

IV. *Nor yet let any student on the other hand fright himself at every turn with insurmountable difficulties*, nor imagine that the truth is wrapt up in impenetrable darkness. These are

formidable spectres which the understanding raises sometimes to flatter its own laziness. Those things which in a remote and confused view seem very obscure and perplexed, may be approached by gentle and regular steps, and may then unfold and explain themselves at large to the eye. The hardest problems in geometry, and the most intricate schemes or diagrams may be explicated and understood step by step: every great mathematician bears a constant witness to this observation.

V. In learning any new thing, *there should be as little as possible first proposed to the mind at once, and that being understood and fully mastered, proceed then to the next adjoining part yet unknown.* This is a slow, but safe and sure way to arrive at knowledge. If the mind apply itself at first to easier subjects and things near a-kin to what is already known, and then advance to the more remote and knotty parts of knowledge by slow degrees, it will be able in this manner to cope with great difficulties, and prevail over them with amazing and happy success.

Mathon happened to dip into the two last chapters of a new book of geometry and mensuration; as soon as he saw it, and was frighted with the complicated diagrams which he found there, about the *Frustums of Cones* and *Pyramids*, &c. and some deep demonstrations among *conic sections:* he shut the book again in despair, and imagined none but a Sir Isaac Newton was ever fit to read it. But his tutor happily persuaded him to begin the first pages about lines and angles; and he found such surprising pleasure in three weeks time in the victories he daily obtained, that at last he became one of the chief geometers of his age.

VI. *Engage not the mind in the intense pursuit of too many things at once:* especially such as have no relation to one another. This will be ready to distract the understanding, and hinder it from attaining perfection in any one subject of study. Such a practice, gives a slight smattering of several sciences without any solid and substantial knowledge of them, and without any real and valuable improvement; and though two or three sorts of study may be usefully carried on at once, to entertain the mind with variety, that it may not be over-tired with one sort of thoughts, yet a multitude of subjects will too much distract the attention, and weaken the application of the mind to any one of them. Where two or three sciences are pursued at the same time, if one of them be dry, abstracted, and unpleasant, as *logic*, *metaphysics*, *law*, *languages*, let another be more entertaining and agreeable, to secure the mind from weariness and aversion to study. Delight should be intermingled with labour as far as possible, to allure us to bear the fatigue of dry studies the better. *Poetry*, *practical mathematics*, *history*, *&c.* are generally esteemed entertaining studies, and may be happily

used for this purpose. Thus while we relieve a dull and heavy hour by some alluring employments of the mind, our very diversions enrich our understandings, and our pleasure is turned into profit.

VII. In the pursuit of every valuable subject or knowledge, *keep the end always in your eye, and be not diverted from it by every pretty trifle you meet with in the way.* Some persons have such a wandering genius, that they are ready to pursue every incidental theme or occasional idea, till they have lost sight of their original subject. These are the men who when they are engaged in conversation, prolong their story by dwelling on every incident, and swell their narrative with long parentheses, till they have lost their first design; like a man who is sent in quest of some great treasure, but he steps aside to gather every flower he finds, or stands still to dig up every shining pebble he meets with in his way, till the treasure is forgotten and never found.

VIII. *Exert your care, skill and diligence about every subject, and every question, in a just proportion to the importance of it, together with the danger and bad consequences of ignorance or error therein.* Many excellent advantages flow from this one *direction.*

1. This rule will teach you to be very careful in gaining some general and fundamental truths both in philosophy, in religion, and in human life; because they are of the highest moment, and conduct our thoughts with ease into a thousand inferior and particular propositions. Such is that great principle in natural philosophy, the doctrine of gravitation, or mutual tendency of all bodies toward each other, which Sir Isaac Newton has so well established, and from which he has drawn the solution of a multitude of appearances in the heavenly bodies as well as on earth.

Such is that golden principle of morality which our blessed Lord has given us, *Do that to others, which you think just and reasonable that others should do to you,* which is almost sufficient in itself to solve all cases of conscience which relate to our neighbour. Such are those principles in religion, that a "rational creature is accountable to his Maker for all his actions; that the soul of man is immortal; that there is a future state of happiness and of misery depending on our behaviour in the present life, on which all our religious practices are built or supported."

We should be very curious in *examining all propositions that pretend to this honour of being general principles*: and we should not without just evidence admit into this rank mere matters of common fame, or commonly received opinions; no, nor the general determinations of the learned, or the established

articles of any church or nation, &c. for there are many learned presumptions, many synodical and national mistakes, many established falsehoods, as well as many vulgar errors, wherein multitudes of men have followed one another for whole ages almost blindfold. It is of great importance for every man to be careful that these general principles are just and true; for one error may lead us into thousands, which will naturally follow, if once a "leading falsehood" be admitted.

2. This rule will direct us to be *more careful about practical points than mere speculations*, since they are commonly of much greater use and consequence: therefore the speculations of Algebra, the doctrine of *infinities* and the *quadrature of curves in mathematical learning*, together with all the train of theorems in *natural philosophy*, should by no means intrench upon our studies of *morality and virtue*. Even in the science of divinity itself, the sublimest speculations of it are not of that worth and value, as the rules of duty towards God and towards men.

3. In matters of practice we should be most careful *to fix our end right*, and wisely determine the *scope at which we aim*: because that is to direct us in the choice and use of all the means to attain it. If our end be wrong, all our labour in the means will be vain, or perhaps so much the more pernicious as they are better suited to attain that mistaken end. If mere sensible pleasure or human grandeur or wealth be our chief end, we shall chuse means contrary to piety and virtue, and proceed apace toward real misery.

4. This rule will "engage our best powers and deepest attention in the affairs of religion," and things that relate to a future world; for those propositions which extend only to the interest of the present life, are but of small importance, when compared with those that have influence upon our everlasting concernments.

5. And even in the affairs of religion, if we walk by the conduct of this rule, we shall be much more laborious in our inquiries into the *necessary and fundamental articles of faith and practice than the lesser appendices of Christianity*. The great doctrines of *repentance toward God, faith in our Lord Jesus Christ, with love to men, and universal holiness*, will employ our best and brightest hours and meditations; while the mint, annise, and cummin, the gestures, and vestures, and fringes of religion, will be regarded no further than they have a plain and evident connection with faith and love, with holiness and peace.

6. This rule will make us solicitous not only to "avoid such errors, whose influence will spread wide into the whole scheme of our own knowledge and practice," but such mistakes also whose "influence would be yet more extensive and injurious to others, as well as to ourselves;" perhaps to many persons or many

families, to a whole church, a town, a country, or a kingdom. Upon this account, persons who are called to instruct others, who are raised to any eminence either in church or state, ought to be careful in settling their principles in matters relating to the civil, the moral or the religious life; lest a mistake of theirs should diffuse wide mischief, should draw along with it most pernicious consequences, and perhaps extend to following generations. These are some of the advantages which arise from the eighth rule, viz. pursue every enquiry and study in proportion to its real value and importance.

IX. *Have a care lest some beloved notion, or some darling science so far prevail over your mind, as to give a sovereign tincture to all your other studies, and discolour all your ideas;* like a person in the jaundice, who spreads a yellow scene with his eyes over all the objects which he meets. I have known a man of peculiar skill in music, and much devoted to that science, who found out a great resemblance of the *Athanasian doctrine of the Trinity* in every single note, and he thought it carried something of argument in it to prove that doctrine. I have read of another who accommodated the seven days of the first week of creation to seven notes of music, and thus the whole creation became harmonious.

Under this influence, derived from mathematical studies, some have been tempted to cast all their logical, their metaphysical, and their theological and moral learning into the method of mathematicians, and bring every thing relating to those abstracted, or those practical sciences under theorems, problems, postulates, scholiums, corollaries, &c. whereas the matter ought always to direct the method; for all subjects or matters of thought, cannot be moulded or subdued to one form. Neither the rules for the conduct of the understanding, nor the doctrines nor duties of religion and virtue can be exhibited naturally in figures and diagrams. Things are to be considered as they are in themselves; their natures are inflexible, and their natural relations unalterable; and therefore in order to conceive them aright, we must bring our understandings to things, and not pretend to bend and strain things to comport with our fancies and forms.

X. "Suffer not any beloved study to prejudice your mind so far in favour of it as to despise all other learning. This is a fault of some little souls who have got a smattering of *astronomy, chemistry, metaphysics, history, &c.* and for want of a due acquaintance with other sciences, make a scoff at them all in comparison of their favourite science. Their understandings are hereby cooped up in narrow bounds, so that they never look abroad into other provinces of the intellectual world, which are more beautiful perhaps, and more fruitful than their own: if

leave so much as to examine or believe any thing beside the dictates of their own family or sect, or party, are justly charged with a narrowness of soul. Let us survey some instances of this imperfection, and then direct to the cure of it.

(1.) Persons who have been bred up all their days within the smoke of their father's chimney, or within the limits of their native town or village, are surprised at every new sight that appears, when they travel a few miles from home. The ploughman stands amazed at the shops, the trade, the crouds of people, the magnificent buildings, the pomp and riches and equipage of the court and city, and would hardly believe what was told him before he saw it. On the other hand, the cockney travelling into the country is surprised at many actions of the quadruped and winged animals in the field, and at many common practices of rural affairs. If either of these happen to hear an account of the familiar and daily customs of foreign countries, they pronounce them at once indecent and ridiculous; so narrow are their understandings, and their thoughts so confined, that they know not how to believe any thing wise or proper, besides what they have been taught to practise.

This narrowness of mind should be cured by *hearing and reading the accounts of different parts of the world, and the histories of past ages, and of nations and countries distant from our own*, especially the more polite parts of mankind. Nothing tends in this respect so much to enlarge the mind, as travelling, that is, making a visit to other towns, cities or countries, besides those in which we were born and educated: and where our condition of life does not grant us this privilege, we must endeavour to supply the want of it by books.

(2.) It is the same narrowness of mind that awakens the surprise and aversion of some persons, when they hear of *doctrines and schemes in human affairs or in religion* quite different from what they have embraced. Perhaps they have been trained up from their infancy in one set of notions, and their thoughts have been confined to one single tract both in the civil or religious life, without ever hearing or knowing what other opinions are current among mankind; or at least they have seen all other notions besides their own, represented in a false and malignant light, whereupon they judge and condemn at once every sentiment but what their own party receives, and they think it a piece of justice and truth to lay heavy censures upon the practice of every different sect in christianity or politics. They have so rooted themselves in the opinions of their party, that they cannot bear an objection with patience, nor can they bear a vindication, or so much as an apology for any set of principles beside their own; all the rest is nonsense or heresy, folly or blasphemy.

This defect also is to be relieved by "free conversation with persons of different sentiments;" this will teach us to bear with patience a defence of opinions contrary to our own. If we are scholars, we should also read the objections against our own tenets, and view the principles of other parties, as they are represented in their own authors, and not merely in the citations of those who would confute them. We should take an honest and unbiassed survey of the force of reasoning on all sides, and bring all to the test of unprejudiced reason and divine revelation. Note, This is not to be done in a rash and self-sufficient manner; but with a humble dependence on divine wisdom and grace while we walk among snares and dangers.

By such a free converse with persons of different sects (especially those who differ only in particular forms of Christianity, but agree in the *great and necessary doctrines* of it) we shall find that there are persons of good sense and virtue, persons of piety and worth, persons of much candour and goodness, who belong to different parties, and have imbibed sentiments opposite to each other. This will soften the roughness of an unpolished soul, and enlarge the avenues of our charity towards others, and incline us to receive them into all the degrees of unity and affection which the word of God requires.

(3.) I might borrow further illustrations both of this freedom and this aversion to receive new truths from modern astronomy and natural philosophy. How much is the vulgar part of the world surprised at the talk of the *diurnal and annual revolutions of the earth?* They have ever been taught by their senses and their neighbours, to imagine the *earth* stands fixed in the centre of the universe, and that the *sun* with all the *planets* and the *fixed stars* are whirled round this little globe once in twenty-four hours; not considering that such a diurnal motion, by reason of the distance of some of those heavenly bodies, must be almost infinitely swifter and more inconceivable than any which the modern astronomers attribute to them. Tell these persons that the *sun is fixed in the centre*, that the *earth*, with all the *planets*, roll round the sun in their several periods, and that the *moon* rolls round the earth in a lesser circle, while together with the earth she is carried round the sun; they cannot admit a syllable of this new and strange doctrine, and they pronounce it utterly contrary to all sense and reason.

Acquaint them that there are *four moons* also perpetually rolling round the planet Jupiter, and carried along with him in his periodical circuit round the sun, which little moons were never known till the year 1610, when Galileo discovered them by his telescope; inform them that Saturn has *five moons* of the same kind attending him; and that the *body of that planet* is encompassed with *a broad flat circular ring*, distant from the

planet twenty-one thousand miles, and twenty-one thousand miles broad, they look upon these things as tales and fancies, and will tell you that the glasses do but delude your eyes with vain images; and even when they themselves consult their own eye-sight in the use of these tubes, the narrowness of their mind is such, that they will scarcely believe their senses when they dictate ideas so new and strange.

And if you proceed further, and attempt to lead them into a belief that all these *planetary worlds are habitable*, and it is probable they are replenished with intellectual beings dwelling in bodies, they will deride the folly of him that informs them; for they resolve to believe there are no habitable worlds but this *earth*, and no spirits dwelling in bodies besides *mankind*; and it is well if they do not fix the brand of *heresy* on the man who is leading them out of their long imprisonment, and loosing the fetters of their souls.

There are many other things relating to *mechanical experiments*, and to the properties of the air, water, fire, iron, the loadstone, and other minerals and metals as well as the doctrine of the sensible qualities, viz. colours, sounds, tastes, &c. which this rank of men cannot believe for want of a greater amplitude of mind.

The best way to convince them, is by giving them some acquaintance with the various experiments in philosophy, and proving by ocular demonstration the multiform and amazing operations of *the air pump, the loadstone, the chemical furnace, optical glasses, and mechanical engines.* By this means the understanding will stretch itself by degrees, and when they have found there are so many new and strange things that are most evidently true, they will not be so forward to condemn every new proposition in any of the other sciences, or in the affairs of religion or civil life.

III. The capacity of the understanding includes yet another qualification in it, and that is an *ability to receive many ideas at once without confusion.* The ample mind takes a survey of several objects with one glance, keeps them all within sight and present to the soul, that they may be compared together in their mutual respects; it forms just judgments, and it draws proper inferences from this comparison even to a great length of argument, and a chain of demonstration.

The *narrowness* that belongs to human souls in general, is a great imperfection and impediment to wisdom and happiness. There are but few persons who can contemplate, or practise several things at once; our faculties are very limited, and while we are intent upon one part or property of a subject, we have but a slight glimpse of the rest, or we lose it out of sight. But it is a sign of a large and capacious mind, if we can with one

single view take in a variety of objects; or at least when the mind can apply itself to several objects with so swift a succession, and in so few moments, as attains almost the same ends as if it were all done in the same instant.

This is a necessary qualification in order to great knowledge and good judgment: for there are several things in human life, in religion, and in the sciences, which have various circumstances, appendices and relations attending them; and without a survey of all those ideas which stand in connection with, and relation to each other, we are often in danger of passing a false judgment on the subject proposed. It is for this reason there are so numerous controversies found among the learned and unlearned world, in matters of religion as well as in the affairs of civil government. "The notions of sin, and duty to God and our fellow-creatures; of law, justice, authority, and power; of covenant, faith, justification, redemption, and grace; of church, bishop, presbyter, ordination, &c. contain in them such complicated ideas, that when we are to judge of any thing concerning them, it is hard to take into our view at once all the attendants or consequents that must and will be concerned in the determination of a single question: and yet without a due attention to many, or most of these, we are in danger of determining that question amiss.

It is owing to the narrowness of our minds, that we are exposed to the same peril in the *matters of human duty and prudence.* In many things which we do, we ought not only to consider the mere naked action itself but the persons who act, the persons toward whom, the time when, the place where, the manner how, the end for which the action is done, together with the effects that must or that may follow, and all other surrounding circumstances: these things must necessarily be taken into our view, in order to determine whether the action, which is indifferent in itself, be either lawful or unlawful, good or evil, wise or foolish, decent or indecent, proper or improper, as it is so circumstantiated.

Let me give a plain instance for the illustration of this matter. Mario kills a dog, which considered merely in itself, seems to be an indifferent action: now the dog was Timon's and not his own; this makes it look unlawful. But Timon bid him do it; this gives it an appearance of lawfulness again. It was done at church, and in time of divine service: these circumstances added, cast on it an air of irreligion. But the dog flew at Mario, and put him in danger of his life; this relieves the seeming impiety of the action. Yet Mario might have escaped by flying thence; therefore the action appears to be improper. But the dog was known to be mad; this further circumstance makes it almost necessary that the dog should be slain, lest he

might worry the assembly, and do much mischief. Yet again, Mario killed him with a pistol, which he happened to have in his pocket since yesterday's journey, now hereby the whole congregation was terrified and discomposed, and divine service was broken off; this carries an appearance of great indecency and impropriety in it; but after all, when we consider a further circumstance, that Mario being thus violently assaulted by a mad dog had no way of escape, and had no other weapon about him, it seems to take away all the colours of impropriety, indecency or unlawfulness, and to allow that the preservation of one or many lives will justify the act as wise and good. Now all these concurrent appendices of the action ought to be surveyed, in order to pronounce with justice and truth concerning it.

There are a multitude of human actions *in private life, in domestic affairs, in traffic, in civil government, in courts of justice, in schools of learning, &c.* which have so many complicated circumstances, aspects and situations, with regard to time and place, persons and things, that it is impossible for any one to pass a right judgment concerning them, without entering into most of these circumstances, and surveying them extensively, and comparing and balancing them all aright.

Whence by the way, I may take occasion to say, how many thousands there are who take upon them to pass their censures on the personal and the domestic actions of others, who pronounce boldly on the affairs of the public, and determine the justice or madness, the wisdom or folly of national administrations, of peace and war, &c. whom neither God nor men ever qualified for such a post of judgment? they were not capable of entering into the numerous concurring springs of action, nor had they ever taken a survey of the twentieth part of the circumstances which were necessary for such judgments or censures.

It is the narrowness of our minds, as well as the vices of the will, that oftentimes prevents us from taking a full view of all the complicated and concurring appendices that belong to human actions: thence it comes to pass that there is so little right judgment, so little justice, prudence, or decency, practised among the bulk of mankind; thence arise infinite reproaches and censures, alike foolish and unrighteous. You see therefore how needful and happy a thing it is, to be possest of some measure of this amplitude of soul, in order to make us very wise, or knowing, or just, or prudent, or happy.

I confess this sort of amplitude or capacity of mind is in a great measure the gift of nature, for some are born with much more capacious souls than others. The genius of some persons is so poor and limited, that they can hardly take in the connection of two or three propositions unless it be in matters of sense,

and which they have learnt by experience; they are utterly unfit for speculative studies: it is hard for them to discern the difference betwixt right and wrong in matters of reason on any abstracted subjects; these ought never to set up for scholars, but apply themselves to those arts and professions of life which are to be learnt at an easier rate, by slow degrees and daily experience.

Others have a soul a little more capacious, and they can take in the connection of a few propositions pretty well; but if the chain of consequences be a little prolix, here they stick and are confounded. If persons of this make ever devote themselves to science, they should be well assured of a solid and strong constitution of body, and well resolved to bear the fatigue of hard labour and diligence in study: *if the iron be blunt*, king Solomon tells us *we must put to more strength*.

But, in the third place, there are some of so bright and happy a genius, and so ample a mind, that they can take in a long train of propositions, if not at once, yet in a very few moments, and judge well concerning the dependence of them. They can survey a variety of complicated ideas without fatigue or disturbance; and a number of truths offering themselves as it were in one view to their understanding, doth not perplex or confound them. This makes a great man. Now though there may be much owing to nature in this case, yet experience assures us that even a lower degree of this capacity and extent of thought may be increased by diligence and application, by frequent exercise, and the observation of such rules as these.

I. *Labour by all means to gain an attentive and patient temper of mind*, a power of confirming and fixing your thoughts so long on any one appointed subject, till you have surveyed it on every side and in every situation, and run through the several powers, parts, properties, and relations, effects and consequences of it. He whose thoughts are very fluttering and wandering, and cannot be fixed attentively to a few ideas successively, will never be able to survey many and various objects distinctly at once, but will certainly be overwhelmed and confounded with the multiplicity of them. The rules for fixing the attention in the former chapter are proper to be consulted here.

II. *Accustom yourself to clear and distinct ideas in every thing you think of.* Be not satisfied with obscure and confused conceptions of things, especially where clearer may be obtained: for one obscure or confused idea, especially if it be of great importance in the question, intermingled with many clear ones, and placed in its variety of aspects towards them, will be in danger of spreading confusion over the whole scene of ideas, and

thus may have an unhappy influence to overwhelm the understanding, with darkness, and pervert the judgment. A little black paint will shamefully tincture and spoil twenty gay colours. Consider yet further, that if you content yourself frequently with *words instead of ideas, or with cloudy and confused notions of things*, how impenetrable will that darkness be, and how vast and endless that confusion which must surround and involve the understanding, when many of these obscure and confused ideas come to be set before the soul at once? and how impossible will it be to form a clear and just judgment about them.

III. *Use all diligence to acquire and treasure up a large store of ideas* and notions: take every opportunity to add something to your stock; and by frequent recollection fix them in your memory: nothing tends to confirm and enlarge the memory like a frequent review of its possessions, then the brain being well furnished with various traces, signatures and images, will have a rich treasure always ready to be proposed or offered to the soul, when it directs its thoughts towards any particular subject. This will gradually give the mind a faculty of surveying many objects at once; as a room that is richly adorned and hung round with a great variety of pictures, strikes the eye almost at once with all that variety, especially if they have been well surveyed one by one at first: this makes it habitual and more easy to the inhabitants to take in many of those painted scenes with a single glance or two. Here *note*, that by acquiring a rich treasure of notions, I do not mean only single ideas, but also propositions, observations and experiences, with reasonings and arguments upon the various subjects that occur among natural or moral, common or sacred affairs; that when you are called to judge concerning any question, you will have some principles of truth, some useful axioms and observations always ready at hand to direct and assist your judgment.

IV. *It is necessary that we should as far as possible entertain and lay up our daily new ideas, in a regular order*, and range the acquisitions of our souls under proper heads, whether of divinity, law, physics, mathematics, morality, politics, trade, domestic life, civility, decency, &c. whether of cause, effect, substance, mode, power, property, body, spirit, &c. we should inure our minds to method and order continually; and when we take in any fresh ideas, occurrences and observations, we should dispose of them in their proper places, and see how they stand and agree with the rest of our notions on the same subject: as a scholar would dispose of a new book on a proper shelf among its kindred authors; or as an officer at the post-house in London disposes of every letter he takes in, placing it in the box that belongs to the proper road or county. In any of these cases if things lay in a heap, the addition of any new

object would increase the confusion; but method gives a speedy and short survey of them with ease and pleasure. Method is of admirable advantage to keep our ideas from a confused mixture, and to preserve them ready for every use. The science of *ontology*, which distributes all *beings*, and all the *affections of being*, whether *absolute* or *relative*, under *proper classes*, is of good service to keep our intellectual acquisitions in such order, as that the mind may survey them at once.

V. As method is necessary for the improvement of the mind, in order to make your treasure of ideas most useful; so *in all your further pursuits of truth and acquirement of rational knowledge, observe a regular progressive method.* Begin with the most simple, easy and obvious ideas; then by degrees join two, and three, and more of them together; thus the complicated ideas growing up under your eye and observation, will not give the same confusion of thought as they would do if they were all offered to the mind at once without your observing the original and formation of them. An eminent example of this appears in the study of arithmetic. If a scholar just admitted into the school observes his master performing an operation in the rule of division, his head is at once disturbed and confounded with the manifold comparisons of the numbers of the *divisor* and *dividend*, and the multiplication of the one and subtraction of it from the other; but if he begin regularly at addition, and so proceed by subtraction and multiplication, he will then in a few weeks be able to take in an intelligent survey of all those operations in division, and to practise them himself with ease and pleasure, each of which at first seemed all intricacy and confusion.

An illustration of the like nature may be borrowed from *geometry* and *algebra*, and other methematical practices: how easily does an expert geometrician with one glance of his eye, take in a complicated diagram made up of many lines and circles, angles, and arches? How readily does he judge of it, whether the demonstration designed by it be true or false? It was by degrees he arrived at this stretch of understanding; he began with a single line or a point; he joined two lines in an angle; he advanced to triangle and square, polygons and circles; thus the powers of his understanding were stretched and augmented daily, till by diligence and regular application he acquired this extensive faculty of mind. But this advantage does not belong only to *mathematical learning*. If we apply ourselves at first in any science to clear and single ideas, and never hurry ourselves on to the following and more complicated parts of knowledge till we thoroughly understand the foregoing, we may practise the same method of *enlarging the capacity of*

the soul with success in any one of the sciences, or in the affairs of life and religion.

Beginning with *A*, *B*, *C*, and making syllables out of letters, and words out of syllables, has been the foundation of all that glorious superstructure of *arts* and *sciences* which have enriched the minds and libraries of the learned world in several ages. These are the first steps by which the ample and capacious souls among mankind have arrived at that prodigious extent of knowledge; which renders them the wonder and glory of the nation where they live. Though Plato and Cicero, Descartes and Mr. Boyle, Mr. Locke and Sir Isaac Newton, were doubtless favoured by nature with a genius of uncommon amplitude; yet in their early years and first attempts of science, this was but limited and narrow in comparison of what they attained at last. But how vast and capacious were those powers which they afterwards acquired by patient attention and watchful observation, by the pursuit of clear ideas and regular method of thinking.

VI. Another means of acquiring this amplitude and capacity of mind, is *a perusal of difficult entangled questions, and of the solution of them in any science.* Speculative and casuistical divinity will furnish us with many such cases and controversies. There are some such difficulties in reconciling several parts of the epistles of St. Paul relating to the Jewish law and the Christian gospel; a happy solution whereof will require such an extensive view of things, and the reading of these happy solutions will enlarge this faculty in younger students. In morals and political subjects, Puffendorf's Law of Nature and Nations, and several determinations therein, will promote the same amplitude of mind. An attendance on public trials and arguments in the civil courts of justice, will be of good advantage for this purpose, and after a man has studied the general principles of the law of nature and the laws of England in proper books, the reading the reports of adjudged cases, collected by men of great sagacity and judgment, will richly improve his mind toward acquiring this desirable amplitude and extent of thought, and more especially in persons of that profession.

CHAP. XVII.—*Of Improving the Memory.*

MEMORY is a distinct faculty of the mind of man, very different from perception, judgment and reasoning, and its other powers. Then we are said to *remember* any thing, *when the idea of it arises in the mind with a consciousness at the same time that we have had this idea before.* Our memory is our

natural power of retaining what we learn, and of recalling it on every occasion. Therefore we can never be said to *remember* any thing, whether it be ideas or propositions, words or things, notions or arguments, of which we have not had some former idea or perception, either by *sense or imagination*, *thought or reflection* ; but whatsoever we learn from observation, books or conversation, &c. it must all be laid up and preserved in the *memory*, if we would make it really useful.

So necessary and so excellent a faculty is the *memory* of man, that all other abilities of the mind borrow from hence their beauty and perfection : for other capacities of the soul are almost useless without this. To what purpose are all our labours in knowledge and wisdom, if we want memory to preserve and use what we have acquired ? What signify all other intellectual or spiritual improvements, if they are lost as soon as they are obtained ? It is memory alone that enriches the mind, by preserving what our labour and industry daily collect. In a word, there can be neither knowledge, nor arts, nor sciences without *memory* : nor can there be any improvement of mankind in virtue or morals, or the practice of religion without the assistance and influence of this power. Without memory the soul of man would be but a poor destitute, naked being, with an everlasting blank spread over it, except the fleeting ideas of the present moment.

Memory is very useful to those who speak, as well as to those who learn. It assists the teacher and the orator, as well as the scholar or the hearer. The best speeches and instructions are almost lost, if those who hear them immediately forget them. And those who are called to speak in public are much better heard and accepted, when they can deliver their discourse by the help of a lively genius and a ready memory, than when they are forced to read all that they would communicate to their hearers. Reading is certainly a heavier way of the conveyance of our sentiments ; and there are very few mere readers, who have the felicity of penetrating the soul and awakening the passions of those who hear, by such a grace of power and oratory, as the man who seems to talk every word from his very heart, and pours out the riches of his own knowledge upon the people round about him by the help of a free and copious memory. This gives life and spirit to every thing that is spoken, and has a natural tendency to make a deeper impression on the minds of men : it awakens the dullest spirits, causes them to receive a discourse with more affection and pleasure, and adds a singular grace and excellency both to the person and his oration.

A *good judgment*, and a *good memory* are very different qualifications. A person may have a very strong, capacious, and retentive memory, where the judgment is very poor and weak ;

as sometimes it happens in those who are but one degree above an idiot, who have manifested an amazing strength and extent of memory, but have hardly been able to join or disjoin two or three ideas in a wise and happy manner, to make a solid rational proposition. There have been instances of others who have had but a very tolerable power of memory, yet their judgment has been of a much superior degree, just and wise, solid and excellent.

Yet it must be acknowledged, that where a happy memory is found in any person, there is one good foundation laid for a wise and just judgment of things, wheresoever the natural genius has any thing of sagacity and brightness to make a right use of it. A *good judgment* must always in some measure depend upon a survey and comparison of several things together in the mind, and determining the truth of some doubtful proposition by that survey and comparison. When the mind has, as it were, set all those various objects present before it, which are necessary to form a true proposition or judgment concerning any thing, it then determines that such and such ideas are to be joined or disjoined, to be affirmed or denied; and this in a consistency and correspondence with all those other ideas or propositions which any way relate or belong to the same subject. Now there can be no such comprehensive survey of many things without a tolerable degree of memory; it is by reviewing things past we learn to judge of the future: and it happens sometimes, that if one needful or important subject or idea be absent, the judgment concerning the thing enquired will thereby become false or mistaken.

You will enquire then, How comes it to pass, that there are some persons who appear in the world of business as well as in the world of learning, to have a good judgment, and have acquired the just character of prudence and wisdom, and yet have neither a very bright genius, nor sagacity of thought, nor a very happy memory, so that they cannot set before their minds at once a large scene of ideas, in order to pass a judgment.

Now we may learn from Pensoroso some account of this difficulty. You shall scarcely ever find this man forward in judging and determining things proposed to him: but he always takes time, and delays, and suspends, and ponders things maturely, before he passes his judgment: then he practises a slow meditation, ruminates on the subject, and thus perhaps in two or three nights and days rouses and awakens those several ideas, one after another as he can, which are necessary in order to judge right of the thing proposed, and makes them pass before his review in succession: this he doth to relieve the want both of a quick sagacity of thought, and of a ready memory and speedy recollection; and this caution and practice, lays the foundation of his

just judgment and wise conduct. He surveys well before he judges.

Whence I cannot but take occasion to infer one good rule of advice, to persons of higher as well as lower genius, and of large as well as narrow memories, viz. *That they do not too hastily pronounce concerning matters of doubt or enquiry, where there is not an urgent necessity of present action.* The bright genius is ready to be so forward as often betrays itself into great errors in judgment, speech and conduct, without a continual guard upon itself, and using the bridle of the tongue. And it is by this delay and precaution, that many a person of much lower natural abilities, shall often excel persons of the brightest genius in wisdom and prudence.

It is often found, that a fine genius has but feeble memory: for where the genius is bright, and the imagination vivid, the power of memory may be too much neglected and lose its improvement. An active fancy readily wanders over a multitude of objects, and is continually entertaining itself with new flying images; it runs through a number of new scenes or new pages with pleasure, but without due attention, and seldom suffers itself to dwell long enough upon any one of them to make a deep impression thereof upon the mind and commit it to lasting remembrance. This is one plain and obvious reason, why there are some persons of very bright parts and active spirits, who have but short and narrow powers of remembrance; for having riches of their own, they are not solicitous to borrow.

And as such a quick and various fancy and invention may be some hindrance to the attention and memory, so a mind of a good retentive ability, and which is ever crowding its memory with things which it learns and reads continually, may prevent, restrain and cramp the invention itself. The memory of Lectorides, is ever ready upon all occasions to offer to his mind something out of other men's writings or conversations, and is presenting him with the thoughts of other persons perpetually: thus the man who had naturally a good flowing invention, does not suffer himself to pursue his own thoughts. Some persons who have been blest by nature with sagacity and no contemptible genius, have too often forbid the exercise of it, by tying themselves down to the memory of the volumes they have read, and the sentiments of other men contained in them.

Where the memory has been almost constantly employing itself in scraping together new acquirements, and where there has not been a judgment sufficient to distinguish what things were fit to be recommended and treasured up in the memory, and what things were idle, useless, or needless, the mind has been filled with a wretched heap and hotch-potch of words, or ideas, and the soul may be said to have had large possessions, but no true riches.

I have read in some of Mr. Milton's writing a very beautiful simile, whereby he represents the books of the fathers, as they are called in the christian church. *Whatsoever*, saith he, *old Time with his huge drag-net has conveyed down to us along the stream of ages, whether it be shells or shell-fish, jewels or pebbles, sticks or straws, sea weeds or mud, these are the ancients, these are the fathers.* The case is much the same with the memorial possessions of the greatest part of mankind. A few useful things perhaps, mixed and confounded with many trifles and all manner of rubbish, fill up their memories and compose their intellectual possessions. It is a great happiness therefore to distinguish things aright, and to lay up nothing in the memory but what has some just value in it, and is worthy to be numbered as a part of our treasure.

Whatsoever improvements are to the mind of man from the wise exercise of his own reasoning powers, these may be called his proper manufactures; and whatsoever he borrows from abroad these may be termed his foreign treasures: both together make a wealthy and happy mind. How many excellent judgments and reasonings are framed in the mind of a man of wisdom and study in a length of years? How many worthy and admirable notions has he been possessed of in life, both by his own reasonings and by his prudent and laborious collections in the course of his reading? But alas! how many thousands of them vanish away again and are lost in empty air, for want of a stronger and more retentive memory? When a young practitioner of the law was once said to contest a point of debate with that great lawyer in the last age, Serjeant Maynard, he is reported to have answered him, *Alas, young man, I have forgotten much more law than ever thou hast learnt or read.*

What an unknown and unspeakable happiness would it be to a man of judgment, and who is engaged in the pursuit of knowledge, if he had but a power of stamping all his own best sentiments upon his memory in some indelible characters; and if he could but imprint every valuable paragraph and sentiment of the most excellent authors he has read, upon his mind, with the same speed and facility with which he read them? If a man of good genius and sagacity could but retain and survey all those numerous, those wise and beautiful ideas at once, which have ever passed through his thoughts upon any one subject, how admirably would he be furnished to pass a just judgment about all present objects and occurrences? What a glorious entertainment and pleasure would fill and felicitate his spirit, if he could grasp all these in a single survey: as the skilful eye of a painter runs over a fine and complicated piece of history wrought by a Titian or a Raphael, views the whole scene at once, and feeds himself with the extensive delight? But these are joys that do not belong to mortality.

Thus far I have indulged some loose and unconnected thoughts and remarks with regard to the different powers of *wit*, *memory*, and *judgment*. For it was very difficult to throw them into a regular form or method without more room. Let us now with more regularity treat of *the memory alone*.

Though the memory be a natural faculty of the mind of man, and belongs to spirits which are not incarnate, yet it is greatly assisted or hindered, and much diversified by the brain or the animal nature to which the soul is united in this present state. *But what part of the brain* that is, wherein the images of things lie treasured up, is very hard for us to determine with certainty. It is most probable that those very fibres, pores or traces of the brain, which assist at the first idea or perception of any object, are the same which assist also at the recollection of it: and then it will follow that the memory has no special part of the brain devoted to its own service, but uses all those parts in general, which subserve our sensations as well as our thinking and reasoning powers.

As the memory grows and improves in young persons from their childhood, and decays in old age, so it may be increased by art and labour, and proper exercise; or it may be injured and quite spoiled by sloth, or by a disease, or a stroke on the head. There are some reasonings on this subject, which make it evident, that the goodness of a memory depends in a great degree upon the consistence and the temperature of that part of the brain, which is appointed to assist the exercise of all our sensible and intellectual faculties. So for instance, in children; they perceive and forget an hundred things in an hour; the brain is so soft, that it receives immediately all impressions like water or liquid mud, and retains scarcely any of them: all the traces, forms or images which are drawn there, are immediately effaced or closed up again, as though you wrote with your finger on the surface of a river or on a vessel of oil.

On the contrary, in old age, men have a very feeble remembrance of things that were done of late, that is, the same day or week, or year, the brain is grown so hard, that the present images or strokes make little or no impression, and therefore they immediately vanish: Prisco in his seventy-eighth year, will tell long stories of things done when he was in the battle at the Boyne almost fifty years ago, and when he studied at Oxford seven years before; for these impressions were made when the brain was more susceptive of them; and they have been deeply engraven at the proper season, and therefore they remain. But words or things which he lately spoke or did, they are immediately forgotten, because the brain is now grown more dry and solid in its consistence, and receives not much more impression, than if you wrote with your finger on a floor of clay, or a plastered *wall*.

But in the middle stage of life, or it may be from fifteen to fifty years of age, the memory is generally in its happiest state, the brain easily receives and long retains the images and traces which are impressed upon it, and the natural spirits are more active to range these little infinite unknown figures of things in their proper cells or cavities, to preserve and recollect them. Whatsoever therefore keeps the brain in its best temper and consistence, may be a help to preserve the memory; but excess of wine or luxury of any kind, as well as excess in the studies of learning or the businesses of life, may overwhelm the memory, by overstraining and weakening the fibres of the brain, overwasting the spirits, injuring the true consistence of that tender substance, and confounding the images that are laid up there.

A *good memory* has these several qualifications, 1. It is *ready to receive and admit with great ease*, the various ideas both of words and things which are learned or taught. 2. *It is large and copious* to treasure up these ideas in great number and variety 3. *It is strong and durable* to retain for a considerable time those words or thoughts which are committed to it. 4. *It is faithful and active* to suggest and recollect upon every proper occasion, all those words or thoughts which have been recommended to its care, or treasured up in it. Now in every one of these qualifications a memory may be injured, or may be improved; yet I shall not insist distinctly on these particulars, but only in general propose a few rules or directions, whereby this noble faculty of memory in all its branches and qualifications may be preserved or assisted, and shew what are the practices that both by reason and experience have been found of happy influence to this purpose.

There is one great and general direction which belongs to the improvement of other powers as well of the *memory*, and that is, *to keep it always in due and proper exercise.* Many acts by degrees form a habit, and thereby the ability or power is strengthened and made more ready to appear again in action.—Our memories should be used and inured from childhood to bear a moderate quantity of knowledge let into them early, and they will thereby become strong for use and service. As any limb well and duly exercised grows stronger, the nerves of the body are corroborated thereby. Milo took up a calf, and daily carried it on his shoulders; as the calf grew, his strength grew also, and he at last arrived at firmness of joints enough to bear the bull.

Our memories will be in a great measure moulded and formed, improved or injured, according to the exercise of them. If we never use them they will be almost lost. Those who are wont to converse or read about a few things only will but retain a few in their memory; those who are used to remember things

t for an hour, and charge their memories with it no longer, ll retain them but an hour before they vanish, and let words remembered as well as things, that so you may acquire a *copia rborum* as well as *rerum*, and be more ready to express your ind on all occasions.

Yet there should be a caution given in some cases; the me- ory of a child, or any infirm person, should not be overbur- ned, for a limb or a joint may be overstrained by being too uch loaded, and its natural power never to be recovered.— achers should wisely judge of the power and constitution of uth, and impose no more on them than they are able to bear th cheerfulness and improvement. And particularly they ould take care, that the memory of the learner *be not too uch crowded with a tumultuous heap or overbearing multi- de of documents or ideas at any one time;* this is the way remember nothing; one idea effaces another. An over- eedy grasp does not retain the largest handful. But it is e exercise of memory with a due moderation, that is one ge- al rule towards the improvement of it. The *particular rules* e such as these;

1. *Due attention and diligence to learn and know things* hich we would commit to our remembrance, is a rule of great ecessity in this case. When the attention is strongly fixed to y particular subject, all that is said concerning it, makes a eeper impression upon the mind. There are some persons who mplain they cannot remember divine or human discourses which ey hear, when in truth their thoughts are wandering half the ne, or they hear with such coldness and indifferency and a ifling temper of spirit, that it is no wonder the things which e read or spoken make but a slight impression on the brain, id get no firm footing in the seat of memory, but soon vanish id are lost.

It is needful therefore, if we would maintain a long remem- ance of the things which we read or hear, that we should *gage our delight and pleasure in those subjects*, and use the her methods which are before prescribed, in order to fix the tention. *Sloth*, *indolence*, and *idleness*, will no more bless the ind with intellectual riches, than it will fill the hand with gain, e field with corn, or the purse with treasure. Let it be added o, that not only the slothful and the negligent deprive them- lves of proper knowledge for the furniture of their memory, t such as appear to have active spirits, who are ever skimming er the surface of things with a volatile temper, will fix nothing their mind. Vario will spend whole mornings in running over se and unconnected pages, and with fresh curiosity is ever oing over new words and ideas that strike his present fancy; is fluttering over a thousand objects of art and science, and

yet treasures up but little knowledge, there must be the labour and the diligence of close attention to particular subjects of thought and enquiry, which only can impress what we read or think of upon the remembering faculty in man.

2. *Clear and distinct apprehension of the things which we commit to memory*, is necessary, in order to make them stick and dwell there. If we would remember words, or learn the names of persons or things, we should have them recommended to our memory by *clear and distinct pronunciation, spelling or writing.* If we would treasure up the ideas of things, notions, propositions, arguments and sciences, these should be recommended also to our memory by a *clear and distinct perception of them.* Faint glimmering and confused ideas will vanish like images seen in twilight. Every thing which we learn, should be conveyed to the understanding in the plainest expressions without any ambiguity, that we may not mistake what we desire to remember. This is a general rule whether we would employ the memory about words or things; though it must be confest, that mere sounds and words are much harder to get by heart than the knowledge of things and real images.

For this reason *take heed* (as I have often before warned) *that you do not take up with words instead of things*, nor mere sounds instead of real sentiments and ideas. Many a lad forgets what has been taught him, merely because he never well understood it; he never clearly and distinctly took in the meaning of those sounds and syllables which he was required to get by heart. This is one true reason why boys make so poor a proficiency in learning the Latin tongue, under masters who teach them by grammars and rules written in Latin, of which I have spoken before. And this is a common case with children when they learn their catechisms in their early days. The language and the sentiments conveyed in those catechisms are far above the understanding of creatures of that age, and they have no tolerable ideas under the words. This makes the answers much harder to be remembered, and in truth they learn nothing but words without ideas; and if they are ever so perfect in repeating the words, yet they know nothing of divinity.

And for this reason it is a necessary rule in teaching children the principles of religion, that *they should be expressed in very plain, easy, and familiar words*, brought as low as possible down to their understandings, according to their different ages and capacities, and thereby they will obtain some useful knowledge when the words are treasured up in their memory, because at the same time they will treasure up those divine ideas too.

3. *Method and regularity in the things we commit to memory*, is necessary, in order to make them take more effectual posses-

sion of the mind, and abide there long. As much as systematical learning is decried by some vain and humourous triflers of the age, it is certainly the happiest way to furnish the mind with a variety of knowledge.

Whatsoever you would trust to your memory *let it be disposed in a proper method, connected well together, and referred to distinct and particular heads or classes both general and particular.* An apothecary's boy will much sooner learn all the medicines in his master's shop, when they are ranged in boxes or on shelves according to their distinct natures, whether herbs, drugs, or minerals, whether leaves or roots, whether chemical or galenical preparations, whether simple or compound, &c. and when they are placed in some order according to their nature, their fluidity, or their consistence, &c. in phials, bottles, gallipots, cases, drawers, &c. So the genealogy of a family is more easily learnt when you begin at some great grandfather as the root, and distinguish the stock, the large boughs, the lesser branches, the twigs, and the buds, till you come down to the present infants of the house. And indeed all sorts of arts and sciences taught in a method something of this kind, are more happily committed to the mind or memory.

I might give another plain simile to confirm the truth of this. What horse or carriage can take up and bear away all the various rude and unwieldly loppings of a branchy tree at once? But if they are divided yet further, so as to be laid close, and bound up in a more uniform manner into several faggots, perhaps those loppings may be all carried as one single load or burden.

The mutual dependence of things on each other, helps the memory of both. A wise connection of the parts of a discourse in a rational method gives great advantage to the reader or hearer, in order to his remembrance of it. Therefore many mathematical demonstrations in a long train may be remembered much better than a heap of sentences which have no connection. The book of Proverbs, at least from the tenth chapter and onwards, is much harder to remember, than the book of Psalms, for this reason; and some christians have told me, that they remember what is written in the epistle to the Romans, and that to the Hebrews, much better than many others of the sacred epistles, because there is more exact method and connection observed in them.

He that would learn to remember a sermon which he hears should acquaint himself by degrees *with the method in which the several important parts of it are delivered.* It is a certain fault in a multitude of preachers, that they utterly neglect method in their harangues: or at least they refuse to render their method visible and sensible to the hearers. One would be tempted to think it was for fear lest their auditors should remember too much

of their sermons, and prevent their preaching them three or four times over: but I have condour enough to persuade myself, that the true reason is, they imagine it to be a more modish way of preaching without particulars: I am sure it is a much more useless one. And it would be of great advantage both to the speaker and hearer, to have discourses for the pulpit cast into a plain and easy method, and the reasons and inferences ranged in a proper order, and that under the words, *first*, *secondly*, and *thirdly*, however they may be now fancied to sound unpolite or unfashionable: but archbishop Tillotson did not think so in his days.

4. *A frequent review and careful repetition of the things we would learn, and an abridgment of them in a narrow compass for this end*, has a great influence to fix them in the memory: therefore it is that the rules of grammar, and useful examples of the variation of words, and the peculiar forms of speech in any language, are so often appointed by the master as lessons for the scholar to be frequently repeated; and they are contracted into tables for frequent review, that what is not fixed in the mind at first, may be stamped upon the memory by a perpetual survey and rehearsal.

Repetition is so very useful a practice, that Mnemon, even from his youth to his old age, never read a book without making some small points, dashes or hooks in the margin, to mark what parts of the discourse were proper for a review: and when he came the end of a section or chapter, he always shut his book, and recollected all the sentiments or expressions he had remarked, so that he could give a tolerable *analysis* and *abstract* of every treatise he had read, just after he had finished it. Thence he became so well furnished with a rich variety of knowledge. Even when a person is hearing a sermon, or a lecture, he may give his thoughts leave now and then to step back so far as *to recollect the several heads* of it from the beginning, two or three times before the lecture or sermon is finished: the omission or the loss of a sentence or two among the amplifications, is richly compensated by preserving in the mind the method and order of the whole discourse in the most important branches of it.

If we would fix in the memory the discourses we hear, or what we design to speak, *let us abstract them into brief compends, and review them often.* Lawyers and divines have need of such assistances: they write down short notes or hints of the principal heads of what they desire to commit to their memory, in order to preach or plead; for such abstracts and epitomes may be reviewed much sooner, and the several amplifying sentiments or sentences will be more easily invented or recollected in their proper places. The art of *short hand* is of excellent use for this as well as other purposes. It must be acknowledged, that those who scarcely ever take a pen in their hands to write short notes or hints of what

they are to speak or learn, who never try to cast things into method, or to contract the survey of them, in order to commit them to their memory, had need have a double degree of that natural power of retaining and recollecting what they read or hear or intend to speak.

Do not plunge yourself into other businesses or studies, amusements or recreations, immediately after you have attended upon instruction, if you can well avoid it. Get time if possible to recollect the things you have heard, that they may not be washed all away from the mind by a torrent of other occurrences or engagements nor lost in the croud or clamour of other loud and importunate affairs.

Talking over the things which you have read with your companions on the first proper opportunity you have for it, is a most useful manner of review or repetition, in order to fix them upon the mind. Teach them your younger friends, in order to establish your own knowledge while you communicate it to them. The animal powers of your tongue and of your ear, as well as your intellectual faculties, will all join together to help the memory. Hermetas studied hard in a remote corner of the land, and in solitude, yet he became a very learned man. He seldom was so happy as to enjoy suitable society at home, and therefore he talked over to the fields and the woods in the evening what he had been reading in the day, and found so considerable advantage by this practice, that he recommended it to all his friends, since he could set his *probatum* to it for seventeen years.

5. *Pleasure and delight in the things we learn, gives great assistance towards the remembrance of them.* Whatsoever therefore we desire that a child should commit to his memory, make it as pleasant to him as possible; endeavour to search his genius and his temper; and let him take in the instructions you give him, or the lessons you appoint him, as far as may be, in a way suited to his natural inclination. Fabellus would never learn any moral lessons till they were moulded into the form of some fiction or fable like those of Æsop, or till they put on the appearance of a parable, like those wherein our blessed Saviour taught the ignorant world: then he remembered well the emblematical instructions that were given him, and learnt to practise the moral sense and meaning of them. Young Spectorius was taught virtue, by setting before him a variety of examples of the various good qualities in human life; and he was appointed daily to repeat some story of this kind out of Valerius Maximus. The same lad was early instructed to avoid the common vices and follies of youth in the same manner. This is a-kin to the method whereby the Lacedæmonians trained up their children to hate drunkenness and intemperance, viz.

by bringing a drunken man into their company, and shewing them what a beast he had made of himself. Such visible and sensible forms of instruction, will make long and useful impressions upon the memory.

Children may be taught to remember many things in a way of sport and play. Some young creatures have learnt their letters and syllables, and the pronouncing and spelling of words, by having them pasted or written upon many little flat tablets or dies. Some have been taught vocabularies of different languages, having a word in one tongue written on one side of these tablets, and the same word in another tongue on the other side of them. There might be also many entertaining contrivances for the instruction of children in several things relating to *geometry*, *geography*, and *astronomy*, in such alluring and illusory methods, which would make a most agreeable and lasting impression on their minds.

6. *The memory of useful things may receive considerable aid if they are thrown into verse:* for the numbers and measures, and rhyme, according to the poesy of different languages have a considerable influence upon mankind, both to make them receive with more ease the things proposed to their observation, and preserve them longer in their remembrance. How many are there of the common affairs of human life, which have been taught in early years by the help of rhyme, and have been like *nails fastened in a sure place* and rivetted by daily use?

So the number of the days of each month are engraven on the memory of thousands by these four lines:

Thirty days have September,
June and April and November;
February twenty-eight alone,
And all the rest have thirty-one:

So lads have been taught frugality by surveying and judging of their own expences by these three lines:

Compute the pence but of one day's expence,
So many pounds and angels, groats and pence
Are spent in one whole year's circumference.

For the number of days in a year is three hundred sixty-five, which number of pence make one pound, one angel, one groat, and one penny. So have rules of health been prescribed in the book called *Schola Salernitana*, and many a person has preserved himself doubtless from evening gluttony, and the pains and diseases consequent upon it, by these two lines:

Ex magna cœno stomacho fit maxima pœna;
Ut sis nocte levis, sit tibi cœna brevis.

Englished:

To be easy all night
Let your supper be light:
Or else you'll complain
Of a stomach in pain.

And a hundred proverbial sentences in various languages are formed into rhyme or a verse, whereby they are made to stick upon the memory of old and young. It is from this principle that moral rules have been cast into a poetic mould from all antiquity. So the golden verses of the Pythagoreans in Greek; Cato's Distichs De Moribus in Latin; Lilly's *precepts to scholars called* Qui mihi, with many others; and this has been done with very good success. A line or two of this kind recurring on the memory, have often guarded youth from a temptation to vice and folly, as well as put them in mind of their present duty.

It is for this reason also that the genders, declensions, and variations of nouns and verbs have been taught in verse, by those who have complied with the prejudice of long custom, to teach English children the Latin tongue by rules written in Latin: and truly those rude heaps of words and terminations of an unknown tongue, would have never been so happily learnt by heart by a hundred thousand boys without this smoothing artifice; nor indeed do I know any thing else can be said with good reason, to excuse or relieve the obvious absurdities of this practice.

When you would remember new things or words, *endeavour to associate and connect them with some words or things which you have well known before, and which are fixed and established in your memory.* This association of ideas is of great importance and force, and may be of excellent use in many instances of human life. One idea which is familiar to the mind, connected with others which are new and strange, will bring those new ideas into easy remembrance. Mæronides had got the first hundred lines of Virgil's Æneis printed upon his memory so perfectly, that he knew not only the order and number of every verse from one to a hundred in perfection, but the order and number of every word in each verse also; and by this means he would undertake to remember two or three hundred names of persons or things by some rational or fantastic connection between some word in the verse, and some letter, syllable, property, or accident of the name or thing to be remembered, even though they had been repeated but once or twice at most in his hearing. Animato practised much the same art of memory by getting the Latin names of twenty-two animals into his head according to the alphabet, viz. *asinus, basiliscus, canis, draco, elephas, felis, gryphus, hircus, juvencus, leo, mulus, noctua, ovis, panthera, quadrupes, rhinoceros, simia, taurus, ursus,*

xiphias, hyaena or yaena, zibetta. Most of these he divided also into four parts, viz. head and body, feet, fins or wings and tail, and by some arbitrary or chimerical attachment of each of these to a word or thing which he desired to remember, he committed them to the care of his memory, and that with good success.

It is also by this *association of ideas*, that we may better imprint any new idea upon the memory by joining with it some circumstances of the time, place, company, &c. wherein we first observed, heard or learnt it. If we would recover an absent idea, it is useful to recollect those circumstances of time, place, &c. The substance will many times be recovered and brought to the thoughts by recollecting the shadow: a man recurs to our fancy by remembering his garment, his size, or stature, his office, or employment, &c. A beast, bird, or fish by its colour, figure, or motion, by the cage, or court-yard, or cistern wherein it was kept.

To this head also we may refer that remembrance of names and things, which may be derived from our recollection of their likeness to other things which we know; either their resemblance in the name, character, form, accident, or any thing that belongs to them. An idea or word which has been lost or forgotten, has been often recovered by hitting upon some other kindred word or idea, which has the nearest resemblance to it, and that in the letters, syllables or sound of the name, as well as properties of the thing.

If we would remember, Hippocrates or Galen, or Parcelsus, think of a physician's name, beginning with H. G. or P. If we will remember Ovidius Naso, we may represent a man with a great nose; if Plato, we may think upon a person with large shoulders; if Crispus, we shall fancy another with curled hair; and so of other things. And sometimes a new or strange idea may be fixed in the memory, by considering its *contrary* or *opposite*. So if we cannot hit on the word Goliath, the remembrance of David may recover it: or the name of a Trojan may be recovered by thinking of a Greek, &c.

8. In such cases wherein it may be done, *seek after a local memory*, or a remembrance of what you have read by the side or page where it is written or printed; whether the right or the left, whether at the top, the middle or the bottom; whether at the beginning of a chapter or a paragraph, or the end of it. It has been some advantage for this reason, to accustom one's self to books of the same edition: and it has been of constant and special use to divines and private Christians, to be furnished with several *Bibles* of the same edition; that wheresoever they are, whether in their chamber, parlour or study, in the younger or elder years of life, they may find the chapters and verses

standing in the same parts of the page. This is also a great conveniency to be observed by printers in the new editions of Grammars, Psalms, Testaments, &c. to print every chapter, paragraph or verse in the same part of the page as the former, that so it may yield an happy assistance to those young learners, who find, and even feel the advantage of a *local memory*.

9. *Let every thing we desire to remember be fairly and distinctly written and divided into periods, with large characters in the beginning*, for by this means we shall the more readily imprint the matter and words on our minds, and recollect them with a glance, the more remarkable the writing appears to the *eye*. This *sense* conveys the ideas to the fancy better than any other; and what we have *seen* is not so soon forgotten as what we have only heard. What Horace affirms of the *mind* or *passions* may be said also of the *memory*.

Segnius irritant animos demissa per aurem
Quam quæ sunt oculis subjecta fidelibus, et quæ
Ipse sibi tradit spectator.

Applied thus in English:

Sounds which address the ear are lost and die
In one short hour; but that which strikes the eye
Lives long upon the mind; the faithful sight
Engraves the knowledge with a beam of light.

For the assistance of weak memories, the first letters or words of every period, in every page, may be written in distinct colours; yellow, green, red, black, &c. and if you observe the same order of colours in the following sentences, it may be still the better. This will make a greater impression, and may much aid the memory.

Under this head we may take notice of the advantage which the memory gains, by having the *several objects of our learning drawn out into schemes and tables*; matters of *mathematical* science and *natural philosophy* are not only let into the understanding, but preserved in the memory by *figures* and *diagrams*. The situation of the several parts of the earth are better learnt by one day's conversing with a *map* or *sea-chart*, than by mere reading the description of their situation a hundred times over in books of *geography*. So the constellations in *astronomy* and their position in the heavens, are more easily remembered by hemispheres of the stars well drawn. It is by having such sort of memorials, figures and tables hung round our studies or places of residence or resort, that our memory of these things will be greatly assisted and improved, as I have shewn at large in the twentieth chapter of the *Use of the sciences*.

I might add here also, that *once writing over* what we design to remember, and *giving* due attention to what we write,

will fix it more in the mind than reading it five times. And in the same manner, if we had a plan of the naked lines of longitude and latitude, projected on the *meridian* printed for this use, a learner might much more speedily advance himself in the knowledge of *geography* by his own drawing the figures of all the parts of the world upon it by imitation, than by many days survey of a map of the world so printed. The same also may be said concerning the constellations of heaven, drawn by the learner on a naked projection of the circles of the sphere upon the plane of the *equator*.

10. It has sometimes been the practice of men to imprint names or sentences on their memory, by *taking the first letters of every word of that sentence, or of those names*, and making a new word out of them. So the name of the Maccabees is borrowed from the first letters of the Hebrew words which make that sentence Mi Camoka Baelim Jehovah, that is, who is like thee among the gods? Which was written on their banners. Jesus Christ our Saviour hath been called a *fish*, by the fathers, because these are the first letters of those Greek words, Jesus Christ, God's Son, the Saviour. So the word *vibgyor* teaches us to remember the other of the seven original colours, as they appear by the sun-beams cast through a prism on a white paper, or formed by the sun in a rainbow, according to the different refrangibility of the rays, viz. *violet, indigo, blue, green, yellow, orange* and *red*.

In this manner the Hebrew grammarians teach their students to remember the letters which change their natural pronunciation by the inscription of a *dagesh*, by gathering these six letters, *beth, gimel, daleth, caph, pe* and *thau*, into the word *begadchephat*; and that they might not forget the letters named *quiescent*, viz. *a, h, v*, and *i*, they are joined in the word *ahevi*. So the universal and particular propositions in *logic*, are remembered by the words *barbara, celarent, darii, &c.* Other artificial helps to memory may be just mentioned here.

Dr. Grey in his book called Memoria Technica, has exchanged the figures 1, 2, 3, 4, 5, 6, 7, 8, 9, for some consonants, *b, d, t, f, l, y, p, k, n*, and some vowels, *a, e, i, o, u*, and several diphthongs, and thereby formed words that denote numbers, which may be more easily remembered: and Mr. Lowe has improved his scheme in a small pamphlet called Mnemonics Delineated, whereby in seven leaves he has comprized almost an infinity of things in science and in common life, and reduced them to a sort of measure like Latin verse; though the words may be supposed to be very barbarous, being such a mixture of vowels and consonants as are very unfit for harmony. But after all, the very writers on this subject have confessed, that several of these *artificial* helps of memory are so cumbersome as not to

be suitable to every temper or person; nor are they of any use for the delivery of a discourse by memory, nor of much service in learning the sciences; but they may be sometimes practised for the assisting our remembrance of certain sentences, numbers, or names.

CHAP. XVIII.—*Of determining a Question.*

I. WHEN a subject is proposed to your thoughts, *consider whether it be knowable at all, or no:* and then whether it be not above the reach of your enquiry and knowledge in the *present state*; and remember that it is a great waste of time, to busy yourselves too much amongst unsearchables: the chief of these studies is to keep the mind humble, by finding its own ignorance and weakness.

II. *Consider again whether the matter be worthy of your enquiry at all;* and then, how far it may be worthy of your present search and labour according to your age, your time of life, your station in the world, your capacity your profession, your chief design and end. There are many things worthy enquiry to one man, which are not so to another; and there are things that may deserve the study of the same person in one part of life, which would be improper or impertinent at another. To read books of the *art of preaching*, or disputes about *church discipline*, are proper for a theological student in the end of his academical studies, but not at the beginning of them. To pursue *mathematical* studies very largely may be useful for a *professor of philosophy*, but not for a *divine*.

III. *Consider whether the subject of your enquiry be easy or difficult; whether you have sufficient foundation or skill, furniture and advantages for the pursuit of it.* It would be madness for a young statuary to attempt at first to carve a *Venus* or a *Mercury*, and especially without proper tools. And it is equally folly for a man to pretend to make great improvements in *natural philosophy* without due experiments.

IV. *Consider whether the subject be any ways useful or no*, before you engage in the study of it; often put this question to yourselves, *Cui bono?* to what purpose? what end will it attain? Is it for the glory of God, for the good of men, for your own advantage, for the removal of any natural or moral evil, for the attainment of any natural or moral good? Will the profit be equal to the labour? There are many subtle impertinences learnt in the schools, many painful trifles even among the *mathematical* theorems and problems, many *difficiles nugae*, or laborious follies of various kinds, which some ingenious men have

been engaged in. A due reflection upon these things wil call the mind away from vain amusements, and save much time.

V. *Consider what tendency it has to make you wiser and better*, as well as to make you more learned; and those questions which tend to wisdom and prudence in our conduct among men, as well as piety towards God, are doubtless more important, and preferable beyond all those enquiries which only improve our knowledge in mere speculations.

VI. If the question appear to be well worth your diligent application, and you are furnished with the necessary requisites to pursue it, then *consider whether it be drest up and entangled in more words than is needful*, and contain or include more complicated ideas than is necessary: and if so, endeavour to reduce it to a greater simplicity and plainness, which will make the enquiry and argument easier and plainer all the way.

VII. If it be stated in an improper, obscure, or irregular form, it may be meliorated *by changing the phrase, or transposing the parts of it;* but be careful always to keep the grand and important point of enquiry the same in your new stating the question. Little tricks and deceits of sophistry, by sliding in, or leaving out such words as entirely change the question, should be abandoned and renounced by all fair disputants, and honest searchers after truth. The stating a question with clearness and justice, goes a great way many times toward the answering it. The greatest part of true knowledge lies in a distinct perception of things which are in themselves distinct; and some men give more light and knowledge by the bare *stating of the question* with perspicuity and justice than others by talking of it in gross confusion for whole hours together. To *state a question* is but to separate and disentangle the parts of it from one another, as well as from every thing which doth not concern the question, and then to lay the disentangled parts of the question in due order and method; oftentimes without more ado this fully resolves the doubt, and shews the mind where the truth lies, without argument or dispute.

VIII. If the question relate to an *axiom* or *first principle of truth*, remember that a long train of consequences may depend upon it, *therefore it should not be suddenly admitted and received.* It is not enough to determine the truth of a proposition, much less to raise it to the honour of an axiom or first principle; to say that it has been believed through many ages, that it has been received by many nations, that it is almost universally acknowledged or no body denies it, that it is established by human laws, or that temporal penalties or reproaches will attend the disbelief of it.

IX. Nor is it enough to forbid any proposition the title of an axiom, *because it has been denied by some persons, and*

doubted of by others; for some persons have been unreasonably credulous, and others have been as unreasonably sceptical. Then only should a proposition be called an axiom or a self-evident truth, when by a moderate attention to the subject and predicate, their connexion appears in so plain a light and so clear an evidence, as needs no third idea or middle term to prove them to be connected.

X. While you are in search after truth in questions of a doubtful nature, or such as you have not yet thoroughly examined, *keep up a just indifference to either side of the question,* if you would be led honestly into the truth: for a desire or inclination leaning to either side, biasses the judgment strangely; whereas by this indifference for every thing but truth, you will be excited to examine fairly instead of presuming, and your assent will be secured from going beyond your evidence.

XI. For the most part people are born to their opinions, and never question the truth of what their family or their country or their party profess. They clothe their minds as they do their bodies, after the fashion in vogue, nor one of a hundred ever examines their principles. It is suspected of lukewarmness to suppose examination necessary, and it will be charged as a tendency to apostacy if we go about to examine them. Persons are applauded for presuming they are in the right, and (as Mr. Locke saith) he that considers and enquires into the reasons of things is counted a foe to orthodoxy, because possibly he may deviate from some of the received doctrines. And thus men without any industry or acquisition of their own, (lazy and idle as they are) inherit local truths, that is, the truths of that place where they live, and are inured to assent without evidence. This hath a long and unhappy influence; for if a man bring his mind once to be positive and fierce for propositions whose evidence he hath never examined, and that in matters of the greatest concernment, he will naturally follow this short and easy way of judging and believing in cases of less moment, and build all his opinions upon insufficient grounds.

XII. In determining a question, especially when it is a matter of difficulty and importance, *do not take up with partial examination,* but turn your thoughts on all sides, to gather in all the light you can toward the solution of it. Take time, and use all the helps that are to be attained before you fully determine, except only where present necessity of action calls for speedy determination. If you would know what may be called a partial examination take these instances, viz. When you examine an object of sense, or enquire into some matter of sensation at too great a distance from the object, or in an inconvenient situation of it, or under any indisposition of the organs, or any disguise whatsoever relating to the medium or the organ of the object

i self; or when you examine it by one sense only where others might be employed? Or when you enquire into it by sense only, without the use of the understanding and judgment and reason.

If it be a question which is to be determined by reason and argument, then your examination is partial, when you turn the question only in one light and do not turn it on all sides; when you look upon it only in its relations and aspects to one sort of objects and not to another; when you consider only the advantages of it and the reasons for it, and neglect to think of the reasons against it, and never survey its inconveniences too: when you determine on a sudden, before you have given yourself a due time for weighing all circumstances, &c.

Again, If it be a question of fact depending upon the report or testimony of men, your examination is but partial, when you enquire only what one man or a few say, and avoid the testimony of others, when you only ask what those report who were not eye or ear-witnesses, and neglect those who saw and heard it; when you content yourself with mere loose and general talk about it, and never enter into particulars; or, when there are many who deny the fact, and you never concern yourself about their reasons for denying it, but resolve to believe only those who affirm it.

There is yet further a fault in your partial examination of any question, when you resolve to determine it by natural reason only, where you might be assisted by supernatural revelation; or when you decide the point by some word or sentence, or by some part of revelation; without comparing it with other parts, which might give further light and better help to determine the meaning. It is also a culpable partiality, if you examine some doubtful or pretended vision or revelation without the use of reason; or without the use of that revelation, which is undoubted and sufficiently proved to be divine. These are all instances of imperfect examination, and we should never determine a question by one or two lights, where we may have the advantage of three or four.

XIII. *Take heed lest some darling notion, some favourite hypothesis, some beloved doctrine, or some common but unexamined opinion, be made a test of the truth or falsehood of all other propositions about the same subject.* Dare not build much upon such a notion or doctrine till it be very fully examined, accurately adjusted, and sufficiently confirmed. Some persons by indulging such a practice, have been led into long ranks of error; they have found themselves involved in a train of mistakes, by taking up some pretty hypothesis or principle, either in philosophy, politics, or religion, upon slight and insufficient grounds, and establishing that as a test and rule by which to judge of all other things.

XIV. For the same reason, *have a care of suddenly determining* any one question on which the determination of any kindred or parallel cases will easily or naturally follow. Take heed of receiving any wrong turn in your early judgment of things; be watchful, as far as possible, against any false bias which may be given to the understanding, especially in younger years. The indulgence of some one silly opinion, or the giving credit to one foolish fable, lays the mind open to be imposed upon by many. The ancient Romans were taught to believe, that Romulus and Remus the founders of their state and empire, were exposed in the woods and nursed by a wolf: this story prepared their minds for the reception of any tales of the like nature relating to other countries. Trogus Pompeius would enforce the belief, that one of the ancient kings of Spain was also nursed and suckled by a hart, from the fable of Romulus and Remus. It was by the same influence they learned to give up their hopes and fears to omens and soothsaying, when they were once persuaded that the greatness of their empire and the glory of Romulus their founder, were predicted by the happy omen of twelve vultures appearing to him when he sought where to build the city. They readily received all the following legends of prodigies, auguries, and prognostics, for many ages together, with which Livy has furnished his huge history.

So the child who is once taught to believe any one occurrence to be a *good or evil omen*, or any day of the month or week to be *lucky or unlucky*, hath a wide inroad made on the soundness of his understanding in the following judgments of his life: he lies ever open to all the silly impressions and idle tales of nurses, and imbibes many a foolish story with greediness, which he must unlearn again if ever he become acquainted with truth and wisdom.

XV. *Have a care of interesting your warm and religious zeal* in those matters which are not sufficiently evident in themselves, or which are not fully and thoroughly determined and proved: for this zeal, whether right or wrong, when it is once engaged, will have a powerful influence to establish your own minds in those doctrines which are really doubtful, and to stop up all the avenues of further light. This will bring upon the soul a sort of sacred awe and dread of heresy: with a divine concern to maintain whatever you have espoused as divine, though perhaps you have espoused it without any just evidence, and ought to have renounced it as false and pernicious.

We ought to be zealous for the most important points of our religion, and to *contend earnestly for the faith once delivered to the saints*; but we ought not to employ this sacred fervour of spirit in the service of any article, till we have seen it made out with plain and strong conviction, that it is a necessary or impor-

tant point of faith or practice, and is either an evident dictate of the light of nature, or an assured article of revelation. Zeal must not reign over the powers of our understanding, but obey them: God is the God of light and truth, a God of reason and order, and he never requires mankind to use their natural faculties amiss for the support of his cause. Even the most mysterious and sublime doctrines of revelation, are not to be believed without a just reason for it; nor should our pious affections be engaged in the defence of them, till we have plain and convincing proof that they are certainly revealed, though perhaps we may never in this world attain to such clear and distinct ideas of them as we desire.

XVI. As a warm zeal ought never to be employed in the defence of any revealed truth, till our reason be well convinced of the revelation; *so neither should wit and banter, jest and ridicule*, ever be indulged to oppose or assault any doctrines of professed revelation, till reason has proved they are not really revealed. And even then, these methods should be used very seldom, and with the utmost caution and prudence. Railery and wit were never made to answer our enquiries after truth, and to determine a question of rational controversy; though they may sometimes be serviceable to expose to contempt those inconsistent follies which have been first abundantly refuted by argument; they serve indeed only to cover nonsense with shame, when reason has first proved it to be mere nonsense.

It is therefore a silly and most unreasonable test which some of our deists have introduced to judge of divine revelation, viz. to try if it will bear ridicule and laughter. They are effectually beaten in all their combats at the weapons of men, that is, reason and argument; and it would not be unjust (though it is a little uncourtly) to say that they would now attack our religion with the talents of a vile animal, that is, grin and grimace.

I cannot think that a jester or a monkey, a droll or a puppet, can be proper judges or deciders of controversy. That which dresses up all things in disguise, is not likely to lead us into any just sentiments about them. Plato or Socrates, Cæsar or Alexander, might have a fool's coat clapt upon any of them, and perhaps in this disguise, neither the wisdom of the one, nor the majesty of the other, would secure them from a sneer; this treatment would never inform us whether they were kings or slaves, whether they were fools or philosophers. The strongest reasoning, the best sense, and the politest thoughts, may be set in a most ridiculous light by this grinning faculty: the most obvious axioms of eternal truth may be dreat in a very foolish form, and wrapt up in artful absurdities by this talent; but they are truth and reason, and good sense still. Euclid with all his demonstrations might be so covered and overwhelmed with banter,

that a beginner in the mathematics might be tempted to doubt, whether his theorems were true or no, and to imagine they could never be useful. So weaker minds might be easily prejudiced against the noblest principles of truth and goodness; and the younger part of mankind might be beat off from the belief of the most serious, the most rational and important points even of natural religion, by the impudent jests of a profane wit. The moral duties of the civil life, as well as the articles of christianity, may be painted over with the colours of folly, and exposed upon a stage, so as to ruin all social and personal virtue among the gay and thoughtless part of the world.

XVII. It should be observed also, that these very men cry out loudly against the use of all severe railing and reproach in debates, and all penalties and persecutions of the state, in order to convince the minds and consciences of men and determine points of truth and error. Now I renounce these penal and smarting methods of conviction as much as they do, and yet I think still these are every whit as wise, as just, and as good for this purpose, as banter and ridicule. Why should public mockery in print, or a merry joke upon a stage, be a better test of truth, than severe railing sarcasms and public persecutions and penalties? Why should more light be derived to the understanding by a song of scurrilous mirth or a witty ballad, than there is by a rude cudgel? When a professor of any religion is set up to be laughed at, I cannot see how this should help us to judge of the truth of his faith, any better than if he were scourged. The jeers of a theatre, the pillory, and the whipping-post, are very near a-kin. When the person or his opinion is made the jest of the mob, or his back the shambles of the executioner, I think there is no more conviction in the one than in the other.

XVIII. Besides, supposing it is but barely possible that the great God should reveal his mind and will to men by miracle, vision or inspiration, it is a piece of contempt and profane insolence, to treat any tolerable or rational appearance of such a revelation with jest and laughter, in order to find whether it be divine or not. And yet if this be a proper test of revelation, it may be properly applied to the true as well as the false, in order to distinguish it. Suppose a royal proclamation were sent to a distant part of the kingdom, and some of the subjects should doubt whether it came from the king or no; is it possible that wit and ridicule should ever decide the point? or would the prince ever think himself treated with just honour, to have his proclamation canvassed in this manner on a public stage, and become the sport of buffoons, in order to determine the question, *Whether it is the word of a king or no?*

Let such sort of writers go on at their dearest peril, and

sport themselves in their own deceivings; let them at their peril make a jest at the bible, and treat the sacred articles of christianity with scoff and merriment; but then let them lay aside all their pretences to reason as well as religion; and as they expose themselves by such writings to the neglect and contempt of men, so let them prepare to meet the majesty and indignation of God, without timely repentance.

XIX. In reading philosophical, moral or religious controversies, never raise your esteem of any opinion by the assurance and zeal wherewith the author asserts it, nor by the highest praises he bestows upon it; nor on the other hand, let your esteem of an opinion be abated, nor your aversion to it raised by the supercilious contempt cast upon it by a warm writer, nor by the sovereign airs with which he condemns it. *Let the force of argument alone influence your assent or dissent.* Take care that your soul be not warped or biassed on one side or the other, by any strains of flattering or abusive language; for there is no question whatsoever, but hath some such sort of defenders and opposers. Leave those writers to their own follies, who practise thus upon the weakness of their readers without argument; leave them to triumph in their own fancied possessions and victories; it is oftentimes found that their possessions are but a heap of errors, and their boasted victories are but overbearing noise and clamour, to silence the voice of truth.

In philosophy and religion, the bigots of all parties are generally the most positive, and deal much in this sort of arguments. Sometimes these are the weapons of pride; for a haughty man supposes all his opinions to be infallible, and imagines the contrary sentiments are ever ridiculous and not worthy of notice.—Sometimes these ways of talking are the mere arms of ignorance; the men who use them know little of the opposite side of the question, and therefore they exult in their own vain pretences to knowledge, as though no man of sense could oppose their opinion. They rail at an objection against their own sentiments, because they can find no other answer to it but railing. And men of learning by their excessive vanity, have been sometimes tempted into the same insolent practice as well as the ignorant.—Yet let it be remembered too, that there are some truths so plain and evident, that the opposition to them is strange, unaccountable, and almost monstrous; and in vindication of such truths, a writer of good sense may sometimes be allowed to use a degree of assurance, and pronounce them strongly with an air of confidence, while he defends them with reasons of convincing force.

XX. Sometimes a *question* may be proposed, which is of so large and extensive a nature, and refers to such a multitude of subjects; as ought not in justice to be determined at once by a

single argument or answer; as if one should ask me, Are you a professed disciple of the Stoics or the Platonists? Do you give an assent to the principles of Gassendus, Descartes, or Sir Isaac Newton? Have you chosen the hypothesis of Tycho or Copernicus? Have you devoted yourself to the sentiments of Arminius or Calvin? Are your notions *episcopal*, *presbyterian* or *independent*? &c. I think it may be very proper in such cases not to give an answer in the gross, but rather to enter into a detail of particulars, and explain one's own sentiments. Perhaps there is no man, nor set of men upon earth whose sentiments I entirely follow. God has given me reason to judge for myself, and though I may see sufficient ground to agree to the greatest part of the opinions of one person or party, yet it does by no means follow that I should receive them all. Truth does not always go by the lump, nor does error tincture and spoil all the articles of belief that some one party professes.

Since there are difficulties attending every scheme of human knowledge, it is enough for me in the main to incline to that side which has the fewest difficulties; and I would endeavour, as far as possible, to correct the mistakes or the harsh expressions of one party, by softening and reconciling methods, by reducing the extremes, and by borrowing some of the best principles or phrases from another. Cicero was one of the greatest men of antiquity, and gives us an account of the various opinions of philosophers in his age; but he himself was of the *Eclectic sect*, and chose out of each of them such positions, as in his wisest judgment came nearest to the truth.

XXI. When you are called in the course of life or religion to judge and determine concerning any question, and to affirm or deny it, take a full survey of the objections against it, as well as of the arguments for it, as far as your time and circumstances admit, and see on which side the preponderation falls. If either the objections against any proposition, or the arguments for the defence of it, carry in them most undoubted evidence, and are plainly unanswerable, they will and ought to constrain the assent, though there may be many seeming probabilities on the other side, which at first sight would flatter the judgment to favour it. But where the reasons on both sides are very near of equal weight, there suspension or doubt is our duty, unless in case wherein present determination or practice is required, and there we must act according to the present appearing preponderation of reasons.

XXII. In matters of moment and importance, it is our duty indeed to seek after certain and conclusive arguments, (if they can be found) in order to determine a question; but where the matter is of little consequence, it is not worth our labour to spend much time in seeking after *certainties*; it is sufficient here, if

probable reasons offer themselves. And even in matters of greater importance, especially where daily practice is necessary; and where we cannot attain any sufficient or certain grounds to determine a question on either side, we must then take up with such probable arguments as we can arrive at. But this general rule should be observed, viz. to take heed that our assent be no stronger, or rise no higher in the degree of it, than the probable argument will support.

XXIII. There are many things even in religion, as well as in philosophy and the civil life, which we believe with very different degrees of assent: and this is, or should be always regulated according to the different degrees of evidence which we enjoy: and perhaps there are a thousand gradations in our assent to the things we believe, because there are thousands of circumstances relating to different questions, which increase or diminish the evidence we have concerning them, and that in matters both of reason and revelation.

I believe there is a God, and that obedience is due to him from every reasonable creature: this I am most fully assured of, because I have the strongest evidence, since it is the plain dictate both of reason and revelation. Again, *I believe there is a future resurrection of the dead,* because scripture tells us so in the plainest terms, though reason says nothing of it. I believe also, *that the same matter of our bodies which died* (in part at least) *shall arise;* but I am not so fully assured of this circumstance, because the revelation of it is not quite so clear and express. Yet further I believe that the good men who were acquainted here on earth, *shall know each other in heaven:* but my persuasion of it is not absolutely certain, because my assent to it arises only from circumstantial reasonings of men upon what God has told us, and therefore my evidences are not strong beyond a possibility of mistake. This direction cannot be too often repeated, that our assent ought always to keep pace with our evidence; and our belief of any proposition, should never rise higher than the proof or evidence we have to support it, nor should our faith run faster than right reason can encourage it.

XXIV. Perhaps it will be objected here, why then does our Saviour in the histories of the gospel, so much commend a strong faith; and lay out both his miraculous benefits and his praises upon some of those poor creatures of little reasoning, who profest an assured belief of his commission and power to heal them?

I answer, the God of nature has given every man his own reason to be the judge of evidence to himself in particular, and to direct his assent in all things about which he is called to judge; and even the matters of revelation are to be believed by us, because our reason pronounces the revelation to be true. Therefore the great God will not, or cannot in any instances, require us to

assent to any thing without reasonable or sufficient evidence: nor to believe any proposition more strongly, than what our evidence for it will support. We have therefore abundant ground to believe, that those persons of whom our Saviour requires such a strong faith, or whom he commends for their strong faith, had as strong and certain evidence of his power and commission, from the credible and incontestable reports they had heard of his miracles, which were wrought on purpose to give evidence to his commission.* Now in such a case, both this strong faith and the open profession of it were very worthy of public encouragement and praise from our Saviour, because of the great and public opposition which the magistrates and the priests, and the doctors of the age made against Jesus the man of Nazareth, when he appeared as the Messiah.

And besides all this it may be reasonably supposed, with regard to some of those strong exercises of faith which are required and commended, that these believers had some further hints of inward evidence and immediate revelation from God himself; as when St. Peter confesses Christ to be the Son of God; Mat. xvi. 16, 17. our blessed Saviour commends him, saying, *blessed art thou Simon Bar-jona;* but he adds, *flesh and blood hath not revealed it unto thee, but my Father who is in heaven.* And the same may be said concerning the *faith of miracles*, the exercise whereof was sometimes required of the disciples and others, that is, when by inward and divine influences God assured them some miracles should be wrought, their obedience to and compliance with these divine illuminations was expected and commended. Now this supernatural inspiration, carried sufficient evidence with it to them, as well as to the ancient prophets, though we who never felt it are not so capable to judge and distinguish it.

XXV. What is said before concerning *truth* or *doctrines*, may be also affirmed concerning duties; the reason of both is the same: as the one are *truths for our speculation*, the others are *truths for our practice*. Duties which are expressly required in the plain language of scripture, or dictated by the most evident reasoning upon first principles, ought to bind our consciences more than those which are but dubiously inferred, and that only from occasional occurrences, incidents and circumstances: as for instance, I am certain that *I ought to pray to God*, my con-

* When our Saviour gently reproves Thomas for his unbelief, John xx. 29. he does it in these words, *Because thou hast seen me, Thomas, thou hast believed: blessed are they who have not seen and yet have believed*, that is, blessed are they who, though they have not been favoured with the evidence of their senses as thou hast been, yet have been convinced by the reasonable and sufficient moral evidence of the well grounded report of others, and have believed in me upon that evidence. Of this moral evidence Mr. Ditton writes exceedingly well, in his book of the Resurrection of Christ.

science is bound to this, because there are most evident commands for it to be found in scripture, as well as to be derived from reason. I believe also that I may pray to God, *either by a written form, or without one,* because neither reason nor revelation expressly requires either of these modes of prayer at all times, or forbids the other. I cannot therefore bind my conscience to practise the one, so as utterly to renounce the other; but I would practise either of them, as my reason and other circumstances direct me.

Again, I believe that *Christians ought to remember the death of Christ by the symbols of bread and wine;* and I believe *there ought to be pastors in a christian church,* some way ordained or set apart to lead the worship, and to bless and distribute the elements; but the last of these practices is not so expressly directed, prescribed, and required in scripture as the former; and therefore I feel my conscience evidently bound *to remember the death of Christ* with some society of christians or other, since it is a most plain command, though their methods of ordaining a pastor be very different from other men, or from my own opinion; or whether the person who distributes these elements, be only an occasional or a settled administrator; since none of these things are plainly determined in scripture. I must not omit or neglect an express command, because some unnecessary circumstances are dubious. And I trust I shall receive approbation from the God of nature, and from Jesus my judge at the last day, if I have endeavoured in this manner to believe and practise every thing in proportion to the degree of evidence which God has given me about it, or which he has put me into a capacity to seek and obtain in theage and nation wherein I live.

Query, Whether the obstinate Deists and the Fatalists of Great-Britain, will find sufficient apology from this principle?—But I leave them to venture the awful experiment.

XXVI. We may observe these three rules, in judging of probabilities which are to be determined by reason, relating either to things past, or things to come:

1. That which agrees most with the constitution of nature carries the greatest probability in it, where no other circumstance appears to counterpoise it; as, if I let loose a greyhound within sight of a hare upon a large plain, there is great probability the greyhound will seize her; that a thousand sparrows will fly away at the sight of a hawk among them.

2. That which is most conformable to the constant observations of men, or to experiments frequently repeated, is most likely to be true; as, that a winter will not pass away in England without some frost and snow; that if you deal out great quantities of strong liquor to the mob, there will be many drunk; that a large assembly of men will be of different opinions in any

doubtful point; that a thief will make his escape out of prison, if the doors of it are unguarded at midnight.

3. In matters of fact which are past or present, where neither nature, nor observation, nor custom gives us any sufficient information on either side of the question, there we may derive a probability from the attestation of wise and honest men by word or writing, or the concurring witnesses of multitudes who have seen and known what they relate, &c. This testimony in many cases will arise to the degree of moral certainty. So we believe that the plant tea grows in China; and that the Emperor of the Turks lives at Constantinople; that Julius Cæsar conquered France, and that Jesus our Saviour lived and died in Judea; that thousands were converted to the christian faith in a century after the death of Christ; and that the books which contain the christian religion, are certain histories and epistles which were written above a thousand years ago. There is an infinite variety of such propositions which can admit of no reasonable doubt, though they are not matters which are directly evident to our own senses, or our mere reasoning powers.

XXVII. When a point hath been well examined, and our own judgment settled upon just arguments, in our manly age, and after a large survey of the merits of the cause, it would be a weakness for us always to continue fluttering in suspence. We ought therefore to stand firm in such well established principles, and not be tempted to change and alter for the sake of every difficulty, or every occasional objection. We are not to *be carried about with every* flying *doctrine, like children tossed to and fro, and wavering with the wind. It is a good thing to have the heart established with grace, not with meats;* that is, in the great doctrines of the gospel of *grace* and in Jesus Christ who *is the same yesterday, to-day and for ever;* but it is not so necessary in the more minute matters of religion, such as meats and drinks, forms and ceremonies, which are of less importance, and for which scripture has not given such express directions. This is the advice of the great apostle; Eph. iv. 14. Heb. xiii. 8, 9.

In short, those truths which are the springs of daily practice, should be settled as soon as we can with the exercise of our best powers, after the state of manhood; but those things wherein we may possibly mistake, should never be so absolutely and finally established and determined, as though we were infallible. If the Papists of Great Britain had maintained such a resolute establishment and assurance in the days of King Henry the VIII. or Queen Elizabeth, there never had been a reformation;—nor would any Heathen have been converted even under the ministry of St. Paul, if their obstinate settlement in their idolatries had kept their eyes shut against all further light. Yet this should not hinder *us from* settling our most important

principles of faith and practice, where reason shines with its clearest evidence, and the word of God plainly determines truth and duty.

XXVIII. But let us remember also, that though the gospel be an infallible revelation, we are but fallible interpreters, when we determine the sense even of some important propositions written there; and therefore though we seem to be established in the belief of any particular sense of scripture, and though there may be just calls of providence to profess and subscribe it, yet there is no need that we should resolve or promise, subscribe or swear never to change our mind; since it is possible in the nature and course of things, we may meet with such a solid and substantial objection, as may give us a quite different view of things from what we once imagined, and may lay before us sufficient evidence of the contrary. We may happen to find a fairer light cast over the same scriptures, and see reason to alter our sentiments even in some points of moment. *Sic sentio, sentiam*, that is, *so I believe, and so I will believe*, is the prison of the soul for life time, and a bar against all the improvements of the mind.' To impose such a profession on other men in matters not absolutely necessary and not absolutely certain, is a criminal usurpation and tyranny over faith and conscience, and which none has power to require but an infallible dictator.

CHAP. XIX.—*Of enquiring into Causes and Effects.*

SOME effects are found out by their causes, and some causes by their effects. Let us consider both these.

I. When we are enquiring into the causes of any particular effect or appearance, either in the world of nature, or in the civil or moral concerns of men, we may follow this method:—1. Consider what effects or appearances you have known of a kindred nature, and what have been the certain and real causes of them; for like effects have generally like causes, especially when they are found in the same sort of subjects.—2. Consider what are the several possible causes which may produce such an effect; and find out by some circumstances, how many of those possible causes are excluded in this particular case; thence proceed by degrees to the probable causes till a more close attention and inspection shall exclude some of them also, and lead you gradually to the real and certain cause.—3. Consider what things preceded such an event or appearance, which might have any influence upon it; and though we cannot certainly determine the cause of any thing only from its going before the effect, yet among the many forerunners, we may probably light upon the true cause, by further and more particular enquiry.—4. Consider whether

one cause be sufficient to produce the effect, or whether it does not require a concurrence of several causes; and then endeavour as far as possible, to adjust the degrees of influence that each cause might have in producing the effect, and the proper agency and influence of each of them therein.

So in natural philosophy, if I would find what are the principles or causes of that sensation which we call heat when I stand near the fire; here I shall find it is necessary that there be an agency of the particles of fire on my flesh, either mediately by themselves, or at least by the intermediate air; there must be a particular sort of motion and vellication imprest upon my nerves; there must be a derivation of that motion to the brain; and there must be an attention of my soul to this motion; if either of these are wanting, the sensation of heat will not be produced.

So in the moral world, if I enquire into the revolution of a state or kingdom, perhaps I find it brought about by the tyranny or folly of a prince, or by the disaffection of his own subjects; and this disaffection and opposition may arise, either upon the account of impositions in religion, or injuries relating to their civil rights; or the revolution may be effected by the invasion of a foreign army, or by the opposition of some person at home or abroad that lays claim to the government, &c. or a hero who would guard the liberties of the people; or by many of these concurring together; then we must adjust the influences of each as wisely as we can, and not ascribe the whole event to one of them alone.

II. When we are enquiring into the effects of any particular cause or causes, we may follow this method.

1. Consider diligently the nature of every cause apart, and observe what effect every part or property of it will tend to produce.—2. Consider the causes united together in their several natures, and ways of operation; enquire how far the powers or properties of one, will hinder or promote the effects of the other, and wisely balance the proportions of the influence.—3. Consider what the subject is, in or upon which the cause is to operate; for the same cause on different subjects will oftentimes produce different effects, as the sun which softens wax will harden clay.—4. Be frequent and diligent in making all proper experiments; in setting such causes at work whose effects you desire to know, and putting together in an orderly manner, such things as are most likely to produce some useful effects, according to the best survey you can take of all the concurring causes and circumstances.—5. *Observe* carefully all the events which happen either by an occasional concurrence of various causes, or by the industrious application of knowing men; and when you see any happy effect certainly produced, and often repeated, treasure it up together

with the known causes of it, amongst your improvements.—6. Take a just survey of all the circumstances which attend the operation of any cause or causes, whereby any special effect is produced, and find out as far as possible, how far any of those circumstances had a tendency either to obstruct or promote, or change those operations, and consequently how far the effect might be influenced by them.

In this manner, physicians practice and improve their skill. They consider the various known effects of particular herbs or drugs, they meditate what will be the effect of their composition, and whether the virtues of the one will exalt or diminish the force of the other, or correct any of its innocent qualities. Then they observe the native constitution, and the present temper or circumstances of the patient, and what is likely to be the effect of such a medicine on such a patient. And in all uncommon cases they make wise and cautious experiments, and nicely observe the effects of particular compound medicines on different constitutions, and in different diseases; and by these treasuries of just observations, they grow up to an honourable degree of skill in the art of healing.

So the preacher considers the doctrines and reasons, the precepts, the promises, and threatenings of the word of God, and what are the natural effects of them upon the mind; he considers what is the *natural tendency of such a virtue or such a vice;* he is well apprised that the representation of some of these things may convince the understanding, some may terrify the conscience, some may allure the slothful, and some encourage the desponding mind; he observes the temper of his hearers, or of any particular person that converses with him about things sacred, and he judges what will be the effects of each representation on such persons; he reviews and recollects what have been the effects of some special parts and methods of his ministry; and by a careful survey of all these, he attains greater degrees of skill in his sacred employment.

Note, In all these cases, we must distinguish those causes and effects which are *naturally* and *necessarily connected* with each other, from those which have only an accidental or contingent connection. Even in those causes where the effect is but contingent, we may sometimes arrive at a very high degree of probability; yet we cannot arrive at such certainty as where the causes operate by an evident and natural necessity, and the effects necessarily follow the operation.

See more on this subject, *logic* Part II. Chap. V. Sect. 7. Of the principles and rules of judging concerning things past, present and to come, by the mere use of reason.

CHAP. XX.—*Of the Sciences, and their use in particular Professions.*

I. THE best way to learn any science, is to begin with a regular system, or a short and plain scheme of that science, well drawn up into a narrow compass, omitting the deeper and more abstruse parts of it, and that also under the conduct and instruction of some skilful teacher. Systems are necessary to give an entire and comprehensive view of the several parts of any science, which may have a mutual influence toward the explication or proof of each other: whereas if a man deals always and only in essays and discourses on particular parts of a science, he will never obtain a distinct and just idea of the whole, and may perhaps omit some important part of it after seven years reading of such occasional discourses. For this reason, young students should apply themselves to their systems much more than pamphlets. That man is never so fit to judge of particular subjects relating to any science, who has never taken a survey of the whole.

It is the remark of an ingenious writer, should a barbarous Indian, who had never seen a palace or a ship, view their separate and disjoined parts, and observe the pillars, doors, windows, cornices and turrets of the one, or the prow and stern, the ribs and masts, the ropes and shrouds, the sails and tackle of the other he would be able to form but a very lame and dark idea of either of those excellent and useful inventions. In like manner, those who contemplate only the fragments or pieces broken off from any science dispersed in short unconnected discourses, and do not discern their relation to each other, and how they may be adapted, and by their union procure the delightful symmetry of a regular scheme, can never survey an entire body of truth, but must always view it as deformed and dismembered; while their ideas, which must be ever indistinct and often repugnant, will lie in the brain unsorted, and thrown together without order or coherence: such is the knowledge of those men who live upon the scraps of the sciences.

A youth of genius and lively imagination, of an active and forward spirit, may form within himself some alluring scenes and pleasing schemes in the beginning of a science, which are utterly inconsistent with some of the necessary and substantial parts of it which appear in the middle or the end. And if he never read and pass through the whole, he takes up and is satisfied with his own hasty pleasing schemes, and treasures those errors up amongst his solid acquisitions: whereas his own labour and study farther pursued would have shewn him his early mistakes, and cured him of his self-flattering delusions. Hence it comes to pass, that we have so many *half-scholars* now-a-days, and there is so much confusion and *inconsistency* in the notions and opi-

the inmost soul: or do they imagine that youth can penetrate into all these beauties and artifices of nature without these helps, which persons of maturer age find necessary for that purpose? I would not willingly name the books, because some of the writers are said to be gentlemen of excellent acquirements.

VII. After we have first learnt and gone through any of those arts or sciences which are to be explained by diagrams, figures and schemes, such as *geometry*, *geography*, *astronomy*, *optics*, *mechanics*, *&c.* we may best preserve them in memory by having those schemes and figures in large sheets of paper hanging always before the eye in closets, parlours, halls, chambers, entries, stair-cases, &c. Thus the learned images will be perpetually imprest on the brain, and will keep the learning that depends upon them alive and fresh in the mind, through the growing years of life: the mere diagrams and figures will ever recal to our thoughts those theorems, problems, and corollaries, which have been demonstrated by them.

It is incredible how much geography may be learnt this way by the two terrestrial hemispheres, and by particular maps and charts of the coasts and countries of the earth happily disposed round about us. Thus we may learn also the constellations by just projections of the celestial sphere, hung up in the same manner. And I must confess, for the bulk of learners of astronomy, I like that projection of the stars best, which includes in it all the stars in our horizon, and therefore it reaches to the 38th degree of *southern latitude*, though its centre is the *north-pole*. This gives us a better view of the heavenly bodies as they appear every night to us, and it may be made use of with a little instruction, and with ease, to serve for a *noctural*, and shew the true hour of the night.

But remember, that if there be any colouring upon these maps or projections, it should be laid on so thin, as not to obscure or conceal any part of the lines, figures, or letters: whereas most times they are daubed so thick with gay and glaring colours, and hung up so high above the reach of the eye that should survey and read them, as though their only design were to make a guady show upon the wall, and they hung there merely to cover the naked plaister or wainscot.

Those sciences which may be drawn out into tables may also be thus hung up and disposed in proper places, such as brief abstracts of history, chronology, &c. and indeed, the schemes of any of the arts or sciences may be analysed in a sort of skeleton, and represented upon tables, with the various dependencies and connections of their several parts and subjects that belong to them. Mr. Solomon Lowe has happily thrown the grammar of several languages into such tables; and a frequent review of those abstracts and epitomes would tend much to im-

print them on the brain, when they have been once well learned; this would keep those learned traces always open, and assist the weakness of a labouring memory. In this manner may a scheme of the *scripture history* be drawn out, and perpetuate those ideas in the mind with which our daily reading furnishes us.

VIII. Every man who pretends to the character of a scholar, should attain *some general and superficial idea of most or all the sciences*; for there is a certain connection among the various parts of human knowledge, so that some notions borrowed from any one science may assist our acquaintance with any other, either by way explication, illustration or proof; though there are some sciences conjoined by a much nearer affinity than others.

IX. Let those parts of every science *be chiefly studied at first, and reviewed afterwards*, which have a more direct tendency to assist our proper profession, as men, or our general profession as Christians, always observing what we ourselves have found most necessary and useful to us in the course of our lives. Age and experience will teach us to judge which of the sciences, and which parts of them, have been of greatest use, and are most valuable; but in younger years of life we are not sufficient judges of this matter, and therefore should seek advice from others who are elder.

X. There are three learned professions among us, viz. *divinity*, *law*, and *medicine*. Though every man who pretends to be a scholar or a gentleman should so far acquaint himself with a superficial scheme of all the sciences, as not to stand amazed like a mere stranger at the mention of the common subjects that belong to them; yet there is no necessity for every man of learning to enter into their difficulties, and deep recesses, nor to climb the heights to which some others have arrived. The knowledge of them in a proper measure may be happily useful to every profession, not only because all arts and sciences have a sort of communion and connection with each other, but it is an angelic pleasure to grow in knowledge, it is a matter of honour and esteem, and renders a man more agreeable and acceptable in every company. But let us survey several of them more particularly, with regard to the learned professions; and first of the *mathematics*.

XI. Though I have so often commended *mathemetical studies*, and particularly the speculations of *arithmetic* and *geometry*, as a means to fix a wavering mind, to beget an habit of attention, and to improve the faculty of reason; yet I would by no means be understood to recommend to all a pursuit of these sciences, to those extensive lengths to which the moderns have advanced them. This is neither necessary nor proper for any

students, but those few who shall make these studies their chief profession and business of life, or those gentlemen whose capacities and turn of mind are suited to these studies, and have all manner of advantage to improve in them.

The general principles of *arithmetic, algebra, geometry and trigonometry, of geography, of modern astronomy, mechanics, statics and optics,* have their valuable and excellent uses, not only for the exercise and improvement of the faculties of the mind, but the subjects themselves are very well worth our knowledge in a moderate degree, and are often made of admirable service in human life. So much of these subjects as Dr. Wells has given us in his three volumes, entitled, The Young Gentleman's Mathematics, is richly sufficient for the greatest part of scholars or gentlemen ; though perhaps there may be some single treatises, at least on some of these subjects, which may be better written and more useful to be perused than those of that learned author.

But a penetration into the abstruse difficulties and depths of modern *algebra* and *fluxions*, the various methods of *quadratures*, the mensuration of all manner of *curves*, and their mutual transformation, and twenty other things that some modern mathematicians deal in, are not worth the labour of those who design either of the three learned professions, *divinity, law*, or *physic*, as the business of life. This is the sentence of a considerable man, viz. Dr. George Cheyne, who was a very good proficient and writer on those subjects ; he affirms, that they are but barren and airy studies for a man entirely to live upon, and that for a man to indulge and riot in these exquisitely bewitching contemplations, is only proper for public professors, or for gentlemen of estates, who have a strong propensity this way, and a genius fit to cultivate them.

But, says he, to own a great but grievous truth, though they may quicken and sharpen the invention, strengthen and extend the imagination, improve and refine the reasoning faculty, and are of use both in the necessary and the luxurious refinement of *mechanical* arts; yet having no tendency to rectify the will, to sweeten the temper, or mend the heart, they often leave a stiffness, a positiveness and sufficiency on weak minds, which is much more pernicious to society, and to the interests of the great end of our being, than all their advantages can recompense. He adds further concerning the launching into the depth of the studies, that they are apt to beget a sacred and refined pride, and over-weening, and over-bearing vanity, the most opposite temper to the true spirit of the gospel. This tempts them to presume on a kind of omniscience in respect to their fellow creatures, who have not risen to their elevation : nor are they fit to be trusted in the hands of any but those who have acquired a

humble heart, a lowly spirit, and a sober and teachable temper. See Dr. Cheyne's Preface to his *Essay on Health and long Life.*

XII. Some of the practical parts of *geometry*, *astronomy*, *dialing*, *optics*, *statics*, *mechanics*, &c. may be agreeable entertainments and amusements to students in every profession at leisure hours if they enjoy such circumstances of life as to furnish them with conveniences for this sort of improvement; but let them take great care, lest they entrench upon more necessary employments, and so fall under the charge and censure of wasted time.

Yet I cannot help making this observation, that where students, or indeed any young gentlemen, have in their early years made themselves masters of a variety of elegant problems in the *mathematic* circle of knowledge, and gained the most easy, neat, and entertaining experiments in *natural philosophy*, with some short and agreeable speculations or practices in any *other of the arts or sciences*, they have hereby laid a foundation for the esteem and love of mankind among those with whom they converse, in higher or lower ranks of life; they have been often guarded by this means from the temptation of innocent pleasures, and have secured both their own hours and the hours of their companions, from running to waste in sauntering and trifles, and from a thousand impertinencies in silly dialogues. Gaming and drinking, and many criminal and foolish scenes of talk and action, have been prevented by these innocent and improving elegancies of knowledge.

XIII. History is a necessary study in the supreme place for gentlemen who deal in *politics*. The government of nations, and distressful and desolating events which have in all ages attended the mistakes of politicians, should be ever present on their minds, to warn them to avoid the like conduct. *Geography* and *chronology*, which precisely informs us of the *place* and *time* where such transactions or events happened, are the eyes of *history*, and of absolute necessity in some measure to attend it.

But *history*, so far as relates to the affairs of the bible is as necessary to divines as to gentlemen of any profession. It helps us to reconcile many difficulties in scripture, and demonstrates a divine providence. Dr. Prideaux's Connection of the Old and New Testament, is an excellent treatise of this kind.

XIV. Among the smaller histories, *biography*, or the memoirs of the lives of great and good men, has a high rank in my esteem, as worthy of the perusal of every person who devotes himself to the study of *divinity*. Therein we frequently find our holy *religion reduced to practice*, and many parts of

Christianity shining with a transcendent and exemplary light. We learn there how deeply sensible great and good men have been of *the ruins of human nature by the first apostacy from God*, and how they have toiled and laboured, and turned themselves on all sides, to seek a recovery in vain, till they have found the gospel of Christ an all-sufficient relief. We are there furnished with effectual and unanswerable evidences that the religion of Jesus, with all its self-denials, virtues and devotions, is a very practicable thing, since it has been carried to such a degree of honour by some wise and holy men. We have been there assured, that the pleasures and satisfaction of the Christian life, in its present practice and its future hopes, are not the mere raptures of fancy and enthusiasm, when some of the strictest professors of reason have added the the sanction of their testimony.

In short, the *lives* or *memoirs* of persons of piety well written, have been of infinite and unspeakable advantage to the disciples and professors of Christianity, and have given as admirable instances and rules how to resist every temptation of a soothing or a frowning world, how to practise important and difficult duties, how to *love God* above all, and *to love our neighbours as ourselves, to live by the faith of the Son of God*, and to die in the same faith, in sure and certain hope of a resurrection to eternal life.

XV. Remember that *logic* and *ontology* or *metaphysics*, are necessary sciences, though they have been greatly abused by the scholastic writers who have professed to teach them in former ages. Not only all students, whether they design the profession of *theology*, *law*, or *physic*, but all gentlemen should at least acquire a superficial knowledge of them. The introduction of so many subtleties, nice distinctions, and insignificant terms without clear ideas, has brought a great part of the *logic* or *metaphysics* of the schools into just contempt. Their *logic* has appeared the mere art of wrangling, and their *metaphysics* the skill of splitting an hair, of distinguishing without a difference, and of putting long hard names upon common things, and sometimes upon a confused jumble of things which have no clear ideas belonging to them. It is certain, that an unknown heap of trifles and impertinencies have been intermingled with these useful parts of learning, upon which account many persons in this polite age have made it a part of their breeding to throw a jest upon them; and to rally them well, has been esteemed a more valuable talent than to understand them.

But this is running into wide extremes; nor ought these parts of science to be abandoned by the *wise*, because some writers of former ages have played the fool with them. True *logic* teaches us to use our reason well, and brings light into the understanding: true *metaphysics* or *ontology*, casts a light upon all

the objects of thought and meditation, by ranging every being with all the absolute and relative perfections and properties, modes and attendants of it in proper ranks or classes, and thereby it discovers the various relations of things to each other, and what are their general or special differences from each other, wherein a great part of human knowledge consists. And by this means it greatly conduces to instruct us in *method*, or the disposition of every thing into its proper rank and class of beings, attributes, or actions.

XVI. If I were to say any thing of natural philosophy, I would venture to lay down my sentiments thus: I think it must needs be very useful to a divine to understand something of natural science. The mere natural history of *birds, beasts, and fishes, of insects, trees, and plants*, as well as of meteors, such as, *clouds, thunders, lightnings, snow, hail, frost, &c.* in all their common or uncommon appearances, may be of considerable use to one who studies divinity, to give him a wider and more delightful view of the works of God, and to furnish him with lively and happy images and metaphors drawn from the large volume of nature, to display and represent the things of God and religion in the most beautiful and affecting colours.

And if the mere history of these things be useful for this purpose, surely it will be of further advantage to be led into the reasons, causes and effects of these natural objects and appearances, and to know the established laws of nature, matter, and motion, whereby the great God carries on his extensive works of providence from the creation to this day.

I confess, the old Aristotelean scheme of this science, will teach us very little that is worth the knowing about these matters; but the later writers; who have explained nature and its operations in a more sensible and geometrical manner, are well worth the moderate study of a divine: especially those who have followed the principles of that wonder of our age and nation, Sir Isaac Newton. There is much pleasure and entertainment, as well as real profit, to be derived from those admirable improvements which have been advanced in natural philosophy of late years, by the assistance of mathematical learning, as well as from the multitude of experiments which have been made and are still making in natural subjects.

XVII. This is a science which indeed eminently belongs to the physician: he ought to know all the parts of human nature, what are the sound and healthy functions of an animal body, and what are the distempers and dangers which attend it; he should also be furnished with a large knowledge of plants and minerals, and every thing which makes up the *materia medica*, or the ingredients of which medicine are made; and many other things in natural philosophy are subservient to his profession, as well as to the *kindred art of surgery*.

XVIII. Questions about the *powers and operations of nature*, may also sometimes come into the lawyer's cognizance, especially such as relate to assaults, wounds, murders, &c. I remember, I have read a trial of a man for *murder by drowning*, wherein the judge on the bench heard several arguments concerning the lungs being filled or not filled with water, by inspiration or expiration, &c. to all which he professed himself so much a stranger, as did not do him any great honour in public.

XIX. But I think no *divine* who can obtain it, should be utterly destitute of this knowledge. By the assistance of this study he will be better able to survey the various monuments of creating wisdom in the heavens, the earth and the seas, with wonder and worship: and by the use of a moderate skill in this science, he may communicate so much of the astonishing works of God in the formation and government of this visible world, and so far instruct many of his hearers, as may assist the transfusion of the same ideas into their minds, and raise them to the same delightful exercises of devotion. *O Lord, how manifold are thy works? In wisdom hast thou made them all! They are sought out by all that have pleasure in them.* Besides, it is worthy of the notice of every student in theology, that he ought to have some acquaintance with the principles of nature, that he may judge a little how far they will go; so that he may not be imposed upon to take every strange appearance in nature for a miracle, that he may reason the clearer on this subject, that he may better confirm the miracles of Moses and of Christ, nor yield up his faith to any pretences of prodigy and wonder, which are either the occasional and uncommon operations of the elements, or the crafty sleights of men well skilled in philosophy and mechanical operations, to delude the simple.

XX. The knowledge also of animal nature and of the rational soul of man, and the mutual influence of these two ingredients of our composition upon each other, is worthy the study of a divine. It is of great importance to persons of this character and office, to judge how far the animal powers have influence upon such and such particular appearances and practices of mankind; how far the appetites or passions of human nature are owing to the flesh and blood, or to the mind; how far they may be moderated, and how far they ought to be subdued; and what are the happiest methods of obtaining these ends. By this science also we may be better informed, how far these passions or appetites are lawful, and how far they are criminal, by considering how far they are subject to the power of the will, and how far they may be changed and corrected by our watchfulness, care and diligence.

It comes also very properly under the cognizance of this profession, to be able in some measure to determine questions

which may arise relating to real inspiration or prophecy, to wild enthusiasm, to fits of a convulsive kind, to melancholy or phrenzy, &c. and what directions are proper to be given concerning any appearances of this nature.

XXI. Next to the knowledge of *natural things*, and acquaintance with the *human nature* and *constitution*, which is made up of soul and body, I think natural religion properly takes its place. This consists of these two parts, viz. (1.) The *speculative* or *contemplative*, which is the knowledge of God in his various perfections, and in his relations to his rational creatures, so far as may be known by the light of nature, which heretofore used to be called the second part of metaphysics. It includes also (2.) That which is practical or active, which is the knowledge of the several duties that arise from our relation to God, and our relation to fellow-creatures, and our proper conduct and government of ourselves: this has been used to be called *ethics*, or *moral philosophy*.

XXII. The knowledge of these things is proper for all men of learning; not only because it teaches them to obtain juster views of the several parts of revealed religion, and of christianity which are built upon them, but because every branch of natural religion and of moral duty is contained, and necessarily implied in all the revealed religions that ever God prescribed to the world. We may well suspect that religion does not come from God, which renounces any part of natural duty.

Whether mankind live under the dispensation of the Patriarchs, or of Moses, or the prophets, or of our Lord Jesus Christ, still we are bound to *know the one true God*, and to practise all that adoration and reverence, all that love to him, that faith in his perfections, with that obedience and submission to his will, which natural religion requires. We are still bound to exercise that justice, truth and goodness towards our neighbours, that restraint and moderation of our own appetites and passions, and that regular behaviour towards ourselves and all our fellow creatures around us, which moral philosophy teaches. There is no sort of revealed religion that will dispense with these natural obligations: and a happy acquaintance with the several appetites, inclinations, and passions of human nature, and the best methods to rule and restrain, to direct and govern them, are our constant business, and ought to be our everlasting study.

Yet I would lay down this caution, viz. That since students are instructed in the knowledge of the true God in their lectures on christianity, and since among the christian duties they are also taught all the moral dictates of the light of nature, or a complete scheme of ethics, there is no absolute necessity of learning these two parts of natural religion, as distinct sciences, separate and by themselves; but still it is of great importance for a tutor,

while he is reading to his pupils these parts of the christian religion, to give them notice how far the light of nature or mere reason will instruct us in these doctrines and duties, and how far we are obliged to divine revelation and scripture, for clearing up and establishing the firm foundations of the one, for affording us superior motives and powers to practise the other, for raising them to more exalted degrees, and building so glorious a superstructure upon them.

XXIII. The study of natural religion, viz. The knowledge of God and the rules of virtue and piety, as far as they are discovered by the light of nature, is needful indeed to prove the truth of divine revelation or scripture, in the most effectual manner: but after the divine authority of scripture is established, that will be a very sufficient spring from whence the bulk of mankind may derive their knowledge of divinity or the christian religion, in order to their own present faith and practice, and their future and eternal happiness. In this sense theology is a science necessary for every one that hopes for the favour of God and the felicity of another world; and it is of infinitely more importance than any of the arts and sciences, which belong to any of the learned professions here on earth.

XXIV. Perhaps it will be thought necessary I should say something concerning the study of the civil law or the law of nature and nations. If we would speak with great justness and propriety, the civil law signifies the peculiar law of each state, county or city: but what we now usually mean by the civil law, is a body of laws composed out of the best of the Roman and Grecian laws, and which was in the main received and observed through all the Roman dominions for above twelve hundred years.

The Romans took the first grounds of this law from what they call the twelve tables, which were the abridgments of the laws of Solon at Athens, and of other cities in Greece, famous for knowledge and wisdom; to which they added their own ancient customs of the city of Rome, and the laws which were made there. These written laws were subject to various interpretations, whence controversies daily arising, they were determined by the judgment of the learned; and these determinations were what they first called *jus civile*. All this by degrees grew to a vast number of volumes; and therefore the emperor Justinian, commanded his chancellor Tribonian to reduce them to a perfect body, and this is called the body of the civil law.

XXV. But that which is of most importance for all learned men to be acquainted with is *the law of nature, or the knowledge of right and wrong among mankind*, whether it be transacted between single persons or communities, so far as common reason and the light of nature dictate and direct. This is what Puffen-

dorf calls the *law of nature and nations*, as will appear if you consult sect. 3. chap. III. of that most valuable *folio* he has written on the subject; which is well worthy the study of every man of learning, particularly *lawyers* and *divines*, together with other treatises on the same theme.

If any question proposed relate to right and property, and justice between man and man, in any polite and civilized country, though it must be adjudged chiefly according to the particular statutes and laws of that country, yet the knowledge of the *law of nature* will very considerably assist the lawyer and the civil judge in the determination thereof. And this knowledge will be of great use to divines, not only in deciding of cases of conscience among men, and answering any difficult enquiries which may be proposed to them on this subject, but it will greatly assist them also in their studies relating to the law of God, and the performance or violation thereof, the nature of duty and sin, reward and punishment.

XXVI. I have spoken something of the *languages* before, but let me here resume the subject, and put in a few thoughts about those studies which are wont to be called *philological*; such as history, languages, grammar, rhetoric, poesy, and criticism. An acquaintance with some of the *learned languages* at least, is necessary for all the three learned professions.

XXVII. The lawyers, who have the least need of foreign tongues, ought to understand Latin. During many ages past, very important matters in the law were always written and managed in that language by the lawyers, as prescriptions in medicine by the physicians, and citations of the scriptures in divinity were always made in Latin by the divines. Prayers also were ordained to be said publicly and privately in the Roman tongue: Pater-nosters and Ave-marias were half the devotion of those ages. These cruel impositions upon the people, would not suffer them to read in their own mother tongue what was done, either to or for, their own souls, their bodies, or their estates. I am ready to suspect this was all owing to the craft and policy of the priesthood and church of Rome, which endeavoured to aggrandize themselves, and exalt their own profession into a sovereign tyranny, and to make mere slaves of the laity among mankind, by keeping them in utter ignorance, darkness and dependence. And they were willing to compound the matter with the physicians and the lawyers, and allow them a small share in this tyranny over the populace, to maintain their own supreme dominion over all.

But we thank God, the world is grown something wiser; and of late years, the British Parliament has been pleased to give relief from that bondage in matters relating to the law also, as in the age of the reformation we were delivered from saying

our prayers in Latin, from being bound to read the word of God in a tongue unknown to the people, and from living in an everlasting subjection to the clergy in matters of this life and the life to come.

But to return. There are still so many forms of proceedings in judicature, and things called by Latin names in the profession of the law, and so many barbarous words with Latin terminations, that it is necessary *lawyers* should understand this language. Some acquaintance also with the old French tongue is needful for the same persons and profession, since the tenures of Lyttleton, which are a sort of bible to the gentlemen of the long robe, were written in that language: and this tongue has been interwoven in some forms of the English law, from the days of William the conqueror, who came from Normandy in France.

XXVIII. Physicians should be skilled in the Greek as well as in the Latin, because their great master Hypocrates wrote in that tongue, and his writings are still of good value and use. A multitude of the names, both of the parts of the body, of diseases, and of medicines, are derived from the Greek language; and there are many excellent books of physic both in the theoretical and practical parts of it, which are delivered to the world in the Roman tongue, and of which that profession should not be ignorant.

XXIX. Such as intend the study of theology, should be well acquainted also with the Latin, because it has been for many hundred years the language of the schools of learning: their disputations are generally limited to that language, and many excellent books of divinity must be entirely concealed from the students, unless they are acquainted with Latin authors.

But those that design the sacred profession of theology, should make it their labour of chief importance to be very conversant with their bibles, both in the Old and New Testament; and this requires some knowledge of those original languages, Greek and Hebrew, in which the scriptures were written. All that will pursue these studies with honour, should be able to read the Old Testament tolerably in the Hebrew tongue: at least they should be so far acquainted with it, as to find out the sense of a text by the help of a dictionary. But scarce any man should be thought worthy of the name of a solid divine or a skilful teacher of the gospel in these days of light and liberty, unless he has pretty good knowledge of the Greek, since all the important points of the christian religion are derived from the New Testament, which was first written in that language.

XXX. As for the Syriac and Arabic tongues, if one divine in thirty or in three hundred, travel far into these regions, it is enough. A few learned men skilled in these languages, will make sufficient remarks upon them for the service of the whole

christian world; which remarks may sometimes happen to be of use to those divines, who are unacquainted with them in reading the bible. But the advantage of these tongues is not of so great importance as it has been too often represented. My reader will agree with me when he considers, that the chief uses of them are these: The Arabic is a language which has some kindred and affinity to the Hebrew, and perhaps we may now and then guess at the sense of some uncommon and doubtful Hebrew word, which is found but once or twice in the bible, by its supposed affinity to the Arabic: but whatsoever conjectures may be made by some kindred of an Hebrew word to an Arabic root, yet there is no certainty to be gathered from it, for even words of the same language which are undoubtedly derived from the same theme or primitive, will give us but very doubtful and sorry information concerning the true sense of kindred words which spring from the same theme.

Let me give a plain instance or two of this uncertainty. The word *strages* signifies *slaughter*; *stratum* is Latin for a *bed*: *stramen* is *straw*; and *stragulum* is a quilt or coverlet: they are all drawn and derived from *sterno*, which signifies to throw down, to kill, or to spread abroad. Let the critics tell me what certain sense they could put upon either of these four words by their mere cognation with each other, or their derivation from one common verb. Again, who could tell me the certain meaning and precise idea of the word *honest* in English, and assure me that it signifies a man of integrity, justice and probity, though it is evidently derived from *honestus* in Latin? Whereas *honestus* hath a very different idea, and signifies a man of some figure in the world, or a man of honour. Let any man judge then, how little service toward explaining the Hebrew tongue can be furnished from all the language of Arabia. Surely a great part of the learned fatigues and tiresome travels of men through this country, is almost vain and useless to make the Hebrew bible better understood.

As for the *Syriac language*, it is granted there may be some small advantage drawn from the knowledge of it, because there is a very ancient translation of the New Testament in that tongue: and perhaps this may sometimes give a proper and apposite meaning to a difficult and doubtful text, and offer a fair hint for recovering the true meaning of the scripture from the perverse glosses of other writers. But there are several commentators and lexicographers who have been acquainted with the Syriac language, and have given us the chief of these hints in their writings on scripture. And after all, since none of these assistances can yield us a sufficient proof of a true interpretation, and give us the certain sense of a text, who would be per-

suaded to waste any great number of his better hours in such dry studies, and in labours of so little profit?

XXXI. *The Chaldean language* indeed is much nearer to the Hebrew, and it is proper for a divine to have some acquaintance with it, because there are several verses or chapters of Ezra and Daniel which are written in that language; and the old Jewish targums or commentaries, which are written in the Chaldean tongue, may sometimes happen to cast a little light upon a doubtful scripture of the Old Testament. But it must be still owned, that the knowledge of the Eastern tongues does not deserve to be magnified to such a degree, as some of the proficients in them have indulged; wherein they have carried matters beyond all reason and justice, since scarcely any of the most important subjects of the gospel of Christ and the way of salvation, can gain any advantage from them.

XXXII. *The art of grammar* comes now to be mentioned. It is a distinct thing from the mere knowledge of the languages; for all mankind are taught from their infancy to speak their mother tongue, by a natural imitation of their mothers and nurses, and those who are round about them, without any knowledge of the art of grammar, and the various observations and rules that relate to it. Grammar indeed, is nothing else but rules and observations drawn from the common speech of mankind in their several languages; and it teaches us to speak and pronounce, to spell and write with propriety and exactness, according to the custom of those in every nation who are, or were supposed to speak and write their own language best. Now it is a shame for a man to pretend to science and study in any of the three learned professions, who is not in some measure acquainted with the propriety of those languages with which he ought to be conversant in his daily studies, and more especially in such as he may sometimes be called upon to write as well as read.

XXXIII. *Next to grammar, we proceed to consider rhetoric.* Now rhetoric in general is the art of persuading, which may be distinguished into these three parts; viz. (1.) *Conveying the sense of the speaker* to the understanding of the hearers in the clearest and most intelligent manner, by the plainest expressions and the most lively and striking representations of it, so that the mind may be thoroughly convinced of the thing proposed. (2.) *Persuading the will* effectually to chuse or refuse the thing suggested and represented.

(3.) *Raising the passions* in the most vivid and forcible manner, so as to set all the soul and every power of nature at work, to pursue or avoid the thing in debate.

To attain this end, there is not only a great deal of art necessary in the representation of matters to the auditory, but also in the disposition or method of introducing these particular repre-

sentations, together with the reasons which might convince, and the various methods which might persuade and prevail upon the hearers. There are certain seasons, wherein a violent torrent of oration in a disguised and concealed method, may be more effectual than all the nice forms of logic and reasoning. The figures of interrogation and exclamation, have sometimes a large place and happy effect in this sort of discourse, and no figure of speech should be wanting here, where the speaker has art enough happily to introduce it.

There are many remarks and rules laid down by the teachers of this art, to improve a young genius into those glorious talents whereby Tully and Demosthenes acquired that amazing influence and success in their own age and nation, and that immortal fame through all nations and ages. And it is with great advantage these rules may be perused and learned. But a happy genius, a lively imagination, and warm passions, together with a due degree of knowledge and skill in the subject to be debated, and a perpetual perusal of the writings of the best orators, and hearing the best speakers, will do more to make an orator, than all the rules of art in the world, without these natural talents and this careful imitation of the most approved and happiest orators.

XXXIV. Now you will presently suppose, that *pleaders at the bar* have great need of this art of rhetoric; but it has been a just doubt, whether pleading in our British courts of justice, before a skilful judge, should admit of any other aid from rhetoric, than that which teaches to open a cause clearly, and spread it in the most perspicuous, complete and impartial manner before the eyes of him that judges; for impartial justice being the thing which is sought, there should be no artifices used, no eloquence or powers of language employed to persuade the will, or work upon the passions, lest the decisive sentence of the judge should be biassed or warped into injustice. For this reason, Mr. Locke would banish all pleaders in the law for fees, out of his government of Carolina, in his posthumous works; though perhaps that great man might possibly be too severe, in so universal a censure of the profession.

XXXV. *But the case is very different with regard to divines:* the eloquence of the pulpit, beyond all controversy, has a much larger extent. Their business is not to plead a cause of right and wrong before a wise and skilful judge, but to address all the ranks of mankind, the high and low, the wise and the unwise, the sober and the vicious, and persuade them all to pursue and persevere in virtue with regard to themselves, in justice and goodness with regard to their neighbours, and piety towards God. These are affairs of everlasting importance, and most of the persons to whom these addresses are made, are not wise and skilful judges, but are influenced and drawn strongly to the con-

expressing our ideas in the most proper and beautiful language, whether we write or speak of the things of God or men. It is pity that some of these harmonious writers have ever indulged any thing uncleanly or impure to defile their paper, and abuse the ears of their readers, or to offend against the rules of the nicest virtue and politeness: but still amongst the writings of Mr. Dryden and Mr. Pope, and Dr. Young, as well as others, there is a sufficient choice in our own language, wherein we shall not find any indecency to shock the most modest tongue or ear.

Perhaps there has hardly been a writer in any nation, and I may dare to affirm, there is none in ours, has a richer and happier talent of painting to the life, or has ever discovered such a large and inexhausted variety of description as the celebrated Mr. Pope. If you read *his translation of* Homer's Iliad, you will find almost all the terms or phrases in our tongue that are needful to express any thing that is grand or magnificent: but if you peruse his Odyssey, which descends much more into common life, there is scarcely any usual subject of discourse or thought, or any ordinary occurrence which he has not cultivated and dressed in the most proper language; and yet still he has ennobled and enlivened even the lower subjects, with the brightest and most agreeable ornaments.

I should add here also, that if the same author had more frequently employed his pen on divine themes, his short poem on the Messiah, and some part of his letters between Abelard and Eloisa, with that ode of the *dying* Christian, &c. sufficiently assure us, that his pen would have honourably imitated some of the tender scenes of penitential sorrow, as well as the sublimer odes of the Hebrew psalmist; and perhaps discovered to us in a better manner than any other translation has done, how great a poet sat upon the throne of Israel.

4. After all that I have said, there is yet a further use of reading *poesy*, and that is, when the mind has been fatigued with studies of a more laborious kind, or when it is any ways unfit for the pursuit of more difficult subjects, it may be as it were unbent, and repose itself a while on the flowery meadows where the muses dwell. It is a very sensible relief to the soul when it is over-tired, to amuse itself with the numbers and the beautiful sentiments of the poets; and in a little time, this agreeable amusement may recover the languid spirits to activity and more important service.

XXXVII. All this I propose to the world as my best observations about reading of verse. But if the question were offered to me, *shall a student of a bright genius never divert himself with writing poesy?* I would answer, *Yes, when he cannot possibly help it:* a lower genius in mature years, would heartily

wish that he had spent much more time in reading the best authors of this kind, and employed much fewer hours in writing. But it must be confessed, or supposed at least, that there may be seasons, when it is hardly possible for a poetic soul to restrain the fancy or quench the flame, when it is hard to suppress the exuberant flow of lofty sentiments, and prevent the imagination from this sort of style or language: and that is the only season I think, wherein this inclination should be indulged; especially by persons who have devoted themselves to professions of a different kind; and one reason is because what they write in that hour, is more likely to carry in it some appearances above nature, some happy imitation of the dictates of the muse*.

XXXVIII. There are other things besides history, grammar and languages, rhetoric and poesy, which have been included under the name of philological knowledge; such as, *an acquaintance with the notions, customs, manners, tempers, polity, &c. of the various nations of the earth, or the distinct sects and tribes of mankind.* This is necessary, in order to understand history the better; and every man who is a lawyer or a gentleman, ought to obtain some acquaintance with these things, without which he can never read history to any great advantage, nor can he maintain his own station and character in life with honour and dignity, without some insight into them.

XXXIX. Students in *divinity* ought to seek a larger acquaintance with *the* Jewish *laws, polity, customs, &c.* in order to understand many passages of the Old Testament and the New, and to vindicate the sacred writers from the reproaches of infidels. An acquaintance also with many of the Roman and Grecian affairs is needful to explain several texts of scripture in the New Testament, to lead sincere enquirers into the true and genuine sense of the evangelists and apostles, and to guard their writings from the unreasonable cavils of men.

XL. The art of *criticism* is reckoned by some as a distinct part of *philology*; but it is in truth nothing else, than a more exact and accurate knowledge or skill in the other parts of it, and a readiness to apply that knowledge upon all occasions, in order to judge well of what relates to these subjects, to explain what is obscure in the authors which we read, to supply what is defective, and amend what is erroneous in manuscripts or ancient copies, to correct the mistakes of authors and editors in the sense or the words, to reconcile the controversies of the learned, and by this means to spread a juster knowledge of these things among the inquisitive part of mankind.

Every man who pretends to the learned professions, if he

* The muse in the ancient heathen sense is supposed to be a goddess, but in the philosophic sense it can mean no more, than a bright genius with a warm and strong imagination, elevated to an uncommon degree.

doth not arise to be *critic* himself in *philological* matters, he should be frequently conversing with those books, whether dictionaries, paraphrasts, commentators, or other critics, which may relieve any difficulties he meets with, and give him a more exact acquaintance with those studies which he pursues. And whensoever any person is arrived to such a degree of knowledge in these things, as to furnish him well for the practice of *criticism* let him take great care that pride and vanity, contempt of others, with inward wrath and insolence, do not mingle themselves with his remarks and censures. Let him remember the common frailties of human nature, and the mistakes to which the wisest man is sometimes liable, that he may practise this art with due modesty and candour.

PREFACE

TO

"THE IMPROVEMENT OF THE MIND."

PART II.

THE author's name, which is prefixed to this book, renders it altogether needless for us to say any thing to recommend it; and we need not assure any judicious reader, who has been conversant with Dr. Watts's writings, that this is the genuine work of that author; for he cannot fail of discerning the Doctor's *easy style, and beautiful manner of expression* in every page. We esteem it an honour done us by that truly great man, that he was pleased by his last will, to entrust us with his manuscripts which he designed for the press, however, he lived to publish several of those himself, after his will was made, so that not many remain to be published by us. Some indeed there are remaining, which he did originally intend for the press, but his broken state of health did not permit him to finish them, and they are left too imperfect to be ever published. Of this sort, among others, is *the larger Discourse on Psalmody*, which he gave notice of his intention to publish in the preface to the second edition of his Hymns, when he withdrew the shorter Essay on that subject, which was annexed to the first edition. There are also among his manuscripts, some tracts relating to a doctrinal controversy, which the Doctor had been engaged in, but which the world seems to be tired of: so that, most probably, *this second part of the Improvement of the Mind*, with *the Discourse on Education*, and some additions to the *Reliquiæ Juveniles*, are all the posthumous works of Dr. Watts that will ever be printed.

As to this work in particular, a considerable part of it was corrected for the press by the Doctor's own hand; and as to the rest of it, he did not leave it so far unfinished as should, in his own judgment, discourage the publishing it; for he has left this note in a paper along with it, "Though this book, or the second volume of the Improvement of the Mind, is not so far finished as I could wish, yet I leave it among the number of books corrected for the press; for it is very easy for any person of genius and science to finish it, and publish it in a form sufficiently useful to the world." The corrections we have presumed to make are comparatively but few and trivial; and when, now and then, it was thought needful to add a line or two for the illustration of any passage, it is generally put in the form of a note at the foot of the page.

It may perhaps be expected we should make some apology, for delaying the publishing of this book so long after the author's death; a book that has been so much expected and so earnestly desired, as appears by several letters found in the Doctor's study, from eminent persons and from learned societies. There are various causes that have contributed to the delay, which the world need not be informed of; but the remote distance of our habitations, and the multiplicity of business in which each of us is statedly engaged, are circumstances pretty generally known, and which we hope will be admitted in excuse for some part of the delay, and some part the booksellers must answer for. However, we are the less solicitous to apologize for not publishing this book sooner, as we are satisfied it will be welcome now it comes; and that those who, upon reading the first volume, have so earnestly desired the second, will not be disappointed when they read it.

We have only to add, our most sincere wishes and prayers, that a book so admirably suited to improve the minds of men, especially of the rising generation, and to promote universal goodness, as this appears to be, may be attended with a blessing from on high.

D. JENNINGS.

June 26, 1751. P. DODDRIDGE.

THE IMPROVEMENT OF THE MIND;

CONTAINING

Various Remarks and Rules about the Communication of Useful Knowledge.

THE SECOND PART.

Communication of Useful Knowledge.

INTRODUCTION.

THE chief design of the former part of this book, is to lead us into proper methods for the *improvement of our knowledge*; let us now consider what are the best means of *improving the minds of others*, and of *communicating* to them the *knowledge* which we have acquired. If the treasures of the mind should be hoarded up and concealed, they would profit none besides the possessor, and even his advantage by the possession would be poor and narrow, in comparison of what the same treasures would yield, both to himself and to the world, by a free communication and diffusion of them. Large quantities of knowledge acquired and reserved by one man, like heaps of gold and silver, would contract a sort of rust and disagreeable aspect, by lying in everlasting secresy and silence; but they are burnished and glitter by perpetual circulation, through the tribes of mankind. The two chief ways of conveying knowledge to others, are, that of *verbal instruction* to our disciples, or by *writing and publishing* our thoughts to the world.

Here therefore I shall first propose some observations which relate to the conveyance of knowledge to others by regular lectures of verbal instruction or by conversation; I shall represent several of the chief prejudices of which learners are in danger, with directions to guard against them, and then mention some of the easiest and most effectual ways of convincing persons of their mistakes, and of dealing with their understandings, when they labour under the power of prejudice. I shall afterwards add, by way of appendix, an essay written many years ago, on the subject of education, when I designed a more complete treatise of it.

CHAP. I.—*Methods of Teaching and Reading Lectures.*

HE that has learned any thing thoroughly, in a clear and methodical manner, and has attained a distinct perception, and

an ample survey of the whole subject, is generally best prepared to teach the same subject in a clear and easy method; for having acquired a large and distinct idea of it, and made it familiar to himself by frequent *meditation, reading and occasional discourse;* he is supposed to see it on all sides, to grasp it with all its appendices and relations in one survey, and is better able to represent it to the learner in all its views, with all its properties, relations and consequences. He knows which view or side of the subject to hold out first to his disciple, and how to propose to his understanding that part of it which is easiest to apprehend; and also knows how to set it in such a light, as is most likely to allure and to assist his further enquiry.

But it is not every one who is a great scholar that always becomes the happiest teacher, even though he may have a clear conception, and a methodical as well as an extensive survey of the branches of any science. He must also *be well acquainted with words, as well as ideas, in a proper variety;* that when his disciple does not take in the ideas in one form or expression, he may change the phrase into several forms, till at last he hits the understanding of his scholar, and enlightens it in the just idea of truth. Besides this, a tutor should be a person of a happy and condescending temper, who has patience to bear with a slowness of perception, or want of sagacity in some learners. He should also have much candour of soul, to pass a gentle censure on their impertinencies, and to pity them in their mistakes, and use every mild and engaging method for insinuating knowledge into those who are willing and diligent in seeking truth, as well as reclaiming those who are wandering into error. But of this I have spoken somewhat already, in a chapter of the former part, and shall have occasion to express something more of it shortly.

A very pretty and useful way to lead a person into the knowledge of any particular truth is, by question and answer, which is the Socratical method of disputation, and therefore I refer the reader to that chapter or section which treats of it. On this account, dialogues are used as a polite and pleasant method of leading gentlemen and ladies into some of the sciences, who seek not the most accurate and methodical treasure of learning. But the most usual, and perhaps the most excellent way of instructing students in any of the sciences, is *by reading lectures,* as tutors in the academy do to their pupils.

The first work is to choose a book well written, which contains a short scheme or abstract of that science; or at least, it should not be a very copious and diffusive treatise. Or, if the tutor knows not any such book already written, he should draw up an abstract of that science himself, containing the most sub-

stantial and important parts of it, disposed in such a method as he best approves. Let a chapter or a section of this be read daily by the learner, on which the tutor should paraphrase in this manner, namely, *He should explain both words and ideas more largely*, and especially what is dark and difficult should be opened and illustrated, partly by various forms of speech, and partly by apt similitudes and examples. Where the sense of the author is dubious, it must also be fixed and determined.

Where the arguments are strong and cogent, they should be enforced by some further paraphrase, and the truth of the inferences should be made plainly to appear. Where the arguments are weak and insufficient, they should be either confirmed or rejected as useless; and new arguments, if need be, should be added to support that doctrine. What is *treated very concisely* in the author should be *amplified*, and where several things are *laid closely* together they must be taken to pieces and opened by parts. Where the tutor *differs* from the author which he reads, he should gently point out and confute his mistakes. Where the method and order of the book is just and happy, it should be pursued and commended; where it is defective and irregular, it should be corrected.

The most necessary, the most remarkable and useful parts of that treatise, or of that science, should be peculiarly recommended to the learners, and pressed upon them, that they would retain it in memory; and what is more unnecessary or superfluous should be distinguished, lest the learner should spend too much time in the more needless parts of a science.

The various ends, uses, and services of that science, or of any part of it, should be also declared and exemplified, as far as the tutor hath opportunity and furniture to do it; particularly in mathematics and natural philosophy. And if there be any thing remarkably beautiful or defective in the style of the writer, it is proper for the tutor to make a just remark upon it.

While he is reading and explaining any particular treatise to his pupils, he may compare the different editions of the same book, or different writers upon the same subject, he should inform them where that subject is treated by other authors, which they may peruse, and lead his disciples thereby to a further elucidation, confirmation or improvement of that theme of discourse in which he is instructing them.

It is alluring and agreeable to the learner also, now and then to be entertained with some historical remarks, or any occurrences or useful stories which the tutor has met with, relating to the several parts of such a science, provided he does not put off his pupils merely with such stories, and neglect to give them a solid and rational information of the theme in hand. Teachers should

endeavour, as far as possible *to join profit and pleasure together*, and mingle delight with their instructions; but at the same time they must take heed, that they do not merely amuse the ears, and gratify the fancy of their disciples, without enriching their minds. In reading lectures of instruction, let the teacher be very solicitous that the learners take up his meaning, and therefore he should frequently enquire, whether he expresses himself intelligibly, whether they understand his sense, and take in all his ideas, as he endeavours to convey them in his own forms of speech.

It is necessary that he who instructs others should use the most proper style for the conveyance of his ideas easily into the minds of those who hear him; and though in teaching the sciences, a person is not confined to the same rules by which we must govern our language in conversation, for he must necessarily make use of many terms of art and hard words, yet he should never use them merely to shew his learning, nor affect sounding language without necessity; a caution which we shall soon farther inculcate.

I think it very convenient and proper, if not absolutely necessary, that when a tutor reads a following lecture to his pupils, he should run over the foregoing lecture in questions proposed to them, and by this means acquaint himself with their daily proficiency.* It is in vain for the learner to object, *surely we are not school-boys, to say our lessons again; we came to be taught, and not to be catechised and examined.* But alas! how is it possible for a teacher to proceed in his instructions, if he knows not how far the learner takes in and remembers what he has been taught?

Besides, I most generally believe, it is sloth or idleness, it is real ignorance, incapacity or unreasonable pride, that makes a learner refuse to give his teacher an account how far he has profited by his last instructions. For want of this constant examination, young gentlemen have spent some idle and useless years, even under the daily labours and inspection of a learned teacher; and they have returned from the academy without the gain of any one science, and even with the shameful loss of their classical learning, that is, the knowledge of Greek and Latin, which they had learnt in the grammar-school.

Let the teacher always accommodate himself to the genius, temper and capacity of his disciples, and practise various methods

* Note, This precaution, though never to be neglected, is of especial importance when a pupil is entering on any new branch of learning, where it is absolutely necessary the fundamental definitions and principles should not only be clearly understood, but should be rendered very familiar to the mind; and probably most tutors have found young persons sadly bewildered, as they have gone on in their lectures, for want of a little more patience and care in this respect.

of prudence to allure, persuade and assist every one of them in their pursuit of knowledge. Where the scholar has *less sagacity*, let the teacher enlarge his illustrations; let him search and find out where the learner sticks, what is the difficulty; and thus let him help the labouring intellect. Where the learner manifests a forward genius, and a sprightly curiosity, by frequent enquiries; let the teacher oblige such an inquisitive soul by satisfying these questions, as far as may be done by decency and conveniency; and where these enquiries are unseasonable, let him not silence the young enquirer with a *magisterial rebuff*, but with much candour and gentleness postpone those questions and refer them to a proper hour.

Curiosity is a useful spring of knowledge; it should be encouraged in children, and awakened by frequent and familiar methods of talking with them. It should be indulged in youth, but not without a prudent moderation. In those who have too much, it should be limited by a wise and gentle restraint or delay, lest by wandering after every thing, they learn nothing to perfection. In those who have too little, it should be excited, lest they grow stupid, narrow-spirited, self-satisfied, and never attain a treasure of ideas, or an aptitude of understanding.

Let not the teacher demand or expect things too sublime and difficult from the *humble, modest*, and *fearful* disciple: And where such a one gives a just and happy answer, even to plain and easy questions, let him have words of commendation and love ready for him. Let him encourage every spark of kindling light, till it grow up to bright evidence and confirmed knowledge. Where he finds a lad *pert, positive and presuming*, let the tutor take every just occasion to shew him his error: let him set the absurdity in complete light before him, and convince him by a full demonstration of his mistake, till he sees and feels it, and learns to be modest and humble.

A teacher should not only observe the different spirit and humour among his scholars, but he should watch the various efforts of their reason and growth of their understanding. He should practice in his young nursery of learning, as a skilful gardener does in his vegetable dominions, and apply prudent methods of cultivation to every plant. Let him with a discreet and gentle hand, nip or prune the irregular shoots, let him guard and encourage the tender buddings of the understanding, till they be raised to a blossom, and let him kindly cherish the younger fruits.

The tutor should take every occasion to instil knowledge into his disciples, and make use of every occurrence in life, to raise some profitable conversation upon it; he should frequently enquire something of his disciples, that may set their young reason to work, and teach them how to form inferences, and to draw one *proposition* out of another.

Reason being that faculty of the mind which he has to deal with in his pupil, let him endeavour by all proper and familiar methods to call it into exercise, and to enlarge the powers of it. He should take frequent opportunities to shew them an idea is clear or confused, when the proposition is evident or doubtful, and when an argument is feeble or strong. And by this mean the mind will be so formed, that whatsoever he proposes with evidence and strength of reason, they will readily receive.

When any uncommon appearances arise in the natural, moral, or political world, he should invite and instruct them to make their remarks on it, and give them the best reflections of his own, for the improvement of their minds.

He should by all means make it appear that he loves his pupils, and that he seeks nothing so much as their increase of knowledge, and their growth in all valuable acquirements; this will engage their affection to his person, and procure a just attention to his lectures.

And indeed there is but little hope, that a teacher should obtain any success in his instructions, unless those that hear him have some good degree of esteem and respect for his person and character. And here I cannot but take notice by the way, that it is a matter of infinite and unspeakable injury to the people of any town or parish, where the minister lies under contempt. If he has procured it by his own conduct, he is doubly criminal, because of the injury he does to the souls of them that hear him : but if this contempt and reproach be cast upon him by the wicked, malicious and unjust censures of men, they must bear all the ill consequences of receiving no good by his labours, and will be accountable hereafter to the great and divine Judge of all. It would be very necessary to add in this place, if tutors were not well apprized of it before, that since learners are obliged to seek a divine blessing on their studies, by fervent prayer to the God of all wisdom, their tutors should go before them in this pious practice, and make daily addresses to heaven for the success of their instructions.

CHAP. II.—*Of an instructive Style.*

THE most necessary, and the most useful character of a style fit for instruction is, that it be *plain*, *perspicuous* and *easy*. And here I shall first point out all those errors in style, which diminish or destroy the perspicuity of it, and then mention a few directions how to obtain a perspicuous and easy style. The errors of a style which must be avoided by teachers, are these that follow :

I. *The use of many foreign words, which are not naturalized*

the truth, which will naturally lead us into the best methods to promote it. And here the following directions may be useful:—

I. If you would convince a person of his mistake, *choose a proper place, a happy hour, and the fittest concurrent circumstances for this purpose.* Do not unseasonably set upon him when he is engaged in the midst of other affairs, but when his soul is at liberty, and at leisure to hear and attend. Accost him not upon that subject, when is spirit is ruffled or discomposed with any occurrences of life, and especially when he has heated his passions in the defence of a contrary opinion; but rather seize a golden opportunity, when some occurrences of life may cast a favourable aspect upon the truth of which you would convince him, or which may throw some dark and unhappy colour or consequences upon that error from which you would fain deliver him. There are in life some *Mollissima tempora fandi*, some very agreeable moments of addressing a person, which if rightly managed, may render your attempts more successful, and his conviction easy and pleasant.

II. *Make it appear by your whole conduct to the person you would teach, that you mean him well, that your design is not to triumph over his opinion,* not to expose his ignorance, or his incapacity of defending what he asserts. Let him see that it is not your aim to advance your own character as a disputant, nor to set yourself up for an instructor to mankind; but that you love him, and seek his true interest; and not only assure him of this in words, when you are entering on an argument with him, but let the whole of your conduct to him at all times demonstate your real friendship for him. Truth and argument come with particular force from the mouth of one whom we trust and love.

III. *The softest and gentlest address to the erroneous, is the best way to convince them of their mistake.* Sometimes it is necessary to represent to your opponent, that he is not far off from the truth, and that you would fain draw him a little nearer to it; commend and establish whatever he says that is just and true, as our blessed Saviour treated the young scribe, when he answered well concerning the two great commandments:— "Thou art not far, says our Lord, from the kingdom of heaven;" Mark xii. 34. Imitate the mildness and conduct of the blessed Jesus.

Come as near to your opponent as you can in all your propositions, and yield to him as much as you dare, in a consistence with truth and justice. It is a very great and fatal mistake in persons who attempt to convince or reconcile others to their party when they make the difference appear as wide as possible; this is shocking to any person who is to be convinced, he will choose

rather to keep and maintain his own opinions, if he cannot come into yours without renouncing and abandoning every thing that he believed before. Human nature must be flattered a little as well as reasoned with, that so the argument may be able to come at his understanding, which otherwise will be thrust off at a distance. If you charge a man with nonsense and absurdities, with heresy and self-contradiction, you take a very wrong step towards convincing him.

Remember that error is not to be rooted out of the mind of man by reproaches and railings, by flashes of wit and biting jests, by loud exclamations or sharp ridicule; long declamations and triumph over our neighbour's mistake, will not prove the way to convince him; these are signs either of a bad cause, or of want of arguments or capacity for the defence of a good one.

IV. *Set therefore a constant watch over yourself, lest you grow warm in dispute before you are aware.* The passions never clear the understanding, but raise darkness, clouds and confusion in the soul; human nature is like water which has mud at the bottom of it, it may be clear while it is calm and undisturbed, and the ideas like pebbles appear bright at the bottom; but when once it is stirred and moved by passion, the mud rises uppermost and spreads confusion and darkness over all the ideas; you cannot set things in so just and so clear a light before the eyes of your neighbour, while your own conceptions are clouded with heat and passion.

Besides, when your own spirits are a little disturbed, and your wrath is awakened, this naturally kindles the same fire in your correspondent, and prevents him from taking in your ideas, were they ever so clear; for his passions are engaged all on a sudden for the defence of his own mistakes, and they combat as fiercely as yours do, which perhaps may be awakened on the side of truth.

To provoke a person whom you would convince, not only rouses his anger, and sets it against your doctrine; but directs its resentment against your person as well as against all your instructions and arguments. You must treat an opponent like a friend, if you would persuade him to learn any thing from you; and this is one great reason why there is so little success on either side between two disputants or controversial writers, because they are so ready to interest their passions in the while of contest, and prevent the mutual light that might [illegible] ray, or received on either side; ambition, indignation, just where zeal, reign on both sides; victory is the point [illegible] opinions; per- truth is pretended, and truth oftentimes [illegible] retires from the field of battle; the co[illegible] they began, the understandings hold [illegible]

haps with this disadvantage, that they are a little more obstinate, and rooted in them without fresh reason, and they generally come off with the loss of temper and charity.

V. *Neither attempt nor hope to convince a person of his mistake, by any penal methods or severe usage;* there is no light brought into the mind by all the fire and sword, and bloody persecutions that were ever introduced into the world. One would think that the princes, the priests, and the people, the learned and the unlearned, the great and the mean, should have all, by this time, seen the folly and madness of seeking to propagate the truth by the laws of cruelty; we compel a beast to the yoke by blows, because the ox and the ass have no understanding; but intellectual powers are not to be fettered and compelled at this rate; men cannot believe what they will, nor change their religion and their sentiments as they please; they may be made hypocrites by the forms of severity, and constrained to confess what they do not believe; they may be forced to comply with external practices and ceremonies, contrary to their own consciences; but this can never please God, nor profit men.

VI. *In order to convince another, you should always make choice of those arguments that are best suited to his understanding and capacity, his genius and temper, his state, station, and circumstance.* If I were to persuade a plowman of the truth of any form of church government, it should not be attempted by the use of the Greek and Latin fathers, but from the word of God, the light of nature, and the common reason of things.

VII. *Arguments should always be proposed in such a manner, as may lead the mind onward to perceive the truth in a clear and agreeable light,* as well as to constrain the assent by the power of reasoning. Clear ideas in many cases, are as useful toward conviction, as a well formed and unanswerable syllogism.

VIII. *Allow the person you desire to instruct a reasonable time to enter into the force of your argument.* When you have declared your own sentiments in the brightest manner of illustration, and enforced them with the most convincing arguments, you are not to suppose that your friends should immediately be convinced and receive the truth: habitude in a particular way of thinking, as well as in most other things, obtains the force of nature, and you cannot expect to wean a man from his accustomed errors but by slow degrees, and by his own assistance; entreat him therefore not to judge on the sudden, nor determine upon it at once, but that he would please to review your subject upon your arguments with all the impartiality he can, and take time to think these over again at large; tell him you would be disposed to hear you speak yet further without pain or aversion.

Desire him to be in an obliging manner; and say, I

am not so fond as to think I have placed the subject in such lights, as to throw you on a sudden into a new track of thinking, or to make you immediately lay aside your present opinions or designs; all that I hope is, that some hint or other which I have given, is capable of being improved by you to your own conviction, or possibly it may lead you into such a train of reasoning, as in time to effect a change in your thoughts. Which hint leads me to add,

IX. *Labour as much as possible, to make the person you would teach, his own instructor.* Human nature may be allowed, by a secret pleasure and pride in its own reasoning, to seem to find out by itself the very thing that you would teach; and there are some persons that have so much of this natural bias towards self rooted in them, that they can never be convinced of a mistake by the plainest and strongest arguments to the contrary, though the demonstration glare in their faces; but they may be tempted by such gentle insinuations to follow a track of thought, which you propose, till they have wound themselves out of their own error, and led themselves hereby into your opinion; if you do but let it appear, that they are under their own guidance rather than yours. And perhaps there is nothing which shews more dexterity of address than this secret influence over the minds of others, which they do not discern even while they follow it.

X. *If you can gain the main point in question, be not very solicitous about the nicety with which it shall be expressed.* Mankind is so vain a thing, that it is not willing to derive from another, and though it cannot have every thing from itself, yet it would seem at least to mingle something of its own with what it derives elsewhere; therefore when you have set your own sentiment in the fullest light, and proved it in the most effectual manner, an opponent will bring in some frivolous and useless distinction on purpose to change the form of words in the question, and acknowledge that he receives your proposition in such a sense, and in such a manner of expression, though he cannot receive it in your terms and phrases. Vanillus will confess he is now convinced, that a man who behaves well in the state, ought not to be punished for his religion; but yet he will not consent to allow an universal toleration of all religions that do not injure the state, which is the proposition I had been [illegible]. Well, let Vanillus therefore use his own language, I [illegible] is convinced of the truth; he shall have leave to [illegible] own way.

To these directions I shall add two remar[illegible]clu-sion of this chapter, which would not so prope[illegible]er the preceding directions.

I. When you have laboured to instruct [illegible] some con-

troverted truth, and yet he retains some prejudice against it, so that he doth not yield to the convincing force of your arguments, you may sometimes have happy success in convincing him of that truth, by setting him to read a weak author, who writes against it: A young reader will find such pleasure in being able to answer the arguments of the opposer, that he will drop his former prejudices against the truth, and yield to the power and evidence of your reasons. I confess this looks like setting up one prejudice to overthrow another; but where prejudices cannot be fairly removed by dint of reason, the wisest and best of teachers will sometimes find it necessary to make a way for reason and truth to take place by this contrast of prejudices.

II. When our design is to *convince a whole family, or community of persons* of any mistake, or to lead them into any truth, we may justly suppose there are various reigning prejudices among them: and therefore it is not safe to attempt, nor so easy to effect it, *by addressing the whole number at once.* Such a method has been often found to raise a sudden alarm, and has produced a violent opposition even to the most fair, pious, and useful proposals; so that he who made the motion, could never carry his point. We must therefore first make as sure as we can of the most intelligent and learned, at least the most leading persons amongst them, by addressing them apart prudently, and offering proper reasons, till they are convinced and engaged on the side of truth; and these may with more success apply themselves to others of the same community; yet the original proposer should not neglect to make a distinct application to all the rest, so far as circumstances admit. Where a thing is to be determined by a number of votes, he should labour to secure a good majority, and then take care that the most proper persons should move and argue the matter in public, lest it be quashed in the very first proposal by some prejudice against the proposer. So unhappily are our circumstances situated in this world, that if truth and justice and goodness could put on human forms, and descend from heaven to propose the most divine and useful doctrines, and bring with them the clearest evidence, and publish them at once to a multitude whose prejudices are engaged against them, the proposal would be vain and fruitless, and would neither convince nor persuade. So necessary is it to join art and dexterity, together with the force of reason, to convince mankind of truth, unless we came furnished with miracles or omnipotence to create a conviction*.

* The conduct of Christ and his apostles, (armed as they were with supernatural powers) in the gradual openings of truth, against which the minds of their disciples were strongly prejudiced, may not only secure such an address from the imputation of dishonest craft, but may demonstrate the expediency, and in some cases the necessity of attending to it.

CHAP. IV.—*Of Authority, of the Abuse of it, and of its real and proper Use and Service.*

THE influence which other persons have upon our opinions, is usually called authority. The power of it is so great and widely extensive, that there is scarcely any person in the world entirely free from the impression of it, even after their utmost watchfulness and care to avoid it. Our parents and tutors, yea our very nurses determine a multitude of our sentiments; our friends, our neighbours, the custom of the country where we dwell, and the established opinions of mankind, form our belief; the great, the pious, the learned, and the ancient, the king, the priest, and the philosopher, are characters of mighty efficacy to persuade us to receive what they dictate. These may be ranked under different heads of prejudice, but they are all of a kindred nature, and may be reduced to this one spring or head of authority.

I have treated of these particularly in Logic, Part II. Chap. III. Sec. 4th. Yet a few other remarks occurring among my papers, I thought it not improper to let them find a place here.

Cicero was well acquainted with the unhappy influences of authority, and complains of it in the first book *De natura Deorum*. "In disputes and controversies (says he) it is not so much the author, or patron of any opinion, as the weight and force of argument, which should influence the mind. The authority of those who teach, is a frequent hindrance to those who learn, because they utterly neglect to exercise their own judgment, taking for granted whatsoever others whom they reverence have judged for them. I can by no means approve, what we learn from the Pythagoreans, that if any thing asserted in disputation was questioned they were wont to answer, *Ipse dixit*, that is, He himself said so, meaning Pythagoras. So far did prejudice prevail, that authority without reason was sufficient to determine disputes and to establish truth." All human authority, though it be ever so ancient, though it hath had universal sovereignty, and swayed all the learned and the vulgar world for some thousands of years, yet has no certain and undoubted claim to truth: nor is it any violation of good manners, to enter a caveat with due decency against its pretended dominion. What is there among all the sciences that has been longer established and more universally received ever since the days of Aristotle, and perhaps for ages before he lived, than this, that "all heavy bodies whatsoever tend towards the centre of the earth?" But Sir Isaac Newton has found that those bulky and weighty bodies, the earth and all the planets tend toward the centre of the sun, whereby, the authority of near three thousand years or more is not only called in question, but actually refuted and renounced.

Again, Was ever any thing more universally agreed among

the nation of the poets and critics, than that Homer and Virgil are inimitable writers of heroic poems? And whosoever presumed to attack their writings or their reputation, was either condemned for his malice or derided for his folly. These ancient authors have been supposed to derive peculiar advantages to aggrandize their verses from the heathen theology, and that variety of appearances in which they could represent their gods, and mingle them with the affairs of men; yet within these few years Sir Richard Blackmore, (whose prefaces are universally esteemed superior in their kind to any of his poems) has ventured to pronounce some noble truths in that excellent preface to his poem called Alfred, and has bravely demonstrated there, beyond all possible exception, that both Virgil and Homer are often guilty of very gross blunders, indecencies and shameful improprieties? and that they were so far from deriving any advantage from the rabble of heathen gods, that their theology almost unavoidably exposed them to many of those blunders; and that it is not possible upon the foot of Gentile superstition, to write a perfect epic poem; whereas the sacred religion of the bible, would furnish a poem with much more just and glorious scenes and a nobler machinery.

Mr. Dennis also had made it appear in his essays some years before, that there were no images so sublime in the brightest of the heathen writers, as those with which we are furnished in the poetic parts of the holy scripture; and Rapin, the French critic, dared to profess the same sentiments, notwithstanding the world of poets and critics had so universally and unanimously exalted the heathen writers to the sovereignty for so many ages. If we would find out the truth in many cases, we must dare to deviate from the long-beaten track, and venture to think with a just and unbiassed liberty.

Though it be necessary to guard against the evil influences of *authority*, and the prejudices derived thence, because it has introduced thousands of errors and mischiefs into the world, yet there are three eminent and remarkable cases wherein *authority*, or the sentiments of other persons, must or will determine the judgments and practice of mankind:

I. *Parents are appointed to judge for their children* in their younger years, and to instruct them what they should believe, and what they should practise in the civil and religious life. This is a *dictate of nature*, and doubtless it would have been so in a state of innocence. It is impossible that children should be capable of judging for themselves before their minds are furnished with a competent number of ideas, before they are acquainted with any principles and rules of just judgment, and before their reason is grown up to any degrees of maturity and proper exercises upon such subjects.

I will not say, that a child ought to believe nonsense and impossibility, because his father bids him; for so far as the impossibility appears, he cannot believe it; nor will I say, he ought to assent to all the false opinions of his parents, or to practise idolatry and murder, or mischief, at their command; yet a child knows not any better way to find out what he should believe and what he should practise, before he can possibly judge for himself, than to run to his parents, and receive their sentiments and their directions.

You will say, This is hard indeed, that the child of a *heathen idolater*, or a cruel *cannibal*, is laid under a sort of necessity by nature of sinning against the light of nature. I grant it is hard indeed, but it is only owing to our original fall and apostacy: the law of nature continues as it was in innocence, namely, that a parent should judge for his child; but, if the parent judges ill, the child is greatly exposed by it, through that universal disorder that is brought into the world by the sin of Adam, our common father; and from the equity and goodness of God we may reasonably infer, that the great Judge of all will do right; he will balance the ignorance and incapacity of the child, with the criminal nature of the offence in those puerile instances, and will not punish beyond just demerit.

Besides, what could God, as a Creator, do better for children in their minority, than to commit them to the care and instruction of parents; none are supposed to be so much concerned for the happiness of children as their parents are; therefore it is the safest step to happiness, according to the original law of creation, to follow their directions, their parents' reason acting for them, before they have reason of their own in proper exercise; nor indeed is there any better *general rule* in our fallen state by which children are capable of being governed, though in many particular cases it may lead them far astray from virtue and happiness.

If children by providence be cast under some happier instructions, contrary to their parents' erroneous opinions, I cannot say it is the duty of such children to follow error, when they discern it to be error, because their father believes it; what I said before, is to be interpreted only of those that are under the immediate care and education of their parents, and not yet arrived at years capable of examination; I know not how these can be freed from receiving the dictates of parental authority in their youngest years, except by immediate or divine inspiration.

It is hard to say, at what exact time of life the child is exempted from the sovereignty of parental dictates. Perhaps it is much juster to suppose, that this sovereignty diminishes by degrees as the child grows in understanding and capacity, and is

more and more capable of exerting his own intellectual powers, than to limit this matter by months and years.

When childhood and youth are so far expired, that the reasoning faculties are grown up to any just measure or maturity, it is certain that persons ought to begin to enquire into the reasons of their own faith and practice in all the affairs of life and religion; but as reason does not arrive at this power and self-sufficiency in any single moment of time, so there is no single moment when a child should at once cast off all its former beliefs and practices; but by degrees and in slow succession he should examine them, as opportunity and advantages offer; and either confirm or doubt of, or change them, according to the leadings of conscience and reason, with all its best advantages of information.

When we are arrived at manly age, there is no person on earth, no set or society of men whatsoever, that have power and authority given them by God, the Creator and governor of the world, absolutely to dictate to others their opinions or practices in the moral and religious life. God has given every man reason to judge for himself, in higher or in lower degrees. Where less is given, less will be required. But we are justly chargeable with criminal sloth, and misimprovement of the talents with which our Creator has entrusted us, if we take all things for granted which others assert, and believe and practise all things which they dictate, without due examination.

II. Another case wherein *authority* must govern our assent, is in many *matters of fact*. Here we may and ought to be determined by the declarations or narratives of other men; though I must confess, this is usually called *testimony* rather than *authority*. It is upon this foot, that every son or daughter among mankind are required to believe that such and such persons are their parents, for they can never be informed of it but by the dictates of others. It is by *testimony* that we are to believe the laws of our country, and to pay all proper deference to the prince, and to magistrates, in subordinate degrees of authority, though we did not actually see them chosen, crowned, or invested with their title and character. It is by *testimony* that we are necessitated to believe there is such a city as Canterbury or York, though perhaps we have never been at either; that there are such persons as papists at Paris and Rome, and that there are many sottish and cruel tenets in their religion. It is by *testimony* we believe that christianity and the books of the bible, have been faithfully delivered down to us through many generations; that there was such a person as Christ our Saviour, that he wrought miracles and died on the cross, that he rose again and ascended up to heaven.

The *authority* or *testimony* of men, if they are wise and

honest, if they had full opportunities and capacities of knowing the truth, and are free from all suspicion of deceit in relating it, ought to sway our assent; especially when multitudes concur in the same testimony, and when there are many other attending circumstances that raise the proposition which they dictate to the degree of moral certainty.

But in this very case, even in matters of fact and affairs of history, we should not too easily give in to all the dictates of tradition, and the pompous pretences to the testimony of men, till we have fairly examined the several things which are necessary to make up a credible testimony, and to lay a just foundation for our belief. There are and have been so many falsehoods imposed upon mankind, with specious pretences of eye and ear witnesses, that should make us wisely cautious and justly suspicious of reports, where the concurrent signs of truth do not fairly appear, and especially where the matter is of considerable importance. And the less probable the fact testified is in itself, the greater evidence may we justly demand of the veracity of that testimony on which it claims to be admitted.

III. The last case wherein *authority* most govern us is, when we are called to believe what persons under inspiration have dictated to us. This is not properly the *authority* of men, but of God himself; and we are obliged to believe what that authority asserts, though our reason at present may not be able any other way to discover the certainty or evidence of the proposition: it is enough if our faculty of reason, in its best exercise, can discover the divine authority which has proposed it. Where doctrines of divine revelation are plainly published, together with sufficient proofs of their revelation, all mankind are bound to receive them, though they cannot perfectly understand them; for we know that God is true, and cannot dictate falsehood.

But if these pretended dictates are directly contrary to the natural faculties of understanding and reason which God has given us, we may be well assured these dictates were never revealed to us by God himself. When persons are really influenced by authority to believe pretended mysteries, in plain opposition to reason, and yet pretend reason for what they believe, this is but a vain amusement.

There is no reason whatsoever that can prove or establish any authority so firmly, as to give it power to dictate in matters of belief, what *is contrary to all the dictates of our reasonable nature.* God himself has never given us any such revelations; and I think it may be said, with reverence, he neither can nor will do it, unless he changes our faculties from what they are at present. To tell us we must believe a proposition which is plainly contrary to reason, is to tell us that we must believe two

ideas are joined, while (if we attend to reason) we plainly see and know them to be disjoined.

What could ever have established the nonsense of *transubstantiation* in the world, if men had been fixed in this great truth, that God *gives no revelation contradictory to our own reason*? things may be above our reason, that is, reason may have but obscure ideas of them, or reason may not see the connection of these ideas, or may not know at present the certain and exact manner of reconciling such propositions either with one another, or with other rational truths, as I have explained in some of my logical papers: but when they stand directly and plainly against all sense and reason, as *transubstantiation* does, no divine authority can be pretended to enforce their belief, and human authority is impudent to pretend to it. Yet this human authority, in the popish countries, has prevailed over millions of souls, because they have abandoned their reason, they have given up the glory of human nature to be trampled upon by knaves, and so reduced themselves to the condition of brutes.

It is by this amusement of authority (says a certain author) that the horse is taught to obey the words of command, a dog to fetch and carry, and a man to believe inconsistencies and impossibilities. Whips and dungeons, fire and the gibbet, and the solemn terrors of eternal misery after this life, will persuade weak minds to believe against their senses, and in direct contradiction to all their reasoning powers. A parrot is taught to tell lies with much more ease and more gentle usage; but none of all these creatures would serve their masters at the expence of their liberty, had they but knowledge and the just use of reason.

I have mentioned three cases, wherein mankind must or will be determined in their sentiments by authority; that is, the case of children in their minority, in regard of the commands of their parents; the case of all men with regard to universal, complete and sufficient testimony of matter of fact; and the case of every person, with regard to the authority of divine revelation, and of men divinely inspired; and under each of these I have given such limitations and cautions as were necessary.

I proceed now to mention some other cases, wherein we ought to pay a great deference to the authority and sentiments of others, though we are not absolutely concluded and determined by their opinions.

1. When we begin to pass out of our minority, and to judge for ourselves in matters of the civil and religious life, we ought to pay very great deference to the sentiments of our parents, who in the time of our minority were our natural guides and directors in these matters. So in matters of science, an ignorant and inexperienced youth should pay great deference to the

opinions of his instructors; and though he may justly suspend his judgment in matters which his tutors dictate, till he perceive sufficient evidence for them; yet neither parents nor tutors should be directly opposed without great and most evident reasons, such as constrain the understanding or conscience of those concerned.

2. Persons of years and long experience, of human affairs, when they give advice in matters of prudence or civil conduct, ought to have a considerable deference paid to their authority by those that are young and have not seen the world, for it is most probable that the elder persons are in the right.

3. In the affairs of practical godliness, there should be much deference given to persons of long standing in virtue and piety. I confess in the particular forms and ceremonies of religion, there may be as much bigotry and superstition amongst the old as the young; but in questions of inward religion and pure devotion, or virtue, a man who has been long engaged in the sincere practice of those things, is justly presumed to know more than a youth with all his ungoverned passions, appetites and prejudices about him.

4. Men in their several professions and arts, in which they have been educated, and in which they have employed themselves all their days, must be supposed to have greater knowledge and skill than others; and therefore there is due respect to be paid to their judgment in those matters.

5. In matters of fact, where there is not sufficient testimony to constrain our assent, yet there ought to be due deference paid to the narratives of persons wise and sober, according to the degrees of their honesty, skill, and opportunity to acquaint themselves therewith.

I confess in many of these cases, where the proposition is a mere matter of speculation, and doth not necessarily draw practice along with it, we may delay our assent till better evidence appear; but where the matter is of a practical nature, and requires us to act one way or another, we ought to pay much deference to authority or testimony, and follow such probabilities where we have no certainty; for this is the best light we have, and surely it is better to follow such sort of guidance, where we can have no better, than to wander and fluctuate in absolute uncertainty. It is not reasonable to put out our candle, and sit still in the dark, because we have not the light of sun-beams.

CHAP. V.—*Of treating and managing the Prejudices of Men**.

IF we had nothing but the *reason* of men to deal with, and that *reason* were pure and uncorrupted, it would then be a matter of no great skill or labour to convince another person of common mistakes, or to persuade him to assent to plain and obvious truths. But alas! mankind stand wrapt round in *errors*, and intrenched in *prejudices*; and every one of their opinions is supported and guarded by something else beside *reason*. A young bright genius, who has furnished himself with a variety of truths and strong arguments, but is yet unacquainted with the world, goes forth from the schools like a *knight errant*, presuming bravely to vanquish the follies of men, and to scatter light and truth through all his acquaintance. But he meets with huge giants and enchanted castles, *strong prepossessions of mind, habits, customs, educations, authority, interest*, together with all the various passions of men, armed and obstinate to defend their old opinions; and he is strangely disappointed in his generous attempts. He finds now that he must not trust merely to the sharpness of his steel, and to the strength of his arm, but he must manage the weapons of his reason with much dexterity and artifice, with skill and address, or he shall never be able to subdue errors and to convince mankind. Where prejudices are strong, there are these several methods to be practised in order to convince persons of their mistakes, and make a way for truth to enter into their minds.

I. *By avoiding the power and influence of the prejudice, without any direct attack upon it*; and this is done, by choosing all the slow, soft and distant methods of proposing your own sentiments, and your arguments for them, and by degrees leading the person step by step into those truths which his prejudices would not bear if they were proposed all at once. Perhaps your neighbour is under the influence of *superstition and bigotry in the simplicity of his soul*; you must not immediately run upon him with violence, and shew him the absurdity or folly of his own opinions, though you might be able to set them in a glaring light; but you must rather begin at a distance, and establish his assent to some familiar and easy propositions, which have a tendency to refute his mistakes, and to confirm the truth; and then silently observe what impression this makes upon him, and proceed by slow degrees as he is able to bear; and you must carry on the work, perhaps at distant seasons of conversation. The tender or diseased eye cannot bear a deluge of light at once.

* For the nature and causes of prejudices, and for the preventing or curing them in ourselves, see the Doctor's System of Logic, Part II. Chap. III. Of the springs of false judgment, or the doctrine of prejudices.

Therefore we are not to consider our arguments merely *according to our own notions of their force*, and from thence expect the immediate conviction of others; but we should regard *how they are likely to be received by the persons we converse with*; and thus manage our reasoning, as the nurse gives a child drink by slow degrees, lest the infant should be choked or return it all back again if poured in too hastily. If your wine be ever so good, and you are ever so liberal in bestowing it on your neighbour, yet if his bottle into which you attempt to pour it with freedom has a narrow mouth, you will sooner overset the bottle, than fill it with wine.

Over-hastiness and vehemence in arguing is oftentimes the effect of pride; it blunts the poignancy of the argument, breaks its force, and disappoints the end. If you were to convince a person of the falsehood of the *doctrine of transubstantiation*, and you take up the consecrated bread before him and say, *You may see, and taste, and feel, this is nothing but bread; therefore whilst you assert that God commands you to believe it is not bread, you most wickedly accuse God of commanding you to tell a lie.* This sort of language would only raise the indignation of the person against you, instead of making any impression upon him. He will not so much as think at all on the argument you have brought, but he rages at you as a profane wretch, setting up your own sense and reason above sacred authority; so that though what you affirm is a truth of great evidence, yet you lose the benefit of your whole argument by an ill management, and the unseasonable use of it.

II. *We may expressly allow and indulge those prejudices for a season, which seem to stand against the truth*, and endeavour to introduce the truth by degrees while those prejudices are expressly allowed, till by degrees the advancing truth may of itself wear out the prejudice. Thus God himself dealt with his own people the Jews after the resurrection of Christ; for though from the following days of Pentecost when the gospel was proclaimed and confirmed at Jerusalem the Jewish ceremonies began to be void and ineffectual for any divine purpose, yet the Jews who received Christ the Messiah were permitted to circumcise their children, and to practise many Levitical forms, till that constitution which then waxed old should in time vanish away. Where the prejudices of mankind cannot be conquered at once, but they will rise up in arms against the evidence of truth, we must make some allowances, and yield to them for the present, as far as we can safely do it without real injury to truth; and if we would have any success in our endeavours to convince the world, we must practise this complaisance for the benefit of mankind.

Take a student who has deeply imbibed the principles of the

Peripatetics, and imagines certain immaterial beings, called *substantial forms*, to inhabit every herb, flower, mineral, metal, fire, water, &c. and to be the spring of all its properties and operations; or take a Platonist who believes an *anima mundi*, an universal soul of the world to pervade all bodies, to act in and by them according to their nature, and indeed to give them their nature and their special powers; perhaps it may be very hard to convince these persons by arguments, and constrain them to yield up these fancies. Well then, let the one believe his universal soul, and the other go on with his notion of substantial forms, and at the same time teach them how by certain original laws of motion, and the various sizes, shapes, and situations of the parts of matter, allowing a continued divine concourse in and with all, the several appearances in nature may be solved, and the variety of effects produced, according to the corpuscular philosophy, improved by Des Cartes, Mr. Boyle, and Sir Isaac Newton; and when they have attained a degree of skill in this science, they will see these airy notions of theirs, these imaginary powers, to be so useless and unnecessary, that they will drop them of their own accord; the Peripatetic forms will vanish from the mind like a dream, and the Platonic soul of the world will expire.

Or suppose a young philosopher under a powerful persuasion, that there *is nothing but what has three dimensions, length, breadth, and thickness*, and consequently that every finite being has a figure or shape, (for shape is but the term and boundary of dimensions:) suppose this person, through the long prejudices of sense and imagination, cannot be easily brought to conceive of a *spirit*, or a *thinking being* without *shape* and *dimensions*; let him then continue to conceive a *spirit with dimensions*; but be sure in all his conceptions to retain the idea of *cogitation* or a *power of thinking*, and thus proceed to philosophize upon the subject. Perhaps in a little time he will find that length, breadth and shape, have no share in any of the actions of a spirit; and that he can manifest all the properties and relations of such a being, with all its operations of sensation, volition, &c. to be as well performed without the use of this supposed shape or these dimensions; and that all these operations and these attributes may be ascribed to a spirit, considered merely as a power of thinking. And when he further conceives that God, the infinite spirit, is an *almighty, self-existing, thinking power, without shape and dimensions of length, breadth and depth*, he may then suppose the human spirit may be an inferior self-subsisting power of thought; and he may be inclined to drop the ideas of dimension and figure by degrees, when he sees and is convinced they do nothing towards thinking, nor are they necessary to assist or explain the operations or properties of a spirit.

I may give another instance of the same practice, where there is a prejudicate fondness of particular words and phrases. Suppose a man is educated in an *unhappy form of speech* whereby he explains some *great doctrine of the gospel*, and by the means of this phrase he has imbibed a very false idea of that doctrine: yet he is so bigoted to his form of words, that he imagines if those words are omitted the doctrine is lost. Now, if I cannot possibly persuade him to part with his improper terms, I will indulge them a little, and try to explain them in a scriptural sense, rather than let him go on in his mistaken ideas.

Credonius believes that *Christ descended into hell*; I think the word hell, as now commonly understood, is very improper here; but since the bulk of christians, and Credonius among them, will by no means part with the word out of their English creed, I will explain the word hell to signify *the state of the dead, or the separate state of souls*; and thus lead my friend into more just ideas of the truth, *namely, that the soul of Christ existed three days in the state of separation from his body*, or was in the invisible world, which might be originally called hell in English, as well as *hades* in Greek.

Anilla has been bred a papist all her days, and though she does not know much of religion, yet she resolves never to part with the Roman catholic faith, and is obstinately bent against a change. Now I cannot think it unlawful to teach her the true christian, that is, the protestant religion, out of the epistle to the Romans, and shew her that the same doctrine is contained in the catholic epistles of St. Peter, James and Jude; and thus let her live and die a good christian, in the belief of the religion I teach her out of the New Testament, while she imagines she is a Roman catholic still, because she finds the doctrine she is taught in the catholic epistles, and in that to the Romans.

I grant it is most proper there should be different words (as far as possible) applied to different ideas; and this rule should never be dispensed with, if we had to do only with the reason of mankind; but their various prejudices and zeal for some party-phrases, sometimes make it necessary that we should lead them into truth under the covert of their own beloved forms of speech, rather than permit them to live and die obstinate and unconvincible in any dangerous mistake; whereas an attempt to deprive them of their old established words, would raise such a tumult within them, as to render their conviction hopeless.

III. Sometimes we may *make use of the very prejudices under which a person labours, in order to convince him of some particular truth*, and argue with him upon his own professed principles as though they were true. This is called, *argumentum ad hominem*, and is another way of dealing with the prejudices of men. Suppose a Jew lies sick of a fever, and is forbidden

flesh by his physician; but hearing that rabbits were provided for the dinner of the family, desired earnestly to eat of them; and suppose he became impatient because his physician did not permit him, and he insisted upon it, that it could do him no hurt; surely rather than let him persist in that fancy and that desire, to the danger of his life, I would tell him that these animals were strangled, which sort of food was forbidden by the Jewish law, though I myself may believe that law is now abolished.

In the same manner was Tenerilla persuaded to let Damon her husband prosecute a thief, who broke open their house on a Sunday. At first she abhorred the thoughts of it, and refused it utterly, because if the thief were condemned, according to the English law, he must be hanged; whereas (said she) the law of God in the writings of Moses, does not appoint death to be the punishment of such criminals, but tells us, that *a thief shall be sold for his theft;* Ex. xxii. 3. But when Damon could no other way convince her that the thief ought to be prosecuted, he put her in mind that the theft was committed on a Sunday morning; now the same law of Moses requires, that *the Sabbath-breaker shall surely be put to death;* Ex. xxxi. 15. Num. xv. 35. This argument prevailed with Tenerilla, and she consented to the prosecution.

Encrates used the same means of conviction when he saw a Mahometan drink wine to excess, and heard him maintain the lawfulness and pleasure of drunkenness: Encrates reminded him, that his own prophet Mahomet had utterly forbidden all wine to his followers; and the good man restrained his vicious appetite by his superstition, when he could no otherwise convince him that drunkenness was unlawful, nor withhold him from excess.

Where we find any person obstinately persisting in a mistake in opposition to all reason, especially if the mistake be very injurious or pernicious, and we know this person will hearken to the sentiment or authority of some favourite name, it is needful sometimes to urge the opinion and authority of that favourite person, since that is likely to be regarded much more than reason. I confess I am almost ashamed to speak of using any influence of authority, while I would teach the art of reasoning. But in some cases it is better that poor, silly, perverse, obstinate creatures should be persuaded to judge and act right, by a veneration for the sense of others, than to be left to wander in pernicious errors, and continue deaf to all argument, and blind to all evidence. They are but children of a larger size; and since they persist all their lives in their minority, and reject all true reasoning, surely we may try to persuade them to practise what is for their own interest by such childish reasons as they will

hearken to; we may overawe them from pursuing their own ruin by the terrors of a solemn shadow, or allure them by a sugar-plum to their own happiness. But after all, we must conclude, that wheresoever it can be done, it is best to remove and root out those prejudices which obstruct the entrance of truth into the mind, rather than to palliate, humour, or indulge them; and sometimes this must necessarily be done, before you can make a person part with some beloved error, and lead him into better sentiments.

Suppose you would convince a gamester, that *gaming is not a lawful calling, or business of life, to maintain oneself by it*, and you make use of this argument, namely, That which doth not admit us to ask the blessing of God that we may get gain by it, cannot be a lawful employment; but we cannot ask the blessing of God on gaming, therefore, &c. *The minor is proved thus:* We cannot pray that our neighbour may lose; this is contrary to the rule of seeking our neighbour's welfare, and loving him as ourselves; this is wishing mischief to our neighbour.—But in gaming, we can gain but just so much as our neighbour loses; therefore in gaming we cannot pray for the blessing of God that we may gain by it. Perhaps the gamester shrugs and winces, turns and twists the argument every way, but he cannot fairly answer it; yet he will patch up an answer to satisfy himself, and will never yield to the conviction, because he feels so much of the sweet influence of gaming, either towards the gratification of his avarice, or the support of his expences. Thus he is under a strong prejudice in favour of it, and is not easily convinced.

Your first work therefore, must be to lead him by degrees to separate the thoughts of his *own interest* from the argument, and shew him that our own temporal interests, our livelihood, or our loss, hath nothing to do to determine this point in opposition to the plain reason of things, and that he ought to put these considerations quite out of the question, if he would be honest and sincere in his search after truth or duty; and that he must be contented to hearken to the voice of reason and truth, even though it should run counter to his secular interest. When this is done, then an argument may carry some weight of force with it toward his conviction.

In like manner if the question were whether Matrissa ought to expose herself and her other children to poverty and misery, in order to support the extravagancies of a favourite son? Perhaps the mother can hear no argument against it; she feels no conviction in the most cogent reasonings, so close do her fond prejudices stick to her heart. The first business here is to remove this prejudice. Ask her therefore, whether it is not a parent's duty to love all her children, so as to provide for their welfare?

siege in form; he drew all his lines of circumvallation and contravallation according to the rules of art; but he was so tedious and so exact in these mathematical performances, that the season was spent, he was forced to break up the siege, and retire without any execution done upon the town.

Ergates is another sort of preacher, *a workman that need not be ashamed:* he had in his younger days but few of those learned vanities, and age and experience have now worn them all off: he preaches like a man *who watches for our souls, as one that must give an account:* he passes over lesser matters with speed, and pursues his great design, namely, *to save himself, and them that hear him;* 1 Tim. iv. 16. And by following this advice of St. Paul, he happily complies with that great and natural rule of Horace, always to make haste towards the most valuable end:—*Semper ad eventum festinat.*—He never affects to chuse a very obscure text lest he should waste too much of the hour in explaining the literal sense of it: he reserves all those obscurities, till they come in course at his seasons of public exposition; for it is his opinion, that preaching the gospel for the salvation of men, carries in it a little different idea from a learned and critical exposition of the difficult texts of scripture.

He knows well how to use his logic in his composures; but he calls no part of the words by their logical name, if there be any vulgar name that answers it: reading and meditation have furnished him with extensive views of his subject, and his own good sense hath taught him to give sufficient reasons for every thing he asserts; but he never uses one of them till a proof is needful. He is acquainted with the mistaken glosses of expositors, but he thinks it needless to acquaint his hearers with them, unless there be evident danger that they might run into the same mistake. He understands well what his subject is not, as well as what it is; but when he would explain it to you, he never says *first, negatively,* unless some remarkable error is at hand, and which his hearers may easily fall into for want of such a caution.

Thus in five or ten minutes at the most, he makes his way plain to the proposition or theme on which he designs to discourse: and being so wise as to know well what to say, and what to leave out, he proportions every part of his work to his time; he enlarges a little upon the subject, by way of illustration, till the truth becomes evident and intelligible to the weakest of his hearers; then he confirms the point with a few convincing arguments, where the matter requires it, and makes haste to turn the doctrine into use and improvement. Thus the ignorant are instructed, and the growing Christians are established and improved: the stupid sinner is loudly awakened, and the mourning soul receives consolation: the unbeliever is led to trust in Christ

and his gospel, and the impenitent and immoral are convinced and softened, are melted and reformed. The inward voice of the Holy Spirit joins with the voice of the minister; the good man and the hypocrite have their proper portions assigned them, *and the work of the Lord prospers in his hand.*

This is the usual course and manner of his ministry. This method being natural, plain and easy, he casts many of his discourses into this form; but he is no slave to forms and methods of any kind: he makes the nature of his subject, and the necessity of his hearers, the great rule to direct him what method he shall choose in every sermon, that he may the better enlighten, convince, and persuade. Ergates well knows, that where the subject itself is entirely practical, he has no need of the formality of long uses and exhortations: he knows that practice is the chief design of doctrine; therefore he bestows most of his labour upon this part of his office, and intermingles much of the pathetic under every particular: yet he wisely observes the special dangers of his flock, and the errors of the time he lives in; and now and then (though very seldom) he thinks it necessary to spend almost a whole discourse in mere doctrinal articles. Upon such an occasion, he thinks it proper to take up a little larger part of his hour in explaining and confirming the sense of his text, and brings it down to the understanding of a child.

At another time, perhaps, he particularly designs to entertain the few learned and polite among his auditors: and that with this view, that he may ingratiate his discourses with their ears, and may so far gratify their curiosity in this part of his sermon, as to give an easier entrance for the more plain, necessary, and important parts of it into their hearts. Then he aims at, and he reaches the sublime, and furnishes out an entertainment for the finest taste; but he scarcely ever finishes his sermon without compassion to the unlearned, and an address that may reach their consciences with words of salvation.

I have observed him sometimes after a learned discourse, come down from the pulpit as a man ashamed and quite out of countenance: he has blushed and complained to his intimate friends lest he should be thought to have *preached himself, and not Christ Jesus his Lord:* he has been ready to wish he had entertained the audience in a more unlearned manner, and on a more vulgar subject, lest the servants and the labourers and tradesmen there, should reap no advantage to their souls, and the important hour of worship should be lost, as to their improvement. Well he knows, and keeps it upon his heart, that the middle and lower ranks of mankind, and people of an unlettered character, make up the greater part of the assembly; therefore he is ever seeking how to adapt his thoughts and his language, and far the greatest part of all his ministrations, to

the instruction and profit of persons of common rank and capacity: it is in the midst of these that he hopes to find his triumph, his joy and crown in the last great day, for *not many wise, not many noble are called.*

There is so much spirit and beauty in his common conversation, that it is sought and desired by the ingenious men of his age: but he carries a severe guard of piety always about him, that tempers the pleasant air of his discourse, even in his brightest and freest hours; and before he leaves the place (if possible) he will leave something of the savour of heaven there: in the parlour he carries on the design of the pulpit, but in so elegant a manner that it charms the company, and gives not the least occasion for censure.

His polite acquaintance will sometimes rally him for talking so plainly in his sermons, and sinking his good sense to so low a level. But Ergates is bold to tell the gayest of them, "Our public business, my friend, is chiefly with the weak and the ignorant; that is, the bulk of mankind: *the poor receive the gospel*: the mechanics and day-labourers, the women and the children of my assembly, have souls to be saved; I will imitate my blessed Redeemer, in preaching *the gospel to the poor;* and learn of St. Paul to *become all things to all men, that I may win souls* and lead many sinners to heaven by repentance, faith and holiness."

Sect. II.—*A branching Sermon.*

I HAVE always thought it a mistake in the preacher, to mince his text or his subject too small, by a great number of subdivisions; for it occasions great confusion of the understandings of the unlearned. Where a man divides his matter under more general, less general, special, and more particular heads, he is under a necessity sometimes of saying, *firstly* or *secondly*, two or three times together, which the learned may observe; but the greater part of the auditory, not knowing the analysis, cannot so much as take it into their minds, and much less treasure it up in their memories in a just and regular order; and when such hearers are desired to give some account of the sermon, they throw the *thirdlys* and *secondlys* into heaps, and make very confused work in a rehearsal, by intermingling the general and the special heads. In writing a large discourse this is much more tolerable*, but in preaching it is less profitable and more intricate, and offensive.

It is as vain an affectation also to draw out a long rank of particulars in the same sermon under any one general, and run up the number of them to *eighteenthly*, or *seven-and-twentiethly.*

* Especially as words may be used to number the generals: and figures of different kinds and forms, to marshal the primary and secondary ranks of particulars under them.

Men that take delight in this sort of work, will cut out all their sense into shreds; and every thing that they can say upon any topic, shall make a new particular.

This sort of folly and mistaken conduct appears weekly in Polyramus' lectures, and renders all his discourses lean and insipid. Whether it proceed from mere barrenness of thought and a native dryness of soul, that he is not able to vary his matter, and to amplify beyond the formal topics of an analysis, or whether it arise from affectation of such a way of talking, is hard to say; but it is certain, that the chief part of his auditory are not overmuch profited or pleased. When I sit under his preaching, I fancy myself brought into the valley of Ezekiel's vision; *it was full of bones, and behold, there were very many in the valley, and lo, they were very dry*; Ezek. xxxvii. 1, 2.

It is the variety of enlargement upon a few proper heads, that *clothes the dry bones and flesh*, and animates them with blood and spirits; it is this that colours the discourse, makes it warm and strong, and renders the divine propositions bright and persuasive: it is this brings down the doctrine or the duty to the understanding and conscience of the whole auditory, and commands the natural affections into the interest of the gospel: in short, it is this that, under the influence of the Holy Spirit, gives life and force, beauty and success to a sermon, and provides food for souls. A single rose-bush, or a dwarf-pear, with all their leaves, flowers and fruit about them, have more beauty and spirit, in themselves, and yield more food and pleasure to mankind, than the innumerable branches, boughs and twigs of a long hedge of thorns. The fruit will feed the hungry, and the flower refresh the fainting; which is more than can be said of the thickest oak in Bashan, when it has lost its vital juice; it may spread its limbs indeed far and wide, but they are naked, withered, and sapless.

Sect. III.—*The Harangue.*

IS it not possible to forsake one extreme without running into a worse? Is there no medium between a sermon made up of sixty dry particulars, and a long loose declamation without any distinction of the parts of it? Must the preacher divide his works by the breaks of a minute watch, or let it run on incessantly to the last word, like the flowing stream of the hour-glass that measures his divinity? Surely Fluvio preaches as though he knew no medium; and having taken a disgust heretofore at one of Polyramus' lectures, he resolved his own discourses should have no distinction of particulars in them. His language flows smoothly in a long connection of periods, and glides over the ear like a rivulet of oil over polished marble, and like that too leaves no trace behind it. The attention is detained in a gentle pleasure,

and (to say the best thing possible of it) the hearer is soothed in something like divine delight; but he can give the enquiring friend scarcely any account what it was that pleased him. He retains a faint idea of the sweetness, but has forgotten the sense.

Tell me Fluvio, is this the most effectual way to instruct ignorant creatures in the several articles of faith, and the various duties of the christian life? Will such a long uniform flow of language imprint all the distant parts of christian knowledge on the mind, in their best form and order? Do you find such a gentle and gliding stream of words, most powerful to call up the souls of sinners from their dangerous or fatal lethargy? Will this indolent and moveless species of oratory, make a thoughtless wretch attend to matters of infinite moment? Can a long purling sound awaken a sleepy conscience, and give a perishing sinner just notices of his dreadful hazard? Can it furnish his understanding and his memory with all the awful and tremendous topics of our religion, when it scarcely ever leaves any distinct impression of one of them on his soul? Can you make the arrow wound where it will not stick? Where all the discourse vanishes from the remembrance, can you suppose the soul to be profited or enriched? When you brush over the closed eyelids with a feather, did you ever find it give light to the blind? Has any of your soft harangues, your continued threads of silken eloquence, ever raised the dead? I fear your whole aim is to talk over the appointed number of minutes upon the subject, or to practise a little upon the gentler passions, without any concern how to give the understanding its due improvement, or to furnish the memory with any lasting treasure, or to make a knowing and a religious christian.

Ask old Wheatfield the rich farmer, ask Plowdown your neighbour or any of his family who have sat all their lives under your ministry, what they know of the common truths of religion, or of the special articles of christianity. Desire them to tell you, *what the gospel is, or what is salvation? What are their duties toward God, or what they mean by religion? Who is Jesus Christ, or what is the meaning of his atonement or redemption by his blood?* Perhaps you will tell me yourself, that you have very seldom entertained them with these subjects. Well, enquire of them *what is heaven?* Which is *the way to obtain it*, or *what hope they have* of dwelling there? Entreat them to tell you, *wherein they have profited* as to holiness of heart or life, or fitness for death. They will soon make it appear by their aukward answers, that they understood very little of all your fine discourses, and those of your predecessors; and have made but wretched improvement of forty years attendance at church. They have now and then been pleased, perhaps, with the music of your voice, as with the sound of *a sweet in-*

strument, and they mistook that for devotion; but their heads are dark still, and their hearts earthly; they are mere heathens with a christian name, and know little more of God than their yokes of oxen. In short, Polyramus' auditors have some confusion in their knowledge, but Fluvio's hearers have scarcely any knowledge at all.

But you will tell me, your discourses are not all made up of harangue; your design is sometimes to inform the mind by a train of well connected reasonings, and that all your paragraphs in their long order prove and support each other; and though you do not distinguish your discourse into particulars, yet you have kept some invisible method all the way, and by some artificial gradations, you have brought your sermon down to the concluding sentence. It may be so sometimes, and I will acknowledge it: but believe me Fluvio, this artificial and invisible method, carries darkness with it instead of light; nor is it by any means a proper way to instruct the vulgar, that is, the bulk of your auditory; their souls are not capable of so wide a stretch, as to take in the whole chain of your long connected consequences; you talk reason and religion to them in vain, if you do not make the argument so short as to come within their grasp, and give a frequent rest for their thoughts; you must break the bread of life into pieces to feed children with it, and part your discourses into distinct propositions, to give the ignorant a plain scheme of any one doctrine, and enable them to comprehend or retain it.

Every day gives us experiments to confirm what I say, and to encourage ministers to divide their sermons into several distinct heads of discourse. Myrtilla, a little creature of nine years old, was at church twice yesterday: in the morning the preacher entertained his audience with a running oration, and the child could give her parents no other account of it, but that he talked smoothly and sweetly about virtue and heaven. It was Ergates' lot to fulfil the service of the afternoon; he is an excellent preacher, both for the wise and unwise: in the evening, Myrtilla very prettily entertained her mother with a repetition of the most considerable parts of the sermon; for "Here," said she, "I can fix my thoughts upon first, secondly, and thirdly, upon the doctrine, the reasons, and the inferences; and I know what I must try to remember, and repeat it when my friends shall ask me: but as for the morning sermon I could do nothing but hear it, for I could not tell what I should get by heart."

This manner of talking in loose harangue, has not only injured our pulpits but it makes the several essays and treatises, that are written now-a-days, less capable of improving the knowledge or enriching the memory of the reader. I will easily grant, that where the whole discourse reaches not beyond a few pages,

there is no necessity of the formal proposal of the several parts, before you handle each of them distinctly, nor is there need of such a set method: the unlearned and narrow understanding can take an easy view of the whole, without the author's pointing to the several parts. But where the essay is prolonged to a greater extent, confusion grows upon the reader almost at every page, without some scheme or method of successive heads in the discourse, to direct the mind and aid the memory.

If it be answered here, That neither such treatises nor sermons are a mere heap, for there is a just method observed in the composure, and the subjects are ranked in a proper order. It is easy to reply, That this method is so concealed, that a common reader or hearer can never find it; and you must suppose every one that peruses such a book, and much more that attends such a discourse, to have some good knowledge of the art of Logic before he can distinguish the various parts and branches, the connections and transitions of it. To an unlearned eye or ear, it appears a mere heap of good things *without any method, form or order*; and if you tell your young friends they should get it into their heads and hearts, they know not how to set about it.

If we enquire, how it comes to pass that our modern ingenious writers should affect this manner? I know no juster reason to give for it, than a humourous and wanton contempt of the customs and practices of our forefathers; a sensible disgust taken at some of their mistakes and ill conduct, at first tempted a vain generation into the contrary extreme near sixty years ago; and now even to this day it continues too much in fashion, so that the wise as well as the weak are ashamed to oppose it, and are borne down with the current.

Our fathers formed their sermons much upon the model of *doctrine, reason and use*; and perhaps there is no one method of more universal service, and more easily applicable to most subjects, though it is not necessary or proper in every discourse: but the very names of doctrine and use are become now-a-days such stale and old-fashioned things, that a modish preacher is quite ashamed of them, nor can a modish hearer bear the sound of those syllables: a direct and distinct address to the consciences of saints and sinners, must not be named or mentioned, though these terms are scriptural; lest it should be hissed out of the church, like the garb of a round-head, or a puritan.

Some of our fathers have multiplied their particulars under one single head of discourse, and run up the tale of them to sixteen or seventeen. Culpable indeed, and too numerous! But in opposition to this extreme, we are almost ashamed in our age to say thirdly; and all fourthly's and fifthly's are very unfashionable words. Our fathers made too great account of the sciences

of logic and metaphysics, and the formalities of definition and division, syllogism and method, when they brought them so often into the pulpit; but we hold those arts so much in contempt and defiance, that we had rather talk a whole hour without order and without edification, than be suspected of using logic or method in our discourses.

Some of our fathers neglected politeness perhaps too much, and indulged a coarseness of style, and a rough or aukward pronunciation; but we have such a value for elegance, and so nice a taste for what we call polite, that we dare not spoil the cadence of a period to quote a text of scripture in it, nor disturb the harmony of our sentences, to number or to name the heads of our discourse. And for this reason, I have heard it hinted, that the name of Christ has been banished out of polite sermons, because it is a monosyllable of so many consonants, and so harsh a sound.

But after all, our fathers with all their defects, and with all their weaknesses, preached *the gospel of Christ* to the sensible instruction of whole parishes, to the *conversion of sinners from the errors of their way*, and the salvation of multitudes of souls. But it has been the late complaint of Dr. Edwards, and other worthy sons of the established church, that in too many pulpits now-a-days, there are only heard some smooth declamations, while the hearers that were ignorant of the gospel, abide still without knowledge, and the profane sinners are profane still. O that divine grace would descend and reform what is amiss in all the sanctuaries of the nation. *

CHAP. VII.—*Of writing Books for the Public.*

IN the explication and distinction of words and things by definition and description; in the division of things into their several parts, and in the distribution of things into their several kinds, be sure to observe a just medium. We must not always explain and distinguish, define, divide and distribute, nor must we always omit it: sometimes it is useless and impertinent, sometimes it is proper and necessary. There is confusion brought into our argument and discourse by too many, or by too few of these. One author plunges his reader into the midst of *things*

* It appears by the date, at the bottom of this paper in the MSS. that it was written in the year 1718. The first and perhaps the second section of it, may seem now to be grown in a great measure out of date; but whether the third is not at least as seasonable now as ever, may deserve serious consideration. The author since this was drawn up, hath delivered his sentiments more fully in the first part of that excellent piece, entitled, An humble Attempt for the Revival of Religion, &c.

without due explication of them; another jumbles together without distinction, all those ideas which have any likeness; a third is fond of explaining every word, and coining distinctions between ideas which have little or no difference; but each of these runs into extremes; for all these practices are equal hindrances to clear, just, and useful knowledge. It is not a long train of rules, but observation and good judgment, can teach us when to explain, define, and divide, and where to omit it.

In the beginning of a treatise, it is proper and necessary sometimes to premise some *praecognita* or general principles, which may serve for an introduction to the subject in hand, and give light or strength to the following discourse: but it is ridiculous, under a pretence of such introductions or prefaces, to wander to the most remote or distant themes, which have no near or necessary connexion with the thing in hand; this serves for no other purpose but to make a gaudy shew of learning. There was a professor of divinity, who began an analytical exposition of the epistle to the Romans with such *praecognita* as these: first he shewed the excellence of man above other creatures, who was able to declare the sense of his mind by arbitrary signs; then he harangued upon the origin of speech; after that he told of the wonderful invention of writing, and enquired into the author of that art which taught us to paint sounds: when he had given us the various opinions of the learned on this point, and distributed writing into its several kinds, and laid down definitions of them all at last he came to speak of epistolary writing, and distinguished epistles into familiar, private, public, recommendatory credentials, and what not? Thence he descended to speak of the superscription, subscription, &c. And some lectures were finished before he came to the first verse of St. Paul's epistle; the auditors, being half starved and tired with expectation, dropped away one by one, so that the Professor had scarce any hearers to attend the college or the lectures which he had promised on that part of scripture.

The rules which Horace has given in his Art of Poetry would instruct many a *preacher* and *professor of theology*, if they would but attend to them. He informs us that a wise author, such as Homer, who writes a poem of the Trojan war, would not begin a long and far distant story of Jupiter in the form of a swan impregnating Leda with a double egg; from one part whereof Helen was hatched, who was married to Menelaus a Greek general, and then stolen from him by Paris, son of Priam king of Troy, which awakened the resentment of the Greeks against the Trojans.

Nec gemino bellum Trojanum orditur ab ovo.

But the writer, says he, makes all proper haste to the event of things, and does not drag on slowly, perpetually turning aside

from his point, and catching at every incident to prolong his story, as though he wanted matter to furnish out his tale.

Semper ad eventum festinat.

Though I must confess, I cannot think Homer has always followed this rule in either of his two famous epic poems: but Horace does not hear what I say. There is also another rule near a-kin to the former.

As a writer or a speaker should not wander from his subject to fetch in foreign matter from afar, so neither should he amass together and drag in all that can be said even on his appointed theme of discourse; but he should consider what is his chief design, what is the end he hath in view, and then to make every part of his discourse subserve that design. If he keep his great end always in his eye, he will pass hastily over those parts or appendages of his subject which have no evident connexion with his design, or he will entirely omit them, and hasten continually towards his intended mark; employing his time, his study and labour, chiefly on that part of his subject which is most necessary to attain his present and proper end. This might be illustrated by a multitude of examples; but an author who should heap them together on such an occasion, might be in danger of becoming himself an example of the impertinence he is cautioning others to avoid.

After you have finished any discourse which you design for the public, it would be always best, if other circumstances would permit, to *let it sleep some time before you expose it to the world*, that so you may have opportunity to review it with the indifference of a stranger, and to make the whole of it pass under a new and just examination: for no man can judge so justly of his own work, while the pleasure of his invention and performance is fresh, and has engaged his self-love too much on the side of what he has newly finished. If an author would send a discourse into the world, which should be most universally approved, he should *consult persons of every different genius, sentiment and party*, and endeavour to learn their opinions of it. In the world it will certainly meet with all these. Set it therefore to view amongst several of your acquaintance first, who may survey the argument on all sides, and one may happen to suggest a correction which is entirely neglected by others; and be sure to *yield yourself to the dictates of true criticism, and just censure, wheresoever you meet with them*; nor let a fondness for what you have written, blind your eyes against the discovery of your own mistakes.

When an author desires a friend to revise his work, it is too frequent a practice to disallow almost every correction which a judicious friend would make; he apologizes for this word, and the other expression; he vindicates this sentence, and gives his

to justify those expressions, and vindicate those little lapses they were guilty of, rather than they will condescend to correct those little mistakes, or recal those improper expressions. *O that we could put off our pride, our self-sufficiency, and our infallibility, when we enter into a debate of truth.* But if the writer is guilty of mingling these things with his grand argument, happy will that reader be who has judgment enough to distinguish them, and to neglect every thing that does not belong to the original theme proposed and disputed.

Yet here it may be proper to put in one exception to this general observation or remark, namely, when the second writer attacks only a particular or collateral opinion which was maintained by the first, then the fourth writing may be supposed to contain a necessary part of the complete force of the argument, as well as the second and third, because the first writing only occasionally or collaterally mentioned that sentiment which the second attacks and opposes; and in such a case, the second may be esteemed as the first treatise on that controversy. It would take up too much time should we mention instances of this kind, which might be pointed to in most of our controversial writers, and it might be invidious to enter into the detail.*

Sect. II.—*Of reading Controversies.*

WHEN we take a book into our hands wherein any doctrine or opinion is printed in a way of argument, we are too often satisfied and determined before-hand, whether it be *right* or *wrong;* and if we are on the writer's side, we are generally tempted to take his arguments for solid and substantial; and thus our own former sentiment is established more powerfully, without a sincere search after truth.

If we are on the other side of the question, we then take it for granted that there is nothing of force in these arguments, and we are satisfied with a short survey of the book, and are soon persuaded to pronounce mistake, weakness and insufficiency concerning it. Multitudes of common readers, who are fallen

* Upon this it may be remarked farther, that there is a certain spirit of modesty and benevolence which never fails to adorn a writer on such occasions, and which generally does him much more service in the judgment of wise and sensible men, than any poignancy of satire with which he might be able to animate his productions; and as this always appears amiable, so it is peculiarly charming when the opponent shews that peevishness and petulancy which is so very common on such occasions. When a writer, instead of pursuing with eager resentment the antagonist that has given such provocation, calmly attends to the main question in debate, with a noble negligence of those little advantages which ill-nature and ill-manners always give, he acquires a glory far superior to any trophies which wit can raise. And it is highly probable, that the solid instruction his pages may contain, will give a continuance to his writings far beyond what tracts of peevish controversy are to expect, of which the much greater part are borne away into oblivion by the wind they raise or burned in their own flames.

into any error, when they are directed and advised to read a treatise that would set them right, read it with a sort of disgust which they have before entertained; they skim lightly over the arguments, they neglect or despise the force of them, and keep their own conclusion firm in their assent, and thus they maintain their error in the midst of light, and grow incapable of conviction.

But if we would indeed act like sincere searchers for the truth, we should survey every argument with a careful and unbiassed mind, whether it agree with our former opinion or no: we should give every reasoning its full force, and weigh it in our sedatest judgment. Now the best way to try what force there is in the arguments which are brought against our own opinions is, to sit down and endeavour to give a solid answer, one by one, to every argument that the author brings to support his own doctrine; and in this attempt, if we find there some arguments which we are not able to answer fairly to our own minds, we should then begin to bethink ourselves, whether we have not been hitherto in a mistake, and whether the defender of the contrary sentiments may not be in the right. Such a method as this, will effectually forbid us to pronounce at once against those doctrines, and those writers, which are contrary to our sentiments; and we shall endeavour to find solid arguments to refute their positions, before we entirely establish ourselves in a contrary opinion.

Volatillis had given himself up to the conversation of the free-thinkers of our age, upon all subjects; and being pleased with the wit and appearance of argument, in some of our modern deists, had too easily deserted the christian faith, and gone over to the camp of the infidels. Among other books which were recommended to him to reduce him to the faith of the gospel, he had Mr. John Reynold's Three Letters to a Deist put into his hand, and was particularly desired to peruse the third of them with the utmost care, as being an unanswerable defence of the truth of christianity. He took it in hand, and after having given it a short survey, he told his friend he saw nothing in it, but the common arguments which we all use to support the religion in which we had been educated, but they wrought no conviction in him; nor did he see sufficient reason to believe that the gospel of Christ was not a piece of enthusiasm, or a mere imposture.

Upon this the friend who recommended Mr. Reynold's Three Letters to his study, being confident of the force of truth which lay there, entreated of Volatilis that he would set himself down with diligence, and try to answer Mr. Reynold's Third Letter in vindication of the gospel; and that he would show under every head, how the several steps which were taken in the propagation of the christian religion, might be the natural effects

TO MY LEARNED FRIEND MR. JOHN EAMES,

Fellow of the Royal Society.

DEAR SIR,

IT would be mere trifling to say any thing to you of the excellency and great advantage of those sciences, whose first rudiments I have here drawn up. Your large acquaintance with these matters hath given you a just relish of the pleasure of them, and well informed you of their solid use. But, perhaps, it is necessary to excuse myself to the world, if I publish some of the fruits of my former studies on such subjects as these. I would therefore willingly have the unlearned part of mankind apprized of the necessity and general use of this sort of learning; and that not only to civil, but to sacred purposes.

If you, Sir, would please to take upon you this service, you would make it appear with rich advantage how far the knowledge of things human and divine are influenced and improved by these studies.

You can tell the world, that it is the knowledge of this *globe of earth* on which we tread, and of those *heavenly bodies* which seem to roll around us, that hath been wrought up into those two kindred sciences, *Geography* and *Astronomy*. And there is not a son or daughter of Adam but has some concern in both of them, though they may not know it in a learned way.

This *earth* is given us for a habitation: It is the place of present residence for all our fellow-mortals: Nor is it possible that there should be any commerce maintained with those who dwell at a distance, without some acquaintance with the different tracts of land, and the rivers or seas that divide the regions of the earth.

The *heavenly bodies*, which are high over our heads, measure out our days and years, our *life* and *time*, by their various revolutions. Now *life* and *time* are some of the dearest things we have, and it is of important concern to distinguish the *hours* as they pass away, that proper seasons may be chosen and adapted for every business.

You know, Sir, that those necessary and useful instruments, *clocks*, *watches*, and *dials*, owe their origin to the observations of the heavens: The computation of *months* and *years* had been for ever impracticable without some careful notice of the various situations and appearances of those shining worlds above us.

I shall be told, perhaps, that these are not my special province. It is the knowledge of God, the advancement of religion, and converse with the scriptures, are the peculiar studies which Providence has assigned me. I know it, and I adore the divine favour. But I am free and zealous to declare, that without commencing some acquaintance with these mathematical sciences, I could never arrive at so clear a conception of many things delivered in the *scriptures*; nor could I raise my ideas of *God the Creator* to so high a pitch: And I am well assured that many of the sacred function will join with me and support this assertion from their own experience.

If we look down to the *earth*, it is the theatre on which all the grand affairs recorded in the bible have been transacted. How is it possible that we should trace the wanderings of Abraham that great patriarch, and the various toils and travels of Jacob, and the seed of Israel in successive ages, without some *geographical* knowledge of those countries? How can our meditations follow the *blessed Apostles* in their laborious journies through *Europe* and *Asia*, their voyages, their perils, their shipwrecks, and the fatigues they endured for the sake of the gospel; unless we are instructed by *maps* and *tables*,

wherein those regions are copied out in a narrow compass, and exhibited in one view to the eye?

If we look upwards with David to the worlds above us, *we consider the heavens as the work of the finger of God, and the moon and the stars which he hath ordained.* What amazing glories discover themselves to our sight? What wonders of wisdom are seen in the exact regularity of their revolutions? Nor was there ever any thing that has contributed to enlarge my apprehensions of the immense power of God, the magnificence of his creation, and his own transcendent grandeur, so much as that little portion of *Astronomy* which I have been able to attain. And I would not only recommend it to *young students* for the same purposes, but I would persuade *all mankind* (if it were possible) to gain some degrees of acquaintance with the vastness, the distances, and the motions of the planetary worlds on the same account. It gives an unknown enlargement to the understanding, and affords a divine entertainment to the soul and its better powers. With what pleasure and rich profit would men survey those astonishing *spaces* in which the planets revolve, the hugeness of their *bulk*, and the almost incredible swiftness of their *motions?* And yet all these governed and adjusted by such unerring rules, that they never mistake their way, nor lose a minute of their time, nor change their appointed circuits in several thousands of years! When we muse on these things we may lose ourselves in holy wonder, and cry out with the Psalmist, *Lord what is man that thou art mindful of him, and the son of man that thou shouldest visit him?*

It was chiefly in the younger part of my life indeed that these studies were my entertainment; and being desired both at that time, as well as since, upon some occasions, to lead some young friends into the knowledge of the first principles of *Geography* and *Astronomy*, I found no treatise on those subjects written in so very plain and comprehensive a manner as to answer my wishes: Upon this account I drew up the following papers, and set every thing in that light in which it appeared most obvious and easy to me.

I have joined the *general part* of these two sciences together: What belongs particularly to each of them is cast into distinct sections. And I wish, Sir, you would present the world with the *special part of astronomy* drawn up for the use of learners in the most plain and easy method, to render this work more complete.

Most of the authors, which I perused in those days when I wrote many parts of this book, were of older date: And therefore the calculations and numbers which I borrowed from their *astronomical tables*, cannot be so exact as those with which some later writers have furnished us: For this reason the account of the *sun's place* in the ecliptic, the *declination* and *right ascension* of the *sun* and the *stars* in some parts of the book, especially in the solution of some of the problems in the 20th section, may perhaps need a little correction; though I hope the theorems will appear true in the speculation, and the problems so regular and successful in the practice as is sufficient for a learner. However, to apply some remedy to this inconvenience, there are added at the end of the book some later *tables*, which are formed according to the celebrated Mr. Flamstead's observations.

I have exhibited near forty *problems* to be practised on the globe, and thirty-five more of various kinds, to be performed by manual operation with the aid of some *geometrical* practices. These were very sensible allurements to my younger enquiries into these subjects, and I hope they may attain the same effect upon some of my readers.

It was my opinion that it would be a very delightful way of learning the *doctrine* and *uses of the sphere*, to have them explained by a variety of *figures or diagrams;* this is certainly much wanting in most authors that I have perused. I have therefore drawn thirty *figures* with my own hand, in order to render the description of every thing more intelligible.

I have endeavoured to entertain younger minds, and entice them to these studies, by all those easy and agreeable operations relating both to the *earth* and the *heavens*, which probably may tempt them on to the higher speculations of the great Sir Isaac Newton and his followers on this subject.

Yet there should be a due limit set to these enquiries too, according to the different employments of life to which we are called: For it is possible a genius of active curiosity may waste too many hours in the more abstruse parts of their subjects which God and his country demand to be applied to the studies of the *law*, *physic*, or *divinity*; to merchandize or mechanical operations.

If I had followed the conduct of mere inclination, perhaps I should have laid out more of my serene hours in speculations which are so alluring: And then indeed I might have performed what I have here attempted in a manner more answerable to my design, and left less for the critics to censure, and my friends to forgive. But such as it is, I put it entirely, Sir, into your hands to review and alter whatsoever you please, and make it answerable to that idea which I have formed of your skill. Then if you shall think fit to present it to the world, I persuade myself I shall not be utterly disappointed in the views I had in putting these papers together, many of which have lain by me in silence above twenty years.

Farewel, dear Sir, and forgive the trouble that you have partly devolved on yourself by the too favourable opinion you have conceived both of these sheets and of the writer of them, who takes a pleasure to tell the world that he is with great sincerity,

Sir, Your most obedient Servant,

I. WATTS.

heobalds in Hertfordshire,
June 11, 1725.

TO THE READER.

I THINK myself obliged, in justice to the ingenious author as well as the public, to assure them that the alterations I have ventured to make in the revisal of this work, are but few and small. The same perspicuity of thought and ease of expression which distinguish his other works running through the whole of this, I don't question but the world will meet with equal pleasure and satisfaction in the perusal.

JOHN EAMES.

August 20, 1725.

THE FIRST PRINCIPLES

OF

GEOGRAPHY AND ASTRONOMY.

Section I.

Of the Spheres or Globes of the Heaven and Earth.

THERE is nothing gives us a more easy or speedy acquaintance with the *earth* and the *visible heavens* than the representation of them on a *globe* or *sphere*; because hereby we have the most natural image of them set before our eyes.

The *terrestial globe* represents the earth with its several lands, seas, rivers, islands, &c. The *celestial sphere* or *globe* represents the heavens and stars.

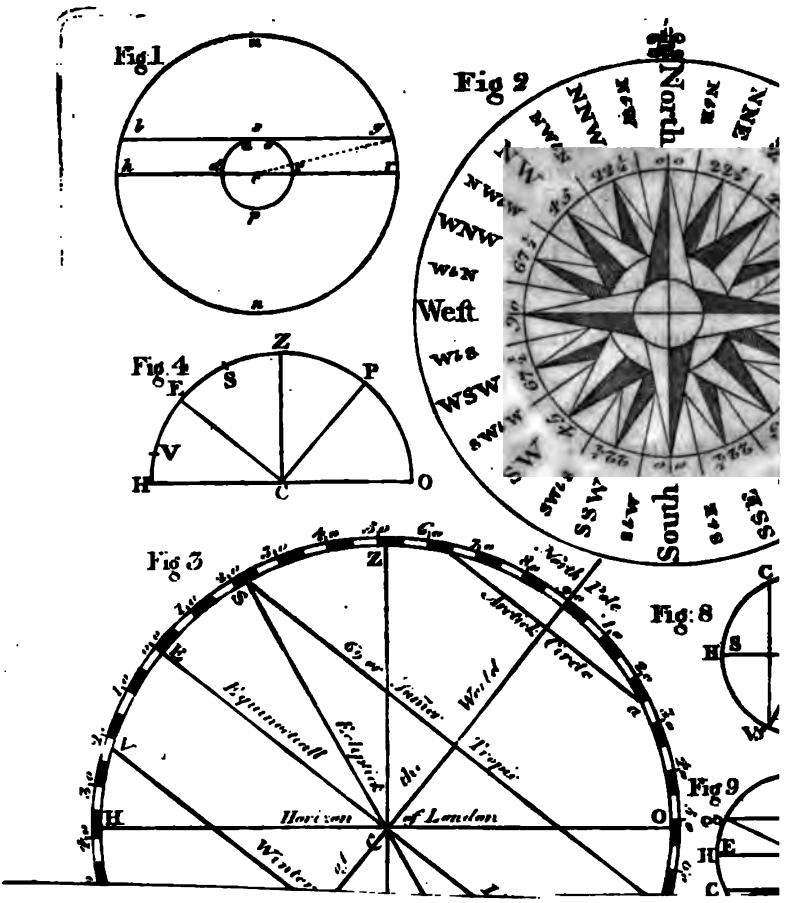
Several *points* and *circles* are either marked or described on those *spheres* or *globes*, or are represented by the brass and wooden work about them, to exhibit the *places* and the *motions* of the sun, moon, or stars, the *situation* of the several parts of the earth, together with the relation that all these bear to each other.

The *earthly globe*, with the *lines* and *signs* and *points* that are usually marked upon it, is sufficient to inform the reader of almost every thing that I shall mention here, even with regard to the *heavens*, the *sun* and the *planets*; unless he has a mind to be particularly acquainted with the *fixed stars*, and the several uses of them; then indeed a *celestial globe* is most convenient to be added to it.

Note 1st, Half the globe is called a *hemisphere*; and thus the whole globe or sphere of the heavens, or of the earth, may be represented on a flat or plane in *two hemispheres*, as in the common *maps* of the earth, or in *draughts* or *descriptions* of the heavens and stars.

Because *globes* are not always at hand, the several *points* and *circles*, together with their properties, shall be so described in this discourse as to lead the reader into some general and imperfect knowledge of these things (as far as it may be done by a *map* of the world, which is nothing else but *a representation of the globe of earth and waters on two flat or plane surfaces*;) or at least I shall so express these matters, that a map will assist him to keep them in remembrance, if he has been first a little acquainted with the globe itself.

Thus it appears that the *sensible horizon* on the earth or



acquainted with the globe itself.

2d, Though the latest and best astronomers have found that the sun is fixt in or near the centre of our world, and that the *earth* moves round its own axis once in twenty-four hours with a *circular motion*, and round the sun once in a year with a *progressive motion*; yet to make these things more easy and intelligible to those that are unskilful, we shall here suppose the *sun* to move round the *earth*, both with a *daily* and *yearly* motion, as it appears to our senses; viz. daily going round the earth, and yet every day changing its place a little in the heavens, till in a year's time it returns to the same place again.

SECT. II.—*Of the greater Circles.*

THE *greater circles* are such as divide the globe into two equal parts, and are these four; (viz.) the *horizon*, the *meridian*, the *equator*, and the *ecliptic*.

I. The *horizon* is a broad flat circle, or the wooden frame in which the globe stands. Its upper edge divides the *globe* into the upper and lower halves or *hemispheres*, and represents the line or circle which divides between the upper and the lower parts of the earth and heavens, and which is called the *horizon*. This circle determines the *rising* or *setting* of sun or stars, and distinguishes *day* and *night*.

When the sun is in the east part of the *horizon*, it is *rising*. When in the west part, it is *setting*. When it is above the *horizon*, it is *day*; When below it is *night*.

Yet till the sun be 18 degrees below the *horizon* it is usually called *twilight*; because the sun-beams shooting upward are reflected down to us by the atmosphere after sun-set or before sun-rise: And it is upon this account that in our horizon at London, there is no perfect night in the very middle of summer for two months together, because the sun is not 18 degrees below the horizon.

The *horizon* is distinguished into the *sensible* and the *rational*, See Fig. 1.

The *sensible horizon* supposes the spectator placed on *s* the surface of the earth or water, and it reaches as far as the eye can see. But the *rational* or *true horizon* supposes the spectator placed in the centre of the earth *c*, and thus divides the globes both of the heavens and the earth into halves.

Suppose in *Figure* 1. the circle *s d p e* is the earth, *u b h n r g* the heavens, *b s g* the line making the sensible horizon, *h r* the rational horizon.

The *sensible horizon* on the earth or sea includes *a s o*, and it reaches but a very few miles; for if a man of six feet high stood on a large plain, or on the surface of the sea, at *s*, he could not see the sea itself, or the land, further than three miles round.

Thus it appears that the *sensible horizon* on the earth or

sea, *a s o*, differs very much from the extent of the *real* or *rational horizon*, *d s e*. But as to the heavens where the fixt stars are, the *sensible horizon b u g* scarce differs at all from the *rational* horizon *h u r*: For the eye placed in the centre of the earth *c*, or on the surface of it *s*, would find no evident difference in the *horizon* of the fixt stars, because they are at so immense a distance, that in comparison thereof half the diameter of the earth, that is *s c* or *g r* the distance between the surface and the centre is of no consideration.

But let it be observed here, that the *planets* are much nearer to the earth than the *fixt stars* are: And therefore half the diameter of the earth, that is, *s c* or *g r* is of some consideration in the horizon of the *planets*.

It may not therefore be improper to note in this place, that suppose a *planet* to be at *g*, if the eye of the spectator were on the surface of the earth at *s*, he would behold it as level with the *horizon*: But if his eye were at the centre of the earth at *c*, he would behold it raised several degrees or minutes above the *horizon*, even the quantity of the angle *g c r*, or (which is all one) *s g c*.

Now the difference between the place wher ea *planet* appears to a spectator, placed on the *centre* of the earth, and to a spectator placed on the *surface*, is called the *parallax* of that planet at that time; and therefore the difference between those two places *g* and *r*, or rather the quantity of the angle *g c r*, or *s g c*, is called its *horizontal parallax*. And this is of great use to adjust the real distances, and consequently the real magnitudes of the several planets. But this doctrine of *parallaxes* belongs rather to the second or *special* part of *astronomy*.

II. The *meridian* is a great brazen circle in which the globe moves; it crosses the *horizon* at right angles, and divides the globes into the *eastern* and *western* hemispheres. It represents that line or circle in the heaven which passes just over our head, and cutting the *horizon* in the *north* and *south* points of it, comes just under our feet on the opposite side of the globe.

This circle shews when the sun or stars are just at *north* or *south* and determines *noon* or *midnight*.

When the sun is on the meridian and above the horizon to us in Great Britain, it is just in the *south*, and it is *noon*. When it is on the meridian and under the horizon, it is just in the *north* and it is *midnight*.

Note, Whensoever we move on the earth, whether *east*, *west*, *north*, or *south*, we change our horizon both *sensible* and *rational*; for every motion or change of place gives us a hemisphere of sky or heaven over our head a little different from what it was; and we can see less on one side of the globe of the earth and more on the other side.

Whensoever we move toward the *east* or *west* we change

our meridian: But we do not change our meridian if we move directly to the *north* or *south*.

Upon this account the *horizon* and *meridian* are called *changeable circles*, and the globe is made moveable within these circles to represent this changeableness, whereby every place on the earth may be brought under its proper meridian, and be surrounded with its proper horizon.

III. The *equator* or *equinoctial line* crosses the *meridian* at right angles, and divides the globe into the *northern* and *southern* hemispheres; and distinguishes the sun's yearly path into the *summer* and *winter* half-years. It represents in the heavens that very line or circle which is the path of the sun in those two days in *spring* and *autumn* when the days and nights are of equal length.

Among all the circles of the globe, this is sometimes eminently called *the line*; and passing over it at sea is called by sailors *crossing the line*.

Note, The sun, moon and stars, with all the frame of the heavens, are supposed to be whirled round from east to west every twenty-four hours upon the axis of the equator, or (which is all one) in their several paths parallel to the equator. This is called their *diurnal* or *daily motion*.

IV. The *ecliptic line* is the *sun's annual or yearly path*, cutting the equinoctial in two opposite points obliquely at the angles of 23½ degrees. On it are figured the marks of the 12 signs through which the sun passes, viz. *Aries* the Ram ♈, *Taurus* the Bull ♉, *Gemini* the Twins ♊, *Cancer* the Crab ♋, *Leo* the Lion ♌, *Virgo* the Virgin ♍, *Libra* the Balance ♎, *Scorpio* the Scorpion ♏, *Sagittarius* the Archer ♐, *Capricornus* the Sea-Goat, ♑, *Aquarius* the Waterer ♒, *Pisces* the Fishes ♓.

These signs are certain *constellations* or numbers of stars which are reduced by the fancy of men for distinction sake into the form of twelve animals, and for the use of the English reader may be described thus:—

The Ram, *the* Bull, *the heavenly* Twins,
And next the Crab, *the* Lion *shines*,
The Virgin, *and the* Scales.
The Scorpion, Archer, *and* Sea-Goat,
The Man *that holds the* Water-pot,
And Fish *with glittering Tails*.

Among these signs, *Aries*, *Taurus*, *Gemini*, *Cancer*, *Leo*, *Virgo*, are called *northern*. But *Libra*, *Scorpio*, *Sagittarius*, *Capricornus*, *Aquarius*, *Pisces*, are *southern*. *Capricorn*, *Aquarius*, *Pisces*, *Aries*, *Taurus*, *Gemini* are *ascending* signs, because they stand in succession *northward*, or rising gradually higher in our *European hemisphere*; But *Cancer*, *Leo*, *Virgo*,

Libra, Scorpio, Sagittarius, are *descending signs,* for their succession tends lower toward our horizon, or rather toward the southern hemisphere.

Each of these signs has 30 degrees of the ecliptic allotted to it. The sun or any planet is said *to be in such a sign* when he is between our eye and that sign, or when he appears in that part of the heavens where those stars are of which the sign is composed.

If it be enquired, how we can know the place of the sun among the stars, since all the stars near it are lost in the sunbeams? It is answered, that we can see plainly what *constellation* or what stars are upon the meridian at *midnight,* and we know the stars which are exactly opposite to them, and these must be upon the meridian (very nearly) the same day at *noon*; and thereby we know that the sun at noon is in the midst of them. So that when you have a globe at hand on which the stars are delineated, you find on what degree of any sign the sun is in on a given day, and see the stars around it.

The sun is reckoned to go through almost one sign every *month* or thirty days, and thus to finish the *year* in 365 days 5 hours and 49 minutes, i. e. near 6 hours: So that the sun may be supposed to move slowly as a snail through almost one degree of the *ecliptic* line every day *from the west to the east,* while it is whirled round together with the whole frame of the heaven *from east to west,* in a line parallel to the *equator* in the time of 24 hours.

Note, We vulgarly call the *sun's diurnal, or daily path parallel* to the equator though properly it is a *spiral line,* which the sun is ever making all the year long, gaining one degree of the ecliptic daily.

From what has been now said it appears plainly, that the *equinoctial line,* or *equator* itself, is the diurnal path of the sun about the 20th or 21st of March and the 23d of September, which are the two opposite points where the *ecliptic,* or yearly path of the sun, cuts the *equator.* And these two days are called the *equinoctial days;* when the sun rises and sets at six o'clock all the world over, (i. e. where it rises and sets at all that day;) and the day and night are every where of equal length; and indeed this is the true reason why this line is called the *equator* or the *equinoctial.*

It may not be improper in this place to remark that those 5 hours and 49 minutes, which the *sun's annual revolution* requires above 365 days, will in 4 years time amount to near a whole day. Therefore every fourth year has 366 days in it, and is called the *Leap-year.*—Note, The super-added day in that year is the 29th of February in *Great-Britain.* It may be farther remarked also, that the odd 11 minutes which in this account

are wanting yearly to make up a complete day of 24 hours, are accounted for in the *new style* by leaving out a whole day once in 133 or 134 years.* And it is the neglect of accounting for these odd minutes in the *old style* above a thousand years backwards, that has made the difference between the *old style* and the *new* to be at present *eleven days*.

Note, The *zodiac* is fancied as a broad belt spreading about 7 or 8 degrees on each side of the *ecliptic*, so wide as to contain most of those stars that make up the 12 constellations or signs. The *inner edge of the wooden horizon* is divided into 360 degrees, or 12 times 30, allowing 30 degrees to every sign or constellation, the figures of which are usually drawn there.

The *next circle* to these on the horizon contains an *almanack* of the *old style* which begins the year eleven days later; and the *next circle* is an almanack of the *new style* which begins so much sooner; and these shew in what sign the sun is, and in what degree of that sign he is every day in the year, whether you count by the old style or the new.

Note, One side or edge of the brazen meridian is also divided into 360 degrees or 4 times 90; on the upper semicircle whereof the numbers usually begin to be counted from the equator both ways toward the poles: On the under semicircle they begin to be counted from the poles both ways toward the equator for special uses, as will afterward appear. And it should be remembered that it is this edge of the brass circle, which is graduated or divided into degrees, that is properly the *meridian line*. The *equator* and the *ecliptic* are called *unchangeable circles*, because wheresoever we travel or change our place on the earth these circles are still the same.

SECT. III.—*Of the Lesser Circles.*

THE *lesser circles* divide the globe into two unequal parts, and are these four, all parallel to the equator, (viz.) *the two tropics*, and *the two polar circles*.

I. *The tropic of cancer* just touches the *north* part of the ecliptic, and describes the sun's path for the longest day in *summer*: It is drawn at 23½ degrees distance from the equator toward the *north*. And it is called *the tropic of cancer*, because the sun enters into that sign the 21st of June, the longest day in the year.

* This was contrived to be done by Pope Gregory in the year 1582, in this manner. Since three times 133 years make near 400 years, he ordered the additional day to be omitted at the end of three centuries successively, and to be retained at the 400th year or 4th century. But in this reformation of the calendar he looked back no farther than the Council of *Nice*. This order almost all foreign nations observed: *Great Britain* did not observe it till the year 1752, when it was introduced and established by act of parliament.

II. The *tropic of capricorn* just touches the *south* part of the ecliptic, and describes the sun's path for the shortest day in the *winter*: It is drawn at 23½ degrees distance from the equator toward the *south*. And it is call the *tropic of capricorn*, because the sun enters into that sign the 21st of December, the shortest day in the year. *Note*, What I speak of the *shortest and longest days*, relates only to us who dwell on the *north* side of the globe: Those who dwell on the *south* side have their longest day when the sun is in *capricorn*, and their shortest in *cancer*.

III. and VI. The north and south *polar circles* are drawn at 23½ degrees of distance from each pole, or which is all one, at 90 degrees distance from the contrary tropic; because the inhabitants under the *polar circles* just lose the sun under the horizon one whole day at their *midwinter*, or when it is in the utmost part of the contrary side of the ecliptic; and they keep it a whole day or 24 hours above their horizon at their *midsummer*, when it is in the nearest part of their side of the ecliptic. The north polar circle is called the *arctic circle*, and the south is the *antarctic*.

Here I might mention the *five zones* by which the ancients divided the earth, for they are a sort of broad circles: But perhaps these may be as well referred to the following part of the book.

Sect. IV.—*Of the Points.*

THE most remarkable *points* in the heavens are these twelve or fourteen.

I, and II, are the two *poles* of the earth or heavens, (viz. the *north* and the *south*, which are ever stedfast, and round which the earth or the heavens are supposed to turn daily as the globe does upon these iron poles. These are also the *poles of the equator*, for they are at 90 degrees distance from it. From one of these *poles* to the other a supposed line runs through the centre of the globe of earth and heavens, and is called the *axis* or *axle* of the world.

III, and IV, are the *zenith*, or point just over our head and the *nadir* or the point just under our feet, which may be properly called *the two poles of the horizon*, for they are 90 degrees distant from it every way.

V, VI, VII, and VIII, are *the four cardinal points of east, west north and south*: These four points are in the horizon which divide it into four equal parts.

Note, For the uses of navigation, or sailing, each of these quarters of the heavens, *east, west, north and south*, are subdivided into eight points, which are called *rhumbs*; so that there are 32 *rhumbs* or points in the whole, each containing 11¼ degrees. These are described on the utmost circle of the wooden horizon. From the *north* towards the *east* these points are named *north and by east, north north-east, north-east and by north, north-east*

north-east, and by east, east-north-east, east and by north, east, &c. Then from the *east* toward the *south* it proceeds much in the same manner. The whole circle of 360 degrees divided in this manner is called the *mariner's compass*, by which they count from what point of the heavens the wind blows, and toward what point of the earth they direct their sailing, which they call *steering their course.* See figure 11.

IX, and X, are the *two solsticial points:* These are the beginning of the signs *cancer* and *capricorn* in the ecliptic line, where the ecliptic just touches those two *tropics.* These points shew the sun's place the longest and shortest days, (viz.) the 21st of June and the 21st of December. Note, These two days are called the *summer and winter solstices*, because the sun seems to stand still, i. e. to make the length of days neither increase nor decrease sensibly for 20 days together.

XI, and XII, are *aries* and *libra*, or the *two equinoctial points*, where the ecliptic cuts the equator: When the sun enters into these two signs, the days and nights are equal all over the world. It enters *aries* in spring the 21st of *March*, which is called the *vernal equinox*, and *libra* in Autumn the 23d of *September*, which is called the *autumnal equinox.* These four points, (viz.) two equinoctial and two solsticial, divide the *ecliptic* into the four *quarters of the year.*

Here let it be noted, that the twelve *constellations* or *signs* in the heavens obtained their names about two thousand years ago or more; and at that time the stars that make up *aries* or the *ram*, were in the place were the ecliptic ascending cuts the equator; but now the constellation *aries* is moved upward toward the place of *cancer* near thirty degrees; and so every constellation is moved forward in the ecliptic from the west toward the east near thirty degrees; so that the constellation or stars that make up the sign *pisces* are now in the place where *aries* was, or where the ecliptic cuts the equator in the spring: And the constellation *virgo* is now where *libra* was, or where the ecliptic cuts the equator in autumn. So *gemini* is in the summer solstice where *cancer* was; and *sagittarias* in the winter solstice where *capricorn* was: And by this means the sun is got into the equinoxes in *pisces* and *virgo*, and is arrived at the solstices in *gemini* and *sagittarius*, i. e. when it is among those stars.

This alteration is called the *procession of the equinox*, i. e. of the equinoctial signs or stars, which seem to be gone forward, i. e. from west to east; but some call it the *retrocession of the equinox*, i. e. of the two equinoctial points, which seem to be gone backwards, i. e. from east to west. This comes to pass by some small variation of the situation of the axis of the earth with regard to the axis of the ecliptic, round which it moves by a coni-

cal motion*, and advances 50 seconds or almost a minute of a degree every year, which amounts to one whole degree in 72 years, and will fulfil a complete revolution in 25,920 years. This period some have called the *platonical year*, when some of the ancients fancied all things should return into the same state in which they now are.

Yet we call these *equinoctial* and *solsticial points* in the heaven, and all the *parts of the ecliptic* by the same ancient names still in astronomy, and mark them still with the same characters viz. ♈, ♉, ♊, ♋, ♌, &c. though the *constellations* themselves seem to be removed so much forward.

XIII, and XIV. Here it may not be improper in the last place to mention the *poles of the ecliptic* which are two other points marked generally in the celestial globe.

If there were an *axis* thrust though the centre of the globe just at right angles with the plane of the ecliptic, its ends would be found in the two *polar circles*. So that a quarter of a circle or 90 degrees numbered directly or perperdicularly from the ecliptic line shew the *poles of the ecliptic*, and fix these two points through which the two *polar circles* are drawn.

It is usual also in books of this kind to mention two great circles called *colures*, drawn sometimes on the celestial globe through the poles of the world, one of which cutting the ecliptic in the two solsticial points is called the *solsticial colure*; the other cutting it in the equinoctial points is called the *equinoctial colure*, but they are not of much use for any common purposes or practices that relate to the globe.

I think it may not be amiss before we proceed farther, to let the learner see a representation of all the foregoing *circles and points* on the globe, just as they stand in our *horizon* at *London*, and so far as they can be represented on a flat surface, and in strait lines.

Let the *north pole* be raised above the north part of the *horizon* 51½ degrees which are numbered on the brazen *meridian*, then let the globe be placed at such a distance as to make the convexity insensible, and appear as a flat or plain surface, and let the eye of the spectator be just level and opposite to c. which represents the *east* point of the *horizon*: then the globe and the circles on it will appear nearly as represented in Figure III.

The large circle divided by every 5 degrees represents the *meridian*, the rest of the larger and the lesser circles are there

* The axis of the earth is supposed to be fastened at its middle in the centre, while both ends of it, or each of the poles in this motion describes a circle round each pole of the ecliptic, which is the base of the cone. The vertexes of each of these cones meet in the centre of the earth; and by this motion of the earth, all the fixt stars seem to be moved from their former places in circles parallel to the ecliptic.


Fig. 15 A Map of a Country exemplified
Peninsula
Isthmus
Chief City
Continent
or Main-Land
Inland Sea
Peninsula
Rocks
Sands
CONTINENT
Lake
Island
Sandy
OCEAN or
MAIN SEA
OCEAN
Degrees of Longitude from the Chief City

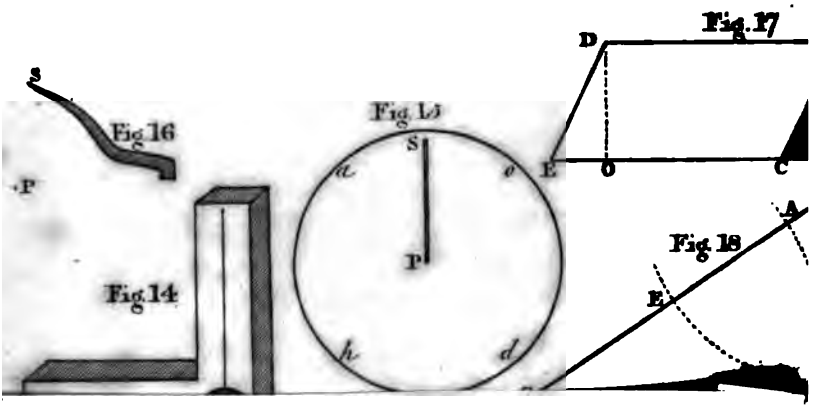


Fig. 16
Fig. 14
Fig. 15
Fig. 17
Fig. 18
S
P
D
E
O
C
A
E

med, together with the *north* and *south poles*. z. is the *Zenith London*, N the *Nadir*, H the *south point* of the Horizon, o the *rth point*, c the *east* and *west points*, s the *summer solstice*, w *winter solstice*, a *the ecliptic's north pole*, e the *ecliptic's uth pole*. The two equinoctial points are represented by c, pposing one to be on this side, the other on the opposite side of e globe.

If you would have the two *colures* represented here in this ure, you must suppose the meridian to be the *solsticial colure*, d the axis of the world to represent the *equinoctial colure*.

Note, This representation or projection of the sphere in ait lines is usually called the *analemma*. See how to project it to erect this scheme, Sect. XX. Probl. XV. Fig. xxiii.

ECT. V.—*Of Longitude and Latitude on the Earthly Globe, and of different Climates.*

THE various parts of the *earth* and heavens bear various lations both to one another, and to these several points and cir-s, which have been described.

First, The *earth* shall be considered here.

Every part of the earth is supposed to have a *meridian* line ssing over its *zenith* from north to south through the poles of e world. It is called the *meridian line of that place*, because e sun is on it at noon.

That meridian line which passes through *Ferro*, one of the *nary Islands*, has been usually agreed upon by geographers a *first meridian*, from which the rest are counted by the num-r of degrees on the *equator*. Others have placed their *first ridian* in *Teneriff*, another of the *Canary Islands*, which is two grees more to the east, but this is matter of choice and custom, t of necessity.

The longitude of a place is its *distance from the first meri-n toward the east measured by the degrees upon the equator.* the longitude of *London* is about 20 degrees, counting the first ridian at *Ferro*.

Note, In *English* globes or maps sometimes the longitude is mputed from the *meridian of London*, in *French* maps from *ris*, &c. for it being purely arbitrary where to fix a *first ridian*, mariners and map-makers determine this according to ir inclination. When only the word *longitude* is mentioned general, it always means the distance eastward; but some-nes we mention the longitude *westward* as well as *eastward*, e. from *London* to *Paris*, &c. especially in maps of particular ntries.

By the meridian circles on a map or globe the eye is direct-to the true longitude of any place according to the degrees rked on the equator: and upon this account the meridians are metimes called *lines of longitude*.

The *latitude of a place* is its *distance from the equator toward the north or south pole measured by the degrees on the meridian.* So the latitude of *London* is 51 degrees 32 minutes, that is, about 51½.

A place is said to have *north latitude* or *south latitude* according as it lies toward the north pole or south pole in its distance from the equator. So *London* has 51½ degrees of north latitude.

The *elevation of the pole* in any particular place is the *distance of the pole above the horizon of that place measured by the degrees on the meridian,* and is exactly equal to the *latitude of that place:* for the *pole* of the world or of the equator is just so far distant from the *horizon as* the *zenith* of the place (which is the pole of the horizon) is distant from the *equator.* For which reason the *latitude of the place or* the *elevation of the pole* are used promiscuously for the same thing.

The truth of this observation, (viz.) that *the latitude of the place and the poles elevation are equal,* may be proved several ways; I will mention but these two. See figure IV.

Let H C O be the *horizon,* Z the *zenith,* or the point over *London,* E Z the *latitude* of *London* 51½, P O the *elevation* of the north pole above the horizon. Now that E Z is equal to P O is proved, thus.

Demonstration I. The arch Z P added to E Z makes a quadrant, (for the *pole* is always at 90 degrees distance from the *equator.)* And the arch Z P added to P O makes a quadrant, (for the *zenith* is always at 90 degrees distance from the *horizon.)* Now if the arch Z P added either to E Z or to P O completes a quadrant, then E Z must be equal to P O.

Demonstration II. The *latitude* E Z must be the same with the *poles elevation* P O: For * the complement of the latitude, or the heighth of the equator above the horizon E H is equal to the complement of the poles elevation P Z. I prove it thus: The equator and the pole standing at right angles as E C P, they complete a quadrant, or include 90 degrees: Then if you take the quadrant E C P out of the semicircle, there remains P O the elevated pole, and E H the complement of the latitude, which complete another quadrant. Now if the complement of the latitude added to the elevation of the pole, will make a quadrant, then the complement of the latitude is equal to the complement of the poles elevation, and therefore the latitude is equal to the poles eleva-

* Note, The *complement* of any arch or angle under 90 degrees denotes such a number of degrees as is sufficient to make up 90; as the *complement* of 50 degrees is 40 degrees, and the *complement* of 51½ is 38½ degrees. And so the complement of the sine or tangent of any arch is called the *co-sine* or *co-tangent:* So also in Astronomy and Geography we use the words *co-latitude, co-altitude, co-declination,* &c. for the complement of the latitude, altitude, or declination, of which words there will be more frequent use among the *problems.*

tion ; for where the complements of any too arches are equal, the arches themselves must also be equal.

As every place is supposed to have its proper *meridian* or *line of longitude*, so every place has its proper *line of latitude* which is a parallel to the equator. By these parallels the eye is directed to the degree of the *latitude of the place* marked on the meridian, either on globes or maps.

By the *longitude* and *latitude* being given you may find where to fix any place, or where to find it in any globe or map : For where those two supposed lines (viz.) the *line of longitude* and *parallel of latitude* cross each other, is the place enquired. So if you seek the longitude from *Ferro*, 20 degrees, and the latitude 51½ degrees, they will shew the point where *London* stands.

Those *parallels of latitude* which are drawn at such distances from each other near and nearer to the poles, as determine the longest days and longest nights of the inhabitants to be half an hour longer or shorter, include so many distinct *climates*, which are proportionally hotter or colder according to their distance from the equator. Though it must be owned that we generally use the word *climate* in a more indeterminate sense, to signify a *country lying nearer or further from the equator*, and consequently *hotter or colder*, without the precise idea of its longest day being just half an hour shorter or longer than in the next country to it.

The *latitude* is never counted beyond 90 degrees, because that is the distance from the *equator* to the *pole :* The *longitude* arises to any number of degrees under 360, because it is counted all round the globe.

If you travel never so far directly towards *east* or *west* your *latitude* is still the same, but *longitude* alters. If directly toward *north* or *south*, your *longitude* is the same, but *latitude* alters. If you go obliquely, then you change both your *longitude and latitude.*

The *latitude of a place*, or the *elevation of the pole* above the horizon of that place, regards only the *distance northward or southward*, and is very easy to be determined by the sun or stars with certainty, as Sect. XX. Prob. VII, and IX. because, when they are upon the *meridian* they keep a regular and known distance from the *horizon*, as well as observe their certain and regular distances from the *equator*, and from the two *poles*, as shall be shewn hereafter : So that either by the sun or stars (when you travel northward or southward) it may be found precisely how much your *latitude* alters.

But it is exceeding difficult to determine what is the *longitude of a place*, or the distance of any two places from each other *eastward* or *westward* by the sun or stars, because they are always moving round from *east* to *west*.

The longitude of a place has been therefore usually found out and determined by measuring the distance travelled on the earth or sea, from the *west* toward the *east*, supposing you know the longitude of the place whence you set out.

SECT. VI.—*Of Right Ascension, Declination, and Hour Circles.*

HAVING considered what respect the *parts of th earth* bear to these artificial lines on the globe, we come, *secondly*, to survey the several relations that the *parts of the heavens*, the sun or the stars, bear to these several imaginary points and artificial lines or circles.

The *right ascension* of the sun or any star is its *distance from that meridian which passes through the point* aries, *counted toward the east, and measured on the equator*; it is the same thing with *longitude on the earthly globe.*

The *hour* of the sun or any star is reckoned also by the divisions of the equator; but the *hour* differs from the *right ascension* chiefly in this, (viz.) The *right ascension* is reckoned from that meridian which passes through *arises*; the *hour* is reckoned on the earthly globe, from that meridian which passes through the *town or city required*; or it is reckoned on the heavenly globe from that meridian which passes through the *sun's place* in the ecliptic, and which, when it is brought to the brazen meridian, represents *noon* that day.

There is also this difference. The *right ascension* is often computed by single degrees all round the equator, and proceeds to 360: The *hour* is counted by every 15 degrees from the meridian of noon, or of midnight, and proceeds in number to 12, and then begins again: Though sometimes the *right ascension* is computed by *hours* also instead of degrees, but proceeds to 24. So the sun's *right ascension* the 10th of *May* is 59 degrees, or as sometimes it is called 3 hours and 56 minutes.

The same lines which are called *lines of longitude* or meridians on the earth are called *hour circles* on the heavenly globe, if they be drawn through the poles of the world at every 15 degrees on the equator, for then they will divide the 360 parts or degrees into 24 hours.

Note, As 15 degrees make *one hour* so 15 minutes of a degree make *one minute in time*, and one whole degree makes four *minutes in time.*

Note, *degrees* are marked sometimes with (^{d}) or with a small circle ($^{\circ}$), *minutes of degrees* with a dash ($'$) *seconds of minutes* with a double dash ($''$), *hours* with (^{h}), *minutes of hours* sometimes with (^{m}) and sometimes a dash, *seconds* with a double dash.

By these *meridians* or *hour-lines* crossing the equator on the heavenly globe, the eye is directed to the true *hour*, or the degree

of *right ascension* on the equator, though the sun or stars may be far from the equator.

By these you may also compute on the earthly globe what hour it is at any place in the world, by having the true hour given at any other place, and by changing the degrees of their *difference of longitude* into hours.

But since several *questions* or *problems* that relate to the hour, cannot be so commodiously resolved by these few *meridians* or *hour-lines*, because every place on the earth hath its proper meridian where the sun is at 12 o'clock, therefore there is a brass *dial-plate* fixed at the north-pole in the globe, whose 24 hours do exactly answer the 24 hour circles which might be drawn on the globe: now the *dial* being fixed, and the *pointer* being moveable, this answers all the purposes of having an infinite number of hour circles drawn on the globe, and fitted to every spot on the heavens or the earth. For the *pointer* or *index* may be set to 12 o'clock, when the sun's true place in the heavens, or when any place on the earth is brought to the brass meridian, and thus the globe moving round with the *index* naturally represents, and shews by the dial-plate the 24 hours of any day in the year, or in any particular town or city.

Note, The upper 12 a clock is the hour of *noon*, the lower 12 is the *midnight* hour, when the globe is fixed for any particular latitude where there are days and nights.

The *declination* of the sun or stars is their *distance from the equator toward the north or south pole, measured on the meridian*; and it is the same thing with *latitude on the earthly globe.*

Note, the sun in the vernal or autumnal equinoxes, and the stars that are just on the equator have no declination.

Parallels of declination are lines parallel to the equator, the same as the *parallels of latitude* on the earthly globe. In the heavens they may be supposed to be drawn through each degree of the meridian, and thus shew the declination of all the stars; or they may be drawn through every degree of the *ecliptic*, and thus represent the *sun's path*, every day in the year. These parallel lines also would lead the eye to the degree of the sun's or any particular star's *declination* marked on the meridian.

The declination is called *north* or *south declination* according as the sun or stars lies northward or southward from the equator.

Observe here, that as any *place, town*, or *city* on earth is found determined by the *parallel of its latitude*; crossing its *line of longitude*; so the proper place of the *sun* or *star* in the heavens is found and determined by the point where its *parallel of declination* crosses its *meridian* or *line of right ascension*;

which indeed are but the self same things on both the globes, though astronomers have happened to give them different names.

Note, The sun's *utmost declination northward* in our summer is but 23½ degrees; and it is just so much *southward* in our winter; for then he returns again; there the *tropics* are placed which describe the *path of the sun* when farthest from the equator, at midsummer, or midwinter; these two tropics are his *parallels of declination* on the longest and shortest day.

While the sun gains 90 degrees on the *ecliptic*, (which is an oblique circle) in a quarter of a year, it gains but 23½ degrees of direct distance from the *equator* measured on the *meridian*; this appears evident on the globe, and may be represented thus in figure v.

Let the semicircle ♈ P ♎ be the meridian of the northern hemisphere, the line ♈ C ♎ be the equator or the sun's path at *Aries* and *Libra*, the arch ♈ ♋ ♎ the ecliptic, the line T ♋ O the summer tropic, the line *a e* the sun's path when it enters *Gemini* and *Leo*, the line *n s* the sun's path when it enters *Taurus* and *Virgo*; then it will appear that in moving from ♈ to ♉ the sun gains 30 degrees in the *ecliptic*, in about a month, and at the same time 12 degrees of *declination*, viz. from ♈ to *n*. Then moving from ♉ to ♊ in a month more it gains 30 degrees on the *ecliptic*, and 8½ degrees of *declination*, viz. from *n* to *a*. Then again from ♊ to ♋ in a month more it gains 30 degrees on the *ecliptic*, and but 3½ degrees of *declination*, viz. from *a* to T. I might also shew the same difference between its *declination* and its motion on the *ecliptic* in its descent from ♋ to ♌, ♍, and ♎.

By drawing another scheme of the same kind below the line ♈ C ♎, we might represent the sun's descent towards the winter solstice, and its return again to the spring; and thereby shew the same differences between the *sun's declination* and its *motion on the ecliptic* in the winter half year as the present scheme shews in the summer half-year.

Hereby it is evident how it comes to pass, that the *sun's declination* alters near half a degree every day just about the *equinoxes*; but it scarce alters so much in 10 or 12 days on each side of the *solstices*; and this shews the reason why the length of days and nights changes so fast in *March* and *September*, and so exceeding slowly in *June* and *December*; for according to the increase of the sun's declination in summer, its semidiurnal arc* will be larger, and consequently it must be so much longer before it comes to its full *height* at noon, and it stays so *much longer* above the *horizon* before it sets.

* The "diurnal arc" is that part of the circle or parallel of declination which is above the "horizon;" and the half of that part is called the "semidiurnal arc."

Thus while the *sun's declination* increases or decreases by slow degrees, the *length of the days* must increase and decrease but very slowly; and when the *sun's declination* increases and decreases swiftly, so also must the *length of the days*; all which are very naturally and easily represented by the globe.

Sect. VII.—*Of Longitude and Latitude on the Heavenly Globe, and of the Nodes and Eclipses of the Planets.*

THE *longitude* and *latitude* in astronomy are quite different things from *longitude* and *latitude* in geography, which is ready to create some confusion to learners.

The *longitude* of the sun or any star is its *distance from the point* aries *eastward, measured in the ecliptic.* This is a short way of describing it, and agrees perfectly to the sun; but in truth a star's *longitude is its distance eastward from a great arch drawn perpendicular to the ecliptic through the point* aries, *and measured on the ecliptic.*

We do not so usually talk of the *sun's longitude*, because we call it *his place in the ecliptic*, reckoning it no farther backward than from the beginning of the sign in which he is. So the 25th day of *June*, we say the sun is in the 14th degree of *cancer*, and not in the 104th degree of *longitude.*

The *latitude* of a star or planet is its *distance from the ecliptic, measured by an arch, drawn through that star perpendicular to the ecliptic.*

Longitude and *latitude* on the heavenly globe bear exactly the same relation to the *ecliptic* as they do on the earthly globe to the *equator.* As the *equator* is the line *from* which the *latitude* is counted, and *on* which the *longitude* is counted on the earthly globe, so the *ecliptic* is the line *from* which the *latitude*, and *on* which the *longitude* are counted on the heavenly globe.

And thus the *lines of latitude* in the heavenly globe are all supposed parallels to the *ecliptic*, and the *lines of longitude* cut the ecliptic at right angles, and all meet in the *poles* of the *ecliptic*, bearing the same relation to it as on the earthly globe they do to the equator.

The *latitude* of a star or planet is called *northern* or *southern* as it lies on the *north* or *south* side of the ecliptic.

The sun has no *latitude*, because it is always in the *ecliptic.* This relation of *latitude* therefore chiefly concerns the planets and stars.

The *fixed stars* as well as the *planets* have their various *longitudes* and *latitudes*; and their particular *place* in the heavens may be assigned and determined thereby, as well as by their right *ascension and declination* which I mentioned before; and *astronomers* use this method to fix exactly the *place* of a

*star.** But I think it is easier for a learner to find a *star's place* by its declination, and *right ascension;* and the common astronomical problems seem to be solved more naturally and easily by this method.

It may be here mentioned, though it is before its proper place, that the several planets, viz. *Saturn*, *Jupiter*, *Mars*, *Venus*, *Mercury*, and the *Moon*, make their revolutions at very different distances from the earth, from the sun, and from one another; each having its distinct *orbit* or path nearer or farther from us. And as each of their *orbits* is at vastly different distances, so neither are they perfectly parallel to one another, nor to the *ecliptic* or yearly path of the sun.

Thence it follows that these planets have some more, some less *latitude*, because their orbits or paths differ some few degrees from the sun's path, and intersect or cross the *ecliptic*, at two opposite points in certain small angles of two, three, four or five degrees, which points are called the *nodes*.

The *node* where any planet crosses the ecliptic ascending to the northward is called the *dragon's head*, and marked thus ☊. Where the planet crosses the ecliptic descending to the southward, it is called the *dragon's tail* and marked thus ☋.

It is very difficult to represent the *latitude of the planets* in their different orbits either upon a globe, or upon a flat or plain surface; the best way that I know is, to take two small hoops of different sizes, as in figure XI. and thrust a straight wire *c o* through them both in the two opposite parts of their circumference: Then turn the innermost hoop (which may represent the *path* of the *moon)* so far aside or obliquely as to make an angle of 5½ degrees with the outermost hoop, (which represents the *sun's path.)* Thus the two points *c* and *o* or ☊ and ☊ where the wire joins the hoops, are the two *nodes* or the points of intersection.

This difference of *orbits* of the planets and their *intersections*, or *nodes*, may be represented also by two circular pieces of pasteboard as in figure XII. When the less (whose edge represents the moon's orbit,) is put half way through a slit A, B, that is made in the diameter of the larger (or the sun's orbit, and then brought up near to a parallel or level with the larger within 5½ degrees. Thus the two *nodes* will be represented by A and B.

* Astronomers know that not only the 12 constellations of the *zodiac*, but also all the *fixed stars* seem to move from the west toward the east about 50″ in a year, or one degree in 72 years, in circles parallel to the *ecliptic*. Therefore their *declination* is a little altered in 72 years time, that being measured from the *equator:* But their *latitude* never alters, that being measured from the *ecliptic:* And upon this account astronomers use the *latitude* rather than the *declination* in their measures, because it abides the same for ever.

If the *moon's* path and the *sun's* were precisely the same, or parallel circles in the same plane, then at every *new moon* the *sun* would be eclipsed by the moon's coming between the earth and the sun: And at every *full moon* the *moon* would be eclipsed by the earth's coming been the sun and the moon. But since the planes of their orbits or paths are different, and make angles with each other there cannot be *eclipses* but in or near the place where the planes of their orbits or paths intersect or cross each other.

In or very near these *nodes*, therefore, is the only place where the earth or moon can hide the sun or any part of it from each other, and cause an *eclipse* either *total* or *partial*; And for these reasons the orbit or path of the sun is called the *ecliptic*.

The eclipses of other planets, or of any part of the sun by their interposition, are so very inconsiderable as deserve not our present notice.

SECT. VIII.—*Of Altitude, Azimuth, Amplitude, and various Risings and Settings of the Sun and Stars.*

THE *altitude* of the sun or star is its *heighth above the horizon, measured by the degrees on the quadrant of altitudes.*

As the height of the sun at noon is called its *meridian altitude*, or its *culminating*, so the height of the sun in the east or west is sometimes called its *vertical altitude*.

The *quadrant of altitudes* is a thin label of brass, with a nut and skrew at the end of it, whereby it is fastened to the *meridian* at the *zenith* of any place; now by bending this down to the *horizon*, you find the altitude of any star or point in the heavens, because the label is divided into 90 degrees counting from the horizon upward.

Circles parallel to the horizon, supposed to be drawn round the globe, through every degree of the *quadrant of altitudes* less and less till they come to a point in the zenith, are called *parallels of altitude*, or sometimes in the old *arabic* name *almicantars*. But these can never be actually drawn on the globe, because the *horizon* and *zenith* are infinitely variable, according to the different latitudes of places. In the VIth figure, suppose z to be the zenith, N the nadir, H R the horizon, and the strait lines *d b*, *f g*, *k m*, will represent the parallels of altitude.

Note, The sun being always highest on the *meridian*, or at *noon*, it descends in an arch towards the horizon in order to *set*, by the same degrees by which it ascended from the horizon after its rising. Stars and planets rise and set and come to the *meridian* at *all different hours* of the day or night according to the various seasons of the year, or according to the signs in which the planets are.

As the word *altitude* is used to signify the height of the sun or star above the horizon, so the *depression* of the sun or star is its distance from or below the horizon.

The *azimuth* of the sun or star is its *distance from any of the four cardinal points*, east, west, north and south, *measured by the degrees of the horizon.*

Note, When we speak of the *sun's azimuth* in general, we usually mean his distance from the south; but when his distance from the north, east, or west, is intended, we say, his azimuth from the north, the east, or the west.

Great circles cutting every degree of the horizon at right angles, and meeting in the zenith and nadir are called azimuthal or vertical circles. They direct the eye to the point of the sun or star's azimuth on the horizon, though the sun or star may be far above, or below the horizon.

Note, *vertical circles* are the same with regard to the zenith, nadir, and the horizon, as meridians or hour circles are with regard to the two poles of the world and the equator. But these *vertical circles* can never be actually drawn on a globe, because *zenith*, *nadir*, and *horizon* are ever variable. See them represented figure VI. by the lines Z H N, Z *a* N, *e* N, Z, &c. supposing H R to be the horizon.

Note, The *quadrant of altitudes* being moveable when one end of it is fastened at the zenith, the graduated edge of it may be laid over the place of the sun or star, and brought down to the horizon; then it represents any azimuth or vertical circle, in which the sun or star is; and thus it shews the degree of its azimuth on the horizon.

Note, The azimuth of the sun or star from the east or west points of the horizon at its rising or setting, is called its *amplitude.*

Note, The sun is always in the south at noon, or 12 o'clock, and in the north at midnight, viz. in Europe and all places on this side on the equator. But it is not at the east or west at six o'clock any other day in the year besides the two equinoctial days, as will easily appear in an *oblique position of the sphere*, (of which see the next section) and especially in the last section where the *analemma* shall be more fully described.

Yet the relation which the *parallels of altitude* bear to the *vertical circles*, and which these vertical or azimuthal circles, bear to the meridians or hour circles, may be respresented to the eye in figure VI. and VII.

In figure VI. suppose the outermost circle to be the meridian, H R, the horizon, Z the zenith, N the nadir; then *d b*, *f g*, *k m*, will be *parallels of altitude: and* Z *a* N, Z *e* N, Z *o* N, Z *c* N, &c. will be *vertical circles*, or circles of azimuth crossing the others *at right angles.*

Thus Z C N, is the vertical circle of east or west. And in this scheme *s a* or *f* H will be the arch of the altitude of the star *s*, and H a will be its azimuth from the meridian; and c *a* will be its azimuth from the east to west.

But if the line H R be supposed to represent the equator, then Z and N will be the two poles of the world, and then *d b*, *f g*, &c. will be *parallels of latitude* on earth, or *parallels of declination* in the heavens. Then also the arches Z H N, Z *a* N, Z *e* N, Z *o* N, Z C N will be meridians, or lines of longitude on earth, and our circles in the heavens.

In figure VII. Let the utmost circle be the meridian, H R the horizon, Z the zenith, N the nadir, E Q the equator, P L the axis of the world, or rather the two poles, north and south; then Z H N, Z *a* N, Z *e* N, Z C N will be circles of *azimuth*; P E L, P *o* L, P *m* L, P C L, &c. will be *hour circles*.

And in this position the star *s* will have T *s*, i. e. equal to *e o* for its hour from noon or the meridian; but its azimuth from noon or the south or meridian will be H *e*. Or if you reckon its azimuth from the east or west vertical (which is Z C N) it will be found to be C *e*, while its hour reckoned from P 6 *o* L (which is the six o'clock hour line) will be found to be 6 *s* or C *o*.

Thus it will appear how the *hour* of the sun differs from its *azimuth* and that both of them are numbered, or counted from the meridian P Z E H L N; yet they do not by any means keep equal pace with one another, one being numbered along the *equator* E Q, the other numbered along the *horizon* H R.

Thus you see most evidently that if you suppose the sun *s* ✱ to be in the tropic of cancer represented by the line T ♋, the difference between the *hour* and *azimuth* will appear to be very great; and that the sun's *azimuth* from noon H *e* increases a deal faster than his *hour* T *s* doth in the middle of summer. And if another line K ♑ were drawn to represent the tropic of capricorn, the sun's *azimuth* from noon will appear to increase a great deal slower than his hours do in the middle of winter.

I think it should not utterly be omitted here what is mentioned in almost all writings of this kind, (viz.) that a star is said to rise or set cosmically when it rises or sets at sun-rising.

It is said to *rise* or *set achronically* if it rise or set at sun-setting.

A star is said to *rise heliacally* when it is just come to such a distance from the sun as that it is no longer hid by the sunbeams. And it is said to *set heliacally* when the sun approaches so near to it as that it begins to disappear from our sight being hid by the beams of the sun.

The fixed stars and the three superior planets, *mars*, *jupiter*, and *saturn*, rise *heliacally* in the morning, but the moon in the

evening; for it is in the evening the new moon first appears, coming from her conjunction with the sun.

Note, This sort of rising and setting of the stars is also called *poetical*; because the ancient poets frequently mention it.

SECT. IX.—*Of the Inhabitants of the Earth according to the Positions of the Sphere, the Zones, &c.*

IN order to make the doctrine of the sphere or globe yet more plain and intelligible, let us consider the inhabitants of the several parts of the world, who may be distinguished three ways, (1.) According to the various positions of the globe. (2.) According to the five zones. (3.) In relation to one another.

First, Let us consider them according to the various positions of the globe or sphere, which are either direct, parallel, or oblique.

These three positions of the sphere are represented in figure VIII, IX, X, in each of which the utmost circle is the *meridian*, H R is the horizon. E Q, the equator, ♋ ♑ the ecliptic, S N the axis of the world, N the north pole, S the south, Z D the vertical circle of east and west, Z the zenith, D the nadir, ♋ A the tropic of cancer, C ♑ the tropic of capricorn. The various position of these lines or circles will appear by the following descriptions:

I. A *direct* or *right sphere* figure VIII. is when the poles of the world are in the *horizon*, and the equator passess through the *zenith*: this is the case of those who live directly under the line or equator.

Here the inhabitants have no *latitude*, no *elevation* of the pole; the north or south poles being in the *horizon* they may very nearly see them both.

All the stars do once in twenty-four hours rise and set with them, and all at right angles with the *horizon*.

The sun also, in whatsoever parallel of *declination* he is, rises and sets at right angles with the *horizon*; their days and nights therefore are always equal, because the horizon exactly cuts the sun's diurnal circles in halves.

They have two summers every year, (viz.) when the sun is in or near the two *equinoctial points*, for then he is just over their heads at noon, and darts his strongest beams. And they have two winters, (viz.) when the sun is in or near the *tropics of cancer* and *capricorn*; for then the sun is farthest distant from them, though even then it is nearer than it is to us in England at midsummer.

II. A *parallel sphere*, figure IX. is where the poles of the world are in the *zenith* and *nadir*: and the *equator* is in the *horizon*.

Now if there were any inhabitants thus directly under the

north and south poles, they would have only one day of six months long, and one night of six months, in a whole year, according as the sun is on this or the other side of the *equator*; for the sun moving slowly in the *ecliptic* on the north side of the *equator* half a year, would be all that time above the *horizon* to the inhabitants at the *north pole*, though it went round them daily: and the sun moving in the *ecliptic* on the south side of the *equator* half a year, would be below their *horizon* all that time. The same might be said concerning the inhabitants of the *south pole*.

The two equinoctial days, or when the sun is in the points *aries*, or *libra*, the day and night are equal all the world over; and this is true in a sense to those who live under the *poles*; for the centre of the sun is in their *horizon*. Thus half the sun is above their *horizon*, and half below it for 24 hours together.

Thus, though the polar inhabitants begin to lose the sun at the *autumnal equinox*, they are not in utter darkness all the time of the sun's absence: For the *twilight* lasts till the sun is 18 degrees below their *horizon*, and that is till he has 18 degrees of *declination*. The inhabitants of the north pole are therefore without the twilight only from the 2nd of November till the 18th of January.

Let it be noted also that the refraction of the rays through the thick air or atmosphere makes the *sun* appear above their horizon several days sooner, and disappear several days later, than otherwise it would do. It may be added in favour of their habitations too, that the moon when she is brightest, (viz.) from the first quarter to the last, does not set during their middle of winter: For in that part of her month she is most opposite to the sun, and is therefore in that part of the heavens which is most distant from the sun while he never rises.

The parallels of the sun's *declination* in this position of the sphere are all parallel to the *horizon*; and are the same with the parallels of his *altitude*, and therefore his highest altitude with them can never exceed 23½ degrees. The stars that they could see would be always the same, making perpetual revolutions round them, and never set nor rise, nor be higher or lower. And the planets during half their periods will be above their horizon, as *Saturn* 15 years, *Jupiter* 6, *Mars*, 1, *&c.*

III. An *oblique sphere*, figure x. is where the latitude or elevation of the pole is at any number of degrees less than 90. Therefore all the inhabitants of the earth (except under the equator and the poles) have an *oblique sphere*. Here the *equator* and all the parallels of declination cut the horizon obliquely, therefore the sun and stars always rise and set at oblique angles with the *horizon*.

As one pole of the world is always in their view, and the

other is never seen, so there are some stars which never set, and others which never rise in their *horizon*. Their days and nights are of very different lengths according to the different declination of the sun in the several seasons of the year.

In this oblique position of the sphere, astronomers sometimes talk of the *oblique ascension* of the sun or stars; and in order to obtain a clearer idea of it, let us again consider the *right ascension*, which is the sun or star's distance from that meridian, which passes through the point aries, measured on the equator.

Or it may be expressed thus: The *right ascension* is that degree of the *equator* which comes to the *meridian* together with the sun or star, considered in its distance from the point *aries*. But the *oblique ascension* is that degree of the *equator* which in an oblique sphere rises together with the sun or star considered in its distance from the point *aries*.

Note, That in a *right* or *direct sphere* all the heavenly bodies can only have *right ascension*, and no *oblique ascension*; because the same point or degree of the equator that rises with them comes also to the meridian with them: But in an *oblique sphere* there is sometimes a great deal of difference between the point that rises with them and the point that comes with them to the meridian. Now the difference between the right ascension of the sun or star, and its oblique ascension is called the *ascensional difference*.

Note, Concerning the stars in the *equator*, that their right and oblique ascension are equal: Therefore the sun in the equinoxes rising at six and setting at six has no *ascensional differences:* But as he goes onward from the equator toward the winter solstice, he rises after six; and as he goes toward the summer he rises before six; and the distance of his rising or setting from six o'clock is called the *ascensional difference*. And perhaps it is sufficient as well as much easier for a learner to remember that the time of the sun or star's rising or setting before or after six o'clock is called by astronomers the *ascensional difference*, without taking any notice at all of the oblique ascension, which is neither so easy to be apprehended or remembered.

The second distinction of the inhabitants of the earth may be made according to the *five zones*, which they inhabit; this was an ancient division of the globe. The *zones* are broad circles, five of which cover or fill up the globe. There are two *temperate*, two *frigid* or cold, and one *torrid* or hot.

The *torrid* or burning *zone* is all the space that lies between the two tropics; it was once counted uninhabitable, because of excessive heat, being so near the sun; but later discoveries have found, many and great nations inhabiting

those parts which contain the greatest part of Africa and of South America.

The two *frigid* or cold *zones* are those spaces which are included within the two polar circles, with the pole in the centre, at great distance from the sun, scarcely habitable by reason of the cold. There lies Greenland and Lapland toward the north pole. The south pole and polar regions are undiscovered.

The two *temperate zones* are those spaces that lie on either side of the globe between the tropics and the polar circles, where the sun gives a moderate heat, and makes those parts most convenient for the habitation of men. All Europe, and the greatest part of Asia, and North America, lie in the north temperate zone. *Note*, That the *torrid zone* lying between the two tropics, every place in it has the sun in the zenith, or exactly over their heads once or twice in every year.

Those who live under the tropic of cancer have their winter when the sun is in capricorn. Those who live under the tropic of capricorn have their winter when the sun is in cancer. Those who live under the equator have (as I said before) two winters in the year; though indeed there is scarce any season can be called winter within the limits of the *torrid zone*.

Those who live just within the borders of the two *frigid zones*, lose the sun for twenty-four hours together at midwinter when the sun is in the contrary tropic: And those places that are nearer and nearer to the poles lose the sun for two, three, four, five, six days, for whole weeks or months together at their winter, or when the sun is near the contrary tropic. What is said concerning the loss of light a whole day or week or month at winter in either of the frozen zones, must be also said concerning the gaining a whole day or week or month of day-light at their summer; and those parts of the year are all darkness in the northern frigid zone, which are all day-light in the southern.

Thus as you go farther *northward* or *southward* the continuance of the sun above the horizon grows longer in their *summer*; and the utter absence of it below the horizon grows longer in their *winter*; till you come to those inhabitants (if any such there be) who live *under the pole*, for these have half the year night, and half the year day, as I said before concerning the parallel sphere.

In the two *temperate zones* (as also in the torrid zone) there are never quite 24 hours either of day or of night together; but when the sun is in the *equator*, all days and nights are equal: Afterwards their days gradually increase till their longest day in summer, and gradually decrease till their shortest day in winter: Though those who live on the borders of the polar circles or the frigid zones have their 22nd of June or longest day in summer near 24 hours; and their 22d of December or shortest day in

winter, but just allows the sun to peep a moment above the horizon, so that their night is very near 24 hours long.

Thirdly, The inhabitants of the earth may also be divided into three sorts in respect of their geographical relation to one another, and they are called the *periœci*, the *antœci* and *antipodes*.

I. The *periœci* live under the same parallel of *latitude* on the same side of the globe, but differ in *longitude* from east to west 180 degrees, or just half the globe. These have their summer and winter at the same times with one another, but day and night just at contrary times. Note, Those who live under the poles have no *periœci*.

II. The *antœci* live under the same meridian or line of *longitude*, and have the same degree of *latitude* too, but on *contrary* sides of the *equator*, one to the north, the other to the south. These have day and night exactly at the same time, but *summer* and *winter* contrary to each other. Note, Those who live under the equator have no *antœci*.

III. The *antipodes* have (if I may so express it) the properties of the *antœci* and *periœci* joined together, for they live on contrary sides of the equator, though in the same latitude or distance from it; and their *meridian* or *line of longitude* is 180 degrees or half the globe different. A line passing through the centre of the earth from the feet of the one would reach the feet of the other. They dwell at the full distance of half the globe, and have *day* and *night*, *summer* and *winter* at contrary times.

In each of the three last figures, viz. VIII, IX, and X. you may see these distinctions of the earth's inhabitants exactly represented. ♋ A are *periœci*, so are C ♑. But ♋ C or A ♑ are *antœci*. ♋ ♑, or A C, or N S, or H R, or E Q, are all antipodes to each other. The *amphiscii*, *heteroscii*, and *ascii*, which are only Greek names invented to tell how the sun casts the shadows of the several inhabitants of the world, are not worth our present notice.

SECT. X.—*The Natural Description of the Earth and Waters on the Terrestial Globe.*

THE earth may be divided into its *natural* or its *political* parts. The one distinction is made by the God of nature who created it: The other by men who inhabit it. The globe or surface of earth on which we dwell is made up naturally of two parts, *land and water*; and therefore it is called the *terraqueous globe*. Each of these elements have their various parts and subdivisions, which are as variously described on artificial globes or maps. The land is called either an *island*, a *continent*, a *peninsula*,

an *isthmus*, a *promontory*, or a *coast*. See the plain description of all these, figure XIII.

An *island* is a country or portion of land, compassed about with sea or other water, as Great Britain, Ireland in the British seas: Sicily, Crete, Cyprus, &c. in the Mediterranean Sea; the Isles of Wight, of Anglesey, of Man near England: There are also islands in rivers.

A *continent*, properly so called, is a large quantity of land in which many great countries are joined together, and not separated from each other by the sea, such are *Europe*, *Asia*, *Africa*. This is sometimes called the main-land.

A *peninsula* is a part of land almost encompassed with water, or which is almost an island: Such is the *Morea* which joins to Greece, such is *Denmark* as joining to Germany, and *Taurica Chersonesus* joining to Little Tartary near Muscovy; and indeed *Africa* is but a large peninsula joining to *Asia*.

An *isthmus* is a narrow neck of land between two seas, joining a peninsula to the continent, as the isthmus of *Darien* or *Panama* which joins North and South America: The isthmus of *Corinth* which joins the Morea to Greece: The isthmus of *Sues* which joins Africa to Asia.

A *promontory* is a hill or point of land stretching out into the sea. It is often called a *cape*, such is the *Cape of Good Hope* in the south of Africa; the *Land's End*, and the *Lizard Point* are two capes at the west of England; *Cape Finisterre* on the West of Spain, &c.

A *coast* or *shore* is all that land that borders upon the sea, whether it be in islands or continents: Whence it comes to pass that sailing near the shore is called *coasting*. That part of the land which is far distant from the sea is called the *inland country*. These are the divisions of the land.

The *water* is divided into *rivers* or *seas*.

A *river* is a stream of water which has usually its beginning from a small spring or fountain whence its flows continually without intermission, and empties itself into some sea. But the word *sea* implies a larger quantity of water, and is distinguished into *lakes*, *gulfs*, *bays*, *creeks*, *straits*, or the *ocean*.

The *ocean* or the main-sea is a vast spreading collection of water, which is not divided or separated by lands running between. Such is the *Atlantic* or *Western Ocean* between Europe and America: The *Eastern* or the *Indian Ocean* in the East-Indies: The *Pacific Ocean* or *South Sea*, on the West Side of America, &c. Note, The various parts of this ocean or main-sea that border upon the land are called by the names of the lands which lie next to it: So the *British Sea*, the *Irish Sea*, the *Ethiopean Sea*, the *French* and *Spanish Seas*.

A *lake* is a large place of water inclosed all round with land,

Sect. XI.—*Of Maps and Sea Charts.*

THOUGH nothing can represent the heavens or the earth in their natural appearances so exactly as a globe, yet the two hemispheres either of the heavens or of the earth may be represented upon a flat or plain surface, which are generally called *projections of the sphere.*

If you suppose a globe to be cut in halves just at the equator, and each hemisphere represented on a plane, it is called a "projection of the globe upon the plane of the equator. Then the equinoctial line will be the circumference, and the two poles of the world will be the centres of those two projections, and all the meridian lines will be so many strait lines or semidiameters meeting in the centre. This is the most common method of representing the celestial globe and the stars.

If the globe be cut asunder at the horizon of any particular place and thus represented on a plane, it is called the "projection on the plane of the horizon." Then the zenith and nadir will be the centres of those projections, and the horizon is the circumference. The two poles will be placed at such a distance from the circumference as the pole of the world is elevated above the horizon of that place; and the meridian will be represented as curve lines meeting in the pole point, excepting only that meridian that passes through the zenith which is always a right line. This is a more uncommon projection of the sphere, though it is much used in dialling.

The most usual way of describing the earthly globe on a plane, or a map, is to suppose the globe cut in halves about the first meridian at the island of Ferro or Teneriff. This is a "projection on the plane of the meridian: then the first meridian will determine the circumferences: The pole points will stand in the upper and lower parts of that circle and the other meridians will be curve lines meeting in the pole points, except that which passes through the centre to the projection, which is a right line.

Here the *equator* will be a strait line or diameter crossing all the *meridians* at right angles, and at equal distances from the two poles. Here the two tropics of *cancer* and *capricorn* are drawn at their proper distances of 23½ degrees from the equator; and the two polar circles at the same distance from the poles.

In this projection the ecliptic is sometimes a strait line cutting the middle of the equater obliquely in each hemisphere, and ending where the two tropics meet the meridian: But sometimes the ecliptic is drawn as a curve line or an arch beginning where the equator meets the meridian, and carried upward just to touch the *tropic* of *cancer* in one hemisphere, and downward to touch the *tropic* of *capricorn* in the other. It is in this form

the maps of the world are generally drawn in two large hemispheres.

Note here, That it is impossible to represent a spherical body exactly in its due proportion upon a plane; and therefore the artificial meridians or lines of longitude, parallels of latitude, &c. are placed at such different distances by certain rules of art, and the degrees marked on them are often unequal; but so drawn as may most commodiously represent the situation of the several parts of the earth with regard to one another.

The *meridian* or circumference of these circles is divided into four quarters, and each marked with 90 degrees beginning from the equator and proceeding toward the poles. These figures or numbers shew the latitude of every place in the earth, or its distance from the *equator*, and at every 10 degrees there is a *parallel of latitude* drawn on purpose to guide and direct the eye in seeking the latitude of any place.

The *equator* of each hemisphere is divided into 180 parts, which makes 360 in the whole: And the several meridians or lines of longitude, cutting the *equator* at every 10 degrees, guide and direct the eye to find the longitude of any place required.

As the *equator*, the several *lines of longitude, of latitude*, &c. cannot be represented on a plane exactly as they are on a globe; so neither can the several parts of the world, kingdoms, provinces, islands, and seas be represented in a map exactly in the same proportion as they stand on a globe. But as the divisions of degrees in a map are bigger or less, so the parts of the land and sea are represented there bigger or less in a most exact proportion to those lines of longitude and latitude among which they are placed.

Therefore though the length or breadth, or distance of places on a map of the world cannot be measured by a pair of compasses as they may be on a globe, yet you may count the number of degrees to which such lengths, breadths or distances correspond, and thereby you may compute their real dimensions; though not always so well as on a globe; of which hereafter. Thus much shall suffice concerning maps that represent the whole world, or the globe of earth and water. Let us next consider those maps which represent particular parts of the world, kingdoms or provinces, these are generally drawn in a large square, and are to be considered as *parts of a projection on the plane of the meridian.*

From the top to or toward the bottom of the square are drawn meridians or lines of longitude; and the number of degrees of longitude are divided and marked on the upper and undermost line of the square. From side to side are drawn parallels of latitude, and the degrees of latitude are marked on the two

side lines. Thus you may easily find on a map what is the *longitude* or *latitude* of any place given, or you may find the point where any town stands or should stand, when the true *longitude* and *latitude* of it are given.

Note, In such maps of particular countries the *longitude*, is not always reckoned from the first meridian, as Ferro or Teneriff, but oftentimes it is reckoned from the chief city of that kingdom, which is described in the map, as I have intimated before. *Observe* farther, That though in globes and maps of the whole world the longitude is reckoned from the *west* toward the *east*, yet in smaller maps it is often reckoned both ways, as Bristol is 2½ degrees of western longitude from London, Amsterdam has near 5 degrees of eastern longitude.

Note also, That when a small country is represented in a large map, the *lines of longitude* and *parallels of latitude* are drawn not merely at every 10 degrees, as in the globe, but sometimes at every 5 degrees, and sometimes at every single degree.

Let it be observed also in *large maps*, that describe any particular country or province, as a single or double crooked waving line signifies a *river* when it is made strong and black; so a *public road* is described by a single or a double line drawn from town to town, not quite so curled nor so strong as a *river* is, but strait or winding as the road itself happens. And where the *roads* lie through a broad plain or great common without houses or hedges, they are sometimes described by a *double row of points*.

As *villages* and *smaller towns* are described by a little circle or small round o in maps of larger countries, where the *cities* are represented by the figure of a house or two with a spire or steeple; so in maps of smaller countries or provinces the *little towns* and *villages* are described by the figure of a house or two, and *great towns* or *cities* are marked like several buildings put together in prospect, or else the naked plan of those very towns or cities is drawn there and distinguished according to their streets.

I proceed now to consider *sea-charts*.

As maps are drawn to describe particular countries by land, so a description of coasts or shores, and of the seas for the use of mariners is called a sea-chart, and it differs from a map chiefly in these particulars.

I. A *map of the land* is full of names and marks describing all the towns, countries, rivers, mountains, &c. but in a *sea-chart* there are seldom any parts of the land marked or described, besides the coast or shores and the sea ports, the towns or cities that border upon the sea, and the mouths of rivers.

II. In a *map* the sea is left as an empty space, except where the lines of longitude and latitude, &c. are placed: But in sea charts all the shoals or sands, and shallow waters, are marked

exactly according to their shape, as they have been found to lie in the sea by sounding the depth in every part of them.

III. In *sea-charts*, the meridians are often drawn in strait and parallel lines, and the lines of latitude are also strait parallels crossing the meridians at right angles. This is called *Mercator's projection*; and the points of the compass are frequently repeated and extended through the whole chart in a multitude of crossing lines,* that wheresoever the mariner is upon the sea he may know toward what point of the compass he must steer, or direct his vessel to carry it toward any particular port; and that he may be able to see with one cast of an eye the various *bearings* of any port, coast, island, cape, &c. toward each other.

IV. The sea is also filled in sea-charts with various numbers or figures which denote the depth of water, and shew how many fathom deep the sea is in those places where the number stands; these are called soundings.

V. In sea-charts there is not such care taken to place the *north* parts of the world always directly upright and before the face of the reader; but the coasts and countries are usually described in such a position as may afford the fittest room to bring in the greatest variety of shores and seas within the compass of the same chart, whether the east, or west, or north, be placed directly before the readers. Here let it be noted that as *geography* taken strictly and properly is a description of land, so a description of water or sea is called *hydrography*; and as those who describe the land on maps are properly called *geographers*, so those who draw the sea-charts are often called *hydographers*.

Sect. XII.—*The political Divisions of the Earth, represented on the Globe.*

THUS we have finished the *natural divisions of the surface of the earth*; we come now to consider how it is divided *politically* by men who inhabit it. In this sense it is distinguished into four quarters, into empires, kingdoms, states, commonwealths, principalities, dukedoms, provinces, counties, cities, towns, villages, &c.

The earth is first divided into four chief parts or quarters, which are called Europe, Asia, Africa, and America.

Europe is divided from Africa and bounded on the south side by the Mediterranean sea. On its eastern side it is divided from Asia by a line drawn on the east side of Candia or Crete passing up the Ægean sea and through the Propontis into the Euxine or Black sea, and from thence through the sea of Zabaique by the river Don or Tanais, and thence through Muscovy, (as some will have it) to the river Oby running into the northern ocean.

* See Marginal Note, Probl. X. Sect. XIX.

It is also bounded on the west side by the *Western* or *Atla ocean.*

Asia is also bounded on the north by the Northern Fro seas: On the south by the *Indian ocean:* On the east it inclu China and the Oriental islands: But on the north-east its bou are unknown, for travellers have not yet been able to deter whether those eastern parts of Great Tartary may not be joi to some unknown parts of North America.

Africa is a large Peninsula joining to Asia by a little i of land at Egypt bounded on the north by the Mediterranean On the west by the Atlantic ocean: On the north east by Red sea; and on the south and east by the Southern and In oceans.

America was unknown to the ancients till found out by Ch topher Columbus, a little above two hundred years ago. called in general the West Indies. It lies almost three thou miles to the westward from Europe and Africa on the o side of the Atlantic and Ethiopic seas: It is made up of large continents, divided by a narrow neck of land into parts; the one is called North America or Mexicana, the South America or Peruana. Let us treat briefly of each of in their order.

SECT. XIII.—*Of Europe and its several Countries a Kingdoms.*

THE chief countries of which *Europe* is composed be distinguished into the *northern*, the *middle*, and the *sout* parts.

I. The *northern* parts are the British isles, Denmark, way, Sweden, Muscovy, and Lapland.

The *British isles* are Great Britain and Ireland. Great Britain contains the two kingdoms of England and Scot which were lately united into one. The chief city of Engla London, and Edinburgh is the chief in Scotland, as Dublin Ireland. *Note*, That Wales is reckoned a part of England, th they speak a different language.

Denmark is a small kingdom on the north of Germany up of one peninsula, and several islands in the Baltic sea chief city is Copenhagen, which stands in the largest of islands.

The kingdom of *Norway* (which lies all along borderin the west of Sweden) has its chief town Drontheim; this tog with the isle of Iceland far distant in the northern sea is the government of the king of Denmark.

Sweden is one of the northern kingdoms which almos compasses the Baltic sea; its chief city is Stockholm. part of it tha lies on the east side of the Baltic is called

land, Livonia, &c. and the southern part on the west side next to Denmark is called Gothland.

All the north-east part of Europe is Russia and Muscovy under the government of the Czar, whose capital city is Moscow. His conquests have lately joined Livonia to his dominion, which before belonged to Sweden, and there he has built the city Petersburgh.

Lapland is a cold savage country that lies on the north of Sweden, and belongs to three princes, viz. the Dane, the Swede, and the Muscovite. Note, That Norway, Lapland, and Sweden, were once all comprized under the general name of Scandinavia.

II. The middle parts of Europe are France, Germany, Poland, Hungary, and Little Tartary.

France lies just southward of England; its northern coast is washed by the English channel; its western shores by the Atlantic sea; and its southern by the Mediterranean: its chief city is Paris.

Before I proceed to Germany, it it proper to mention a long row of distinct governments which lie on the east of France, and divide it from Germany and Italy. These are the seven United Provinces, the ten Spanish Provinces, the dukedom of Lorrain, the countries of Switzerland, Savoy, and Piedmont.

The seven United Provinces are called by the name of Holland, because that is the biggest of them. They are a most considerable Commonwealth, and their chief cities are Amsterdam, Rotterdam, Leyden, Utrecht, &c.

Southward of this lie the ten Spanish Provinces, or the low countries or Netherlands, which are called by the name of Flanders, because that is the largest of them: They have belonged to the kingdom of Spain for some ages; but they are now under the Emperor of Germany; their chief cities are Brussels, Antwerp, Louvain, Mons, Namur, Ghent, &c.

Lorrain lies to the south of Flanders, and is governed by a Duke: Its chief town is Nancy.

Switzerland is the next: It is a free republic divided into thirteen parts commonly called the Swiss Cantons, viz. Zurich, Bern, Basil, Lucern, &c. Their allies are the Grisons, the Valtoline, &c. The Commonwealth of Geneva might also be mentioned here, which is a very small but free sovereignty, and maintains its rights, because none of its neighbours will let the others seize and possess it.

The dukedom of *Savoy* and *Piedmont* borders upon the south of Switzerland, and reaches to the Mediterranean sea: its chief city is Turin; its duke is lately made king of Sardinia.

I proceed now to Germany, which stands in the very heart of Europe; it is called an Empire, and its chief city where the emperor dwells is Vienna: But, there are in it many lesser governments, such as dukedoms, marquisates, landgraves, and several free towns or cities that have some dependence upon the emperor, but yet they are little sovereignties within themselves.

The most considerable of these is the dominion of the archduke of Austria, who is king of Bohemia and Hungary, and is generally chosen emperor. The nine electorates are next in honour, which are so called because their governors are electors by whom the emperor of Germany is chosen. Their names or titles are these: 1. The archbishop of Mentz. 2. The archbishop of Triers or Treves. 3. The archbishop of Cologn. 4. The king of Bohemia. 5. The duke of Bavaria. 6. The duke of Saxony. 7. The marquis of Brandenburgh, now king of Prussia. 8. The prince palatine of the Rhine. 9. The duke of Brunswick and Lunenburg, who is also king of Great Britain. Besides all these there are many small principalities governed by secular or ecclesiastical powers, which are too numerous to be reckoned up here.

Poland is a large kingdom lying to the east of Germany: It comprehends also the large province of Lithuania: The chief cities of this kingdom are Warsaw and Cracow. I might here mention the country of Prussia, which some years past has been dignified with the name of a kingdom: It is situate northward between Germany and Poland. The king resides at Berlin in Brandenburgh.

Hungary is a kingdom which lies just south of Poland, its chief towns are Presburg and Buda: It has been in a great measure under the government of the Turks; but it now belongs to the emperor of Germany.

Little Tartary, which is also called Crim Tartary, is a small country lying to the east of Poland, and stretching along on the north side of the Euxine or Black Sea.

III. We go on now to the southern parts of Europe; and these are Spain, Italy, and the European dominions of the Turk.

Spain is the most southern kingdom of Europe, a large country; its capital city Madrid stands in the midst of it: On the west side of it lies the kingdom of Portugal bordering all along upon it; it was once a part of Spain, but now is subject to a distinct king: Its chief city is Lisbon.

Italy is a large peninsula in the Mediterranean sea, and contains various governments in it, viz. Mantua, Modena, Parma, Lucca, Genoa, &c. but the most noted and remarkable are these five, Venice, Milan, Florence or Tuscany, Naples, and

the State of the church, which is the dominion of the pope, whose chief city is Rome.

In the south east part of Europe lies the famous country of Greece, which contains the ancient provinces of Macedonia, Thessalia, Achaia, &c. with the towns of Thessalonica, Philippi, Athens, Corinth, &c. and the peninsula of Peloponnesus, now called Morea: But all these together with the more northern provinces of Transilvania, Walachia, Bulgaria, Romania, &c. are now almost entirely under the dominion of the Turk, whose chief city is Constantinople, situate at the mouth of the Euxine sea. All this is called Turkey in Europe. Thus have we gone through the northern and middle, and southern countries of Europe: But it may be proper to mention also some of the chief islands of this part of the world, as well as the mountains of Europe and its rivers.

Near to Italy, France and Spain, lie several islands in the Mediterranean sea; such as Majorca, Minorca, Ivica, Corsica, Sardinia, Sicily and Malta, which belong to different princes.

On the east side of Greece is the Ægean sea, or Archipelago, in which are many small islands, and Crete a large one: On the west side of Greece is the Gulph of Venice, or the Adriatic sea, in which also there are several small islands, as Corfu, Cephalonia, Zant, &c.

Divers other isles there are which are included in Europe; as Isle of Man, of Anglesey, of Wight, Jersey, Guernsey, &c. which belong to England: The Hebrides on the west of Scotland, the Orcades, and Shetland Isles on the North: Some in the Baltic sea, which belong to Sweden and Denmark: The Azores or western islands in the Atlantic sea, which are under the king of Spain. And several others of less note.

Some of the most remarkable mountains in Europe are these, 1. The Alps between France and Italy. 2. The Apennine hills in Italy. 3. The Pyrenean hills between France and Spain. 4. The Carpathian mountains in the south of Poland. 5. The Peak in Derbyshire in England. 6. Plinlimmon in Wales, &c. Besides several volcanoes, or burning mountains, as Vesuvius and Stromboli in Naples, Mount Ætna, now called Mon-Gibel, in the island of Sicily, and Mount Hecla in the cold isle of Iceland.

The principal rivers of note in Europe are the Thames and the Severn in England; the Tay in Scotland; the Shannon in Ireland; Tagus in Portugal and Spain; the Po and Tiber in Italy; the Weisel or Vistula in Poland. In Germany the Elbe and the Oder, the Rhine and the Danube. In France the Seine and the Rhone. In Moscovy the Don and the Volga.

The *Danube* and the *Volga* are the largest rivers in Europe, the Danube running through all Germany and Turkey into the Euxine or Black Sea; and the Volga, (which some writers attribute to Asia, because) though it runs through a great part of Moscovy, yet it empties itself into the Caspian Sea.

Sect. XIV.—*Of Asia, and its several Countries and Kingdoms.*

ASIA may be divided into these five parts, (viz.) Turkey, Persia, India, China, and Tartary.

The dominion of the Turks in Asia contains several countries in it, (viz.) Natolia, Palestine, Arabia, Georgia, &c.

1. *Natolia*, or *Asia Minor*, which is a Peninsula, between the Euxine sea and the Mediterranean, where lay he ancient countries of Galatia, Cappadocia, Pontus, Bythynia, Lyconia, Cilicia, Phrygia, Pamphylia, &c. through which the apostle Paul travelled and made many converts there. Here were the seven famous churches of Asia, to which the epistles were written in the second and third chapters of the Revelations, (viz.) Ephesus, Smyrna, Sardis, &c. Many of them are now called by different names: But Smyrna is one of the chief cities in the whole country. 2. Palestine, or the Holy Land, and all the adjacent countries of Syria, Chaldea, Mesopotamia, &c. The chief towns in it now are Aleppo, Scanderoon, or Alexandretta, Bagdat or Babylon, Damascus, Jerusalem, &c. 3. Arabia, which anciently was divided into Arabia the Happy, Arabia the Desart, and Arabia the Stony, lying all between the Persian gulf, and the red sea: The chief towns of it are Mecca, Medina, &c. 4. Georgia and Turkomania, formerly called Armenia Major, are northern provinces belonging to the Turks, that lie between the Euxine and the Caspian sea.

Persia, a large empire, lies eastward from Turkey between the Caspian and Indian seas: Its capital city is Ispahan.

India is divided into two parts by the river Ganges. India, on this side the Ganges, contains the biggest part of the Empire of the Great Mogul, whose chief city is Agra. In a peninsula or large promontory in this part of India, are various settlements of the European nations, as at Fort St. George, Tranquebar, Goa, &c. Beyond the river Ganges lies another large Peninsula, which contains the countries of Pegu, Siam, Tunquim, Cochinchina, &c.

Eastward of all these lies the empire of China, a large and a polite nation, whose chief city is Pekin. These countries last named are called in general the East-Indies.

Great Tartary takes up all the northern part of Asia. That which borders upon Moscovy is often called Moscovy in Asia:

The whole is a savage, unpolished and unknown country as to the parts as well as the inhabitants of it; and how far it reaches to the north-east, no man in this part of the world can inform us.

There are multitudes of Islands which belong to Asia, the chief of which are Japan, Borneo, Celebes, Java, Sumatra, Ceylon, the Philippine Isles, the Maldivian Isles, &c. all these in the eastern Ocean, and Cyprus in the Mediterranean.

The most remarkable rivers are Tigris and Euphrates in Turkey, Ganges and Indus in India, whence the whole country took its first name. The chief mountains are Imaus, Caucasus, Ararat, which are but different parts of the long ridge of hills which runs through Asia from the west to the east, and is called by the ancient general name of Mount Taurus.

SECT. XV.—*Of Africa and its Divisions.*

AFRICA is the third quarter of the world: It may be divided into the following territories, Egypt, Barbary, Bildulgerid, Zaara, Nigritia, Guinea, Nubia, Abyssinia and Ethiopia.

Egypt lies to the north east and joins to Asia; the chief cities are Grand Cairo and Alexandria.

Barbary is a long country, it comprehends most part of the ancient Mauritania, or the country of the Moors; it lies along the coast of the Mediterranean sea: Its chief towns are Fez, Morocco, Mechaness, Sallee, Tangier, Ceuta, Algier, Tunis, Tripoli and Barca.

Bildulgerid, or the ancient Numidia, has its chief town Dara; it lies south and south-east of Barbary, unless it be reckoned a part of it.

Zaara comes next; it is a desart inland country, and much unknown. So is Nigritia, or the land of the Negroes, which lies to the South of Zaara; as Guinea is situated in the south of Nigritia. The Tooth or Ivory Coast, and the Quaque Coast, and the Gold Coast, are several divisions of Guinea well known to mariners.

Nubia lies southward of Egypt, as Abyssinia does to the south of Nubia, both near the coast of the Red sea.

Ethiopia has been given as a general name to all the countries that compose the south-east and south part of Africa, at least, all the maritime countries or coasts from Guinea, on the western side to Abyssinia, or Nubia on the east, and sometimes it includes Abyssinia also, which is called the lesser or inner Ethiopia.

In the most southern part of Ethiopia, are the inland kingdoms of *Monomotapa, Monoemunga*, &c. On the western coast, *Congo, Loango, Angola;* the eastern coast is *Zanguebar* and the *Mozambique*. The southermost coast is inhabited by the

Cafres and the *Hottentots*, near the Cape of Good Hope, who are famous for their stupidity, living in the most brutal and barbarous manner, as though they had little of human nature in them beside the shape.

The chief Islands near Africa are the large Isle *Madagascar*, called the Isle of *St. Lawrence*, that lies toward the eastern sea; and on the west or north-west are the small Islands of *Cape Verd*, the *Canary* Islands, and the *Madeiras* in the Atlantic sea, with others of lesser note in the Ethiopic sea.

The most famous rivers in Africa are the *Nile* and the *Niger*. The Nile runs through all the eastern part of the country, and empties itself into the Mediterrenean sea by many mouths at the land of Egypt. The river Senegal, anciently called Niger, runs through Negroland, into the Atlantic ocean. The most remarkable mountains are these, (1.) *Mount Atlas*, or the *Atlantic* hills in the west of Barbary, which were supposed by the ancients to be the highest in the world; whence came the fable of *Atlas* a giant bearing the heavens upon his shoulders. (2.) The Mountains of the *Moon*, which lie much more southward to Monomotapa: And (3.) The exceeding high hill of *Teneriff*, which is among the Canary islands.

SECT. XVI.—*Of America and its Divisions.*

AMERICA is the fourth and last quarter of the world, it is divided into the northern and southern parts by an isthmus or neck of land at Darien or Panama.

Northern America includes Canada, the English Empire, Old Mexico, New Mexico, Florida, and the Northern Land.

The *Northern Land* contains some Islands and settlements of European nations. In Hudson's-Bay and other coasts of Groenland, Greenland, near to the arctic circle, but few of them are much known, frequented or inhabited. As for the north-west part of North America, it is utterly unknown whether it be Island or Continent, whether it may not reach thousands of miles farther and be joined to the north-east part of Great Tartary.

Canada, or *New France*, lies on the north-east side of the river of St. Lawrence, its chief town is Quebec.

The *English Empire* in America lies along the eastern coast from about thirty to almost fifty degrees of north latitude.

New England is the chief province, of which Boston is the principal town or city. North of New England lies Acadia, sometimes called New Scotland. Its chief town was Port Royal, which hath changed its name to Annapolis. Southward of New England lie New York, New Jersey, Pensylvania and Maryland, Virginia and Carolina. On the west and north-west side of these

plantations lie large tracts of land with many great lakes in it, where various nations of savages inhabit.

Florida comes next in course to be mentioned, it borders east or north-eastward on Carolina, and westward it reaches to the river Missisippi and beyond it. It is bounded by the sea on the south, but there have been no very great or remarkable towns or settlements formed there by the Spaniards, who found and named it.

New Mexico, or *New Granada*, lies west of Florida, possessed also by the Spaniards; its chief town is St. Fe, upon the river Nort.

Mexico, or *New Spain*, lies more south, it is a large and rich country, long and uneven, stretching from north-west to south-east; and contains many provinces in it belonging to the Spaniards, who have destroyed millions of the natives there. It has several towns, of which the chief has the name of Mexico given it. Florida and Mexico together make a large bay, which is called the Gulf of Florida, or the Gulf of Mexico. This country reaches down to the small neck of land whereby South America is joined to it. On this neck of land are Panama on the south side, and Porto-Bello on the north.

The *southern part of America* is something like a large triangle lying in the vast southern ocean, and almost encompassed by it. On the western side this ocean is called the Pacific Sea, because seldom vexed with storms.

This *southern* part of *America* comprehends many great countries, viz. Terra Firma, Peru, Amazonia, Guinea, Brasil, Chili, Paraguay, Terra Magellanica, &c. The inland parts are very much unknown, but the greatest part of the coasts are possessed by the inhabitants derived from Spain and Portugal, who have made various settlements there.

The chief islands of *America* in the north are Newfoundland, which is a triangle near Acadia; then Cuba, Hispaniola, and Jamaica. The lesser isles are called Lucayes, or Bahama islands, south-east of Florida; and the Caribbee islands eastward of Hispaniola. On the west side of North America, lies a very large and long island, called California, with many little ones near it.

The chief island in south America is *Terra del Fuego*, which lies near the main land, and thus makes the *straits of Magellan*. There are many others of less extent and note, both on the coast, and in the vast south-sea. The most noted rivers of north America are the great rivers of *St. Lawrence*, or *Canada*, that divides New England from New France; and the river *Missisippi* where the French have made large settlements.

In *South America* the two great rivers are the *Amazon* with all its branches, and *Rio de la Plata*, or the river of Plate.

The chief mountains are the *Apalachin* hills in North America, which divide Florida from the more northern countries; and the *Andes* in South America, which is a long ridge of mountains running from the south part of America toward the north. Travellers suppose them to be the highest in the world.

Thus I have described the various countries of the earth in a very brief but imperfect manner, sufficient only to give the young and ignorant reader a taste of geography, and to encourage him to pursue the study farther in that excellent manual Gordon's Geographical Grammar, or in volumes of larger size.

Sect. XVII.—*Of the fixed Stars in the Heavenly Globe.*

AS the *Terrestial Globe* has the various countries, cities, mountains, rivers and seas drawn upon it; so on the Celestial Globe are placed the fixed stars exactly according to their situation in the heavens. Yet there is this difference between the representations made by the heavenly and those made by the earthly globe, viz. That the several countries, rivers and seas, are represented on the convex or outward surface of the earthly globe, just as they lie naturally on the convex surface of the earth; whereas the stars naturally appear to us in the concave, or inward hollow surface of the heaven, but they are represented on the heavenly globe on the convex surface of it. Therefore we must suppose our eye to be placed in the centre of the globe, in order to have the stars and heavens appear to us in their concavity and proper situation.

Planets and *comets* are vulgarly called by the general name of stars; but the *fixed stars* differ from the planets and the comets in this, that they always keep the same place or distance with regard to one another; whereas the planets and comets are perpetually changing their places and distances with regard to *one another*, and with regard to the *fixed stars*. They differ also in this respect, that the *fixed stars* generally twinkle, except when near the zenith, or seen through a telescope; and they shoot sprightly beams like the sun, which is usually given as a proof, that like the sun they shine with their own light; the planets have a more calm aspect like the moon, and never twinkle, which is one argument among many others that they derive their light from the sun, and shine only by reflection.

For our better acquaintance with the fixed stars, astronomers have reduced them to certain constellations. This we have shewn already in the second section, concerning those stars that lie in the zodiac, which are reduced to 12 constellations, and called the twelve signs, (viz.) Aries or the ram, Taurus or the bull, Gemini or the twins, &c. the rest of the stars are distinguished into the northern and southern constellations, as lying north or south of the zodiac or ecliptic.

The *Northern Constellations* were thus framed by the ancients, Ursa Minor or the little bear, in whose tail is the pole star, Ursa Major or the great bear, Draco or the dragon, Cepheus whose feet are just at the north pole. Cassiopeia and her chair, Andromeda, the northern triangle, Perseus with Medusa's head, Auriga or the charioteer, Bootes or the hunter, who is sometimes called Arcturus or the bear-keeper, Corona Borealis or the northern crown, Egonasi or hercules kneeling, Lyra or the harp, Cygnus or the swan, Pegasus or the great flying horse, Equuleus or Equiculus the little horse's head, Delphinus or the dolphin, Sagitta or the arrow, Aquila or the eagle, which some call the vulture, Serpens or the serpent, and Serpentarius the man who holds it. To these 21 northern constellations were afterwards added, Antinous at the equator next to the eagle, Cor Caroli or king Charles' heart, a single star south of the great bear's tail, and Bernice's hair, a few small stars south of Charles' heart, &c.

The *Southern Constellations* known to the ancients are Cetus the whale, and the river Eridanus, Lepus the hare, the glorious constellation of Orion with his girdle, sword, and shield, Sirius or the great dog, Canicula or the little dog, Hydra or a large serpent, the ship Argo, Crater or the two handed cup, Corvus the crow, or the raven, Centaurus or the half man half horse, Lupus or the wolf, Ara or the altar, Corona Australis or southern crown, Piscis Notius or the southern fish. To these 15 there have been added 12 other constellations made up of the fixed stars toward the south pole which are never visible to us in Britain, and therefore I shall not mention them.

Astronomers have framed some lesser *Constellations* which are contained in the greater, as the Pleiades or the seven stars, and the Hyades in Taurus or the bull; Capella or the goat, in which is a very bright star so called, in the arms of Auriga or the charioteer; the Manger and Asses in the Crab, which indeed is nothing but a bright spot composed of a multitude of small stars; Charles Wain which are seven bright stars in the rump and tail of the Great Bear, three of which in the tail resemble the Horses, and the other four, *c*, *d*, *b*, *r*, a square cart; see figure xxx. The two hindmost stars in the cart, viz. *b* and *r* are called the pointers, because they point to the north pole. Besides these there are several other smaller stars scattered up and down in the heavens, which are not reduced to any of the Constellations; though of late years Hevelius a great astronomer has made Constellations of them which are described upon some modern globes.

The *fixed Stars* are of different sizes, and are divided into those of the first, second, third, fourth, fifth and sixth magnitudes. There are but a few stars of the first and second magnitude,

and many of them have remarkable names given to them, as the Ram's Head, Aldebaran or the bull's eye, Capella or the goat, the three stars in Orion's girdle, the Lion's Heart, Deneb or the lion's tail, Regel the star in Orion's left foot, Spica Virginis, which is an ear of corn in the virgin's hand, Hydra's heart, the Scorpion's heart, the Eagle or Vulture's heart, Al Pegasi or the horse's wing, Fomahant a large star in the southern fishes mouth near Aquarius, the Pole Star in the Little Bear's Tail, &c. See more in the table of fixed stars at the end of this book. Some remarkable stars are called by the name of the constellation in which they are, as the Great Dog, the Little Dog, Lyra or the harp, Arcturus the bear-keeper, Capella the goat, &c.

As the globe of the earth with all the lands and seas described on a terrestial sphere is represented on maps, so the celestial sphere with all the fixed stars is often represented on two tables or plani spheres, projected, one on the plane of the equator with the two poles of the world in their centres; and the other on the plane of the ecliptic with the poles of the ecliptic in their centres*. Note, This sort of projections has sometimes been furnished with some little appendices which are moveable, and makes an instrument called a Nocturnal to take the hour of the night, and perform many other astronomical problems by the stars.

It is hardly necessary to say, that the stars are supposed to keep their constant revolution once in twenty-four hours by day as well as by night; but the day light conceals them from our eyes.

The sun in its annual course moving from west to east through all the signs of the zodiac hides all those stars from our sight which are near its own light or place in the heavens; and therefore at several seasons of the year you see different stars or constellations rising or setting, or upon the meridian at every hour of the night; and as the sun goes onward daily and monthly toward the east, the Eastern Constellations come daily and monthly within the reach of the sun beams and are concealed thereby, which is called their setting heliacally. And the Western Constellations hereby getting farther off from the sun beams, are made visible to us, which is called rising heliacally.

Thus, as I intimated before, we may easily find what stars will be upon the meridian every midnight by considering in what sign the sun is, and in what degree of that sign; for the sun with the stars that are near it being upon the meridian at noon, the stars that are directly opposite to them in the heavens will

* Mr. Senex at the globe over-against St. Dunstan's in Fleet-street, has lately printed the best that ever were in England, or perhaps in any country.

be upon the meridian that day at midnight. And by the same means if you observe what stars are upon the meridian at midnight, you easily infer the sun is in the opposite point of the heavens at midnoon.

Here it should not be forgotten, that there is a broad uneven path encompassing the heavens, passing near the north-pole, which is brighter than the rest of the sky, and may be best seen in the darkest night: This is called the Milky Way, which later philosophers have found by their telescopes to be formed by the mingled rays of innumerable small stars. It is to the same cause that some other bright spots in the sky (though not all) are ascribed which appear to us like whitish clouds in midnight darkness.

SECT. XVIII.—*Of the Planets and Comets.*

THOUGH the planets and comets are never painted upon the globe because they have no certain place, yet it is necessary here to make some mention of them; since they are stars much nearer to us than the fixed stars are, and we know much more of them. The planets are in themselves huge dark bodies which receive their light from the sun, and reflect it back to us. They are called *planets* from a Greek word which signifies *wanderers*, because they are always changing their places in the heavens, both with regard to the fixed stars and with regard to one another.

The planets are placed at very different distances from the centre of our world, (whether that be the earth or the sun) and they make their various revolutions through the twelve signs of the *Zodiac* in different periods of time.

Saturn	in	29 years and	167 days,	i. e. about 24 Weeks.
Jupiter	in	11	314	45
Mars	in	1	321	46
Earth or sun	in	1	0	0
Venus	in	0	224	32
Mercury	in	0	87	12½
Moon	in	0	27½	4

As the ecliptic line is the orbit or annual path of the *earth* or *sun*, so each *planet* has its proper orbit, whose plane differs some few degrees from the plane of the orbit of the sun, and to a spectator's eye placed in the centre would intersect or cut the sun's orbit at two opposite points or *nodes*. Now the distance of a planet from the ecliptic, measured by an arch perpendicular to the ecliptic, is the *latitude* of that planet as before.

To represent this as in figure XI. you may imagine as many hoops as there are planets thrust through with several strait wires, and thereby joined in different places to the hoop that re-

presents the plane of the ecliptic, i. e. the sun's or earth's orbit; and then let these hoops be turned more or less obliquely from the plane of the *ecliptic:* For all the several orbits or paths of the planets do not cross or intersect the ecliptic or sun's path in the same point, nor at the same angles: But their *nodes* or intersections of the ecliptic are in different parts of the ecliptic, and also make different angles with it.

Among the several uses of observing the *latitude* of a planet, see one very necessary in *problem* XXXVII.

The *comets* were by Aristotle and his followers supposed to be a sort of meteors or fires formed in the sky below the moon, continuing for some months, and then vanishing again. But by later astronomers they have been found to be *dark bodies* like the planets, moving through the heavens without any regard to the ecliptic, but in very different orbits, which are supposed to be *elipses* or ovals of prodigious length, and returning at various periods of several scores or hundreds of years. Though it must be confessed, those parts of their orbits which are within the reach of our sight are so very inconsiderable parts of the vast ovals they are said to describe, that it has been much doubted, whether the lines they describe in their motion be not *parabolical* or some other infinite curve; and thus whether the comets themselves are not *wandering stars* that have lost all regular revolution, and perhaps have no settled periods at all and may never return again: But comets appear so seldom that they have scarce given the nice enquirers of these last ages sufficient opportunity to observe or calculate their motions with such an absolute certainty as could be wished.

Thus I have finished the speculative part of this discourse which contains the rudiments or first principles of astronomy. It is called the *spherical part*, because it treats of the doctrine and use of the sphere; and I have concluded therein the general part of geography, and given a slight survey of the particular divisions of the earth.

It is indeed the *second* or *special part of geography* that treats properly of these particular divisions of the earth which I have but slightly run over, and in a much larger manner enumerates not only all the kingdoms, states, and governments of the world, but also gives some account of their manners, temper, religion, traffic, manufactures, occupations, &c. It also describes the various towns and villages, the larger and lesser mountains, rivers, forests, the several products of every country, the birds, beasts, insects, fishes, plants, herbs, the soil, minerals, metals, and all rarities of art and nature. It relates also the various ancient and modern names of the nations, cities, towns, rivers, islands, &c. What remarkable occurrences of battles, victories, famine, desolations, prodigies, &c. has happened in

every nation, and whatsoever has rendered it worthy of public notice in the world.

There are many books extant in the world on this subject; some of lesser size, such as Gordon's Geographical Grammar, Chamberlain's Geography; and larger, viz. Moden's Geography Rectified, in quarto, Thesaurus Geographicus, Moll's Geography, in folio, &c.

The *second* or *special part of astronomy* is called the *theory of the heavens*, or the sun and planets, which will lead us into the knowledge of a thousand beautiful and entertaining truths concerning the system of the world, the various appearances of the heavenly bodies, and the reasons of those appearances, viz. a more particular and exact account of the day and night, and of the several seasons of the year, spring, summer, autumn, and winter, of the length and shortness of the days. Why in the winter the sun is nearer to us than it is in the summer, and why the winter half-year is seven or eight days shorter than the summer half-year. Whence come the eclipses of the sun and moon, both total and partial; why the moon is only eclipsed when she is full, and the Sun only when she is new: Whence proceed the different phases of the moon, as the new or horned moon, the half-moon, the full, &c. Why the two lower planets Mercury and Venus always keep near the sun, and never move so far as two whole signs from it: Why Venus is horned, halved and full as the moon is. Why the three superior planets Mars, Jupiter and Saturn, appear at all distances from the sun, and are sometimes quite opposite to it. Why both the upper and lower planets sometimes appear swifter, sometimes slower; why they seem sometimes to move directly or forward, sometimes retrograde or backward, sometimes are stationary, or seem to stand still. Why they are sometimes nearer to the earth, which is called their *perigeum*, and sometimes farther from the earth, which is called their *apogeum*, and by this means appear greater or less. Why they are nigher to or farther from the sun, which is called their *perihelion* and *aphelion*; and in what part of their orbits this difference falls out. How it comes to pass that they seem higher in the horizon than really they are by *refraction*, and how again they seem lower than they really are by the *parallax*.

In this part of astronomy it is proper to shew the different schemes or hypotheses that have been invented to solve or explain all these appearances of the heavenly bodies. Here the Ptolematic or ancient system should have the first place, to represent how the ancients placed the *earth in the centre* of the world, and supposed the sun to move round it amongst the other planets as it appears to the vulgar eye; and what tedious and bungling work they made by their contrivance of *solid transparent spheres*

of different thickness, placed in eccentric order and assisted by their little epicycles. What infinite embarrassments and difficulties attend this rude and ill-adjusted contrivance, and how impossible it is to solve all the appearances of nature by this hypothesis.

Then the modern or *copernican scheme* should be represented, which makes the heaven all void, or at least filled only with very fine ethereal matter; which places the *sun in the centre* of our world with all the planets whirling round it; which makes the earth a planet, turning daily round its own axis (which is the axis of the equator) to form day and night; and also carried yearly round the sun in the *ecliptic* between the orbits of Venus and Mars to form summer and winter. This scheme also makes the *moon* a *secondary planet* rolling monthly round the *earth*, and carried with it in its yearly course round the sun, whereby all the variety of appearances of the sun and moon, and of all the planets; as well as the differences of day and night, summer and winter, are resolved and explained with the greatest ease, and in the most natural and simple manner.

Here also it should be shewn that as the moon is but a *secondary planet*, because it moves round the earth which is itself a planet: So Jupiter, because it moves round the sun has also *four secondary planets* or moons moving round it, which are sometimes called his *satellites* or life-guards. *Saturn* also has *five such moons*, all which keep their certain periodical revolutions: And beside these, Saturn is encompassed with a large flat ring 21000 miles broad, whose edges stand inward toward the *globe of Saturn*, (like a wooden horizon round a globe) at about 21000 miles distance from it, which is the most amazing appearance among all the heavenly bodies: But these secondary planets which belong to *Jupiter* and *Saturn* together with this admirable *ring* are visible only by the assistance of telescopes: And yet mathematicians are arrived at so great an exactness in adjusting the periods and distances of these *secondary planets*, that by the motions and eclipses of the *moons* of *Jupiter* they find not only the true swiftness of the motion of light or sun-beams; but they find also the difference of longitude between two places on the earth.

It may be manifested here also that several of the planets have their *revolutions round their own axis* in certain periods of time, as the earth has in 24 hours; and that they are vast bulky dark bodies, some of them much bigger than our earth, and consequently fitted for the dwelling of some creatures; so that it is probable they are all habitable worlds furnished with rich variety of inhabitants to the praise of their great Creator. Nor is there wanting some proofs of this from the scripture itself.—For when the prophet Isaiah tells us, that *God who formed the*

earth, created it not in vain, because he formed it to be inhabited; Isa. xlv. 18. He thereby insinuates, that had such a globe as the earth never been inhabited, it had been *created in vain.* Now the same way of reasoning may be applied to the other planetary worlds, some of which are so much bigger than the earth is, and their situations or motions seem to render them as convenient dwellings for creatures of some animal and intellectual kind.

Many of these things have been performed by ingenious men with great exactness, for the use of persons learned in the mathematics; but I know not any short, plain and intelligible account of them fitted for the use of the unlearned world, except among Dr. Wells' volumes, entitled Mathematics for a Young Gentleman: Yet I persuade myself, that some parts of it might be performed with greater ease and clearness, in a more natural method, and to much greater perfection, if some person of peculiar skill in these sciences and of equal condescension would undertake the work.

SECT. XIX.—*Problems relating to Geography and Astronomy to be performed by the Globe.*

AS *theorems* in mathematic science are certain propositions declaring some *mathematical truth:* So a *problem* is a *mathematical question* proposed to be resolved, or some *practice* to be performed. Because this problematic part will require the recollection of a great many things in the former sections, I think it may not be improper to give a short summary of definitions of the chief subjects of discourse in the *doctrine of the sphere,* and set them in one view.

DEFINITIONS.—*The latitude of a place* on the earthly globe, is the distance of the zenith of that place from the equator toward the north or south pole measured by the degrees of the meridian.

The *elevation of the pole* is the height of the pole above the horizon of that place measured on the meridian: And it is always the same number of degrees as the latitude.

The *longitude of a place* is the distance of it toward the east or west from some first meridian, and it is measured on the equator.

The *declination of the sun* or any star or planet is its distance northward or southward from the equator measured on the meridian. It is the same thing as latitude on the earthly globe.

The *right ascension* of the sun is its distance from that meridian that cuts the point aries measured eastward on the equator; it is much the same with longitude on the earthly globe.

The *hour of the sun* is its distance from noon or the m dian of the place measured on the equator by 15 degrees, every 15 degrees on the equator make an hour. Or it ma reckoned from the opposite meridian or midnight. *Note, right ascension* is reckoned either in degrees or in hours.

The *latitude of a star* or planet is its distance northwar southward from the ecliptic : *Note,* The sun has no latitude cause it is always in the ecliptic.

The *longitude of the sun* or *star* is its distance from point aries eastward measured on the ecliptic. But with reg to the sun or a planet, this is usually called the *place of the or planet,* for any particular day, i. e. its place in the Zodiac the degree of the sign in which it is at that time.

The *altitude* or height of the sun or a star is its dist from and above the horizon, measured on the quadrant of tudes. The *depression* of the sun or star is its distance from below the horizon, The *azimuth* of the sun or a star is its stance from the cardinal points of east, west, north or so measured on the horizon. The sun or star's *meridian alti* is its altitude or height when it is on the meridian or at the so

The *vertical altitude* of the sun is used by some writer its height above the horizon when it is in the azimuth or ver circle of east or west. But the sun is said to be vertical at place when it is in the zenith of that place at noon.

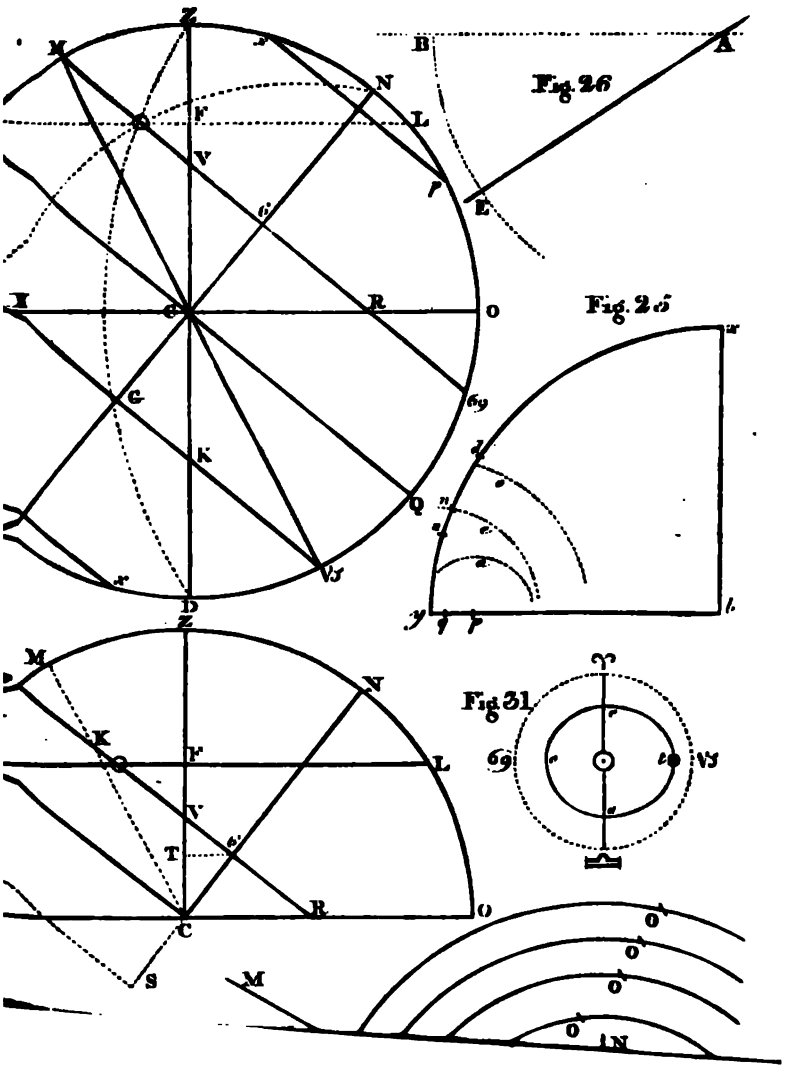
The *amplitude* of the sun or a star is its azimuth or dist from east or west at rising or setting.

The *ascensional difference* is the time of the sun or st rising or setting before or after six o'clock : Or it is the differ between the sun or star's semidiurnal arc and a quadrant or degrees, as some persons express it, because 90 degrees quadrant reaches from 6 o'clock to 12.

PROBLEMS.

Problem I. "To find the longitude and latitude of place on the earthly globe."

Turn the globe about till the place come just under the of the brazen meridian on which the figures are, which is ca its *graduated edge,* then the degree marked on the meridian over the place shews the latitude either north or south : And globe so standing, that degree of the equator, which is cut by meridian shews the true longitude of the place. So London appear to have 51½ degrees of north latitude, and near 18 grees of longitude, counting the first meridian at Teneriff. Rome has 41¾ degrees of north latitude, and about 13 degree lougitude, eastward from London, or almost 31 degrees fr Teneriff.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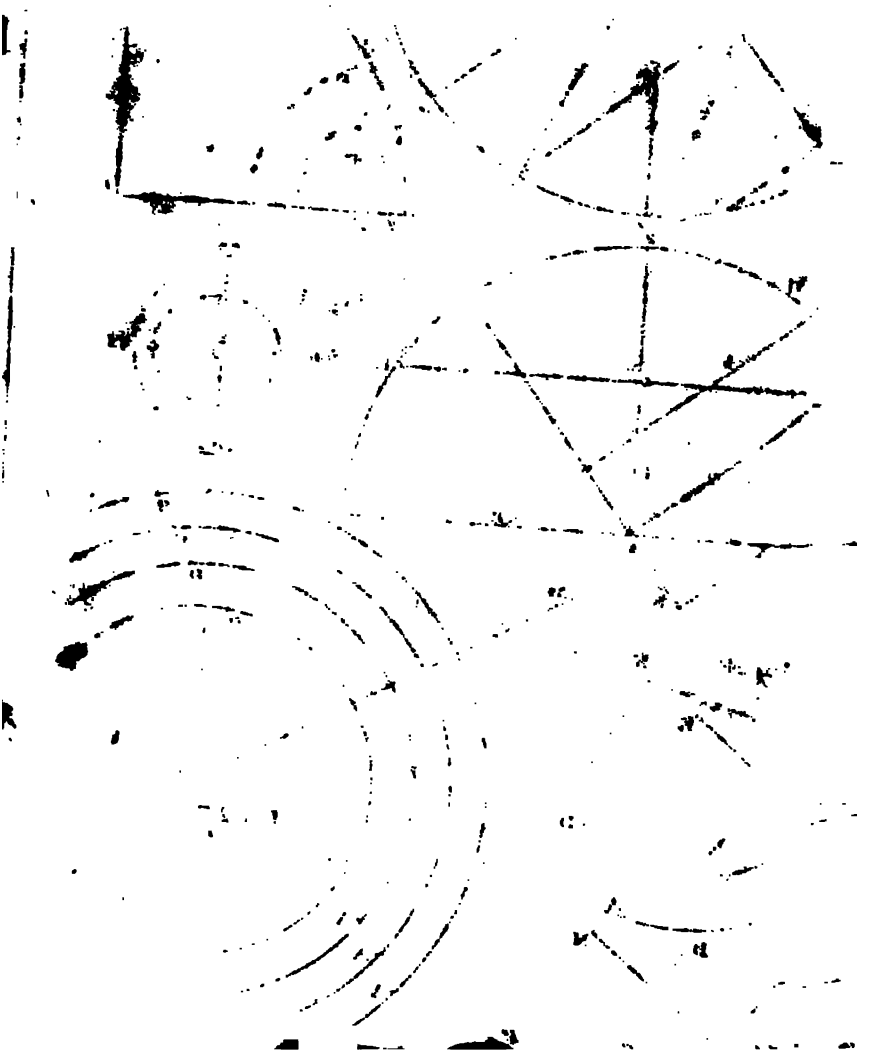

Problem II. "The longitude or latitude of any place being ɟiven, how to find that place on a globe or map."

If only the latitude of a place be given, the place itself may e easily found by casting your eye eastward and westward along ıat parallel of latitude in that part of the world where it lies, ıd the place (if it be marked on the globe) will soon appear. If e longitude only were given, guide your eye along that meri- an northward or southward, and you will quickly see it. But both *longitude* and *latitude* be given, then the place is immedi- ely found, for where the given line of longitude or meridian ts the given line of latitude, there is the place required.— hese two problems also may be practised on a map as well as ı a globe.

Problem III. "To find the distance of any two places on e earthly globe, or two stars on the heavenly."

Here let it be noted that a degree of the meridian or of the ıuator, or of any great circle on the earthly globe is found by easure to be 69¼ or 70 English miles; See Prob. XII. Sect. X. Though geographers many times count 60 geographical iles to a degree, making them the same with the minutes of a egree for the greater ease in computation.

Let it be noted also, that all the degrees on the meridians *lines of longitude* on the globe are equal, because all those ıes are great circles; but in the *parallels of latitude*, the farther ɔu go from the equator the circle grows less and less, and con- quently the degrees of those circles are less also: And there- re if two distant places are either both *on the equator* or have e *same meridian*, the number of the degrees of their distance ı the equator or on the meridian being reduced to miles shews ɔu their true distance: But if the two places are not both on ıe equator nor on the same meridian, you must find their true ıstance by the following method.

To perform this third problem lay the quadrant of altitude om one place to the other, and that will shew the number of egrees of distance, which being multiplied by 60 geographi- ıl miles, or by 70 English miles, will give the distance ıught.

Or you may take the distance between the two places with a ıir of compasses and measure it upon the equator, which shews e distance in degrees, and then reduce them to miles. The ıadrant of altitudes or a pair of compasses in the same manner, ill shew the distance of any two stars on the heavenly globe, z. in degrees, but not in miles.

Observe here, that though these methods will find the true stance of places on the globe, yet on a map the same methods e useless; because in maps or plain surfaces the degrees of

longitude marked on the same parallel of latitude are unequal, and so the degrees of latitude marked on the same meridian are often unequal. (See the XI. section concerning maps.) The only way therefore of measuring distances on a map is to measure the number of degrees on the nearest correspondent line of longitude or latitude, and apply that to the distance required, which after all is but an uncertain account.

Problem IV. "To find the antœci, periœci and antipodes of any place given, suppose of London."

Bring London to the meridian, observe its latitude northward, then reckon so many degrees on the meridian from the equator southward, and it shews the place of the *Antœci*.

Keep London under the meridian, set the hour index or pointer on the dial at the pole to the upper 12 which is 12 o'clock at noon, turn the globe about till the index point to 12 at midnight, and the place that will be under the same degree of the meridian where London was, shews where the *periœci* dwell.

The globe so standing, count the same degrees of latitude from the meridian southward, and that will shew who are the *antipodes* to London.

Problem V. "Any place being given to find all those places which have the same hour of the day with that in the given place."

All the places that have the *same longitude* have the *same hour*. Bring the given place therefore to the brazen meridian, and observe what places are then exactly under the graduated edge of the meridian, for the people in those places have the same hour, and their habitation has the same longitude.

Problem VI. "Any place being given (suppose Paris to find all those places in the world which have the same latitude, and consequently have their days and nights of the same length."

Bring Paris to the meridian, and you find it near 49 degrees north latitude. Turn the globe all round, and all those places which pass under the 49th degree of the meridian have the same latitude with Paris, and the pole is just as much elevated above their horizon, viz. 49 degrees.

Problem VII. "To rectify the globe according to the latitude of any given place."

Elevate the proper pole (whether it be north or south) so far above the horizon as is the latitude of the place proposed; this is done by moving the pole of the globe upward from the horizon, counting by the degrees of the under part of the meridian, which begin to be numbered from the pole; thus for London you must raise the pole 51½ degrees above the horizon.

Then while London stands under the meridian, the true and real situation of it is exactly represented on the globe with its proper horizon: For London is by this means placed in the zenith, or on the very top of the globe, at 90 degrees distance from the horizon every way; and thus the zenith is as high *above the equator* on the south side as the *pole is above the horizon* on the north side.

To render this representation of the situation of any place yet more perfect, 'tis a useful thing to have a small mariner's compass at hand with a needle touched with a load-stone, to shew which are the north or south points of the *real horizon*, and then as near as you can, set the brazen meridian of the globe exactly north and south. Thus the *wooden horizon* will be a perfect parallel to the real horizon, the *brazen meridian* to the real meridian, the *equator*, the *ecliptic*, and all the *lesser circles*, and the points on the globe will represent those circles and points on the earth or in the heavens, in their proper position.

Problem VIII. "The hour being given in any place (as at London) to find what hour it is in any other part of the world."

Rectify the globe for London, bring the city London to the side of the meridian where the degrees are marked; then fix the index of the dial-plate to the hour given (suppose four o'clock in the afternoon) this being done turn the globe and bring any place successively to the meridian, then the index or hour pointer will shew the *true hour* at the *place* required. Thus when it is four o'clock in the afternoon at London it is almost five at Rome, near six at Constantinople, 'tis almost half an hour past nine at night at Fort St. George in the East Indies, 'tis near midnight at Pekin in China, 'tis eleven o'clock in the morning at Jamaica, and a little past noon at Barbadoes.

Problem IX. "To rectify the globe for the zenith."

After the former rectification for the latitude of the place, fasten the edge of the nut of the quadrant of altitude on its graduated side at the proper degree of latitude on the graduated side of the brazen meridian, and that will represent the zenith of that place in the heavens. The quadrant of altitude being thus fastened serves to measure the sun or star's altitude above the horizon, and the sun or star's azimuth; and it has been sometimes (though erroneously) used to shew the bearing of one place to another, as in the following problem.

Problem X. "Any two places being given, to find the bearing from one to the other," i. e. at what point of the compass the one lies in respect to the other.

The common way whereby several writers have solved this problem is this. Rectify the globe both for the *latitude* and for the *zenith* of one of those places, and bring that place to the

zenith. Then bring down the edge of the quadrant of altitude to the other place, and the end of the quadrant shall cut the horizon in the true point of the compass, and shew how the one bears to the other. So if you rectify the globe for the latitude and zenith of Barbadoes, you will find that Cape Finisterre in Spain, and Azoff in Muscovy, both lie in a direct line north-east from Barbadoes, according to this practice.

But here let it be noted, that though according to this sort of measuring, they both lie north-east from Barbadoes, yet they do not lie north-east of one another; for if you rectify the globe for the latitude and zenith of Cape Finisterre, you will find Azoff lies near east-north-east from Cape Finisterre, or more than two points of the compass, (i. e. more than 22½ degrees different from the north-east.)

And if a sailor or traveller who is at Barbadoes, should every league or mile of his way, by observing the compass, still make toward the north-east, he would come sooner to the Hebrides or Western Scots Islands than to Azoff, or even to Cape Finisterre. But the course that he must really steer to come to Cape Finisterre is near north-east and by east: And if he could sail all the way clear to Azoff from Barbadoes, he must steer still much more to the eastward: All which things shew the mistake of solving this problem in this manner.

Perhaps this may be made yet plainer to a learner, if we name two places which lie under the same parallel of latitude, viz. Madrid in Spain, and Pekin in China, latitude 40. Now these must always bear directly east and west from each other.—But if you bring Madrid to the zenith, and having fixed there your quadrant of altitude, you bend it down to the horizon, it will not follow the course of the 40th parallel of latitude, and lead your eye to Pekin, but to much more southern places very far distant from Pekin, and which have a very different bearing, viz. to the Isle of Ceylon, &c.

Upon this account, the best writers call that the *angle of position* between two places, which is found by the quadrant of altitude thus fixed at the zenith of any place, and drawn down to the horizon: But they describe the rhumb or course of bearing from one place to the other in a different manner, viz. It is that point of the compass, toward which any person must constantly sail or travel, in order to arrive at the distant place given.—And without all doubt, this is the most just and exact account of things.

Now in order to find this, it is sufficient for a learner to know, that if any one of the lines drawn from the points of the mariner's compass marked on the globe, (which are called rhumb lines) passes through both places, that line shews the course or bearing from one to the other, as the course from Cape St. Vin-

cent in Portugal, to Cat Island among the Bahama Islands is west and by south.

If no rhumb line passes through those places, then that rhumb line to which those two places lie most parallel, shews their bearing: Thus the course from Barbadoes to Cape Finisterre is orth-east and by east, or thereabouts. If the learner has a mind to see the reason, why there must be such a difference betwixt the *angle of position* between two places, and their *course of bearing* to each other, I know not how to represent it upon a flat surface plainer than by figure XXI.

Suppose the four cardinal points, north, south, east, and west, are represented on the globe by the letters N. S. W. E.— Suppose three distant places are B Barbadoes, C Cape Finisterre, and A Azoff. If the surface of the earth were not spherical, but a plane, and the meridians of these places were all parallel (as in that representation or projection of the globe, which is called *Mercator's chart*) then their *angle of position* and their *course of bearing* would be the same: Then as N S is the meridian of the place B, so *q u* would be the meridian of the place C, viz. a strait line and parallel to N S: Then the line B C A would be the line or rhumb of north-east, viz. 45 degrees distant from N S; which would represent both the *angle of position* and the *course of bearing* between all the three places B C and A: For the angle *q* C A would be the same with the angle N B A; and thus A would still bear north-east from C and from B.*

But the earth being of a spherical figure and the meridians meeting in the poles, the meridian of B on the globe being brought to the zenith is N S; the meridian of C is the curve line N C *m*; and the meridian of A is the curve line N A Z; all which meet in N the north-pole. Now though the strait line B C A shews the *angle of position* between the three places B C and A, (as B stands on the globe at the zenith) yet the line B C A does by no means make the same angles, or has the *same bearing* with the curve line N C *m* (which is the meridian of C) as it does with N S (which is the meridian of E:) and it still makes more different angles with the curve line N A Z (which is the meridian of A.) Thence it follows, that all the rhumb lines must be a sort of spiral lines on the globe, except the north and south, which is the meridian, and the equator with its parallels of east and west, which are circles.†

* And for this reason in those sea charts where the points of the compass or rhumbs are drawn in strait lines quite through the chart, the meridian or lines of longitude are all made strait and parallel lines: For if the meridians were a little curved as they are commonly in maps, the rhumbs could not be drawn through the chart in strait lines. See Sect. XI. Of Sea Charts.

† All the other lines of east and west besides the equator, are parallels of latitude, and are lesser circles. And though the line of east and west in this

The north-east line in this place must be B P *x* still gradually inclining toward the several meridians, that so it may make the same angles with the meridians N C *m* and N. A Z, as it does with N. B S. But by this means you see, that to steer or travel still to the north-east would bring you down to p and *x*, not to C and A. You see also, that the course you must steer or travel to come to A will be represented by the line B *r* a, which is much nearer the east point. But this is something too laborious and painful for every reader to trouble his thoughts with it.

Problem XI. "Having the day of the month given, to find the sun's place in the ecliptic."

Find the day of the month in the calander on the horizon, (either old stile or new, which soever is required) lay a flat rule on the day of the month, and over against it on the inner hedge of the horizon, will appear both the sign in which the sun is, and the degree of that sign, as on the 10th of May old stile, the sun is just entering into the first degree of gemini, which you may find on both the globes on the ecliptic circle; and there you may also compute the longitude of the sun from the point aries if you please.

Problem XII. "The day of the month being given to find those places of the globe where the sun will be vertical or in the zenith that day."

Find out the sun's place in the ecliptic circle; bring it to the meridian; mark the degree over it; then turn the globe round, and all those places that pass under that degree will have the sun in their zenith that day.

Problem XIII. "The day and hour of the day at one place, viz. London being given, to find at what other place the sun is vertical at that hour."

The sun's place for that day being brought to the meridian, and the degree over it, (i. e. the declination) being observed, bring the first place, i. e. London to the meridian. Set the hour index to the given hour, and turn the globe till the index come to the upper 12, (that is 12 at noon) then the place of the earth that stands under the observed degree of the meridian, has the sun at that moment in the zenith.

Problem XIV. "The day and hour at one place, viz. London being given, to find all those places of the earth where the sun is then rising, setting, or on the meridian, (which is

figure, be for the ease of a young learner represented in a strait line, because it is a parallel to the equator, and if drawn round the globe would be a perfect circle and run into itself, yet it should more properly be so far curved, as to cut all the side-meridians N m and N z at right angles, as well as the meridian of the place N S. And thus they are commonly drawn in maps of the world, wherein *there is no line of* east and west drawn strait besides the equator.

called culminating) also where it is day-light, twilight, or dark night.

By the foregoing problem, find the place where the sun is vertical at the hour given; rectify the globe for the latitude of that place; bring that place to the meridian. Then all those places that are in the west semi-circle of the horizon have the sun rising, for it is 90 degrees from their zenith. Those in the east semi-circle of the horizon have it setting, for it is 90 degrees past their zenith.

To those who live under the same line of longitude or upper-meridian, it is noon, if they have any day at that time. To those who live under the opposite line of longitude or lower meridian, it is midnight, if they have any night at that time. Those places that are above the horizon, have the sun above their horizon so many degrees, as the places themselves are. Those places that are under the horizon, but within 18 degrees, have twilight. And with those who are lower than 18 degrees, it is dark night.

Problem XV. "A place being given in the torrid zone, to find those two days in which the sun shall be vertical there."

Bring the place to the meridian; mark the degree over it, which is its latitude; move the globe round, and observe these two opposite points of the ecliptic, that pass through the aforesaid degree; search on the wooden horizon on what two days the sun passes through those two points of the ecliptic, for then the sun at noon will be in the zenith of the place given.

Problem XVI. "A place being given in one of the frigid zones, (suppose the north) to find when the sun begins to depart from, or to appear on that place, how long he is absent, and how long he shines constantly upon it."

Suppose the place given be the north Cape of Lapland 71 degrees of latitude. Rectify the globe for that place, or elevate the pole 71 degrees; then turn the globe till the descending part of the ecliptic, the meridian and south point of the horizon meet together: Thus the ecliptic will shew, that the sun toward the end of scorpio (that is, a little after the middle of November,) goes below the horizon entirely and leaves that part of Lapland.

Then turn the globe a little further, till the ascending part of the ecliptic meet the meridian in the same south point of the horizon, and it will shew that about the ninth or tenth degree of aquarius, that is, about the end of January, the sun begins to rise above their horizon. Thus they are at least two months without the sun in winter.

In like manner bring the ascending part of the ecliptic to meet the meridian in the north point of the horizon, there you

will find the sun begins to be entirely above their horizon toward the end of taurus, or near the middle of May; and if you turn the globe a little farther, the descending ecliptic will meet the meridian and horizon in the north at the 8th or 9th degree of leo, or about the beginning of August: Thus it appears that those Laplanders will have the sun at least two months above their horizon in summer, or two months of complete day-light.

Problem XVII. "To find the sun's declination and right ascension any day in the year; suppose the twenty-first of May."

Find out the sun's place for that day, or the beginning of the first degree of gemini on the ecliptic; bring that point of the ecliptic to the meridian, and the degrees numbered on the meridian will shew the sun's declination, viz. 20 degrees northward.

At the same time the place where the meridian cuts the equator will shew the right ascension of the sun, or its distance from the point aries on the equator, viz. 58 degrees. It is marked usually in degrees on the globe; if you would turn it into hours, divide it by 15, and it amounts to three hours $\frac{13}{15}$ which is 52 minutes. Note, That any star's declination and right ascension are found the same way by bringing it to the meridian. Remember the sun's declination is always north in our summer half-year from the 21st of March, and southward in our winter half-year from the 23d of September.

Problem XVIII. "To rectify the globe for the sun's place, any day in the year, and thus to represent the face of the heavens for that day."

Bring the sun's place found on the ecliptic of the globe to the meridian; and at the same time set the hour-index or pointer of the dial to the upper 12, that is, to noon.

Note, When the globe is thus rectified for the latitude of the particular town or city by problem 7th, and for the zenith of it by problem 9th, and for the sun's place in the ecliptic that day by this problem 18th, it is then fitted to resolve most of the following problems, for then it most exactly represents the real face and state of the heavens for that day.

Here let it be observed, that this practice does really represent the face of the heavens only for that day at noon, (when the astronomers day begins) and not for all the following hours of the day; because the sun is every moment changing his place a little in the ecliptic. But it is customary, and it is sufficient for learners, to make this go for a representation of the heavens for all that day, to perform any common operations.

Problem XIX. "The place and day being given, (viz. May 10th at London) to find at what hour the sun rises or

sets, his ascensional difference, his amplitude, the length of day and night."

Rectify for the latitude, and for the sun's place, then bring the sun's place down to the eastern part of the horizon, and the index will shew the time of sun-rise on the dial, viz. five minutes after four in the morning. Bring the sun's place to the western side of the horizon, and the dial will shew the hour of sun setting, viz. five minutes before eight at night.

Thus his *ascensional difference* will appear, that is, how long he rises or sets before or after six o'clock, which is one hour and 55 minutes. Thus also his amplitude will appear in the horizon to be almost 34 degrees to the north of the east. The hour of the sun's rising doubled gives the length of the night, viz. eight hours and 10 minutes; and the hour of the sun's setting doubled gives the length of the day, which will be 16 hours wanting 10 minutes, i. e. 15 hours 50 minutes.

Problem XX. "The place and day being given, to find the altitude of the sun at any given hour."

Rectify for the *latitude*, for the *zenith* and for the *sun's place:* Bring the quadrant of altitude under the meridian, and it will meet the sun's place in the meridian altitude of the sun that day, and thus shew how high it is at noon.

Turn the globe till the index point to any other given hour on the dial, then observe where the sun's place is, bring the quadrant of altitude to it, and it will shew the sun's altitude at that hour; thus May 10th at London, the sun's meridian altitude will be a little above 58½ degrees, and at nine o'clock in the morning will be 43½.

Problem XXI. "The place and day being given, to find the azimuth of the sun at any given hour."

Rectify the globe for the *latitude*, the *zenith* and the *sun's place;* then turn the globe till the index point to the hour given; then observe the sun's place; bring the edge of the quadrant of altitude down upon it, and it will cut the horizon in the azimuth of the sun, or shew what point of the compass the sun is in. Thus May 10th at 20 minutes past 9 in the morning, the sun's azimuth will be about 60 degrees from the south toward the east, that is, near south-east and by east.

Problem XXII. "The sun's altitude being given at any certain place and day, to find the hour of the day, and also his azimuth."

Rectify as before for the *latitude*, the *zenith* and the *sun's place;* turn the globe, and move the quadrant of altitudes so that the sun's place may meet the degree of altitude given on the quadrant, then the index will shew the hour on the dial? and the quadrant of altitude will cut the azimuth on the horizon.

Thus May 10th in the morning, if the altitude be near 46 degrees, the azimuth from the south will be 60, and the hour 26 minutes past 9. Here Note, That to find the sun's hour or azimuth by his altitude, you should never seek it too near noon, because then the altitude alters so very little for two hours together.

Problem XXIII. "When the sun is due east or west in summer, how to find the hour, and his altitude."

Rectify as before; then bring the quadrant to cut the east or west point of the horizon, and turn the globe till the sun's place in the ecliptic meet the edge of the quadrant. Thus the quadrant will shew the altitude, and the index will point to the hour; thus May 10th in the afternoon, the sun will be due west at about 56 minutes past 4; and its altitude will be near 26 degrees. This is called the *vertical altitude* by some writers.

Thus if the place and day be known, and either the hour, the azimuth, or the altitude be given, you may easily find the other two.

Problem XXIV. "To find the degree of the depression of the sun below the horizon, or its azimuth at any given hour of the night."

Observe the place of the sun, suppose May 21st in the first degree of Gemini, then seek his opposite place in the ecliptic at half a year's distance, (viz.) the first degree of Sagittary on the 23d of November; this being done, seek the altitudes, the azimuths, and the hours just as you please for that day, and they will shew you what are the sun's depression, azimuths, and hours on the 21st of May at night.*

Problem XXV. "To find how long the twilight continues in any given place and given day, suppose the 21st of May at London, both at morning and evening."

The way to answer this question is to seek how many hours or minutes it will be after sun set, before the sun be deprest 18 degrees below the horizon in that place on the 21st of May. And so before sun rise for the morning twilight. This is best performed by seeking how long it will be after sun rise or before sun set on the 23d of November, that the sun will have 18 degrees of altitude, which is done by the foregoing problem. Note, That from the 26th of May to the 18th of July at London, there is no dark night, but constant twilight. For during this space the sun is never deprest above 18 degrees below the horizon.

* Note, The reason why we use the opposite part of the globe, to find the degrees of depression of the sun, is because the wooden horizon is so thick that we cannot conveniently see, observe, or compute the distance of depression from the upper edge of it, which edge is the true representative of the real horizon.

Problem XXVI. "To know by the globe the length of the longest and shortest days and nights in any place of the world."

Remember that the sun enters the first degree of cancer, on the longest day, at all places on the north side of the equator, and the first degree of capricorn on the south side. Also remember that he enters the first degree of capricorn, the shortest day in all places of the northern hemisphere, and the first degree of cancer in the southern. Then rectify the globe for the latitude and sun's place, and find the hour of sun rising, which doubled shews the length of the night. And the hour of the sun setting doubled, shews the length of the day, as in problem XIX.

Problem XXVII. "The declination and meridian altitude of the sun, or of any star, being given to find the latitude of the place."

Mark the point of declination on the meridian, as it is either north or south from the equator; then slide the meridian up and down in the notches, till the point of the declination be so far distant from the horizon as is the given meridian altitude. Then is the pole elevated to the latitude sought.

Thus where the sun or any star's meridian altitude is 58½ degrees, and its declination 20 degrees northward, the latitude of that place will be 51½ degrees north. See more *problem* VII, VIII, IX. Sect. XX.

Note, There are some few problems which relate to the sun and to the hour, which may be performed on the globe when the sun shines, though not with any great exactness, yet sufficient for demonstration of the reason of them as follows.

Problem XXVIII. "The latitude of a place being given, to find the hour of the day in the summer when the sun shines."

Set the frame of the globe upon a plane perfectly level or horizontal, and set the meridian due north and south; both which are difficult to be done exactly; even though you have a *mariner's compass* by you. Then rectify the globe for the latitude, and the iron pin of the pole will cast a shadow on the dial and shew the *true hour*. For when the globe is thus placed, the dial plate with the pole in the centre of it, is a true equinoctial dial for our summer half-year, when the sun is on the north side of the equator. The same may be also done in the winter half-year, by depressing the north pole as much below the south part of the horizon as is equal to the latitude of the place; for then the dial plate is a proper equinoctial dial for the winter half-year: But this is not so commodiously performed, though the reason of it is the same as the former.

Problem XXIX. "To find the sun's altitude, when it shines, by the globe."

Set the frame of the globe truly horizontal or level; turn the north pole to the sun; move the meridian up and down in the notches till the axis cast no shadow; for then it points exactly to the sun, and then the arch of the meridian between the pole and the horizon shews the sun's altitude.

Problem XXX. "The latitude and day of the month being given, to find the hour of the day when the sun shines."

Let the globe stand on a level, and the meridian due north and south; rectify the globe for the latitude and for the sun's place; stick a needle perpendicular to the sun's place on the globe; turn the globe till the needle point directly toward the sun, and cast no shadow; then will the index shew the hour of the day. I proceed now to shew some problems to be formed by the stars upon the heavenly globe.

Problem XXXI. "The place being given, to find what stars never rise or never set in that place."

Rectify the globe for the latitude; turn it round, and observe that such stars as do not go under the horizon during its whole revolution, do never set in the place given; and such stars as rise not above the horizon of the globe during its whole revolution, they never rise in the place given, nor are ever seen by the inhabitants thereof: So the *Little Bear*, the *Dragon*, *Cepheus*, *Cassiopea* and the *Great Bear*, never set at London, and many of the southern constellations never rise.

Problem XXXII. "The place and day of the month being given, to represent the face and appearance of the heavens and shew the situation of all the fixed stars at any hour of the night."

Set the globe exactly north and south; rectify it for the latitude, and for the sun's place; then turn the globe till the index points to the given hour. Thus every star on the globe will exactly answer the appearance of the stars in the heavens; and you may see what stars are near or on the meridian, which are rising or setting, which are on the east or west side of the heavens. Thus October 13th at 10 o'clock at night, the glorious constellation *Orion* will appear on the east side at London, the star *Regel* in the left knee (or foot) of *Orion* just above the horizon, the *three stars* in his girdle a little higher, &c. This represents the face of the heavens at night, as problem XVIII, does in the day. Note, This problem is of excellent use to find out and know the several constellations, and the more remarkable stars in each constellation. Here follow several problems to find the hour of the night by stars.

Problem XXXIII. "Any star on the meridian being given to find the hour of the night."

In order to find what stars are upon the meridian at any

time, it is good to have a meridian line drawn both in a north and in a south window; that is, a line pointing exactly to the north and south: Then set up a broad smooth board of 20 or 24 inches high, and 8 or 10 inches broad; place it perpendicular on the window with its lower edge on, or parallel to the meridian line; and fixing your eye at the upright nearest edge of the broad, and glancing along the plane face of it, you will easily observe what stars are on the meridian, either north or south at that time.*

Having found what star is on the meridian, rectify the globe for the latitude, and for the sun's place that day; then bring the centre of the star which is on the meridian in the heavens to the edge of the brazen meridian of the globe: and the index will shew the time of night on the north side of the dial among the evening, or midnight, or early morning hours.

Note, How to draw a meridian line, see Sect. XX. *Problem* XXII. &c.

Problem XXXIV. "The azimuth of any known star being given, to find the time of night."

The method I just before proposed, will easily find the azimuth, of any star. Set this tall flat board perpendicular on the window, with one end of it upon the meridian line drawn there, so as that your eye may just see the star in the window by the foot of the board will cross the meridian line in the *true angle of its azimuth*, or its distance from north to south.

Having found the azimuth of the star, rectify the globe for the latitude, and for the sun's place as before; rectify it also for the zenith, and bring the quadrant of altitude to the azimuth of the star in the horizon: then turn the globe till the graduated edge of the quadrant of altitude cut the centre of that star, and the index will shew the hour of night upon the dial plate. Note, That if you have a meridian line drawn on a window, you may find by such methods as these when the sun is in the meridian, and what is its azimuth at any time.

Problem XXXV. "The altitude of a star being given, to find the hour of the night."

Note, That the altitude of the star must be found by a quadrant or some such instrument: But remember that if you would find the hour by the altitude of a star, you must never choose a star that is too near the meridian; because for almost two hours together, the altitude varies very little when it is near the meridian. Rectify the globe as before for latitude, zenith and sun's place;

* Note, To set the board perpendicular and convenient it is fit to have a foot made to it behind, that it may stand firm. And let a strait line be drawn from the top to the bottom of the board, through the middle of it, parallel to the sides: Fix also a pin in the upper part of this line, near the top of this upright board, on which hang a thread and plummet, to play loose in a hole near the bottom, to keep it perpendicular. Then the thread hanging almost close to the board *will direct your eyes to the stars on the meridian.*

move the globe and the quadrant of altitude backward or forward, till the centre of that star meet the quadrant of altitude in the degree of altitude which is given, then the index will point to the true hour.

Note, These three last problems being well understood, will shew you how to find at what hour any star will rise or set any day of the year; what stars are or will be upon the north and south meridian at any hour given; what stars are in the east or the west, or on any points of azimuth at any time of the night; and what altitude they have at that hour, or at that azimuth.

Problem XXXVI. "To find the latitude and longitude of any star: Also its right ascension and declination."

Put the centre of the quadrant of altitude on the proper pole of the ecliptic, whether it be north or south; bring its graduated edge to the given star; then that degree on the quadrant is the star's latitude; and the degree cut by the quadrant on the ecliptic is the star's longitude. Thus the latitude of Arcturus is 31 degrees north: Its longitude is 200 degrees from the point aries, or 20 degrees from libra. The latitude of Sirius or the Dog Star is near 40 degrees of south latitude, and its longitude is about 100 degrees from aries, or 10 degrees from cancer.

To find a *star's right ascension* and *declination*, see problem XVII. for it is done the same way as that of the sun; only observe this difference, that the sun changes both his right ascension and his declination every day, whereas the fixt stars have the same right ascension and declination all the days in the year.

Remember also, that the fixt stars every day in the same year, keep the *same longitude and latitude*, as well as the same right ascension and declination;* but the planets are ever changing all these, and the learner can know none of them but by some almanacks which are called *Ephemerides*, or tables which are calculated on purpose to shew the longitude, and latitude, or the place of the several planets among the twelve signs of the zodiac every day in the year.

Problem XXXVII. "To find the place of any planet on the globe: Also to find at what hour any planet, (suppose Jupiter) will rise or set, or will be upon the meridian any given day of the year.

You must first find out by some *ephemeris*, what degree of what sign Jupiter possesses that day of that year: Mark that point on the ecliptic either with chalk or with a pencil, or by sticking on

* The insensible change of the longitude, right ascension, and declination of the fixt stars, made by their slow motion parallel to the ecliptic is not worth notice in this place.

a little black patch; and then for that day and that night you may perform any problem by that planet in the same manner as you did by a fixed star.

But if you would be very exact you must not only seek the *planet's place* in the sign for that day, which is its longitude, but you must seek its latitude also in the ephemeris (which indeed in the superior planets, *Jupiter*, *Saturn*, *Mars*, alters but very little for whole months together) and thus set your mark in that point of latitude, or distance from its supposed place in the ecliptic, whether northward or southward, and then go to work your problem by this mark.

I shall give but one instance, which will sufficiently direct to solve all others of the same kind that relate to the planets. On the 3d of April 1723, I find by an ephemeris that the sun is about the end of the 23d degree of aries, *Jupiter* enters the 8th degree of capricorn, and (if I would be very exact,) I observe also that the latitude of Jupiter that day is 15 minutes or a quarter of a degree to the north: There I make a mark or put on a small black patch on the globe to stand for Jupiter. Then having rectified the globe for the latitude v. c. of London, and for the sun's place, April the 3d, I turn the mark which I made for Jupiter to the eastern edge of the horizon, and I find Jupiter will rise near the south-east at a little past one in the morning: He will come to the meridian at a very little past five: He will set near the south-west, about nine in the morning.

Then if I rectify the globe for the zenith, the quadrant of altitude being brought down to the horizon, will tell you what is his altitude, and what his azimuth, at any given hour of the morning by the help of the dial and index. Or his altitude or azimuth being given you may find what it is o'clock.

By this means you may find the hour when the moon will rise and set, together with her southing, or the time of her coming to the meridian. But let it be noted, that the moon changes her place in the zodiac so swiftly, that she moves through 13 degrees of one sign every day, or thereabout; and therefore you cannot find the precise hour and minute of her rising, setting, southing, &c. upon the globe without much more trouble than most of the other planets will give you, which change their places in the zodiac much more slowly.

Problem XXXVIII. "The day and hour of a solar eclipse being known to find all those places in which that eclipse will be visible."

By the 13th problem find out at what place the *sun is vertical* at that hour of the day. Bring that place to the pole or vertical point of the wooden horizon, that is, rectify the globe for the latitude of that place; then the globe being in that situation, observe what places are in the upper hemisphere; for if it be a large *eclipse the sun will be visibly* eclipsed in most of them.

Problem XXXIX. "The day and hour of a lunar eclipse being known, to find by the globe all those places in which the same will be visible."

By problem XIII. find as before at what place the sun is vertical at that hour; then by problem IV. find the antipodes of that place: Rectify the globe for the latitude of those antipodes; thus they will be in the zenith, or in the pole of the horizon; then observe as before what places are in the upper hemisphere of the globe, for in the most of those places the moon will be visibly eclipsed. The reason of rectifying the globe for the antipodes in this problem, is because the moon must be directly opposite to the sun whensoever she is eclipsed.

SECT. XX.—*Problems relating to Geography and Astronomy, to be performed by the Use of the plain Scale and Compasses.*

IT is supposed that the reader is already acquainted with some of the first and easiest principles of geometry, before he can read with understanding this or any other treatise of astronomy or geography; and it is presumed also that he knows what is a *chord*, a *tangent* and a *sine*, and how to make and to measure an angle either by a *line* or *scale of chords*, or *sines* or *tangents*, in order to practise the problems of this last section; though a very slight knowledge of these things is sufficient for this purpose. Because several of the following problems will depend upon the altitude, or azimuth of the sun, and in order to obtain these, we sometimes use a pin or needle fixed perpendicularly, on an upright or horizontal plane; therefore the first problem I propose shall be this, (viz.)

Problem I. "How to fix a needle perpendicular on a plane, or to raise a perpendicular style or pointer in order to make observations of a shadow."

Note, Any thing fixed or set up to cast a shadow is called a style.

One way to perform this, is by having at hand a joiner's square, and while one edge of it is laid flat to the plane, the other edge of it standing up will shew when a needle or style is fixed on that plane perpendicularly, if it be applied to the side of the needle.

Note, If you have a little square made of box or any hard wood, one leg being fix, and the other eight or nine inches long, one inch or 1¼ broad, and an inch thick, with a thread and plummet hanging from the end of one leg, down toward the place where the other leg is joined, as in figure xiv. and a large hole for the plummet to play in it: it will be of use not only to shew you how to erect a needle truly perpendicular; but it will also discover whether any plane be truly smooth, and be horizontal or level, as well as whether any upright plane be exactly perpendicular to the

horizon. Such a square will also be very useful in the practice of any geometrical problems, by drawing one line perpendicular to another with the greatest ease.

Another way to fix a needle perpendicular to any plane, is this; describe a circle as, *a*, *o*, *d*, *h*, in figure XV. Fix a needle *s p* in the centre *p*, then measure from several opposite parts of it, as, *a*, *o*, *d*, *h*, to the tip of the needle *s*, and fasten the needle so as that the tip *s*, shall be at equal distance from all those points, then it is truly perpendicular.

Note here, That in most of these practices where a perpendicular needle is required, the same end may be attained by a needle or wire strait or crooked, which may be called a style, set up sloping at random, as in figure XVI. without the trouble of fixing it perpendicular, if you do but find the point *p* on the plane, which lies perpendicularly under the tip of the style *s*, and this may be found by applying the edge of the square, described figure XIV. to the tip of the style: Though there are other ways to find this perpendicular point for nice practices in dialing by shadows, which require great exactness.

But take notice here, that if you use this method of a style, set up sloping at random as in figure XVI. then with your compasses you must measure the distance from the tip of the style *s* to the point *p*, and that distance must be counted and used as the length of the perpendicular style *s p* in figure XV. wheresoever you have occasion to know or use the length of it. Observe also, that if the tip of your style (whether strait or crooked) be more than three or four inches high from the plane, you will scarce be able to mark the point of shadow exactly, because of the *penumbra* or faint shadow which leaves the point or edge of a shadow undetermined.

On a horizontal or level plane you must use a much shorter style when the sun is low, or in winter, because the shadow is long; but in the longest days in summer a four inch style is sufficient, though the shadow at that season be very short all the middle hours of the day. From the tip of the style to the tip of the shadow should never be above six inches distance.

After all, if you have frequent occasion for a perpendicular style to observe a shadow by it, I know nothing easier than to get a small prism of wood, or ivory, or rather of brass, such as is described figure XVII. Let the base be a right angled triangle A B C: the line B C an inch: A B two inches: and let the height of the prism, viz. A D or C E be three inches (or near four inches if you please.) By this means you obtain three perpendicular styles of different lengths, according as you want the shadow to be either longer or shorter in summer or in winter. If you set it upon the square side A B D O, your perpendicular style will be B C or O E: if it be B O, then C is the tip of the style, and B marks the

point on the plane. If you set it on the square side E C O E as it stands in the figure, then A E, or D O is your perpendicular style. Or if you set it on its triangular base A E C, then either A D, or E O or CE will be your perpendicular style.

This little plain prism has these great advantages in it, viz. That you can set it up in a moment on a perfectly smooth plane, and you are sure it is perpendicular to the plane; and then if you require it to stand there any time, and it should happen to be moved, if you have but fixed and marked its place by the lower edges on the plane, and remember which edge you designed for the style, you may set it exactly in the same position again.

Problem II. "How to take the altitude of the sun by a needle fixed on a horizontal plane, or by any perpendicular style."

In all these practices be sure that your plane be truly level or horizontal, which you cannot well know without some such instrument as I have described before, figure XIV. which serves instead of a level.

You must apply this instrument or square not only to one part, but to every part of the plane, wheresoever you can imagine the shadow will fall, to see if it be precisely horizontal or level; for a very small variation from the level will cause a great difference in the length and in the point of shadow; and upon this account there are few window-stools, or any boards or posts fixed by the common work of carpenters sufficiently level for a just observation in astronomy or dialling.

Fix your perpendicular style P S, as in figure XVIII. observe the point of shadow cast from the tip of the style S; draw P C; then take the height of the style P S in your compasses; set it perpendicular on P C; draw the line S C on the plane, and the angle C is the sun's altitude, viz. 35 degrees.

Here it is evident that if you suppose C the centre and C P to be the radius, then P S is the tangent of the altitude 35 degrees; for it measures the angle C or the arch P A. But if you make S the centre, and suppose S P to be the radius of a circle, C P is the tangent of the coaltitude of the sun, viz. 55 degrees, for it is that tangent which measures the angles S or the arch P E

Hence it will follow that if you fix a perpendicular needle, pointer or style, on any horizontal plane, and divide a line, as P C, according to the scale of tangents, whose radius shall be P S, beginning at P towards C, and make this line of tangents moveable round the centre P, the shadow of the style will shew you the coaltitude of the sun at any time on that moveable scale of tangents.

Or if the scale of tangents P C be divided on the immoveable horizontal plane itself, and you describe concentric circles on the centre P through every degree of that scale, the shadow of the tip of the style will shew the coaltitude among those circles; for they will exactly represent the parallels of altitude in the heavens.

Note, This is described thus particularly rather for demonstration than use, because when the sun is low the shadow P C will be extended many feet or yards.

Problem III. "To take the altitude of the sun by a style on a perpendicular or upright plane."

Fix your style A B perpendicular to a flat board as figure XIX. raise your board exactly upright, and turn it to the sun; so that the shadow of the style A D may be cast downward directly perpendicular from the centre A in the line A Q. Then take the length of the style A B in your compasses, and set it on the board at right angles to the line of shadow, from A to B; draw the line B D; and the angle A D B shall be the sun's coaltitude, (or zenith distance as it is sometimes called) viz. 55 degrees; the tangent of which is A B to the radius D A, and the angle A B D (which is the compliment of it) or 35d. shall be the sun's altitude; the tangent of which is A D to the radius B A.

Or to make this more evident, draw the obscure line D O parallel to A B, i. e. horizontal, and the angle B D O will plainly appear to be the angle of the sun's altitude 35 degrees.

Hence it will follow, that if the line A D be prolonged to Q and divided according to the degrees of the scale of tangents, this board or instrument will be always ready to shew the sun's altitude on that scale, the shadow of the style A B turned directly to the sun, when the board is held up and made to stand perpendicular to the horizon.

N. B. This is the foundation of those dials which are made on moveable columns, or on walking canes, which shew the hour of the day by the different altitudes of the sun in the various seasons of the year.

Note, There are several other ways to find the altitude of the sun by a moveable or immoveable upright plane, and a perpendicular style fixed on it. But none of those ways of taking an altitude by the point or end of the shadow are the most commodious and exact for common use; I have chiefly mentioned them to lead the learner into a more familiar and perfect acquaintance with the nature and reason of these operations.

If no regular instrument be at hand to take the sun's altitude, I prefer the following method above any others.

Problem IV. "To find the sun's or any star's altitude by the plain board, thread and plummet."

Take a smooth flat board as *n o p q* which is at least 8 or inches broad every way, see figure XX. Mark two points on it *a c* at least seven or eight inches distance, and draw that line.— Fix a very short pin at *c* perpendicular which may be done suffi ciently true by guess. Hang a thread and plummet on it; hol up the edge of the board to the sun till the shadow of the pin *c* cast all along the line *a c*. Observe where the thread falls mark a point in it as at *d*; draw the line *d c*, and the angle *a c* is the complement of the sun's altitude; or you may draw th whole quadrant *a c e*, and then the angle *d c e* is the sun's alti tude. Now if the arch *d e* be measured by a line of chords yo find the number of degrees.

Note, That the degrees of altitude must always be reckone from that side of the quadrant which is held next to the sun, vi *c e*, the coaltitude from the side *c a*. *Note* farther, That th sun's altitude should scarce ever be taken within half an hour noon for any other purposes beside the finding of the meridia altitude; because for an hour together the altitude then increas or decreases so very little, the sun being then near the middle its diurnal arch.

Take notice also, that when the sun is near the horizon appears higher than really it is by reason of the refraction breaking of its rays in passing through a larger space of atmo phere or thicker air. When the sun is one degree high its refra tion causes it to appear near half a degree higher than it is. two degrees high the refraction is 20 minutes, at three degre the refraction is 15 minutes, at five degrees the refraction is minutes, at 10 degrees the refraction is 5 minutes. You mu therefore allow proportionably by deducting so much from th apparent altitude when you make an observation near sun-ri or sun-set.

Note again, That the heavier your plummet is, the mo steady it will hang, and make the observation more exact. you please you may draw the whole quadrant on the board, a stick in the pin at the centre before you make your observatio which indeed is the most proper way. You may find the alt tude of the moon the same way. And the altitude of a star may be found by the same board, if you stick in anoth very short pin perpendicular at *a*, and fixing your eye at *s* brin both the pins *a* and *c* just over the star; then the thread wi hang (suppose) on the point *d* in the arch, and shew the degr or angle of altitude to be *d c e*.

Problem V. "To observe the meridian altitude of the su or its height at noon; and by the same method to find any star meridian altitude."

If you know exactly when it is noon, take the altitude the sun by any instrument within a minute or two of that tim and that is the meridian altitude; for two or three minutes

noon make no sensible difference in the altitude. But if you no have no clock or dial or any thing of that kind whose truth you can rely upon, then a little *before noon* observe and set down the altitude every four or five minutes till you find it begins to grow a little less, then review your observations, and the greatest height was the true meridian altitude. You may, by the same method, find the meridian altitude of any star above the horizon, if you make several observations, when the star is coming near to the north or south part of the meridian.

Problem VI. "How to find out the declination of the sun, or of any large or known star."

If you know the *latitude* of the place where you are, with the meridian altitude of the sun any day in the year, or if you know the sun's place in the ecliptic, you may find the declination of the sun thereby geometrically, as shall be shewn afterward: But if these are not known, then in order to other astronomical operations, you must seek the declination of the sun for that day, either by the globe on the brazen meridian, or in a scale of the sun's declination, which is drawn on artificial quadrants or other mathematical instruments; or it may be found in tables of the sun's declination calculated exactly to every minute of a degree for every day in the year, which is the best way where it may be had.

There are also tables of declination of several of the most noted stars. These are all the year at the same distance from the equator, and their declination does not vary as the sun's does. These tables of the sun and star's declination are found at the end of this book, Sect XXI. But let it be noted here, that the *declination of the sun* not only changes every day in the year, but it differs also some few minutes in the next year from the year foregoing, even on the same day of the month: Whence this difference arises, and how to act with respect to it, see problem XX. following, and more in Sect. XXI.

Problem VII. "To find the latitude of any place by the meridian altitude and declination of the sun any day in the year."

The way to find the latitude of any place (i. e. the distance of the zenith of that place from the equator) by the meridian altitude of the sun, is first to seek its *colatitude*, i. e. the complement of its latitude, or (which is all one) the elevation of the equator above the horizon of that place.—Suppose the day given be the 21st of June, or the summer solstice.

This may be done by looking back to the figure III. First, Draw the line H O for the horizon, and from the centre C raise a perpendicular C Z to represent the zenith. Make the semicircle H Z O for the meridian: Then suppose the meridian altitude of the sun at the summer solstice be 62 degrees, by the use of your

compasses and a scale of chords set up 62 from H to S: Also the declination of the sun that day being 23½ degrees northward, set 23½ from S downward, and it will find the point E, and the arch H E is the altitude of the equator above the horizon, or the colatitude of the place, viz. 38½ degrees: Thence you find the latitude is E Z or 51½ degrees which completes a quadrant. Then if you draw the line E C it will represent the equator in that scheme.

Suppose you take the *meridian altitude of the sun* on either of the equinoctial days, viz. in March or September, and you find it to be 38½ degrees: Set up 51½ from H to E, then the sun having no declination the meridian altitude itself shews you the height of the equator above the horizon, which is the complement of the latitude.

Suppose the meridian altitude of the sun at the shortest day be 15 degrees, set up 15 from H to V: Then the sun's declination is 21½ degrees southward; therefore set 23½ from V upward, and it finds the point E: And the arch H E is the complement of the latitude as before, viz. 38½ degrees.

For all these practices the chief rule is this. In the summer half-year set your declination downward from the point of the meridian altitude, and it will find the *equator's height* above the horizon. In winter set your declination upward from the point of the meridian altitude, and it will shew you the *height of the equator*. The reason of it is most evident in the third and fourth figures.

It may be proper in this place to recollect what I have already demonstrated in Sect. V. figure IV. that the latitude of any place (that is the distance of its zenith from the equator) Z E is equal to the elevation of the pole P O above the horizon. Thereby it appears that the elevation of the equator above the horizon of that place on one side as E H (which is the complement of the latitude) is equal to the complement of the pole's elevation on the other side as Z P. If therefore the latitude (suppose of London) be E Z or P O 51½ the colatitude P Z or H E will be 38½ for it must complete a quadrant or 90 degrees; and therefore if you set the point P 51½ degrees above O on the other side of the horizon, and draw the line P C, you have the axis of the world represented, or the north-pole in its proper elevation for London, and standing (as it ought) at right-angles with the equator E C.

I have represented the solution of this sixth problem in a *geometrical manner* to shew the reason of this practice; but this problem of finding the latitude by the meridian altitude is much easier performed arithmetically thus. In the winter half-year add the declination to the meridian altitude, and it gives you the colatitude. In the summer half-year substract the sun's declination from the meridian altitude and it gives the colatitude.

Example June 11th

Merid. Alt.	HS	62	
Sun's Declin.	ES	23½	Substract
Colatitude	HE	38½	

December 11*th*			
Merid. Alt.	HV	15	
Sun's Declin.	EV	23½	Add.
Colatitude	HE	38½	

Then if you substract the colatitude from the zenith or 90, you find the latitude, as,

Zenith	HZ	90	
Colatitude	HE	38½	Substract
Latitude	EZ	51½	

After all it must be observed here, that all these problems of finding the latitude of the place by the sun or star's meridian altitude, &c. belong chiefly to those places which lie within the *temperate zones*. If the place lie in the *torrid* or *frigid zones*, these methods of solution are good, when the meridian sun is on the same side of the *zenith* with the *equator*, whether north or south. But if not, then there must be some little difference of operation at sometimes of the year. Yet if you project a scheme for the solution of such an enquiry like figure III, the very reason of things will shew you when you must add or substract.

Problem VIII. "To find the meridian altitude of the sun any day of the year, the latitude of the place being given."

This is but the converse of the former problem, and therefore is to be performed the contrary way, viz. in winter substract the declination V E from the equinoctial altitude or colatitude H E, and the remainder is H V the meridian altitude. In summer add the declination E S to the equinoctial altitude, or colatitude H E, and it gives the meridian altitude H S. The meridian altitude at the equinoxes is the same with the colatitude as before.

Problem IX. "To find the declination of the sun, its meridian altitude and the latitude of the place being given."

It is hardly necessary to describe this practice to those who have perfectly learned the two foregoing problems.

Substract the colatitude H E from the meridian altitude

in summer H S, and the remainder is the sun's summer declination E S.

Substract the meridian altitude in winter H V from the colatitude H E, and the remainder is the sun's winter declination E V. Or in short, if the meridian altitude and colatitude be given, substract the less from the greater, and the remainder is the sun's declination.

Problem X. "To find the latitude of a place by the meridian altitude of a star, when it is on the south meridian."

Find the declination of that star in some table or scale of the star's declination. If it has declination northward, (as the sun has in summer) substract the declination from the meridian altitude, and it gives you the colatitude. If the star's declination be southward (as the sun's is in winter) add its declination to its meridian altitude, and it gives you the colatitude.

Note, When I speak of north and southward in relation to winter and summer, in many of these problems, I mean in northern latitude such as ours is in Great Britain. When the star is on the north meridian see how to find the latitude by it in problem XXXII.

Problem XI. "By what methods is the longitude of places to be found."

Though the *latitude* (which lies northward and southward) may be determined with the utmost certainty by the methods before proposed, yet the *longitude* of a place (which is the distance of any two places from each other eastward or westward) is very hard to be determined by the sun or stars, because they always appear moving round from east to west. The longitude therefore of places is usually found by measuring the distance on earth or sea from west or east.

The map-makers who describe countries, provinces or kingdoms, measure the distances on the earth by an instrument made on purpose, with a wheel so contrived, that a certain number of its revolutions is equal to a pole, a furlong, or a mile; it hath also a mariner's compass and needle touched with a loadstone fastened to it, to shew how much their course varies from the north or south.

In this last age they have also invented a way to find the difference of longitude between two towns that are some thousands of miles asunder in distant nations; and that is by a nice and exact observation of the moment when the *eclipses of the moon* begin or end, made by mathematicians at those distant places. And thus by the difference of time in those eclipses they compute the distance of place.

This invention is still further improved by observations of the *eclipses of the four moons* or little secondary planets, which roll round the planet Jupiter as our moon does round our earth.

By these means the supposed distances of some places in the East and West Indies have been altered, and the mistakes of several hundred miles corrected.

The sailors measure it at sea by the log, which is a piece of board fastened to a long line which they cast out of the ship while a minute or half-minute glass begins to run: Then drawing in the log, they see how far the ship has sailed in a minute; and supposing the circumstances of the wind and water to be the same, they compute thereby how far they have sailed in some hours. But this being a very uncertain way of reckoning because of the continual changes either of the strength or the point of the wind, or current of the water, they are often liable to mistakes. Therefore it has been the famous and solicitous enquiry of these last ages how to find out and ascertain *longitude at sea;* and there is so vast a reward as twenty thousand pounds offered by the parliament of Great Britain to any man who shall invent a method for it, which shall be plain, easy and practicable at sea.

Problem XII. "To find the value of the degree of a greater circle upon the earth, or how much it contains in English measure."

Here let it be noted, that one degree of a greater circle on the *earth* answers to one degree of a greater circle in the *heavens.* It is true the heavenly circles are incomparably larger than the circumference of the earth; and they are also larger than each other according to the different distances of the planets and stars; yet every circle (whether greater or lesser) is divided into 360 degrees, and therefore though circles differ never so much in magnitude, yet, when they are supposed to be *concentrical,* (i. e. to have the same centre) every single degree of each circle is correspondent to a single degree of all other circles.

Now that a degree of the heavens thus answers to a degree on the earth is very evident; for if we travel on earth, or sail one degree northward or southward on the same meridian, we shall find by the sun or the fixed stars in heaven that our zenith is just a degree altered, our latitude is changed one degree, and our pole is one degree more or less elevated, (viz.) more elevated if we go from London taward the north, and less elevated if we go toward the south, till we come to the equator. Afterward the contrary pole is elevated gradually. By such experiments as these philosophers infer also that the earth is a globe and not a plane surface.

Wherefore to find the value of a degree on a greater circle of the earth, you must travel directly in the same meridian, measuring your miles all the way, till your latitude be altered one degree; and then (if you have been exact in your mea-

sure) you will find that you have travelled about 70 Englis miles; though geographers often reckon 60 geographical mil to a degree for greater ease in computation, as I have sai before.

Problem XIII. "To find the circumference, the diameter the surface and solid contents of the earth.

Having found the value of one degree to be 70 miles, mul tiply that by 360, and it produces 25,200 miles for the circum ference.

The diameter is in proportion to the circumference as 113 t 355, or as 50 to 157, or in more brief and vulgar account as 7 t to 22, which will make the diameter of the earth to be abou 8000 miles.

Multiply the circumference by the diameter, and that pro duct shall be the square feet, furlongs, miles, &c. of the sur face. Multiply the surface by the sixth part of the diameter and that will give the solid content.

Note, That geographers differ a little in the computation o these measures, because they differ in the measure of a singl degree: And that is because of the crookedness and inequalit of any road that you can travel for 70 miles together. Th justest measures have made 69½ miles go to a degree, or the roun number of 70 miles.

Problem XIV. "To find the value of a degree of a lesse circle on the earth, i. e. the value of a degree of longitude on th lesser parallels of latitude."

I have mentioned it before under the IIId Problem of th 19th Section that all the degrees marked on the equator, or o any of meridians are 70 miles, because all those lines are grea circles; yet in the parallels of latitude, the further you go fro the equator, the circle grows less and less, and consequentl each degree of it must be less also; and for this reason th whole circle of 360 degrees near the pole will not make abov 360 miles; and as you approach still nearer to the pole, it wil not make so many furlongs or feet.

To find therefore the true value of a degree suppose in th parallel of latitude of London 51 ½ degrees, use this method figure XXII. Make a straight line A B to represent one degre in the equator, divide it into 60 geographical miles, or into 7 English miles, all equal. Set the foot of your compasses in describe an arch from B to C of 51½ degrees, then from th point C let fall a perpendicular to D, and A D is the measure o a *degree of longitude in the parallel of London*, (viz.) abou 43½ miles.

The demonstration of it may thus be explained. Prolon the arch B C and complete the quadrant E A B. Then E shal represent the north pole; E A the northern half of the axis o

the world, A B the semidiameter at the equator, and N C the semidiameter of the parallel of latitude for London. Then arithmetically, if the line A B (suppose 1000 equal parts) allow 70 miles for a degree, what will N C (i. e. about 621 equal parts) allow? Ans. 43½.

Or trigonometrically thus: A B is the whole sine of 90d, or radius. N C. is the sine of the colatitude 38d½. Then say, As A B or the sine 90d is to 70 miles, so is N C or A D the sine of 38d½ to 43½ miles.

Note, This diagram or figure will shew the value of a degree of longitude in any parallel of latitude, if from every degree in the arch E C B. a perpendicular were drawn to the line A B. Therefore a whole line of sines if numbered backward, and applied to a scale of 70 equal parts, will shew the miles contained in one degree of longitude under any parallel of latitude whatsoever.

Having shewn in former problems how to take the meridian altitude of the sun, and thereby to find the latitude of any place on the earth, I think it may be proper now to shew how to project the sphere for any latitude upon the plane of the meridian, and represent it in straight lines, which is called the analemma; because the erection of this scheme (and sometimes of a little part of it) will solve a variety of astronomical problems, as will appear hereafter.

Problem XV. "To erect the analemma, or represent the sphere in straight lines for the latitude of London 51½ degrees."

First, It is supposed you have a scale of chords at hand, or a quadrant ready divided into 90 degrees. Take the extent of 60 degrees of the line of chords in your compasses, (or which is all one) the radius of your quadrant, and describe the circle N Z E H S Q for a meridian both north and south as in figure XXIII. viz. N E S, which represents 12 o'clock at noon; and N Q S, which represents the hour of midnight.

Through C the centre draw the line H O for the horizon. At 90 degrees distance from H and O mark the point Z and D for the zenith and nadir; then draw the line Z D which will cross H O at right angles, and will represent the azimuth of east and west; as the semicircle Z O D represents the north azimuth, and Z H D the south.

Above the horizon O mark N for the north pole elevated 51½ degrees; through the centre C draw the line N S for the axis of the world; which line will also represent the hour circle of six o'clock, being at 90 degrees distance from noon and midnight; S will stand for the south pole, depressed as much below H the south side of the horizon, as N the north pole is raised above O on the north side of it.

At 90 degrees from N mark E and Q on each side; then cross the axis of the world N S with the line E Q at right angles which represents the equator. Thus Z will be 90 degrees from N the north pole, 51½ degrees from Z the zenith, which is the latitude, and it will be 38½ degrees above H the horizon which is the complement of the latitude.

At 23 degrees from E on each side mark the points M and W; then parallel to the equator or E Q draw the line M ♋ for the tropic of cancer, and the W ♑ for the tropic of capricorn. After that, through the centre C draw M ♑ which is the ecliptic: It cuts the equator E Q in C, and makes an angle with it of 23½ degrees.

From the points N S mark *p* and *x* on each side at the distance of 23½ degrees, *p p* are the poles of the ecliptic, and the line *p x* and *x p* being drawn are the two polar circles, viz. the artic and antartic.

Thus analemma is completed for all general purposes or problems. The further observables in it are these, viz.

M is the sun's place in the ecliptic when it enters cancer at the summer's solstice: and the arch E M is its north declination 23½ degrees.

C is the sun's place in the ecliptic entering aries or libra at the equinoxes; and then it has no declination.

♑ is the sun's place in the ecliptic entering capricorn at the winter solstice; and the arch ♑ Q or (which is all one) E W is its south declination 23½ degrees.

The line ♋ is the sun's path the longest day, or at the summer solstice; it is at ♋ at midnight; it rises at R; it is at six o'clock at 6; it is in the east azimuth at V; it is on the meridian at M that day, and the arch M H is its meridian altitude, viz 62 degrees.

The line E Q is the sun's path on the two equinoctial days at aries and libra; it is at midnight at Q; it rises at C, and it is at the same moment at the east, and six o'clock; for on the equinoctial days Z D the azimuth of the east and west, and N S the six o'clock hour line both meet at C in the horizon H O, which never happens any other day in the year; then the sun goes up to E at noon; and E H is the arch of its meridian altitude at the equinoxes, viz. 38½ degrees.

W ♑ is the sun's path the shortest day, or at the winter solstice; it is at midnight at ♑; it is in the east at K long before it rises; it is six o'clock at G before it rises also; then at it rises or gets above the horizon; it is noon at W, and its meridian altitude is W H or 15 degrees.

The sun's ascensional difference (that is, its distance from six o'clock at its rising or setting) in the summer solstice is the line R G, and at the winter solstice 'tis the line I G.

Its amplitude (or distance from east or west at its rising or setting) in summer is R C ; in winter it is I C.

Here you must suppose that the sun goes down again from the meridian in the afternoon on the other side of the scheme or globe in the same manner in which its ascent toward the meridian is represented on this side ; so that the line M R represents the sun's semi-diurnal arch at midsummer, E C at the equinoxes, and W I at midwinter. The semi-diurnal arch is half the arch it makes above the horizon.

Note, That as we have described the various places of the sun's appearances above the horizon H O at the several seasons of the year, so the various places of its depression below the horizon H O may be easily found out and described by any learner.

Problem XVI. "How to represent any parallel of declination on the analemma, or to describe the path of the sun any day in the year."

Find out what is the sun's declination that day by some scale or table : Observe whether it be the winter or the summer half-year ; and consequently whether the declination be north or south : then for the north side of the equator, if it be summer, set the degrees of north declination upward from E toward Z : if it be winter set the south declination downward from E toward H : and from the point of declination (suppose it be M or W) draw a line parallel to E Q the equator, as M ♋ or W ♍, and it represents the parallel of declination, or the path of the sun for that day.

Problem XVII. "How to represent any parallel of altitude, either of the sun or star on the analemma.

As the lines of declination are parallel to the equator ; so the lines of altitude are parallel to the horizon : suppose therefore the altitude of the sun be about 42 degrees ; set up 42 degrees on the meridian from H to A, draw the line A L parallel to H O, and it describes the sun's parallel of altitude that moment.

Here Note, That where the sun's parallel of declination for any day and his parallel of altitude for any moment cross each other, that is an exact representation of the sun's place in the heavens at that time: thus the point sol ⊙ is the precise place where the sun is when he is 42 degrees high on the longest day of the year : for M ♋ represents his path or parallel of declination that day, and A L represents his parallel of altitude that moment.

I might add here also, that the prick'd arch N ⊙ S represents the hour circle in which the sun is at that moment ; and Z ⊙ D represents its azimuth or vertical circle at that time. Note, these arches are troublesome to draw aright, and are not at all necessary to solve common problems by the scale and compasses on the analemma.

Problem XVIII. "The day of the month and the sun's altitude being given, how to find the hour or azimuth of the sun by the analemma."

The two foregoing problems acquaint you how to fix the precise point of the sun's place any minute of any day in the year by the parallel of declination and parallel of altitude crossing each other.

Now suppose the day of the month be the 6th of May, and the sun's altitude 34 degrees in the morning. Describe the semicircle H Z e in figure XXIV. for the meridian. Make H C e the horizon. Draw E C making with H C an angle of the colatitude 34½ degrees to represent the equator. Seek the declination of the sun, and in the tables or scales you will find it near 16½ degrees northward; set 16½ from E to D; draw D R for the path of the sun that day, parallel to E e the equator. Then set the altitude 34d. from H to A. draw A L parallel to H O the horizon, thus the point ⊙ shews the place of the sun as before.

Now if you would find the hour, you must draw the line C N at right angles with the equator E C, which represents the six o'clock hour line; and the distance 6 ⊙ is the sun's hour from six; that is, his hour after six in the morning, or before six in the afternoon.

If you are to seek the azimuth, then you must draw the line C Z perpendicular to H O, which is the vertical circle of east and west; then the extent F O is the sun's azimuth from east in the morning, or from west in the afternoon.

Thus you see that in order to solve those two difficult problems of the hour or azimuth, you need but a very few lines to perform the whole operation; for if you want only the hour, C Z may be omitted; if you want only the azimuth, C N may be omitted.

Yet in the winter half-year, suppose the 13th of November, when the declination is near 18 degrees south, it must be set downward as E W from E toward H; then you cannot so well find the hour without producing the six o'clock line N C below the horizon down to *s*, that you may measure the hour from it or six.

Observe also that this little diagram in figure XXIV. will solve a great variety of problems besides the hour and azimuth on the 6th of May: it shews the length of the day by the semidiurnal arch D R. The sun's ascensional difference is 6 R. His amplitude is C R. His azimuth from east or west at six is T 6. His altitude at east and west is V C. His meridian altitude is the arch D H: and his azimuth from east or west at rising or setting is the line C R.

Problem XIX. "How to measure the number of degrees on any of the straight lines in the analemma."

I think there is no need to inform the reader that any part of the outward circle or meridian may be measured upon that scale of chords or quadrant, according to whose radius the whole analemma is drawn.

As for the straight lines they are all to be considered as sines; those semidiameters which are drawn from the centre C to the circumference are so many whole lines of sines or 90 degrees to the common radius of the semicircle. But if you consider any whole diameter which passeth through the centre C, it is a line of versed sines, *i. e.* two lines of right sines joined at their beginning to the same common radius of the semicircle.

If therefore you have a scale or line of sines at hand to the same radius of the circle, you may measure any part of those straight lines, setting one foot of the compasses in the centre C, and extending the other to the point proposed, then applying that extent to the beginning of the line of sines, and observing how far it reaches. But if you have no scale or line of sines at hand, you may find a quantity of any part of the semidiameter by the outward limb or semicircle, and by the scale of chords, according to whose radius the semicircle is drawn. The method of performing it see in figure XXV. where the quadrant *y x b* is drawn by the same radius as the semicircle in figure XXIV. But I choose to make it a distinct figure, lest the lines should interfere with one another and breed confusion; and therefore in figure XXIV. I have used capital letters, in figure XXV. all the letters are small.

Suppose I would find how many degrees are contained in V C which is the sun's altitude at east or west. This is a part of the semidiameter C Z: suppose therefore C Z to be a whole line of sines, beginning to be numbered at C. Take the extent V C in your compasses, and carry one leg up in the arch *y x* till the other leg will but just touch the diameter *y b*, and the leg of the compasses will rest at *n*; wherefore it appears that C V in figure XXIV. is the sine of the arch *y n* in figure XXV. or 21 degrees.

Another way to perform it is this. Take the extent V C, set one leg of the compasses in *y*, and with that extent make a blind or obscure arch at *e*, and by the edge of that arch lay a rule from the centre *b*, and it will find the point *n* in the limb viz. 21 degrees.

By the same practice you may find the number of degrees contained in any part of those lines which are drawn from the centre C, viz. C H, C E, C M, C Z, C N, C O, all which are whole lines of sines to the common radius of the quadrant. But as for those lines in the analemma which are not drawn from the centre C, but are drawn across some other diameter and produced to the limb, such as the line 6 D, the line S W, the line F A, and the line M L, each of these are to be esteemed as a whole line of sines also, but to a less radius.

So 6 ☉ figure XXIV. is the sign of the sun's hour from 6 but the radius is 6 D, and the number of degrees in 6 ☉ is to l found in this manner. Take the extent 6 D, or this whole less radius in your compasses, and set it from *b* to *q* in figure XX then take the extent 6 ☉, and setting one foot of the compass in *q*, make an obscure arch at *o*, and a ruler laid from *b* the centi by the edge of that arch *o* will find the point *d* in the limb, a shew that *d y* is 34½ degrees, which (turned into hours) is tw hours 17 minutes from six, viz. 17 minutes past eight in the morn ing, to 43 minutes past three in the afternoon.

Again F ☉ in figure XXIV. is the sine of the azimuth fro east to west to the radius F A; take therefore F A in your com passes and set it from *b* to *y* in figure XXV. then take the extent ☉ and with one foot in *p* make the obscure arch *a*; by the edg of that arch lay a ruler from *b* the centre, and you will find th point *s* in the limb; therefore *y s* is the azimuth from east to we that is, about 17 degrees.

Note, If you have the instrument called a sector at han and know how to use it, you may with great ease and exactne find the value of any sine in the analemma, whether it be t a greater or a lesser radius, without these geometrical operation

Problem XX. "To find the sun's place in the ecliptic an day in the year."

It is well known that the 12 signs of the zodiac, each which has 30 degrees, contain in all 360 degrees: and the sun said to go through them all at once in twelve months or a yea Therefore in a vulgar account, and for the use of learners, we ge nerally say, the sun goes through one degree in a little more tha a day, and thereby finishes the 360 degrees in 365 days. But th is not the justest and most accurate account of things: let u therefore now toward the end of this book, with a little mor exactness observe,

1. That the annual course which the sun appears to tak through the ecliptic round the earth, is much more properly an truly ascribed to the earth's moving or taking its course round th sun; though the common appearances to our eye are much th same as if the sun moved.

2. This annual course or path of the earth is not properly circle, but an ellipsis or oval: And as the sun is fixed in one the focus's of the ellipsis, so the fixed stars, (and among the the 12 signs,) surround and encompass it. See figure XXXI. whe the black point *t* is the earth in its orbit moving round, and t the sun near the middle, and the outward circle of points is th starry heaven.

3. That part of this ellipsis or oval, which the earth trac in our winter half-year, (*i. e.* from autumn to spring) is nearer

the sun than the other part of it which the earth traces in our summer half-year, (*i. e.* from spring to autumn.) And as it is nearer to the sun, so consequently it is the shorter or lesser half, if I may so express it. The very figure shews it plainly.

Note, By our winter and our summer I mean those seasons as they respect us in Europe, and in these northern parts of the globe.

4. Thence it follows that the sun appears to finish its winter half-year from September 23d to March 20th, *i. e.* from ♎ by ♑ to ♈ sooner by 7 or 8 days than it does the summer half-year, *i. e.* from ♈ by ♋ to ♎, or from March 20th to September 23d, which is proved thus: When the earth is at *t*, the sun appears at ♋ and it is midsummer. When the earth is at *e* the sun appears at ♎ and it is autumn. When the earth is at *o* the sun appears at ♑ and it is midwinter. And when the earth is at *a* the sun appears at ♈ and it is spring. Thus the sun appears to pass through those signs which are just opposite to those which the earth passes. Now as the earth is longer in going through the arch *a t e*, from ♎ to ♈ than it is going through the arch *e o a*, from to ♎, so consequently the sun appears to pass through the opposite signs from aries to libra, slower than he does from libra to aries.

This is proved also plainly by the computation of days.

After the sun enters aries on March 20th, that month hath 11 days, and after the sun enters Libra on September 23d, that month hath 8 days. Now let us compute.

March	11	♈	*September*	8	♎
April	30		*October*	31	
May	31		*November*	30	
June	30	Days	*December*	31	Days
July	31		*January*	31	
August	31		*February*	28	
September	22	♎	*March*	20	♈
Summer	186	Days	*Winter*	179	Days

5. Agreeably hereto it is found that in the winter months (chiefly from the latter end of October to the middle of March) the sun appears to move something more than one degree in a day: But in the summer months (chiefly from the middle of March to the latter end of October) the sun appears to move something less than one degree in a day. This is one reason why a good pendulum clock measures time more justly than the sun: And it is this irregularity of the sun's measuring time that makes the tables of equation of time necessary.

6. And thence arises a sensible inequality between the times

of the sun's apparent continuance in different signs of the zodiac: He seems to tarry longer in those of the summer, and shorter in those of the winter: So that he does not leave one sign, and enter another just in the same proportions or distances of time every month.

7. This occasions a little variation of the declination of the sun, and his right ascension from the regularity that we might expect for they are both derived from his apparent place in the ecliptic: And therefore none of them can be found by learners with utmost exactness, but in an ephemeris or tables which shew the sun's place, &c. every day in the year.

8. Let it be noted also, that the leap-year with its additional day the 29th of February, returning every four years, forbids the sun's place in the ecliptic to be exactly the same at the same day and hour of the following year, as it was in the foregoing; so that though you knew the sun's place, his right ascension and declination for one whole year, that would not serve exactly for the next year, for the nicest purposes of astronomy.

9. Yet as in four years time the sun appears very nearly at the same place in the heavens again at the same day and hour and minute as before, so a table that contains the round of four years is a sufficient direction for 20 years to find the sun's place for any common purposes: Provided always that we seek the sun's place, declination or right ascension, for any year and day in that year in the table that is equally distant from leap-year whether it happens to be the first, the second, or the third after leap-year, or whether it be the leap-year, itself. See more of this matter, Sect. XXI. of the *Tables of Declination.*

10. If we would make one single table or scale of the sun's entrance into the signs of the zodiac, or of his declination or right ascension to serve for every year, we must chuse the second after the leap-year, because that comes nearest to the mean or middle course and place of the sun, and will occasion the least error in any operations.

I have therefore here set down a short table of the sun's entrance into the several signs, for the year 1754, which is the second after leap-year; and for geometrical operations with a plain scale and compass, it is sufficiently exact for 20 years to come.

Anno 1754, the second after leap-year.

	Day	d.	m.		Day	m.	d.
March	20—♈—0	:	09	*Sept.*	23—♎—0	:	21
April	20—♉—0	:	19	*Oct.*	23—♏—0	:	3
May	21—♊—0	:	16	*Nov.*	22—♐—0	:	14
June	22—♋—0	:	51	*Dec.*	22—♑—0	:	44
July	23—♌—0	:	25	*Jan.*	21—♒—0	:	33
August	23—♍—0	:	11	*Feb.*	20—♓—0	:	55

At the same time while one person takes the altitude of the sun in order to find the azimuth from noon by it, let another hold up a thread and plummet in the sun-beams and mark any two distant points in the shadow as A B, figure XXVI. and then draw the line A B: Suppose the azimuth at that moment be found to be 35 degrees, draw the line A E at the angle of 35 degrees from A B, and that will be a true meridian line.

You must observe to set off the angle on the proper side of the line of shadow eastward or westward, according as you make your observation in the morning or in the afternoon.

Note, Where you use a thread and plummet, remember that the larger and heavier your plummet is, the steadier will your shadow be, and you will draw it with greater ease and exactness.

In this and the following operations to draw a meridian line, you must be sure that your plane be truly level and horizontal, or else your performances will not be true.

Problem XXIII. "To draw a meridian line on a horizontal plane by a perpendicular style."

Note, That when I speak of a perpendicular style, I mean either of those three sorts of styles before-mentioned in problem I. viz. A straight needle stuck into the board perpendicularly, as figure XV. A straight or crooked wire stuck in sloping at random with the perpendicular point found under the tip of it, as figure XVI; or the brass prism, as figure XVII. For what I call a perpendicular style may be applied and ascribed to either of these.

Make several parallel circles or arches, as figure XXVII. In the centre of them fix your perpendicular style N C. Mark in the morning what point in any circle the end of the shadow touches, as A. In the afternoon mark where the end of the shadow touches the same circle, as O. Divide the arch A O just in halves by a line drawn from the centre, and that line C M will be the true meridian line.

The reason of this practice is derived hence, viz. that the sun's altitude in the afternoon is equal to the sun's altitude in the morning, when it casts a shadow of the same length: And at those two moments it is equally distant from the point of noon or the south, which is its highest altitude; therefore a line drawn exactly in the middle between these two points of shadow, must be the meridian line or point to the north and south.

This problem may be performed by fixing your perpendicular style first, and observing the shadow A before you make the circles, (especially if you use the brass prism, or the sloping style with the perpendicular point under it) then set one foot of your compasses in the perpendicular point C, extend the other to A, and so make the circle.

If you use the prism for a style, you may mark a line o gle at the foot of it where you first fix it, and place it right a though you move it never so often.

It is very convenient to mark three or four points of sh in the morning, and accordingly draw three or four arch circles, lest the sun should not happen to shine, or you s not happen to attend just at that moment in the afte when the shadow touches that circle on which you marked first point of shadow in the morning.

If you would be very exact in this operation, you s tarry till the sun be gone one minute further westward i afternoon, i. e. till one minute after the shadow touches the circle, and then mark the shadow; because the sun in six time (which is one quarter of a day) is gone eastward (ecliptic in his annual course one minute of time, which minutes (or one quarter) of a degree.

Problem XXIV. "To draw a meridian line on a hor tal plane by a style or needle set up at random."

Another method near a-kin to the former is this. Set needle or sharp-pointed style at random, as N D, in figure XI Fix it very fast in the board, and observe a point of shad the morning as A. Then with a pin stuck on the tip of the N. (without moving the style) draw the arch A S O: Mar point of shadow o, in the afternoon when it touches that arc rather when it is one minute past it.) Then draw the lin and dissect it, or cut it in halves by a perpendicular line which is a true meridian.

Note, In this method you have no trouble of fix style perpendicular, nor finding the point directly under a centre. But in this method as well as in the former good to mark three or four points of shadow in the mor and draw arches or circles at them all, for the same reas before.

Observe here, That in these methods of drawing a me line by the shadow of a tip of a style, I think it is best gen to make your observations between eight and ten o'clock morning, and between two and four in the afternoon. I in the three summer months May, June, and July, you perhaps make pretty good observations an hour earlier i morning, and later in the afternoon; but at no time o year should you do it within an hour of noon, nor when th is near the horizon; for near noon the altitude of the s the length of shadow varies exceeding little; and when sun is near the horizon, the point and bounds of the shado not full and strong and distinct, nor can it be marked exactl

Therefore if in the three winter months, November D ber, or January, you make your observation, you should

do it half an hour before or after ten o'clock in the morning, and so much before and after two in the afternoon; for otherwise the sun will be either too near noon, or too near the horizon.

But in general, it may be advised that the summer half-year is far the best for observation of shadows in order to any operations of this kind.

Problem XXV. "To draw a meridian line on an equinoctial day."

On an equinoctial day or very near it, as the 8th, 9th, or 10th of March; or the 11th 12th, or 13th of September, you may make a pretty true meridian line very easily thus by figure XXIX.

Mark any two points of shadow as A B from a needle C D set up at random, (no matter whether it be either upright or straight.) Let those two shadows be at least at the distance of three or four hours from each other, and it is best they should be observed one in the morning and the other about the same distance from 12 in the afternoon; and then draw the line A B which represents the equinoctial line, and is the path of the sun that day: Cross it any where at right angles, and M N, or O P, are meridian lines.

Note, It is best to mark several shadows that day, as S, S, S, and draw a right line A S S B by those which lie nearest in a right line, that you may be the more exact.

Problem XXVI. "To draw a meridian line by a point of a shadow at noon.

If you have an exact dial to whose truth you can trust, or a good watch or clock set exactly true by the sun that morning, then watch the moment of 12 o'clock or noon, and hold up a thread and plummet against the sun, and mark the line of shadow on a horizontal plane, and that will be a true meridian line.

Or you may mark the point or edge of shadow, by any thing that stands truly perpendicular, at the moment of 12 o'clock, and draw a meridian line by it.

Problem XXVII. "To draw a meridian line by a horizontal dial."

If you have a horizontal dial which is not fastened, and if it be made very true, then find the exact hour and minute by a quadrant, or any other dial, &c. at any time of the day, morning or afternoon; set the horizontal dial in the place you design, to the true hour and minute; and the hour line of 12 will direct you to draw a meridian.

Or if your dial be square, or have any side exactly parallel to the hour line of 12, you may draw your meridian line by that side or edge of the dial.

Problem XXVIII. "How to transfer a meridian line fr one place to another."

There are several ways of doing this.

1st *Way*. If it be on the same plane, make a parallel l to it, and that is a true meridian.

IId *Way*. If it be required on a different plane, set a good horizontal dial at the true hour and minute by your m dian line on the first plane, then remove it and set it to the s minute on the second plane, and by the 12 o'clock line mark y new meridian.

Note, If the sides or edges of your horizontal dial are truly parallel to the 12 o'clock line, you may draw a meridia them as before.

IIId *Way*. Hold up a thread and plummet in the or set up a perpendicular style near your meridian line time of the day, and mark what angle the line of shadow m with that meridian line on your first plane; then at the same ment, as near as possible, project a line of shadow by the thr or another perpendicular style on the new plane, and set off same angle from it which will be a true meridian.

Note, Two persons may perform this better than one.

Problem XXIX. "How to draw a line of east and wes a horizontal plane."

Where a meridian line can be drawn, make a meridian first, and then cross it at right angles, which will be a true of east and west.

But there are some windows in a house on which the cannot shine at noon; in such a case you may draw a line of and west several ways.

Ist *Way*. You may use the same practice which prob XXII. directs, with this difference, viz. instead of seeking sun's azimuth from the south, seek its azimuth from east west, and by a line of shadow from a thread and plum marked at the same time, set off the angle of the sun's muth from the east in the morning, or the west in the af noon. A common observation of the course of the sun sufficiently inform you on which side of the line of shadow to your angle.

IId *Way*. You may use the second method of transferr a meridian line by a horizontal dial with this difference, viz. stead of using the 12 o'clock hour line, by which a meridian to be drawn, use the 6 o'clock line, which will be east and we for in a horizontal dial it stands always at right angles with meridian.

IIId *Way*. The third method of transferring a merid line will serve here also; but with this difference, viz. set off complement of the angle, which the line of shadow makes w

your meridian line on the first plane, instead of setting off the same angle, and observe also to set it off on the contrary side, that so it might make a right angle with a meridian line if that could have come on the plane.

Problem XXX. "How to use a meridian line."

The various uses of a meridian line are these.

Ist *Use.* A meridian line is necessary in order to draw an horizontal dial on the same plane, or to fix an horizontal dial true if be made before.

IId *Use.* A brass horizontal dial may be removed from one place to another in several rooms of the same house; and shew the hour wheresoever the sun comes, if either a meridian line or line of east and west be drawn in every window, by which to set an horizontal dial true.

IIId *Use.* By a thread and plummet, or any perpendicular pin, or post casting a shadow precisely along the meridian line, we find the hour of 12, or the point of noon, and may set a watch or clock exactly true any day in the year, if we have no dial at hand.

IVth *Use.* It is necessary also to have some meridian line in order to find how a house or wall stands with regard to the four quarters of the heavens, east, west, north, or south, which is called the bearing of a house or wall, that we may determine what sort of upright dials may be fixed there, or what sort of fruit-trees may be planted, or which part of a house or garden is most exposed to the sun, or to the sharp winds.

Vth *Use.* By observing the motion of the clouds, or the smoke, or a vane or weather-cock, you cannot determine which way the wind blows, but by comparing it with a meridian line, or with a line of east and west.

When once you have got a true meridian line, and know which is the south, then the opposite point must be north; and when your face is to the north, the east is at your right-hand, and the west at your left.

VIth *Use.* A meridian line will shew the azimuth of the sun at any time by holding up a thread and plummet in the sun, and observing where the line of shadow crosses it. Or the sharp smooth edge of at upright style or post will cast a shadow across a meridian line, and shew the sun's azimuth.

VIIth *Use.* If you have a meridian line on a horizontal plane, you may draw a circle on that as a diameter, and divide it into 360 degrees; then set up a fixed or moveable perpendicular style, and it will shew the azimuth of the sun at all hours.

VIIIth *Use.* A perpendicular style on a meridian line will shew the sun's meridian altitude by the tip of the shadow accord-

ing to problem II. And thereby you may find the latitude of place by problem VII.

IXth *Use.* If you have a broad smooth board with a behind at the bottom, to make it stand, such as is describe problem XXIII. of the XIXth sect. and if it be made to s perpendicular on a horizantal plane by a line and plumm the middle of it, you may set the bottom or lower edge of board in the meridian line, and by your eye fixed at the edg the board and projected along the flat side, you may deter at night, what stars are on the meridian; and then by the s (as in problem XXXIII. and XXXIV. section XIX.) or b instrument called a nocturnal, you may find the hour of the ni or by an easy calculation as in the XXXIIId. problem of XX. section.

Problem XXXI. "How to know the chief stars, and to the north pole."

If you know any one star you may find out all the re considering first some of the nearest stars that lie roun whether they make a triangle or a quadrangle, straight line curves, right angles or oblique angles with the known star. is easily done by comparing the stars on the globe (being r fied to the hour of the night) with the present face of the vens, and the situations of the stars there, as in pro XXXII. section XIX.

And indeed it is by this method that we not only lea know the stars, but even some points in the heavens whe star is. I would instance only in the north pole, which is e found, if you first learn to know those seven stars which are c Charles' Wain, see figure xxx. four of which in a quadr may represent a cart or waggon *b*, *r*, *c*, *d*, and the three othe presenting the horses.

Note also that the star *a* is called Alioth, *d* is called Di *b* and *r* are called the two guards or pointers, for they poi rectly in a straight line to the north pole *p*, which now is 2¼ degrees distant from the star *s*, which is called the north star.

You may find the north pole also by the star Al from which a straight line drawn to the pole star *s*, goes thr the pole point *p*, and leaves it at 2¼ degrees distance fro pole star.

You may find it also by the little star *n*, which is the ne star to the pole star *s*; for a line drawn from *n* to *s* is the pothenuse of a right-angled triangle, whose right angle is i pole point *p*.

Problem XXXII. "To find the latitude by any sta s on the north meridian."

It has been already shewn in the Xth problem of thi

tion, how to find the latitude of a place by the meridian altitude of a star on the south meridian; but the methods of performance on the north meridian are different.

The first way is this. Take the altitude of it when it is upon the north meridian at 5 or 6 or 7 o'clock in the winter, then 12 hours afterwards take its altitude again, for it will be on the meridian on the other side of the pole; substract half the difference of those two altitudes from the greatest altitude, and the remainder is the true elevation of the pole, or latitude of the place.

The second way. Observe when the star Alioth comes to the meridian under the pole; then take the height of the pole star, and out of it substract 2¼ degrees (which is the distance of the pole star from the pole) the remainder will be the true elevation of the pole, or the latitude. The reason of this operation is evident by the xxxth figure, for Alioth is on the meridian under the pole just when the pole star is on the meridian above the pole.

Note, The pole star is upon the meridian above the pole just at 12 o'clock at night on the 4th day of May, and under the meridian on the 5th day of November; fifteen days after that it will be upon the meridian at 11 o'clock; thirty days after at 10 o'clock; so that every month it differs about two hours.

Problem XXXIII. "To find the hour of the night by the stars which are on the meridian."

If you have a meridian line drawn, and such a board as I have described under the 9th Use of the meridian line, you may exactly find when a star is on the meridian; and if you are well acquainted with the stars, wheresoever you set up that board upright on a meridian line, you will see what star is on the meridian. Suppose Aldebaran or the bull's eye on the 20th of January is on the south part of the meridian; then in some tables find the sun's and that star's right ascension, add the complement of the right ascension of the sun for that day, viz. 3 hours 6 minutes to the right ascension of the star 4 hours 17 minutes, and it makes 7 hours 23 minutes the true hour of the afternoon.

Note, If the star be on the north part of the meridian, or below the north pole, it is just the same practice as on the south; for when any star is on the meridian, the difference between the sun's R. A. and that star's R. A. is the sun's true hour, i. e. its distance from 12 o'clock at noon or midnight, at which time the sun is on the meridian either south or north.

If you have no meridian line drawn, you may find within two or three degrees what stars are on the north meridian thus; hold up a string and plummet and project it with your eye over-right the pole star, or rather the pole point, and observe what other stars are covered by it or close to it, for these are on or near the meridian.

would therefore know the sun's declination, suppose at six o'cl in the morning of any given day, you must compare the decli tion for that day with the sun's declination the foregoing day, make a proportionable allowance, viz. three-fourth parts of difference of these two declinations. If at six in the afterno you must compare it with the following day, and allow in same manner one-fourth part.

II. These tables are fitted for the meridian of London. you would know therefore the sun's declination the same day noon at Port Royal in Jamaica, you must consider the differe of longitude. Now that place being about 75 degrees westw from London, that is, five hours later in time, it is but se o'clock in the morning there when it is noon at London; and must make a proportionable allowance for the difference of sun's declination by comparing it with that of the foregoing d If that place had the same longitude eastward from London would be five o'clock in the afternoon there; and then you m compare the sun's present declination with that of the day follo ing, and make allowance for the five hours, i. e. almost of difference of the two declinations. But if you would know sun's declination at any place, and at any hour of the day at t place; find what hour it is at London at the given hour at t place, and find the declination of the sun for that hour at Lon by *note* the first.

Note, These allowances must be added or substracted cording as the sun's declination is increasing or decreasing.

Yet in any of these geometrical operations the differenc the sun's declination at other hours of the day or at other pla of the world is so exceeding small that it is not sufficient to m any remarkable alterations, except when the sun is near equinoxes; and then there may be some allowances made fo in the manner I have described; nor even then is there any n of any such allowances except in places which differ from L don near 5 or 6 hours in longitude.

III. Let it be noted also, that as the place of the sun, consequently his declination and right ascension for every day vary something every year by reason of the odd five hours forty-nine minutes over and above 365 days, of which the s year consists. Therefore it was proper to represent the s declination every day for four years together, viz. the three y before leap-year, and the leap-year itself. For in the circui those four years the sun returns very nearly to the same decli tion again on the same day of the year, because those odd hours and 49 minutes do in four years time make up 24 ho or a whole day (wanting but four times eleven, i. e. 44 minut which day is super-added to the leap-year, and makes the 2 of February, as hath been said before.

It is true, that in a considerable length of time these tables will want further correction, because of those 44 minutes which are really wanting to make up the super-added day in the leap-year. But these tables will serve sufficiently for any common operations for forty or fifty years to come, provided you always consult that table which is applicable to the current year, whether it be a leap-year, or the first, the second, or the third year after it.

IV. Observe also these tables of the sun's declination are sometimes reduced (as it were) to one single scale. And for this purpose men generally choose the table of declination for the second after leap-year, and this is called the mean declination, that is, the middle between the two leap-years. This is that account of the sun's place and declination, &c. which is made to be represented on all mathematical instruments, viz. globes, quadrants, projection of the sphere, and graduated scales, &c. and this serves for such common geometrical practices in astronomy without any very remarkable error.

Concerning the table of the fixed stars, let it be remembered that they move slowly round the round the globe eastward in circles parallel to the ecliptic, and therefore they increase their longitude 50 seconds of a minute every year, that is, one degree in seventy-two years. But their latitude never alters, because they always keep at the same distance from the ecliptic.

Let it be noted also, that this slow motion of the fixed stars causes their declination and their right ascension to vary (though very little) every year. Their right ascension necessarily changes because their longitude changes, though not exactly in the same quantity. And though their latitude never alters, because latitude is the distance from the ecliptic, yet their declination must alter a little, because it is their distance from the equator. But the tables of their right ascension, which I have here exhibited, will serve for any common practices for at least twenty years to come, and their declination for near fifty years, without any sensible error in such astronomical essays as these.

It may be proper here to give notice to learners, that the same stars may have north latitude and south declination; such are all those that lie between the equator and the southern half of the ecliptic; but all those stars which lie between the equator and the northern half of the ecliptic, have south latitude and north declination.

A TABLE

OF

THE SUN'S DECLINATION

For the Year 1753,

BEING

The First after Leap-Year, which will serve for near 50 Years.

Day	Janu. S.		Febr. S.		Mar. S.*		April N.		May. N.		June N.		July N.		Aug. N.		Sept. N*.		Oct. S.		Nov. S.		Dec. S.	
	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.
1	22	59	16	57	07	24	04	43	15	12	22	08	23	07	17	59	08	10	03	20	14	36	21	55
2	22	55	16	40	07	01	05	06	15	30	22	16	23	05	17	43	07	48	03	43	14	55	22	04
3	22	48	16	22	06	38	05	29	15	48	22	23	22	59	17	28	07	26	04	07	15	14	22	13
4	22	41	16	04	06	15	05	52	16	05	22	30	22	54	17	12	07	04	04	30	15	32	22	21
5	22	35	15	46	05	51	06	14	16	23	22	36	22	48	16	56	06	42	04	53	15	51	22	28
6	22	27	15	28	05	28	06	37	16	40	22	43	22	42	16	39	06	19	05	16	16	09	22	36
7	22	19	15	09	05	05	07	00	16	56	22	49	22	36	16	23	05	57	05	39	16	27	22	42
8	22	11	14	50	04	42	07	22	17	13	22	54	22	29	16	05	05	34	06	02	16	44	22	48
9	22	03	14	31	04	18	07	44	17	28	22	59	22	22	15	47	05	11	06	25	17	01	22	54
10	21	54	14	11	04	55	08	07	17	44	23	04	22	15	15	30	04	49	06	48	17	18	23	00
11	21	45	13	52	03	31	08	29	17	59	23	08	22	06	15	12	04	26	07	11	17	35	23	05
12	21	35	13	32	03	07	08	51	18	14	23	12	21	58	14	54	04	03	07	34	17	51	23	09
13	21	25	13	12	02	44	09	12	18	29	23	16	21	49	14	36	03	40	07	56	18	07	23	13
14	21	14	12	52	02	20	09	34	18	44	23	19	21	40	14	18	03	17	08	19	18	22	23	17
15	21	03	12	31	01	57	09	55	18	58	23	22	21	31	13	59	02	54	08	41	18	38	23	20
16	20	52	12	10	01	33	10	17	19	12	23	24	21	21	13	40	02	30	09	03	18	53	23	23
17	20	39	11	49	01	09	10	37	19	26	23	25	21	11	13	21	02	07	09	25	19	08	23	25
18	20	27	11	28	00	45	10	58	19	39	23	26	21	01	13	02	01	44	09	47	19	22	23	26
19	20	14	11	06	00	22	11	19	19	52	23	27	20	50	12	42	01	20	10	09	19	36	23	27
20	20	01	10	45	N.	02	11	39	20	05	23	28	20	39	12	22	00	58	10	31	19	50	23	28
21	19	48	10	22	00	25	12	00	20	17	23	29	20	28	12	02	00	34	10	52	20	05	23	29
22	19	34	10	00	00	48	12	20	20	29	23	28	20	15	11	42	00	10	11	14	20	16	23	28
23	19	20	09	39	01	12	12	40	20	40	23	27	20	03	11	22	S.	12	11	34	20	29	23	28
24	19	06	09	16	01	36	13	00	20	51	23	26	19	50	11	01	00	36	11	55	20	41	23	27
25	18	51	08	54	01	59	13	19	20	02	23	25	19	37	10	41	00	59	12	16	20	53	23	25
26	18	36	08	31	02	23	13	39	21	12	23	24	19	24	10	20	01	23	12	36	21	04	23	23
27	18	21	08	09	02	46	13	58	21	22	23	22	19	11	09	59	01	46	12	57	21	15	23	21
28	18	05	07	46	03	01	14	17	21	32	23	19	18	57	09	37	02	10	13	17	21	25	23	18
29	17	49			03	33	14	36	21	42	23	15	18	43	09	16	02	33	13	37	21	36	23	14
30	17	31			03	56	14	54	21	51	23	11	18	28	08	55	02	57	13	57	21	46	23	10
31	17	14			04	19			21	59			18	14	08	33			14	16			23	05

A TABLE

OF

THE SUN'S DECLINATION

For the Year 1754,

BEING

The Second after Leap-Year, which will serve for near 60 Years.

Day	Janu. S.		Febr. S.		Mar. S.*		April N.		May N.		June N.		July N.		Aug. N.		Sept. N*.		Oct. S.		Nov. S.		Dec. S.	
	d.	m.	d.	m.	d.	m.	d.	m,	d.	m.	d.	m,	d.	m.	d.	m.	d.	m.	d	m.	d.	m.	d.	m.
1	23	01	17	01	07	29	04	37	15	08	22	06	25	8	18	02	08	15	03	14	14	31	21	53
2	22	55	16	44	07	06	05	00	15	26	22	14	23	04	17	47	07	54	03	38	14	50	22	02
3	22	50	16	27	06	43	05	23	15	44	22	21	23	0	17	32	07	31	04	01	15	09	22	11
4	22	44	16	09	06	20	05	46	16	01	22	28	22	55	17	16	07	09	04	24	15	28	22	19
5	22	37	15	51	05	57	06	09	16	19	22	35	22	49	17	00	06	47	04	47	15	46	22	27
6	22	29	15	32	05	34	06	32	16	37	22	41	22	44	16	43	06	25	05	11	16	04	21	34
7	22	21	15	14	05	11	06	54	16	51	22	47	22	37	16	26	06	02	05	34	16	22	22	40
8	22	13	14	55	04	47	07	17	17	08	22	53	22	31	16	09	05	40	05	57	16	40	22	47
9	22	05	14	35	05	24	07	39	17	24	22	58	22	24	15	52	05	17	06	20	16	57	22	53
10	21	56	14	16	04	00	08	01	17	40	23	03	22	17	15	34	04	54	06	43	17	14	22	58
11	21	47	13	56	03	37	08	23	17	55	23	07	22	09	15	17	04	31	07	05	17	31	23	03
12	21	37	13	37	03	13	08	45	18	11	23	11	22	00	14	59	04	09	07	28	17	48	23	08
13	21	27	13	16	02	50	09	07	18	26	23	15	21	51	14	40	03	45	07	51	18	04	23	12
14	21	17	12	56	02	26	09	29	18	40	23	18	21	43	14	22	03	22	08	13	18	19	23	16
15	21	06	12	36	02	02	09	50	18	55	23	21	21	33	14	03	02	59	08	36	18	34	23	19
16	20	55	12	15	01	39	10	11	19	09	23	23	21	24	13	45	02	36	08	58	18	49	23	22
17	20	42	11	54	01	15	10	32	19	22	23	25	21	14	13	26	02	13	09	20	19	04	23	24
18	20	30	11	33	00	51	10	53	19	36	23	26	21	03	13	06	01	49	09	42	19	19	23	26
19	20	17	11	12	00	28	11	14	19	49	23	27	20	53	12	47	01	26	10	04	19	33	23	27
20	20	04	10	49	00	04	11	34	20	02	23	28	20	42	12	27	01	03	10	25	19	47	23	28
21	19	51	10	27	N.	19	11	55	20	14	23	29	20	30	12	07	00	39	10	46	20	00	23	9
22	19	38	10	06	00	43	12	15	20	26	23	29	20	18	11	47	00	16	11	08	20	13	23	29
23	19	24	09	44	01	06	12	35	20	38	23	28	20	06	11	27	S.	07	11	29	20	26	23	28
24	19	09	09	22	01	30	12	55	20	49	23	27	19	53	11	06	00	30	11	51	20	38	23	27
25	18	55	08	59	01	53	13	15	20	59	23	26	19	40	10	46	00	5	12	11	20	50	23	26
26	18	40	08	37	02	17	13	34	21	10	23	24	19	27	10	25	01	17	12	31	21	02	23	24
27	18	24	08	14	02	40	13	53	21	20	23	21	19	14	10	04	01	41	12	52	21	13	23	21
28	18	08	07	52	03	04	14	12	21	30	23	18	19	00	09	45	02	04	13	12	21	23	23	18
29	17	52			03	27	14	31	21	39	23	15	18	46	09	21	02	27	13	32	21	33	23	15
30	17	36			03	51	14	50	21	49	23	12	18	32	08	59	02	51	13	52	21	45	23	11
31	17	18			04	14			21	57			18	17	08	37			14	12			23	06

A TABLE

OF

THE SUN'S DECLINATION

For the Year 1755,

BEING

The Third after Leap-Year, which will serve for near 50 Years.

Day	Jan. S.		Febr. S.		Mar. S.*		April N.		May. N.		June N.		July N.		Aug. N.		Sept. N*.		Oct. S.		Nov. S.		Dec. S.	
	d.	m.	d.	m.	d.	m.	d.	m.	d.	m	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.
1	23	02	17	06	07	35	04	30	15	04	22	04	23	09	18	06	08	21	03	09	14	26	21	50
2	22	57	16	48	07	12	04	54	15	22	22	12	23	05	17	51	07	59	03	32	14	46	22	00
3	22	51	16	31	06	49	05	17	15	39	22	20	23	01	17	35	07	37	03	55	15	05	22	09
4	22	45	16	13	06	26	05	39	15	57	22	27	22	56	17	20	07	15	04	19	15	23	22	17
5	22	38	15	55	06	03	06	03	16	14	22	33	22	51	17	04	06	53	04	42	15	42	22	24
6	22	31	15	37	05	40	06	26	16	31	22	39	22	45	16	47	06	30	05	05	16	00	22	31
7	22	23	15	18	05	16	06	49	16	48	22	46	22	39	16	30	06	08	05	28	16	18	22	38
8	22	15	14	59	04	53	07	11	17	04	22	51	22	32	16	13	05	45	05	51	16	36	22	45
9	22	07	14	40	04	29	07	34	17	20	22	57	22	26	15	56	05	22	06	14	16	53	22	51
10	21	58	14	21	04	06	07	56	17	36	23	02	22	18	15	38	04	00	06	37	17	10	22	57
11	21	49	14	01	03	43	08	18	17	52	23	06	22	10	15	21	04	37	07	00	17	26	23	02
12	21	40	13	41	03	19	08	40	18	07	23	10	22	02	15	03	04	14	07	23	17	43	23	07
13	21	30	13	21	02	55	09	02	18	22	23	14	21	53	14	45	03	51	07	45	17	59	23	11
14	21	19	13	01	02	32	09	24	18	37	23	17	21	45	14	27	03	28	08	07	18	15	23	15
15	21	09	12	41	02	08	09	45	18	51	23	20	21	36	14	08	03	05	08	29	18	30	23	18
16	20	57	12	20	01	44	10	06	19	05	23	23	21	26	13	49	02	42	08	51	18	46	23	21
17	20	45	11	59	01	21	10	27	19	19	23	25	21	16	13	30	02	18	09	14	19	01	23	23
18	20	33	11	38	00	57	10	48	19	33	23	26	21	06	13	11	01	55	09	36	19	15	23	25
19	20	20	11	17	00	33	11	09	19	46	23	27	20	55	12	51	01	32	09	57	19	30	23	27
20	20	08	10	55	00	10	11	29	20	59	23	28	20	44	12	32	00	08	10	19	19	43	23	28
21	19	54	10	35	N.	13	11	50	20	11	23	29	20	33	12	12	00	45	10	41	19	57	23	29
22	19	41	10	11	00	37	12	10	20	23	23	29	20	21	11	52	00	21	11	02	20	10	23	29
23	19	27	09	49	01	00	12	30	20	35	23	28	20	09	11	32	S.	02	11	23	20	23	23	28
24	19	13	09	27	01	24	12	50	20	46	23	27	19	56	11	11	00	25	11	45	20	35	23	27
25	18	58	09	05	01	48	13	10	20	57	23	26	19	44	10	51	00	48	12	05	20	47	23	26
26	18	43	08	42	02	11	13	29	21	07	23	24	19	31	10	30	01	11	12	26	20	58	23	24
27	18	28	08	20	02	35	13	49	21	18	23	22	19	17	09	09	01	35	12	47	21	09	23	21
28	18	12	07	57	02	58	14	08	21	28	23	19	19	04	09	48	01	58	13	07	21	20	23	18
29	17	56			03	22	14	27	21	37	23	16	18	50	09	26	02	22	13	27	21	31	23	15
30	17	40			03	45	14	45	21	46	23	13	18	35	09	04	02	45	13	47	21	41	23	12
31	17	23			04	08			21	55			18	21	08	42			14	07			23	08

A TABLE

OF

THE SUN'S DECLINATION

For the Year 1756,

BEING

Leap-Year, which will serve for near 50 Years.

Day.	Janu. S.		Febr. S.		Mar. S.*		April N.		May N.		June N.		July N		Aug. N.		Sept. N*.		Oct. S.		Nov. S.		Dec. S.	
	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.
1	23	03	17	10	07	17	04	49	15	17	22	10	25	06	17	55	08	04	03	26	14	41	21	57
2	22	58	16	53	06	54	05	12	15	35	22	17	25	02	17	39	07	42	03	50	15	00	22	06
3	22	52	16	35	06	08	05	35	15	52	22	24	22	57	17	24	07	20	04	13	15	19	22	15
4	22	46	16	17	06	28	05	58	16	09	22	31	22	52	17	08	06	58	04	36	15	37	22	25
5	22	39	15	59	05	45	06	21	16	26	22	38	22	46	16	51	06	36	04	59	15	56	22	30
6	22	32	15	41	05	22	06	43	16	43	22	44	22	40	16	34	06	13	05	23	16	14	22	37
7	22	25	15	23	04	59	07	06	17	00	22	50	22	34	16	17	05	51	05	46	16	31	22	43
8	22	17	15	04	04	35	07	28	17	16	22	56	22	27	16	00	05	28	06	09	16	49	22	50
9	22	09	14	45	04	12	07	50	17	32	23	01	22	20	15	43	05	05	06	32	17	06	22	56
10	22	01	14	26	03	48	08	13	17	48	23	05	22	12	15	25	04	42	06	54	17	23	23	01
11	21	52	14	06	03	25	08	35	18	03	23	10	22	04	15	07	04	20	07	17	17	39	23	06
12	21	42	13	46	03	01	08	57	18	18	23	14	21	55	14	49	03	57	07	40	17	55	23	10
13	21	32	13	26	02	37	09	18	18	33	23	17	21	47	14	31	03	33	08	02	18	11	23	14
14	21	22	13	06	02	14	09	39	18	48	23	20	21	38	14	13	03	10	08	25	18	27	23	18
15	21	11	12	46	01	50	10	00	19	02	23	22	21	28	13	54	02	47	08	47	18	42	23	21
16	21	00	12	25	01	26	10	22	19	16	23	24	21	19	13	35	02	24	09	09	18	57	23	23
17	20	49	12	04	01	03	10	43	19	29	23	26	21	08	13	16	02	01	09	31	19	12	23	25
18	20	37	11	43	00	39	11	04	19	42	23	27	20	58	12	56	01	37	09	53	19	26	23	27
19	20	24	11	22	00	16	11	24	19	55	23	28	20	47	12	37	01	14	10	15	19	40	23	28
20	20	11	10	00	N.	07	11	45	20	07	23	28	20	36	12	17	00	51	10	36	19	54	23	28
21	19	58	10	38	00	31	12	05	20	19	23	29	20	24	11	57	00	27	10	57	20	07	23	29
22	19	44	10	16	00	55	12	25	20	31	23	28	20	12	11	37	00	04	11	18	20	20	23	28
23	19	30	09	54	01	18	12	45	20	43	23	28	19	59	11	16	S.	19	11	39	20	32	23	28
24	19	16	09	32	01	42	13	05	20	54	23	27	19	47	10	56	00	42	12	00	20	45	23	27
25	19	02	09	10	02	06	13	25	21	05	23	25	19	34	10	35	01	06	12	21	20	56	23	25
26	18	47	08	48	02	29	13	44	21	15	23	23	19	21	10	14	01	29	12	42	21	07	23	22
27	18	32	08	25	02	53	14	03	21	25	23	20	19	07	09	53	01	53	13	02	21	18	23	19
28	18	16	08	03	03	16	14	22	21	35	23	17	18	53	09	32	02	16	13	22	21	28	23	16
29	18	00	07	40	03	39	14	41	21	44	23	14	18	39	09	10	02	40	13	42	21	38	23	13
30	17	44			04	03	14	59	21	53	23	10	18	24	08	48	03	03	14	02	21	48	23	09
31	17	27			04	26			22	02			18	10	08	26			14	22			23	04

[redacted]

A TABLE

the right Ascencion and Declination of some of the most noted among the fixed Stars, for the Year 1754, *which will serve for near* 20 *Years without sensible Errors.*

The NAMES of the STARS.	Magni.	Declination. d.	Declination. m.	Right Ascen. d.	Right Ascen. m.	N. or S.
nib in Flying Horse's Wing, called also *Ala Pegasi*,	2	00	10	13	40	N.
ider in *Cassiopeia's* Breast,	3	06	41	55	03	N.
ght Star in *Aries*,	2	28	20	22	09	N.
edibula or *Mencar*, the Whale's Jaw,	2	42	23	02	06	N.
ol in the Head of *Medusa*,	3	43	01	39	53	N.
ebaran, the Bull's Eye,	1	65	29	15	55	N.
pella, the Goat-Star,	1	74	35	45	41	N.
tell, the bright Foot of *Orion*,	1	75	28	08	33	S.
on's preceding Shoulder,	2	77	49	06	04	N.
ldermost in *Orion's* Girdle,	2	81	01	01	24	S.
t in *Orion's* Girdle,	2	82	12	02	07	S.
on's following Shoulder,	1	85	31	07	19	N.
ius, the Dog-Star,	1	98	44	16	20	S.
or's Head, i. e. the Northernmost Twin,	2	109	41	32	27	N.
yon, or the little Dog-Star,	2	111	41	05	54	N.
ra's Heart,	2	138	56	07	30	S.
ulus, the Lion's Heart,	1	148	49	13	18	N.
ab, the Lion's Tail,	2	174	08	16	06	N.
t in the Great Bear's Tail,	3	190	28	21	53	N.
demiatrix, Virgin's North Wing,	2	192	53	57	03	N.
on's Spike,	1	198	05	09	44	S.
ldermost in the Great *Bear's* Tail,	2	198	06	56	23	N.
t in the Great *Bear's* Tail,	2	204	34	50	43	N.
turus,	1	211	11	20	39	N.
thern Balance,	2	219	21	14	53	S.
thern Crown,	2	231	11	27	40	N.
ares, the Scorpion's Heart,	1	243	37	25	47	S.
entarius's Head,	2	260	58	12	46	N.
gon's Head,	2	268	60	51	32	N.
da Lyræ, in the Harp,	1	277	21	38	33	N.
le or *Vulture's* Heart,	1	294	46	08	10	N.
inous's Hand,	3	292	54	01	57	S.
ahant, the Southern Fish's Mouth,	1	340	57	31	04	S.
us, in the Flying Horse's Shoulder,	2	349	00	23	36	N.
rchab, in the Flying Horse's Neck,	2	343	09	13	44	N.
romeda's Head,	2	58	58	27	35	N.

e, In this Edition, which is taken from the Fourth published by the Doctor, are no alterations made, except what were necessary to adapt the various thereof, particularly the tables, to the new style, and the present time.

* These Tables will answer pretty exactly for every other 50 years, counting the date of the years here mentioned, viz. the tables for 1803, will be the with those for 1703, allowance being made for the variation of the stile; and for 1853, will be nearly the same with the tables here exhibited for the year

In like manner the tables for 1754, 1755, 1756, will nearly represent the Declination for the years 1854, 1855, 1856.

TABLES

OF

THE SUN's RIGHT ASCENSION

For every Tenth Day of the Years 1753, 1754, 1755, 1756.

The Sun's Right Ascension for all the intermediate Days may be near computed by allowing about four Minutes of an Hour, *i. e.* one Degr for every Day.

Y.	D.	Jan.	Feb.	March	April	May	June
		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1753.	1	18 49	20 59	22 51	0 44	2 35	4 38
	11	19 33	21 40	23 28	1 20	3 13	5 19
	21	20 16	22 20	00 04	1 57	3 53	6 01
1754.	1	18 48	20 58	22 50	0 43	2 34	4 37
	11	19 32	21 39	23 27	1 19	3 12	5 18
	21	20 15	22 19	00 03	1 56	3 52	6 00
1755.	1	18 47	20 57	22 49	0 42	2 33	4 36
	11	19 31	21 38	23 26	1 18	3 11	5 17
	21	20 14	22 18	00 02	1 55	3 51	5 59
1756.	1	18 50	21 00	22 52	0 45	2 36	4 39
	11	19 34	21 41	23 29	1 21	3 14	5 20
	21	20 17	22 21	00 05	1 58	3 54	6 02

Y.	D.	July	Aug.	Sept.	Oct.	Nov.	Dec.
		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1753.	1	6 42	8 41	10 43	12 31	14 27	16 32
	11	7 23	9 22	11 19	13 08	15 08	17 15
	21	8 04	10 03	11 55	13 45	15 49	18 00
1754.	1	6 41	8 40	10 42	12 30	14 26	16 31
	11	7 22	9 21	11 18	13 07	15 07	17 14
	21	8 03	10 02	11 54	13 44	15 48	17 59
1755	1	6 40	8 39	10 41	12 29	14 25	16 30
	11	7 21	9 20	11 17	13 06	15 06	17 13
	21	8 02	10 01	11 53	13 43	15 47	17 58
1756.	1	6 43	8 42	10 44	12 32	14 28	16 33
	11	7 24	9 23	11 20	13 09	15 09	17 16
	21	8 05	10 04	11 56	13 46	15 50	18 01

PHILOSOPHICAL

ESSAYS, &c.

PREFACE

TO "PHILOSOPHICAL ESSAYS ON VARIOUS SUBJECTS, &c."

AMONG the various Philosophical Enquiries which my younger studies had committed to writing, these few have escaped the injuries of time, and other accidents, and by the persuasion of a learned friend are now offered to the public view. Some of them may date their original at the distance of thirty years: Many new books have since appeared in the world, and new conversations have arisen, which have sometimes given occasion for the fresh exercise of my thoughts on these subjects. And since my more important duties have allowed me some hours of leisure and amusement, I have now and then added to these papers, which are now grown up to this bulk and form.

The subjects treated of in the two first essays, viz. Space, Substance, Body and Spirit, have no inconsiderable influence in adjusting our ideas of God and creatures, animate and inanimate beings. It is strange that philosophers, even in this enlightened age, this age of juster reasoning, should run into such wide extremes in their opinions concerning space; that while some depress it below all real being, and suppose it to be mere nothing, others exalt it to the nature and dignity of godhead. It would be a great happiness if we could all unite in some settled and undoubted opinion on this subject. The unlearned may ridicule the controversy, but men of science know the difficulties that attend it. I make no pretence to have cleared them all away; but if I have said any thing here that may strike a glimpse of light into this obscure question, I shall acknowledge my felicity.

Body and spirit are the two only proper substances that we know of; and if their distinct essences can be limited and adjusted in clear ideas, it will be a happy clue to lead us into some further knowledge of the visible and invisible world, and will give us a more particular and distinct acquaintance with human nature, which is compounded of matter and mind.

There are few studies so worthy of man as the knowledge of himself.—Many advantages in moral sciences attend a right notion of the union of soul and body, the sensations, the appetites, the passions, and various operations which are derived thence. This hath been, I confess, a favourite employment of my thoughts: Whether I have succeeded in any of my meditations or sentiments on this subject, I must leave the reader to judge.

I cannot pretend that all my opinions in these matters are exactly squared to any public hypothesis. From the infancy of my studies, I began to be of the eclectic sect. Some of these essays are founded on the Cartesian doctrine of spirits, though several principles in his system of the material world could never prevail upon my assent; and what other opinions of that philosophy relating to the phœnomena of heaven and earth I had imbibed in the academy, I have seen reason long ago to resign at the foot of Sir Isaac Newton. But as the two worlds of matter and mind stand at an utter and extreme distance from each other, so the weakness of the Cartesian hypothesis of bodies and its utter demolition, does by no means draw with it the ruin of his doctrine of spirits.

I am not so attached to this scheme, nor do I do plead for it as a doctrine full of light and evidence, and which has no doubts and difficulties attending it: After all my studious enquiries into this noble subject, I am far from being arrived at an assurance of the truth of these opinions. The speediest way to

A TABLE

OF

THE SUN'S DECLINATION

For the Year 1754,

BEING

The Second after Leap-Year, which will serve for near 50 Years.

Day	Janu. S.		Febr. S.		Mar. S.		April N.		May N.		June N.		July N.		Aug. N.		Sept. N.		Oct. S.		Nov. S.		Dec. S.	
	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.
1	23	01	17	01	07	29	04	37	15	08	22	06	23	8	18	02	08	15	03	14	14	31	21	53
2	22	55	16	44	07	06	05	00	15	26	22	14	23	04	17	47	07	54	03	38	14	50	22	02
3	22	50	16	27	06	43	05	23	15	44	22	21	23	0	17	32	07	31	04	01	15	09	22	11
4	22	44	16	09	06	20	05	46	16	01	22	28	22	55	17	16	07	09	04	24	15	28	22	19
5	22	37	15	51	05	57	06	09	16	19	22	35	22	49	17	00	06	47	04	47	15	46	22	27
6	22	29	15	32	05	34	06	32	16	37	22	41	22	44	16	43	06	25	05	11	16	04	21	34
7	22	21	15	14	05	11	06	54	16	51	22	47	22	37	16	26	06	02	05	34	16	22	22	40
8	22	13	14	55	04	47	07	17	17	08	22	53	22	31	16	09	05	40	05	57	16	40	22	47
9	22	05	14	35	05	24	07	39	17	24	22	58	22	24	15	52	05	17	06	20	16	57	22	53
10	21	56	14	16	04	00	08	01	17	40	23	05	22	17	15	34	04	54	06	43	17	14	22	58
11	21	47	13	56	03	37	08	23	17	55	23	07	22	09	15	17	04	31	07	05	17	31	23	03
12	21	37	13	37	03	15	08	45	18	11	23	11	22	00	14	59	04	09	07	28	17	48	23	08
13	21	27	13	16	02	50	09	07	18	26	23	15	21	51	14	40	03	45	07	51	18	04	23	12
14	21	17	12	56	02	26	09	29	18	40	23	18	21	43	14	22	03	22	08	13	18	19	23	16
15	21	06	12	36	02	02	09	50	18	55	23	21	21	33	14	03	02	59	08	36	18	34	23	19
16	20	55	12	15	01	39	10	11	19	09	23	23	21	24	13	45	02	36	08	58	18	49	23	22
17	20	42	11	54	01	15	10	32	19	22	23	25	21	14	13	26	02	13	09	20	19	04	23	24
18	20	30	11	33	00	51	10	53	19	36	23	26	21	03	13	06	01	49	09	42	19	19	23	26
19	20	17	11	12	00	28	11	14	19	49	23	27	20	53	12	47	01	26	10	04	19	33	23	27
20	20	04	10	49	00	04	11	34	20	02	23	28	20	42	12	27	01	03	10	25	19	47	23	28
21	19	51	10	27	N.	19	11	55	20	14	23	29	20	30	12	07	00	39	10	46	20	00	23	9
22	19	38	10	06	00	43	12	15	20	26	23	29	20	18	11	47	00	16	11	08	20	13	23	29
23	19	24	09	44	01	06	12	35	20	38	23	28	20	06	11	27	S.	07	11	29	20	26	23	28
24	19	09	09	22	01	30	12	55	20	49	23	27	19	55	11	06	00	30	11	51	20	38	23	27
25	18	55	08	59	01	53	13	15	20	59	23	26	19	40	10	46	00	54	12	11	20	50	23	26
26	18	40	08	37	02	17	13	34	21	10	23	24	19	27	10	25	01	17	12	31	21	02	23	24
27	18	24	08	14	02	40	13	53	21	20	23	21	19	14	10	04	01	41	12	52	21	13	23	21
28	18	08	07	52	03	04	14	12	21	30	23	18	19	00	09	45	02	04	13	12	21	23	23	18
29	17	52			03	27	14	31	21	39	23	15	18	46	09	21	02	27	13	32	21	33	23	15
30	17	36			03	51	14	50	21	49	23	12	18	32	08	59	02	51	13	52	21	45	23	11
31	17	18			04	14			21	57			18	17	08	37			14	12			23	06

His essay on the human understanding has diffused fairer light through the world in numerous affairs of science and of human life. There are many admirable chapters in that book, and many truths in them, which are worthy of letters of gold. But there are some opinions in his philosophy, especially relating to intellectual beings, their powers and operations, which have not gained my assent. The man who hath laboured to lead the world into freedom of thought, has thereby given a large permission to his readers to propose what doubts, difficulties, or remarks have arisen in their minds, while they peruse what he has written. And indeed several of the essays which are published (besides the XIIth, which bears that title) are the fruits of such remarks, as will be easily observed in the perusal of them.

The essays on the various works of nature in the upper and lower parts of the creation, in the sun and stars, in plants and animals, were written at first with a design to entertain the politer part of mankind, whose circumstances of life indulge them with much leisure and ease, and who search not very far into the hidden principles of nature, and their abstruse springs of operation. I know the philosophers of the present age have carried their enquiries to great length, beyond any of my meditations: Yet perhaps these may be so happy as to lead those persons who know them not, and who search no further than I do, into an exalted idea of the wonders of divine wisdom in the heavens and the earth, the vegetable and the animal world. Perhaps also they may serve to give no unprofitable amusement to their leisure hours, as the composure of them hath given to me.

[And here I would take notice, that in the second edition, in the first and second sections of the ninth essay, and the appendix thereto, I have added a few sentences to express my thoughts more clearly concerning the everlasting but uniform agency of God on the material world, in the production of plants and animals; and to guard against those objections which the Rev. Dr. Denne offers with great civility in his preface to his late ingenious sermon of the wisdom of God in the vegetable creation, and acknowledge it was my want of greater expressness might lead him into a mistake of my sentiments. Though we both pursue the same end, viz. the display of the wisdom of God in the animal and vegetable worlds, yet I beg leave to make use of a very different opinion as the means of attaining it.]

If I were to make apologies for publishing any thing of this kind to the world, I would say that the chief part of these subjects are not beneath the notice and enquiry of any profession and character whatsoever. If I am charged with repeating the same thing several times, I would reply, that it is perhaps introduced on different occasions, or set in a different light, or at least, to speak plainly, when I had wrote one, I had forgot the other, these papers being written at many years distance. And this may serve also among persons of temper and candour to apologize for small mistakes, if there should be any appearing opposition between my expressions in different essays, which were written in distant parts of life. I hope none will be found so gross, but may be well reconciled by a candid reader.

Shall I be told that other writers have said the very same thing which I have done, and in a much better manner? I confess I know it not; for though I now and then look into modern books of philosophy, yet there are many which I have never seen, having not sufficient time to peruse them; and I am persuaded some of these essays were framed long before those very works, whence some persons may imagine I have borrowed several of my reasonings.

If there be any hint or thought amongst them all that may assist the reader in his conceptions of God or of himself, of natural or divine things, let him correct or retrench, let him refine, let him alter or improve it as he pleases, and make it his own, that I may thank him for it as a new acquisition. And let him renounce whatsoever he finds disagreeable to truth, reason, or

A TABLE

OF

THE SUN'S DECLINATION

For the Year 1756,

BEING

Leap-Year, which will serve for near 50 Years.

Day	Janu. S.		Febr. S.		Mar. S.*		April N.		May N.		June N.		July N		Aug. N.		Sept. N*.		Oct. S.		Nov. S.		Dec. S.	
	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.	d.	m.
1	23	03	17	10	07	17	04	49	15	17	22	10	25	06	17	55	08	04	03	26	14	41	21	57
2	22	58	16	53	06	54	05	12	15	35	22	17	25	02	17	39	07	42	03	50	15	00	22	06
3	22	52	16	35	06	08	05	35	15	52	22	24	24	57	17	24	07	20	04	13	15	19	22	15
4	22	46	16	17	06	28	05	58	16	09	22	31	22	52	17	08	06	58	04	36	15	37	22	23
5	22	39	15	59	05	45	06	21	16	26	22	38	22	46	16	51	06	36	04	59	15	56	22	30
6	22	32	15	41	05	22	06	43	16	43	22	44	22	40	16	34	06	13	05	23	16	14	22	37
7	22	25	15	23	04	59	07	06	17	00	22	50	22	34	16	17	05	51	05	46	16	31	22	43
8	22	17	15	04	04	35	07	28	17	16	22	56	22	27	16	00	05	28	06	09	16	49	22	50
9	22	09	14	45	04	12	07	50	17	32	23	01	22	20	15	43	05	05	06	32	17	06	22	56
10	22	01	14	26	03	48	08	13	17	48	23	05	22	12	15	25	04	42	06	54	17	23	23	01
11	21	52	14	06	03	25	08	35	18	03	23	10	22	04	15	07	04	20	07	17	17	39	23	06
12	21	42	13	46	03	01	08	57	18	18	23	14	21	55	14	49	03	57	07	40	17	55	23	10
13	21	32	13	26	02	37	09	18	18	33	23	17	21	47	14	31	03	33	08	02	18	11	23	14
14	21	22	13	06	02	14	09	39	18	48	23	20	21	38	14	13	03	10	08	25	18	27	23	18
15	21	11	12	46	01	50	10	00	19	02	23	22	21	28	13	54	02	47	08	47	18	42	23	21
16	21	00	12	25	01	26	10	22	19	16	23	24	21	19	13	35	02	24	09	09	18	57	23	23
17	20	49	12	04	01	03	10	43	19	29	23	26	21	08	13	16	02	01	09	31	19	12	23	25
18	20	37	11	43	00	39	11	04	19	42	23	27	20	58	12	56	01	37	09	53	19	26	23	27
19	20	24	11	22	00	16	11	24	19	55	23	28	20	47	12	37	01	14	10	15	19	40	23	28
20	20	11	10	00	N.	07	11	45	20	07	23	28	20	36	12	17	00	51	10	36	19	54	23	28
21	19	58	10	38	00	31	12	05	20	19	23	29	20	24	11	57	00	27	10	57	20	07	23	29
22	19	44	10	16	00	55	12	25	20	31	23	28	20	12	11	37	00	04	11	18	20	20	23	28
23	19	30	09	54	01	18	12	45	20	43	23	28	19	59	11	16	S.	19	11	39	20	32	23	28
24	19	16	09	32	01	42	13	05	20	54	23	27	19	47	10	56	00	42	12	00	20	45	23	27
25	19	02	09	10	02	06	13	25	21	05	23	25	19	34	10	35	01	06	12	21	20	56	23	25
26	18	47	08	48	02	29	13	44	21	15	23	23	19	21	10	14	01	29	12	42	21	07	23	22
27	18	32	08	25	02	53	14	03	21	25	23	20	19	07	09	53	01	53	13	02	21	18	23	19
28	18	16	08	03	03	16	14	22	21	35	23	17	18	53	09	32	02	16	13	22	21	26	23	16
29	18	00	07	40	03	39	14	41	21	44	23	14	18	39	09	10	02	40	13	42	21	38	23	13
30	17	44			04	03	14	59	21	53	23	10	18	24	08	48	03	03	14	02	21	48	23	09
31	17	27			04	26			22	02			18	10	08	26			14	22			23	04

PHILOSOPHICAL ESSAYS, &c.

ESSAY I.

A fair Enquiry and Debate concerning Space, *whether it be Something or Nothing, God or a Creature.*

Sect. I.—*The Subject explained in general.*

WOULD any one imagine, that so familiar an idea as that ich we have of *space*, should be so abstruse and mysterious, so ficult and unaccountable a thing, as that it should be doubtful l undetermined to this day, among the philosophers even of knowing age, *what space is*; whether it be a substance or de, God or a creature, something or nothing.

The common idea which all mankind have of it, seems to much the same, viz. "Extension void of matter or body, capable of receiving or containing matter or body." This ce, when it is thus considered as *empty*, by the learned is ally called *vacuum* or void; when it is considered as *filled* h body, the learned have supposed it to be *space* still, and n it is called *plenum* or full. Whether there be a *vacuum* void space is now no longer doubted among philosophers, having been proved by Sir Isaac Newton, and others, be- nd all contradiction; and every one agrees to it. Whether should be called *space* when it is full, shall be afterwards nsidered.

Void space is conceived by us as scattered through all the rld between bodies, as interspersed through all the pores of dies, and as reaching also beyond all the worlds that God has ade and extended on all sides without bounds. And as these eas seem plain and easy, so there is no difference between the ilosopher and the ploughman in this their general and common nception or idea of it. But the grand enquiry is, *what is this ace?* Let us search the subject a little.

Space is either something or nothing: If something, it either a mere idea in the mind, or something existing with- t. If it exist without us, it is a substance or a mode. If a bstance, it is created or increated. Let us examine all these arts distinctly.

Sect. II.—*Is* Space *Something or Nothing?*

SURELY one would suppose that *space* cannot be a mere

nothing; for it is one of the most fundamental axioms of science, that *what has no being, can have no properties or powers*; but *space* seems to have powers and properties; it is long, broad and deep: Can there be any mere nothing that has three dimensions? Space seems to have measurable distances contained in it, viz. an inch, an ell, a mile, a league, a diameter of the earth, or a thousand such diameters. Is it possible that a mere nothing should reach to such an extent? It appears to have real capacity, or a power to receive and contain bodies; now if this capacity be not a mere nothing, one would conclude *space* must be *something* real and existing, which has such a real capacity.

Besides, if two bodies were placed at twenty miles distance from each other, and all the universe besides were annihilated, would not this space be really twenty miles long? and would not this space be called something, which is of such a length? Or if space be not something, then there is nothing between these two bodies; and must they not therefore lie close together, and touch one another, if there be nothing between them? Does not this plainly prove *space* to be *something?* Well, if space be any sort of *something*, it must either have its being only in our minds as a *mere idea*, or it must have an *existence without us*. That it cannot be a *mere idea* of the mind, is proved by Dr. Clarke, because no ideas of space can possibly be framed greater than finite; yet reason shews that space must be infinite. See his Letters to Leibnitz.

To which I might add, space seems to have such an existence as it hath, and to maintain it, whether there were any mind to conceive it or no; and therefore it seems not to be a mere idea. This leads us to think therefore, that if space hath any existence, it cannot be merely an existence in the mind, but it must be something without us.

Sect. III.—*Is* Space *a Substance?*

IF space be something which has an existence without us, it must be either a *substance* itself, or a *mode* or *property* of some substance; for it is most evident, that it must either subsist by itself, or it must subsist in or by some other thing which does subsist by itself. There can be no medium between subsistence *in and by itself*, and subsistence *in and by one another*.

Now that space cannot be a *mode* or *property*, I prove thus. If it be a *mode*, where is the substance in which it is, or by which it subsists, or to which it belongs? Doth not the substance exist wheresoever the mode is? Did we ever hear of a mode ten thousand miles long, and no substance in all that length to uphold it?

Or if the substance be co-extended with it, as it must be, wherein does this long substance differ from this property and

mode? Have not this substance and mode one and the same idea? Are they not the very same individual entity or being? Have they not the same individual extension? and equally self-existing, equally real or unreal? If space be any thing real, and yet a mode, it looks so much like the very substance itself by the properties attributed to it, that I think no man should ever take it for a mere mode, unless he can tell us how it differs from the substance which supports it, and how it depends for existence on that substance.

"O, (say our opponents) Space is a mere mode, but the substance that supports it is utterly unknown, as all substances are." Happy *asylum* for the learned to retreat to! This shelter of darkness! this invented idea of an unknown and unknowable thing called *substance!* how well does it screen and hide a modern disputant from light and argument, when they pursue him so close that he has no other refuge! Yet even this dark shelter I have endeavoured to break open and demolish in the next essay. But let us proceed now in the fair enquiry, whether space be a substance or a mode.

Some Philosophers, particularly Mr. Leibnitz, have fancied *space* to be a sort of *relative mode*, and call it the "Order of co-existent beings or bodies, which order is their general situation or distance: As place is the relation which one particular body has to the situation of others, so space is that order of situation which results from all places taken together." Thus, after a manner which is unintelligible to me, they go on to explain their idea of space. But how can space be a mere order or mode of bodies, when itself seems to have parts extraneous to all bodies; both as it is interspersed among them in the world, and reaches beyond the limits of this world also? Can space be the order of bodies, when space is where the bodies are not? And when space does not depend for its existence on the existence of bodies, can space be a relation of bodies; when it is and ever would be the same idea, if no body ever had been, or if all bodies ceased to be?

Or let us put the argument thus: Space, if it be a *mode of being*, must either be an *absolute* or a *relative mode*; but it cannot be either of these. For all *absolute modes* want some subject proper for them to inhere in, or to support them in being: All *relative modes* or *relations* require some other being, or some subject to which they must relate: But space neither wants any subject to inhere in, or relate to: It wants no other being that we can conceive to make it exist. Try to suppose all beings annihilated, yet you cannot conceive space to be annihilated: It seems to be obstinately existent and self-subsisting: You cannot nullify it, even in thought, though you should nullify all other substances, body and mind, with all their modes. Surely this can never be

a mode of being; for if it has any real subsistence at all, *it subsists of itself*, which is the first character and property of a substance.

Besides it seems to have the other character of *substance* also; for as it subsists of itself, *i. e.* it *wants no created being to support its existence*, so itself seems to be the proper subject of many properties, modes or accidents, such as were just mentioned before, viz. length, breadth, capacity, &c. nor do they need any other *substratum* to uphold them. Now these are the known and agreed characters of substance among the learned, viz. *substantia est quod per se subsistit, (i. e. nulla re creata indiget ad subsistendum) & substat accidentibus.*

Even a very learned writer, in his discourses on this subject in his letters to Leibnitz, uses but feeble reasoning to prove that space is not a substance, viz. "That infinite space is *immensitas* not *immensum*; whereas an infinite substance is *immensum* not *immensitas*: therefore space must be a property." Now I might use this very language to prove that space is a substance, and say is not space the *immensum* itself, if it has any thing real in it. We have only a mere denial of it, without any argument. Do we not generally say, space is immense, or space has immensity belonging to it? Space is properly the *immensum*, and what forbids it to be a substance? And indeed if space has any thing of a real and positive existence without us, all the arguments that ever I read to disprove it to be a substance, carry no force at all with them, and seem to be mere assertions, not only without reason, but contrary to it.

Sect. IV.—*Is* Space *created or increated?*

IF it be allowed then that space is a substance, it is either *created* or *increated*. Surely it cannot be a created substance because we cannot conceive it possible to be created, since we cannot conceive it as non-existent and creable, which may be conceived concerning every created being. Nor can we conceive it properly as annihilated or annihilable, which we may suppose of every creature. In short, if it be a substance, shall I dare venture to speak it? it appears to be God himself. Mr. Raphson, a great mathematician, has written a book on this theme, De Spacio Reali, wherein he labours to prove that this *space* is God himself going all along upon this supposition, that space is and must be something real; and then his reason cannot find an idea for it below godhead. And indeed if space be a real thing existent without us it appears to bid fair for deity; for the supposed perfections and properties of it are such as seem to be infinite and divine. As for instance:

If space has length, breadth, and depth, it is *infinite* length breadth and depth: If it has capacity, it is an *unbounded* or an

infinite capacity. Nor can we possibly conceive of it beyond the universe, but as *immense* or *unmeasurable*: it seems to be *omnipresent*, if it penetrate all things; and it has several other appearing properties of godhead. We have also an idea of it as *eternal*, and *unchangeable*; for we cannot conceive that it begun to be, since we cannot conceive it as having ever been non-existent, or any otherwise than now it is: It cannot be created nor annihilated. It seems to contain what existence it has in the very idea, nature or essence of it; (which is one attribute of God, whereby we prove his existence.) It appears therefore in this view to be a *necessary* being, and has a sort of *self-existence*, for we cannot tell how to conceive it not to be. It seems to be an *impassible*, *indivisible*, and *immutable* essence; it looks like an *all-pervading*, *all-containing* nature, an *all-comprehending being*. What are all these but attributes of godhead? and what can this be but God himself?

And how agreeable are these properties of space (say some persons) to the attributes of God in scripture, taken in the most vulgar and literal sense? It has a being like God in *heaven*, *earth and hell*, diffused through all, as Ps. cxxxix. describes the omnipresence of God: And as the prophet represents God speaking, *Do not I fill heaven and earth, saith the Lord? Jer.* xxiii. 24. *Heaven, and even the heaven of heavens*, saith Solomon, *cannot contain him*; 2 Chron. vi. 18. Nor does the idea of space disagree with St. Paul's account of God; Acts xvii. 28. *He is not far from every one of us, for in him we live and move and have our being*. And accordingly some philosophers (as is before mentioned) have written to prove that *space* is a real being, and that this *space is God*.

Sect. V.—Space *cannot be God.*

BUT is not this too gross an idea of the Deity, and unworthy of him? I am afraid of those natural and necessary consequences which seem to arise from the idea of real *extension* attributed to God, because they seem so very frightful and absurd. We can hardly mention them indeed with a preservation of that reverence of language, and that sacred veneration of soul that is due to the Majesty of heaven and earth; and this is a sort of presumptive argument against them, viz. That if they are truths, they are such a kind of horrendous truths, that a devout creature shudders to hear them in a literal manner attributed to his Maker. Yet if we will manifest their absurdities, we are forced to pronounce a few of them.

I. If space be God himself, then all bodies are situated in God, as in their proper place; then every single body exists in part of God, and occupies so much of the dimensions of godhead, as it fills of space; then an elephant or a mountain, a whale, or

a wicked giant, have more of the essence or presence and goodness of God with them, than the holiest or best man in the world, unless he be of equal size.

2. If space were God, then the divine being, though in its whole it be unmeasurable, yet hath millions of parts of itself, really distinct from each other, measurable by feet, inches, yards, and miles, even as the bodies are which are contained in it: And according to this notion it may be most properly said, that one part of God is longer than another part of him, and that twenty-five inches of the divine nature, long, broad, and deep, will contain above two feet of solid body, &c. which predications seem at least very harsh, they grate with pain upon the ear, and are even offensive to the understanding, if they be not absolutely absurd and impossible in the nature of things.

Nor is it to any purpose for an objector to say, that space or infinite extension has properly no parts; for we have as clear an idea, and indeed much clearer, of the several parts of space near us and round about us, than we have or can have of the whole positively infinite space, if I may so express it, of which we finite creatures have no proper idea: Our idea of *infinite space*, such as it is, is made of finite spaces, or parts of space in a perpetual addition. Nor can it be denied that space has parts, on a pretence that these parts are not actually separable; for even in a body we conceive clearly of the several distinct parts of it, without considering whether they be separable or no. Suppose body to be infinite, and suppose it to be perfectly solid, and as uniform as space is, yet it is very evident that we can conceive distinct parts in it, without conceiving them separated or separable. The ideas of *separation* or *separability* are not necessary to the idea of the *parts* of space, which are conceived as several lesser spaces or extensions co-existent in time, but really distinct from each other, whether adjacent or distant.

3. Another hard consequence of supposing *space to be God*, is this. Then every part of this divine space will contain divine perfections in it complete, or only some part of each of them; if only some part of each of them, then each part of the space, whether an inch or a mile square, has a degree or share of wisdom and power, holiness and goodness, in proportion to its dimensions; which position is too absurd to be allowed. We must be forced to allow then, that every part of space contains all these divine attributes or perfections in it completely; and if it be so, then not only every mile, but every yard and ell, and every inch of space, is all-wise and all-holy, almighty and gracious; for every inch of space is a part of the substance or essence of God, if space be God himself. Besides, if every inch of space contain completely these divine perfections, then there seem to be so many complete wisdoms and powers, i. e. in reality

so many all-wise and almighty beings, as there are inches or minutest parts of space; for every part of *space* seems to be as much independent on any other part, as one part of *matter* is independent on another part: And if so, then every part of space is an independent, all-wise and almighty being; and instead of one God we shall have millions.

To conclude; if space be a substance, it must be the one divine substance of infinitely long and broad perfections; or else all the parts of it must be lesser divine substances united in one. What manifold and strange absurdities, or at least seeming absurdities and frightful propositions will arise from this notion of the Divine Being?

Object. Perhaps it will be said, that "this space is not God himself, but only his immensity; now his immensity is not properly said to be all-wise and holy and mighty, though God himself be so."

Ans. We have already proved that space cannot be a *mode* or property; but that, if it be any thing, it must be a *substance.* Therefore, if it be any thing divine, it is not merely the divine immensity, or an attribute of God; but it is his essence or substance; it is the real *immensum*, it is God himself.

This appears further evident, if we consider, that we must necessarily suppose the all-wise and almighty substance or essence of God to be co-extended with his immensity; otherwise you make infinite extension, which you call a property or a mode, to exist beyond and without the subject of it; which is absurd enough. And therefore Sir Isaac Newton in his famous Scholium, at the end of his Mathematical Principles, where he supposes God to be extended, is constrained to allow, "that God is present every where by his substance; for, saith he, Power without substance cannot subsist;" and I am sure then it is sufficiently evident that immensity or space extended beyond the substance, can have no subsistence.

Besides, is not this immensity or *space* the very thing you conceive of as the *subject* of the modes of eternity, capacity, comprehension, self-existence, unchangeableness, &c. i. e. as the *substance* itself? Is it not this *space* which you conceive of as a self-subsisting and unannihilable Being? and what is that but a most substantial idea? Though some of our modern philosophers renounce all knowledge of substances, while they maintain the necessity of them as a *substratum* for modes; yet it seems to me that this is one chief reason which has tempted many of them to suppose both God and all other spirits to be extended, that they may have a sort of *substratum* or subject for the powers of thinking and willing, or the modes of knowledge and volition to subsist in.

Thus it appears, so far as I can see, that if space be any

thing in or of God, it is the very substance of God. However even upon the supposition of this last objector, we may at least infer thus much, that if space be but the immensity of God, then God is wheresoever space is, and his essence consists partly at least in this immense space; and most of the inferences which I drew from the supposition of *space being God*, are just and natural, if space be God's immensity, however harsh and absurd they may be. Let me just mention another argument to prove that space is not God.

4. It hath been proved by some philosophers, Des Cartes, Dr. Cudworth, Mr. Norris, and others, and that with a good degree of evidence, that a spirit is not extended; and then God, who is the most perfect spirit, includes no idea of extension in the notion of him. The most essential, obvious, and prime ideas of God, are of a spiritual kind, viz. consciousness, thought, wisdom, knowledge, will, active power, goodness, the first cause of all, &c. Now none of these imply *extension*, or have any need of parts extraneous to each other. Yet if this extended space be the divine substance, it is very amazing, that the properties of deity should have no apparent need of such a substance, and that this substance, should have no conceivable connection with its most essential and necessary properties and powers.—Who can point out to us any influence that extension or space can have towards thinking? towards wisdom or power? towards holiness, goodness or faithfulness? There is no conceivable connection in the ideas. They are not only distinct but separable. Banish perfect wisdom and power from your thoughts, and if possible, annihilate them in thought; yet *space* or *extension* remains: Banish *extension* from your thoughts, yet *perfect wisdom* and *power* remain. We cannot conceive of wisdom, goodness, power, as inherent in space; nor can we conceive of space as being wise, holy, powerful and good. There doth not seem to be any possible connection in our ideas of these different extremes, nor any real union or connection in the nature of things, since we can banish either of them in our thoughts, and yet the other remains in the full idea of it. Can one then be a property of the other?

Let us enquire again, If God be infinite space, what can this space do toward his creation or government of the universe? Does proximity enable him to know or to move the corporeal world? he cannot touch nor be touched. He is supposed to penetrate all bodies, but this very penetration does nothing toward his consciousness, or his movement of them. His knowledge and motive power do not act toward bodies by penetration of them, and there are two plain reasons for it. (1.) Because God knew the world as well before he made it, and before he supposed to penetrate it, as he does now; and he caused it at first to arise *into being* in all its motions, without a prior penetration of it.—

(2.) Because created spirits neither acquire their knowledge or their motivity of bodies by this supposed penetration, as I have shewn in Essay VI. The power of God to know and move bodies arises therefore from some such superior and unknown property of his nature as belongs to Deity alone, who can create them.

Again: Does every act of God, every thought, and every volition about an atom or a fly, employ the whole immense extension of space? Doth a thought of the purest, the most spiritual and abstracted objects, imply or require any use of length and breadth in it? Does the whole infinite extension work in every thought? Or indeed what has immense length and breadth to do at all toward thinking or willing? Let us first find what the supposed finite length and breadth of a common spirit can do towards its ideas and volitions, and then I shall be more easily persuaded that infinite length and breadth have a proportionable influence upon infinite or divine thinking.*

To sum up the whole matter; we have endeavoured by reasoning to trace out *what is space*, and we seem to have found it cannot be a *mere nothing*, because it appears to have real properties; it cannot be a *mode of being*, because it seems to carry in it an idea that subsists of itself, though we should nullify all other beings in our thoughts; and therefore it must be a *substance*, and yet if it be a substance it cannot be a *created substance;* because we cannot conceive it creable or annihilable; and therefore it carries with it an idea of necessary existence; and besides this idea of necessary existence, it seems to have several other properties of *godhead*, viz. Immensity or omnipresence, eternity, &c.

And yet so great is the absurdity of making the *blessed God* a being of infinite length, breadth and depth, and of ascribing to him parts of this nature, measurable by inches, yards and miles, and commensurate to all particular bodies in the universe with other unhappy consequences, that I cannot suffer myself to assent to this notion, that *space is God:* And yet the strongest arguments seem to evince this, that it must be God, or it must be *nothing*.

* It would be endless to run over the arguments which have been brought by many writers, against the power of *extension* as well as against the power of *matter* to think. I would only mention here what seems to be the result of Dr. Clarke's long contest with Mr. Collins, to prove that *matter* cannot think, and apply it more effectually to *extension*. If extension has the property of thinking, every part of extension must either have that property in itself, or must do something towards it in the whole: As for instance, If body has motion, every part of that body has motion in itself; or if a surface be round, every part of that surface doth contribute something toward that roundness: But every part of extension or space doth not think; this would make innumerable spirits; nor doth every part do any thing toward it; for thought is simple, and not made up of parts; and therefore a spirit must be quite another thing, even a being which has no parts, no extension.

SECT. VI.—*A Review and Recollection of the Argument.*

BUT whither has this track of reasoning led me? What is this most common and most strange thing which we call *space* at last? This wonder of nature, or this imaginary being? This real mystery, which is so universally known, and so utterly unknowable? Is it neither nothing nor something? Is it neither mode nor substance? Is it neither a creature nor God? That's impossible: Surely it must be ranked under one of these names: All these can never be renounced and denied concerning *space:* That would be most absurd indeed. What have we learnt then by all this train and labour of argument, but the weakness of our own reasoning? We seem to be urged on every side with huge improbabilities, or glaring inconsistencies: We are lost and confounded in the most familiar and common things we can speak of: There is scarce any idea more universal and familiar than that of *empty space;* all mankind seem to agree in their idea of it: And yet after all our philosophy and toil of reasoning, shall it be said that we know not whether it be a *mere nothing,* or whether it be the true and *eternal God?* Fruitless toil indeed, and astonishing ignorance? Puzzling difficulties attend the argument on every side, and a shameful perplexity and darkness hang heavy upon the boasted reason of man, while he is labouring with all the powers of his soul to resolve this entangled theme.—We enter into the abyss of *space,* infinite and eternal *space,* and our thoughts are lost and drowned in it.

Let us lie still here and muse a little, and give a loose to our wonder and our shame. Are the eternal God and a mere empty nothing so near a-kin to one another, that we cannot see the difference between them? that we are not able to tell whether *space* be God, or whether *space* be nothing?

This we know and are sure of, upon the most substantial and uncontroulable proofs and evidences, that there is a first cause and mover of all things; there is a self-existent being which needs no cause; and there is an eternal and all-wise mind: There is a conscious and almighty power which made all things; *there is a God.* He is the supreme substance, the most necessary and *substantial* of all beings, as being at the greatest distance from *nihility* or nothing. Our belief of this doctrine is too well founded, and too strongly supported to be ever weakened by any airy debates about empty space. And yet has this empty thing, or rather this empty nothing, surnamed *space,* such sort of properties and powers as to resemble godhead? Are the widest extremes so near together? Is a mere non-entity so like the infinite being, the most perfect substance, in any properties, that we cannot distinguish the one from the other? Can the absence of all things, or an *empty nothing,* ever look like so *substantial a being,* as to be mistaken for God? Or can the great God, in

any views or aspects, ever appear to be so thin, so subtle, so empty and unsubstantial a thing as to look like nothing? What surprising shame should seize upon our understandings, our vain and conceited understandings, at such a thought as this, that even philosophers cannot agree and inform us certainly whether *space* be God or nothing! Though we are ascertained by many demonstrations, that the great God has a most substantial and eternal existence, yet we seem at a loss to determine whether this empty thing called *space* be not this God.

Let our reason blush and hide its head, and lie abased for ever at the foot of the divine Majesty, this strange theatre of argument, this endless war of words and ideas, throws a world of confusion and abasement upon the proudest powers of mankind. It seems to spread a scene of triumph for God over the vain creature man, and all his boasted acquisitions of knowledge, that he hardly knows the highest and the best of beings from an imaginary shadow of being, an empty nothing; that though in some views he is absolutely certain that God is the supreme substance, and has the highest and strongest title to existence and being; yet in other views and enquiries he cannot strongly and boldly distinguish the Creator of all things from a mere non-entity, which in some sense is infinitely below the character or idea of the meanest dust or atom of the creation. Blessed God, forgive all the vanity and conceit of our reasoning powers, all our foolish and unworthy apprehensions concerning thy majesty; scatter these shadows of thick darkness, lead us out of this labyrinth of gross ignorance and mistake, and help us to make our way through this abyss of night, through this endless circle of perplexity. Shew us thyself, O God our maker, and teach us what thou art, that we may adore thee better; nor suffer us to wander in this thick mist, wherein we can scarce distinguish thee from that which has no being.

Sect. VII.—*The Original of our Idea of* Space, *and our Danger of a Mistake.*

COME then, my soul, let us make one effort more, and try to recover ourselves. May we not suppose, that in this imperfect state wherein the soul is united to a body, it is too ready to be imposed upon thereby many ways? Under the influence of this union to matter, it is easily persuaded to attribute corporeal ideas, such as length and breadth, to a spirit, and even to God the infinite spirit, because the soul is continually conversant with them; it is best acquainted with these bodily ideas, and is tempted to imagine that no real being can exist without them.

Sometimes the soul dwelling in animal nature, and under

the power of imagination, mistakes a *substantial being* for *mere nothing*, and sometimes it mistakes *nothing* for a *substantial being*. And indeed this is the very first way whereby all men gain the idea of *space*, the subject of our present debate. We see a room which is full of light, and air, which are real *bodies* or *substances*, and we imagine there is *nothing* in it; and then we call this nothing *void* or *empty space*, and fancy this empty *space* to be broad, and long, and deep, to reach from wall to wall, and from the floor to the ceiling: Thence comes our first conception of *space*, with its properties of length, breadth and depth; and thus it is ushered into our minds at first by a gross mistake of light and air, which are *something*, for mere *nothing*. Then our imagination changes the scence, and turns this *nothing* into *something* again, by leaving out the idea of *void* or *emptiness*, giving it a positive name, and calling it *space*.

Alas! how prone are we to error, in taking things that are not for things that are, and of mistaking mere imaginary beings for real ones, by supposing real properties to belong to them. Perhaps this may be the very case, when we imagine *space* (which in itself may be a mere non-entity or nothing) to have any real powers or properties; and our thoughts may be grossly deluded in this matter, though it may not be easy to find always where the delusion lies.

Sect. VIII.—Space *compared to Shadow or Darkness.*

I AM sure there is a very great instance or example of the like kind of delusion in our ideas of *shadow* or *darkness**. May we not as well say, that a *shadow* or *darkness* has some real *powers* and *properties*? May we not say, that it hath the property of *length, and breadth, and depth, and distance* contained in it? That it has power to conceal men and houses from our sight, to spread darkness and invisibility over a garden of flowers, or a room of pictures, and yet that it hath a power to render stars and glow-worms more visible? Does not a shadow shew us the hour on a sun-dial? Does it not refresh man and beast in a sultry day, and help to spread slumber over the eyes at night? Are not these considerable and real powers.

Again, a shadow seems to have a *motion*. If a cloud move across the sky and hide the sun, do we not say, the shadow moves either slowly or swiftly across the field or the chamber?

* The chief if not the only difference between our ideas of *shadow* and *darkness*, is this, that *darkness* is a general term, signifying the *absence of light*; but the word *shadow* usually signifies that absence of light from any place, which is caused by the interposition of an opacious body between some lucid body and that place. Such are the shadows of men, beasts and trees upon a field, in a shining day. Night itself in a proper speech is the *shadow* of the earth interposed between the sun and the opposite part of the air or sky. And all *darkness* as far as our senses reach, is really but a *shadow*.

Hath it not also ten thousand *shapes* or *figures?* Let me hold up my hand or any other object between the sun and the wall, hath not the shadow what shape I please to give it, and what motion I please to excite in the thing which is represented by the shadow? Now it is plain, that all these seem to be real properties, and the powers of a real being.

And as it has these seeming *properties* and *powers*, which make mankind ready to fancy it a real being, so some of the properties of it seem to be *infinite* also. Is not *darkness* extended beyond the utmost bounds of the material creation? Is there not some real limit to the flight of the utmost wandering star-beam? If not, then the material world is infinite; for star-beams and light are matter: If there be a limit to light, then all beyond this limit and these wandering beams is pure darkness, and this darkness is unlimited and infinite. May not a thousand new lights, new stars, or planetary worlds, be created in this immense darkness? Has it not capacity to contain them all, and yet again to stretch itself infinitely beyond the bounds of this new creation? We can no more assign the limits of it, than we can the limits of space*. Again, As *darkness* hath a seeming *immensity* belonging to it, has it not an *eternity* also? Was not darkness eternal before light was ever formed or the first beam of it created?

And yet after all these sportings of the imagination, which seem to assign real properties and powers to *shadows* and *darkness*, and even to stretch them to an infinite extent, we know and are sure that *darkness* or a *shadow* is a mere nothing: It it only a privation or absence of light: In proper speech it has no being: And philosophers are able to give an exact and rational account how all these appearances are made by the presence or absence of light, without allowing a shadow to be a real being, or to have in reality any powers or properties at all. And perhaps in this present state we are deluded with the seeming properties of *space*, as much as we are with the seeming properties of *shadow:* And though I grant the parallel be not perfectly exact in all respects, yet in several respects they are so much a-kin, that in reality *space* may be nothing but the *absence of body*, as *shade* is the absence of *light:* And both may be capable of explication by philosophy, without supposing the one or the other of them to be real beings.

Sect. IX.—Space *inactive and impassive.*

LET us try now whether we may not take courage from thi

* I am sensible it will be objected here, that it is "space," not "darkness," that has the capacity of receiving or admitting light or sun-beams. But it may be replied, that though it is space that admits new body to exist there, yet it is darkness that does as it were join with space, to admit the first beams of light there. Darkness gives it a capacity of admitting that particular body called "light," as much as space gives it a capacity of admitting body.

hint, and raise some efforts of reasoning, in order to prove *space* to be *nothing real*, or *no real being*: Surely there is no real being whatsoever, but has some capacity either of *action* or *passion*, of putting forth some sort of act, or of being acted upon: But *space* is utterly incapable of all real *active* or *passive power*: It can neither be an agent, nor a recipient of action. It cannot act upon body, either as body does, i. e. by touching; nor as spirit does, i. e. by volition; for it cannot touch nor will. Nor can space receive any actions or impressions of any kind from body or from spirit: Now, since no manner of agency can belong to it, nor any operation of any being be received by it, surely such an *inactive* thing cannot be God, nor can such an *impassive* thing be a creature. Therefore it must be a mere non-entity or nothing.

1. Such an *impassive* thing cannot be a *creature*. There is no created being but is capable of being acted upon by another being, at least by God himself, and thereby receiving some change: But *space* cannot be acted upon; no, not by the Great God the Maker of all; nor can it receive any real and proper alteration in itself, nor suffer any manner of change, but what a mere nothing may receive; i. e. *being* may be put where *nothing* was before: so body may be put where before there was empty space. Thus space in itself is really an impassive thing, and therefore it is no created being.

2. Such an *inactive* being cannot be *God*; for the living and true God cannot be conceived otherwise than as a most active being, a being of necessary and everlasting activity: This belongs to the very idea and essence of Godhead. But *space, empty space*, i. e. *extension without solidity*, is the most inactive idea you can frame, and indeed utterly incapable of all action, either as an instrument, or as a prime agent.

You cannot add the least degree of *solidity* to the idea of space, in order to render it capable of acting as a *body* does; for that would turn it into the idea of body or matter, it would be *space* no longer.

You cannot make *space* think, or will, or act, as a *spirit* does; for join *thinking* and space, which are two distinct ideas, as near as possible in your mind, yet you cannot unite them into one being, nor conceive of space as having any share in thinking, or as exerting a thought. So you may join *iron* and *joy* together in you mind as two neighbouring ideas, but they will be two ideas for ever distinct. No force can squeeze, melt or weld them together, and make them unite in one; you can never make *iron* become *joyful*: There is an utter inconsistency in their ideas, and they are eternally incompatible. Space can no more exert a thought, than iron can exert joy.

Thus space can never act as a body or as a mind. *Space* and *action* are two incompatible ideas. Mere extension is not only

inactive in itself, but cannot possibly have activity given to it by any means; for it contains an idea of everlasting inactivity, and an impossibility of action: Wheresoever there is action there is something besides space, even some other being: Space therefore can never be the idea of the nature or substance of God, whose nature is necessarily and for ever active, and whose existence ceases when his activity ceases.

Sect. X.—*A Re-examination whether Space has any real Properties.*

LET us examine yet further the supposed properties and powers of *space*, and consider whether they be real or no.

The *first* supposed property of space is *extension*, or length, breadth and depth; but let us remember what is our original idea of *space*, and how we came by it. Have we not found that our first idea of it is *emptiness*, or absence of body or matter in a room or vessel, whose sides are distant? Then we call this absence of matter, or this emptiness, *long, broad, and deep*, i. e. there is no matter or body there. And when we say, that some part of space is a yard or a mile long, we mean only that body is absent for a yard or a mile, or there is emptiness for a yard or a mile together, or that emptiness reaches a mile or ten thousand miles beyond the universe; that is, there is no matter or body there. This is the common idea of mankind. And thus we come to ascribe the properties of being to a mere nothing; and let this be well observed, that if we were never so sure that there were no being at all there, as we are sure there is no body, yet we should have the very same idea of *space* as we have now, i. e. a long, broad, and deep emptiness, or absence of being; and that body which is long, broad and deep, might be placed there. But this leads our thoughts to the next particular.

The *second* supposed property of space is a *capacity to receive bodies into it*. But if this matter be searched to the bottom, perhaps it will be found that space is no otherwise capable of receiving body into it, than as the emptiness of a vessel makes it capable of receiving liquor, as *darkness* is capable of receiving *light*, or than as *sound* may be admitted where before was *silence*; that is, that *something* may be introduced or received where there was *nothing* before. And it is much in the same manner that *privation* is exalted to be one of the three famous *principles of being* among the *Aristotelian* philosophers, viz. *matter, form*, and *privation*. Ridiculous principle indeed! which signifies no more, than that where any *new form* or *quality* is introduced into *matter*, there must be an absence of that very quality or form before it is introduced; so when *body* is admitted or introduced into *space*, it is necessary there must be no body there before; and where the first light is introduced, there must be antecedent darkness.

I grant the modes of speaking concerning *the capacity of space to receive body*, are more familiar to our ears than the *capacity of darkness to receive light*; but perhaps in truth both these expressions signify no more, than that body or light may be brought in where there was space or darkness before.

In the *third* place, we have been ready to say, that *space penetrates all body, and is itself penetrable by body*; that bodies can exist where space is and fill up the self-same room; as though body and space were two-extended and co-existent beings. But perhaps it is a very improper thing to say *space penetrates body* or *matter*, for we might as well say *light penetrates shadow*; whereas in truth, where light comes shadow ceases and is no more, for light excludes it. May it not be as natural and just therefore to suppose that space can never penetrate matter, but that wheresoever matter is, there space is not? Doth not space vanish or cease utterly when and where body comes? I am sure *empty space* ceases, and does not penetrate matter, and I know of no space but *empty space*.

And here by the way I might observe, that for this very reason *space cannot be God*; for space is really nullified where body comes. But no part of God can be nullified. To talk of *mutual penetration* of matter and space, is a mere term of art invented to maintain the existence of space, where sense and reason join to declare there is none. For in truth, where body exists space is not, and it only *then* appears to be what it really was *before*, that is, an empty *nothing*. Space is no more, and is entirely lost, when body is placed in the room of emptiness. Thus *space* and *emptiness* are all one, and perhaps are as mere a nothing as shadow or darkness.

A *fourth* attribute or property allowed to space, is *immensity* or *infinity*; but though space seem to be infinite or immense, yet it is not really and positively so; for wheresoever body is, there space is not; and therefore space is not every where, and then it cannot be absolutely infinite. Wheresoever this material world is, space is excluded, is as it were nullified, and is not: now it would be a marvellous idea indeed, to suppose space all round beyond this world to be a real, positive, immense or infinite being, and yet to have such vast nullities of space in the very centre and bosom of it where this world lies; this would destroy the complete infinity of it, and seclude it far from the idea of a God, as being utterly unworthy of him.

And yet further, if this world, or any part of, it were annihilated, then space or emptiness would be larger than it was before; that is, emptiness would be increased; but this is too mean and too changeable an idea to make any pretences to godhead.

Again; a *fifth* supposed attribute of space is *indivisibility*;

it seems to be indivisible indeed, but it is not so, if it does not penetrate matter; for put a body into the middle of an empty space, and it really divides it; i. e. the middle part ceases to be empty space, because it is filled with body, and space remains on both sides; even as a streak of light or sunshine coming from the *south* destroys darkness or shade so far as it comes, and thus divides the two parts of remaining darkness, the *east* from the *west*.

A *sixth* attribute or property ascribed to *space*, is *self-existence*, or that *it wants no cause*. But perhaps the true reason why it appears to want no cause, is not that it has such a real and substantial essence as is too big to be produced by any cause, but that it is such a subtle, tenuous, unessential or imaginary thing, that has not essence, nor existence, nor reality enough to want a cause, or to be produced or caused: now this is vastly different from the idea of *God's self-existence*, or his *self-sufficiency to exist without a cause*. Universal darkness wanted no cause before the creation of light.

There is yet another supposed property of space, and that is, *necessary existence*, and that it *cannot be annihilated*, nor can it *begin to exist*. But here also *light* and *shade* are happy illustrations of this debate about *body* and *space*. Darkness and space are not necessarily existent; for where light comes shadow is annihilated and gone; where body comes, space is vanished and annihilated. When that body is removed, space begins to exist there again, as much as shadow does when light departs: But in truth it should rather be said in both cases, where something was before, now there is nothing; and when something returns, the non-entity or nothingness ceases. *Body* and *space* mutually exclude one another, as *light* and *shade*, as something and nothing. And we are too ready to apply the words *existence* and *annihilation* to shade and space, which are non-entities, as well to light and body, which are real beings.

Positive terms tend to give us positive and delusive ideas of non-entity. If in our survey of all these supposed properties of space, we used the word *emptiness* or *void* instead of the positive term *space*, we should perhaps arrive at juster ideas of all this matter. Let us take the pains then briefly to run over them again in this manner

Is emptiness *long, broad and deep?* Is emptiness extended? Has emptiness a *capacity* to receive body? Is emptiness *penetrable by matter?* What do we mean by all this? Does it signify any thing more than that matter or body is absent thence, and it may be brought in there where emptiness was before? This does not render emptiness a substance, or real being, or make it the support or *substratum* of real properties.

Is emptiness *immense* or *infinite* beyond the limits of the

universe? What do we intend by it, but that beyond this world of bodies there is no matter or body existing, yet matter or body may be introduced where there is an emptiness or absence of it.

Is emptiness *indivisible*? By no means; for a wall or curtain hung up in an empty room divides it into two lesser voids or emptinesses, i. e. there is an emptiness or absence of body on both sides of the partition.

Is emptiness *self-existent*? Not at all; for it hath no real existence: it is rather a negation of being. It is *necessarily existent*? No surely; for it loses what existence it is supposed to have when body or matter is introduced, as shade or darkness loses what existence it appeared to have when light breaks in.

Yet a little further may this parallel be illustrated, in order to shew how much analogy there is between *space* and shade. Take a hollow sphere of lead, out of which all air is supposed to be excluded; place it on a bright day in the midst of sunbeams; here is a globe of *space*, and a globe of *shade or darkness* commensurate, and, if you please, co-extended with each other, and both included in this sphere; move it swiftly, the *shade* and the *space* move with the same swiftness; stop the sphere, and the *space* and *shade* are at rest; bruise it inwardly, and you alter the figure both of the *shade* and the *space* included; for you annihilate a segment both of *space* and *shade*: break a hole into this globe, and immediately you admit both light and air, which are bodies, to fill up the room of space and shade; and thus both the *shade* and the *space* are annihilated or nullified together. Here are then, or here appear to be, two co-extended and commensurate globes of figured and moveable I *know not what's* absolutely destroyed and nullified in a moment; but perhaps the whole mystery of it is no more than this, that the nonentity of each of them ceases by the introduction of real being or matter.

Sect. XI.—*An Objection against the Nihility of Space answered.*

AFTER all some person may say, but how will you answer that great *objection*, viz. space cannot be mere nothing, for two bodies may have twenty miles of space between them, and yet if all this space be nothing, then there is nothing between these two bodies, and therefore they are close together or touch one another, and yet are twenty miles distant, which is impossible?

But may not this be *answered* by a round denial of this proposition, "If there be nothing between them, then they touch or are close together?" Why may not two bodies be created or

placed at twenty miles distance, and yet nothing but emptiness, i. e. no real being, between them? However harsh and uncouth it may sound to learned ears, that these "two bodies are twenty miles asunder, and they do not touch though there be nothing between them," yet the vulgar world, who very much determine the common sense of words, will allow this language to be good; for they generally suppose *space* to be *emptiness*, that is, to be nothing. And if the learned are offended with this language, it is because they have of late years at least, run into this supposition, that *space* is a *real something*; and it is merely their own espoused opinion that makes this expression offensive to them which the vulgar part of mankind generally approve of, if you give them leave to think a little.

Besides, by the former debates it plainly appears, that if space be a real something, it must be a substance, it must be deity; for the reasons seem to be unanswerably strong, that space cannot be a mode, nor a creature. Now is it not quite as absurd to say, "There are twenty miles of deity between two such distant bodies, as to say, they are created or placed at such a distance," and yet there is *nothing* between them, *i. e.* there is no real being, or between them is all *emptiness*.

I grant it is hardly possible to speak on this subject of *nonentities* or *nothings*, without using the terms that represent *positive beings* and real properties: but as we are thus imposed upon by words and by our common ideas in treating of *shadows*, which we know are nothing but the *absence of light*, *i. e.* a mere nonentity, why may not the same be true also with regard to *space* or *emptiness*, which is the mere absence of body? And if we are in this point imposed upon to take *space* or *emptiness* for a real something, by some forms of speech we have been taught to use concerning it, and some appearing or imaginary properties that we ascribe to it, we see plainly it is not the first nor the only instance wherein mankind have been deluded by the common ways and manners of speaking, and imposed upon to take words for things, and to mistake appearances for realities.

In order to confirm this thought, I may cite Mr. Locke himself, however positive an idea he may suppose *space* to be in some parts of his writings. His *eight chapter* of the *second Book* of his *Essays* allows positive ideas of mere private things or privations. See §. 3, 4, 5. "The idea of *black* is no less positive in the mind of a painter than that of *white*, however the cause of that colour in the external object may be only *privation*."

Sect. 4. "If it were the design of my present undertaking to enquire into the natural causes and manner of preception, I should offer this as a reason why a *privative cause* might in some cases at least produce a *positive idea*, viz. that all sensation being

produced in us only by different degrees and modes of motion in our animal spirits, variously agitated by external objects, the abatement of any former motion must as necessarily produce a new sensation as the variation and increase of it, and so introduce a new idea, which depends only on a different motion of the animal spirits in that organ."

Sect. 5. "But whether this be so or no, I will not here determine; but I appeal to every one's own experience, whether the *shadow* of a man, though it consists in nothing but the *absence of light*, (and the more the absence of light is, the more discernible is the shadow) does not, when a man looks on it, cause as clear and positive an idea in his mind as a man himself, though covered over with clear sunshine? And the picture of a *shadow* is a *positive* thing. Indeed we have negative names which stand not directly for *positive* ideas, but for their absence, such as *insipid*, *silence*, *nihil*, &c. which words denote (or refer to) positive ideas, *i. e. taste*, *sound*, *being*, with a signification of their absence."

Sect. 6. "And thus one may truly be said *to see darkness*. For suppose a hole perfectly dark, from whence no light is reflected, it is certain one may see the figure of it, or it may be painted." Thus far Mr. Locke: and I ask leave to add to this discourse, that I have found a late ingenious writer, in his notes on the *English* translation of Bishop King's Treatise *De Origine Mali*, published in 1731, well support such sort of sentiments as I have here advanced concerning *space*, viz. that it is rather a negation of being than any thing real and positive, however our common ideas and language may lead us into mistakes about it. See Chap. 1. §. I. Note 5, and 11, and 13. Whether the learned author of the *defence* of Dr. Clarke's demonstration of the being of God, has effectually answered all this, the reader must judge.

Sect. XII.—Space *Nothing real, but a mere abstract Idea.*

AFTER all these debates wherein we have been endeavouring to prove *space to be nothing real without us*, yet perhaps we may allow it to be an abstracted idea of *the mind*; and it may possibly be formed by abstracting the length, breadth and depth of matter, *i. e.* the extension from the solidity of it: for since we frame an idea of length without breadth, and call it a *line*, when we know there is no such thing really existent; and we form ideas of united length and breadth without depth, and call this a *surface*, though we know also this cannot exist; so why may we not frame an idea of extension or space, *i. e.* length, breadth and depth without solidity*, and yet allow that it had no proper ex-

* *Solid* here is taken in the *physical* sense for *what resists matter*, and not in the *geometrical* sense for the *three dimensions united*.

tence but in our ideas? The arguments used in the beginning this Essay to disapprove *space* to be a *mere idea*, may be reated and answered thus.

It is *said*, We cannot have an idea of what is truly infinite; it our reason assures us space is infinite, or without bounds, id therefore it is not a mere idea. I *answer*, Though we do ot form an idea of space actually and positively infinite, yet we n form an idea of infinite space of the ever-growing kind, and may be a mere idea still. Our idea indeed is not actually inite, we cannot grasp the infinity of space beyond the world, r that would be to bound or limit emptiness: And so we may ve an ever-growing idea of *infinite number* as well as *infinite ace* or *emptiness*, yet it is a mere idea, and hath no real existce without us.

Again, It is said, space cannot be a mere idea, because it ems to have a necessary and obstinate existence, whether there ere any mind or no to form an idea of it. I *answer*, Such are e eternal truths, viz. *Three and three makes six, the whole is gger than a part, &c.* and yet what are these besides ideas? ave they any real existence extraneous to the minds that conive them? And yet perhaps space has hardly so much existce as these. And it is certain, if space or emptiness be noing but the mere absence of being, then the idea of it is only a nception of nothing after the manner of something, and that ust be a *mere idea*.

To conclude, After the laborious searches of thought, reaning and reading in several stages of my life past, these are the st conceptions and sentiments that I can frame of *space*. I grant ere may be some difficulties yet remaining, and some darknesses hich yet may hang over this subject. Learned men have boured hard to scatter them in former ages, and in the present o without full success; yet perhaps in future time there may be way found out for adjusting all these difficulties to the more mplete satisfaction of some following age. But in every age this mortal and imperfect state there will be some unknowables id insolvables: Many of the themes and enquiries relating to *finites* and *incommensurables*, both in magnitude and number, id *eternals* in duration and *abstracted truths*, are of this kind: nd if we should agree to throw in *space*, and *atoms* or *indivibles* into this heap, we should but enlarge the number of those rplexing arguments, whereby perhaps the great God our aker designs to maintain a perpetual check upon our proudest wers of reasoning, to plunge us now and then into darkness id endless confusion, to humble us under a sense of the narrow nits of human knowledge, and teach us to pay all due venera-n to his understanding, which is unsearchable.

APPENDIX.

ABOUT the time the second edition was published I had four treatises put into my hands, wherein the notion of *space* is at large debated, which is the subject of this *First Essay*. When an important dispute is managed by persons of such ingenuity, and such acute reasoning powers as Mr. Jackson, Mr. Edmund Law, Mr. John and Mr. Joseph Clarke, I hope the result of their thoughts will be the investigation of truth, and the establishment of it in the world; lest while some suppose *space* to be true Godhead, and others make it a mere idea and nothing real, the atheists upbraid us that we scarce know the difference between *God* and *nothing*. I owe my thanks to two of those gentlemen who think any light hath been thrown on this controversy by the speculations of my younger years: but my time now demands other employment, and I cheerfully leave this subject in such hands. Yet I ask leave to take notice that Mr. Joseph Clarke's distinction of a *real* and an *ideal nothing* will help to solve many difficulties in this debate, which are created merely by the perplexity of language: and I cannot but approve of Mr. Law's remark, That a subject which in the minds of so many men either raises or occasions so many different and contradictory ideas or notions, bids fair to be a mere idea, and to have no real existence. 1734.

ESSAY II.

Of Substance: and of Solid Extension and a Thinking Power, as the two only original Substances.

SECT. I.—*Mr. Locke's Notion of* Substance *considered.*

SUBSTANCE is another of those mysteries wherein we bewilder and lose ourselves by attempting to make something out of nothing. Mr. Locke had happily refuted that unreasonable notion of *substance* in general, which makes it to be some real thing in nature, different from all the united qualities, the supposed properties and powers of body or spirit, and he has exposed it to just ridicule, as in Book 2. Chap. 13. §. 18, 19, 20. In Chap. 23. §. 2, 3, and 6. and in other places he tells us, "Whatever be the secret and abstract nature of substance in general, all the ideas we have of particular distinct sort of substances are nothing but several combinations of simple ideas co-existent in such (though unknown) cause of their union, as makes the whole subsist of itself:" And he often speaks of this same *unknown cause of the union of properties* both in corporeal and spiritual substances, as in §. 15, 37. Now I acknowledge I have very little to say against Mr. Locke's representation of the notion which we has of *particular substances*, if this *unknown something*, which he supposes to be the cause of the union of their properties, were not so much insisted on, as to lead his readers into a belief that here is such a sort of unknown real being called *substance in general*, which supports all the properties that we observe in particular different beings, and which he before had refuted and ridiculed with so much justice and elegance.

I confess I see no sufficient reason why we may not content ourselves with the notion and description of *substance* in the main which the schools give us, viz. *Substantia est Ens per se subsistens & substans accidentibus;* in *English* thus, 1. It is that which supports accidents or qualities in being, which could have no being or existence at all without such a support or such a subject in which to exist. 2. It is that which can exist, or which subsists by itself, without dependence on any created being. All this is not at all disagreeable to Mr. Locke's sentiment: For when we observe any being, whose several modes we perceive inhering and united in it as in one common subject or bond of their union, this we call a *substance:* and this name of *substance* we also attribute to this being from a further consideration that it subsists of itself, i. *e.* independent upon any other created being.

But though Mr. Locke would seem to exclude and abandon any *general notion of substance*, as another real physical distinct being, provided to support all its real or supposed accidents or qualities, and seems to banter it by the "Indians unknown something, which supports the tortoise, which supports the elephant, which supports the world;" yet, as I intimated, he too often represents this notion of *substance* as some real *unknown thing* or being, which holds the properties in union, and which is different from all those things which he calls *qualities* or *properties*, and which supports them all in existence; though he owns, *we know it not*, and have no idea of it: and thus he seems to build again and maintain the very notion which he before destroyed.

Truly if there were any such real being in nature as *substance in general*, or a common substance which supports all the properties of things, and this being were utterly unknown to us, then I think it might be granted, that all beings are, or at least might be, the same in substance, and are or may be diversified only by their properties or accidents: for if we know nothing of this being called *substance*, we can deny nothing of it: And then perhaps it might be said, that God and the creature, that body and mind, are the same in substance, even the same individual substance, and that they differ only in certain properties: But this is a most palpable falsehood, which I shall take some further notice of by and by: for God and the creature differ from each other in their very essence, in their substantial nature or *physical* being, though the *logical* or generic idea of *substance* may be applied to them both, as self-subsisting beings. So matter and mind, or body and spirit, have a real, essential and unchangeable difference in the very substance of them, *i. e.* in what they are in *nature*, though the *name substance* be attributed to both, and that even in the same sense, because they both agree so far that *they both subsist by themselves*.

SECT. II.—*The plain Idea or Notion of* Substance *applied to Mind and Body.*

LET us try now whether we cannot trace out and represent with clearness and evidence some better and more satisfactory idea of this matter, than to suppose the substance of all things to be so much unknown, or that there is any such real being as *substance* distinct from all that we usually call *properties*.

Substance in the proper notion of it is a certain idea or character which our minds affix to beings, from a consideration that they depend upon no created being for their subsistance; and therefore are said to *subsist by themselves*; and from this further consideration also, that they appear to be the *subjects of various modes or qualities*. Not that there is or can be any such thing in nature as *substance, pure substance*, existing abstracted from all

qualities, any more than there can be what the schools call *materia prima*, or first matter abstracted from all forms, or then there can be pure *qualities* existing abstracted from all *substances*. Who can tell what is *motion* or *resistance*, without including the idea of some *substance moved* or *resisting*? Nor can any one have the idea of *substance* in *bodies*, without the idea of *solid extension*; nor in *minds*, without the idea of *cogitation*, or a *cogitative* power.

But to proceed further in this enquiry about substance. *Body and Spirit* are the two most general and distinct, if not the only, ideas we have of *substances*. *i. e.* of such things or beings which we conceive as the subjects or supporters of distinct *qualities*, and which subsist of themselves without dependence upon any creature. Now let us for the present suppose *body* to be solid extension, and *spirit* to be a power of cogitation or thinking, or at least that these are the prime distinguishing properties of these two beings, and we will enquire whether there be need of any further idea of some substance to support them.

These two, viz. *body and spirit*, seem to be sufficient supports for all the qualities or modes that we can have any idea of; since they are all either *sensible*, *intellectual*, or *abstracted*, as we shall shew afterward. *Body or solid extension* is a sufficient subject or support for any other *corporeal or sensible qualities*, whether it be figure, size, colour, motion, rest, resistance, situation, &c. they all plainly subsist in *solid extension* as in their subject: Think of yellowness, roundness, hardness, swiftness, touching, resistance, or any other bodily qualities, they all want *solid extension* in order to subsist, and they want nothing else. So *spirit*, or a *power of thinking*, is a sufficient subject or support for any *intellectual* qualities, whether it be consciousness, knowing, reasoning, doubting, fearing, hoping, wishing, willing, resolving, chusing, refusing, &c. all these subsist plainly in a *cogitative nature or power* as in their subject, especially supposing this *power* to be always in act. As for such *abstracted ideas* or modes, as cause, effect, likeness, difference, &c. they belong sometimes to bodies, sometimes to spirits, but they need nothing to support them as their subject, besides a *thinking power* or *solid extension*.

And as *solid extension* and a *power of thinking* have this one character of *substance* that they are sufficient supports for qualities, modes or accidents; so they have the other property of substance also, viz. that they subsist of themselves, independent of any created being: No creature can give being to one particle of *solid extension*, or the meanest *thinking power*, or can annihilate and destroy either of them, and put them out of being: Not the feeblest *spirit*, or the least particle of *matter* or *body*, can be utterly destroyed and annihilated by the most powerful creature.

I might add yet further, that since Mr. Locke declares our idea of particular distinct substances to be "several combinations of simple ideas co-existent in some unknown cause of their union and which makes the whole subsist by itself," why may not *power of thinking* be this supposed unknown cause and subject of the combination of the several properties of spirits? And why may not *solid extension* be the cause of the union of the several properties and qualities of body? What is there necessary to unite all the properties of matter beyond *solid extension*? Make a trial of all the modes that can belong to any material being. What do they want but solid extension to unite them? Make the same trial by taking a survey of the properties of a spirit: Will not the idea of a *thinking power* unite them all?

Why then may we not suppose that *solid extension* and a *thinking power* may be the very substances themselves, though the names *grammatically* taken may seem to denote *property* and *quality*?

The following *considerations* may perhaps lead the mind into a favourable disposition toward this opinion, or at least relieve the seeming strangeness of it from the charge of absurd and impossible.

SECT. III.—*Considerations to support the Application of the Name of Substance to solid Extension and a thinking Power.*

FIRST, Since our most piercing thoughts cannot reach deep enough to find out, to know or conceive of any subject or *substratum* that upholds this *power of cogitation* in spirits, or this idea of *solid extension* in bodies, why should we imagine there is any such unknown and unknowable being? May we not suspect that learned and *logical* forms of speaking have introduced this sort of notion into our minds, rather than any *physical* necessity could introduce it into the nature of things? And why should we suppose and multiply real beings without necessity? Why may not these very ideas of solid extension and a thinking power be the *substrata* or substances themselves, since we have no idea of any other?

Second, If we can lay aside all our prejudices in this point, I am persuaded *solid extension* would appear substantial enough to be called a *substance*, since even mere *empty space, or extension without solidity*, hath been by some philosophers esteemed substantial enough to subsist by itself and to deserve the honour of this name? And why may not a *spirit* or *mind* be a power and yet a substance, a *self-subsistent power in perpetual acts*? Do we not know that the acute and laborious schoolmen among their deep reasonings tell us, that God is an eternal self-existent act, or almighty power in eternal act? And this certainly inheres in no subject: God is a substance or subject himself: In their way

of speaking they call God the *most actual act*, and yet that does not hinder them from calling him also the *most substantial substance*. And what nobler or more grand and illustrious idea can we frame of the blessed God, than to conceive of him as an unlimited power of consciousness and volition in the most constant and universal activity?

Note, In this case I may so far agree with the schoolmen, as not to make very much distinction between a *power of cogitation* or *thinking*, and that *actual cogitation* or *thought* which is considered in the general and permanent idea of it, as ever existing and as determined to particular objects simultaneous or successive. And this I may venture to say, because I supposed this power to be in constant and perpetual act, and necessarily so, even in created spirits, when once they are created; and herein they are a bright emblem of the blessed God, all consciousness and activity. It is the very nature of God to be conscious and active: if he ceases to be conscious and active, he ceases to be. Conscious activity is also the essence of every spirit. A noble rank of beings we are, the living and lively offspring and image of that intellectual and vital power who gave us being. Του γαρ γενος εσμεν, said *Aratus* and St. Paul.

Thirdly, Consider that if *solid extension* and a *thinking power* are but mere modes or qualities, and not substances, then I enquire, may not the substances remain if these modes were destroyed? But destroy *solid extension*, and in the room of it there will remain a mere nothing. Destroy *thinking power*, and there remains nothing in its room. We have no idea left. All ideas are utterly banished out of the mind, and all beings are banished out of the world at once by this supposition. Therefore it seems to me that *solid extension* and a *cogitative power* are real substances, for if you nullify them they leave mere nothing behind them. If you suppose *space* to be something remaing behind, I have accounted for that in another *Essay*.

Perhaps you will answer, that the *essential modes* or properties of a being cannot be destroyed without destroying the substance also, though the *accidental modes or qualities* may be destroyed while the substance remains; so roundness in a bowl is an essential mode or property, and if you destroy roundness the bowl is destroyed; it is a bowl no longer; and so solid extension and thinking power may be essential modes or properties of certain substances to which they belong, and therefore they cannot be destroyed without destroying the substance.

To this I reply, that what is *only* and *merely* a mode or property (even though it be an essential mode) of any particular being, whether body or spirit, may be destroyed, and yet some substance, some real being will remain; though its essential mode being destroyed, it will not have the same form or name as

it had before: Destroy *roundness*, and the body ceases to be a *bowl*, but it is body or matter still; destroy the peculiar essential mode (whatever it be) that distinguishes a *human spirit* from all other spirits, and yet it is a spirit still, though it ceases to be a human spirit. But the case is not so with *solid extension* and a *thinking power*; for if you destroy these, there is nothing at all remains, not so much as an idea; and therefore I think they are not so properly *mere* essential modes, but they are substances themselves.

I know it will be objected here, that though we should grant *solid extension* to be a substance, yet we cannot suppose a *thinking power* to be a substance also; a power must have some substance to inhere in, and extension or expansion belongs to all substances whatsoever; and it is probable that extension void of solidity is the *substratum* of the thinking powers of a spirit.

But may it not be *replied*, that we have used ourselves so much in logic to conceive *power* as a mode or property, that it is harder perhaps for scholars than it is for others to drop this prejudice. Yet in common language among *heathens* or *christians*, the *heavenly powers*, or the *powers above*, signify God, or Gods, or angels; and the scripture uses this language, for it often calls angels *principalities* and *powers*, Eph. vi. 12. Col. i. 16. and ii. 16. 1 Pet. iii. 22.

And as for supposing some extension to be the substance or *substratum* of every thinking power, I grant we are so tied down by constant and familiar ideas of body to length, breadth, and depth, that we are ready to imagine there can be no being without it. We may allow therefore, say the *Cartesians*, we may allow young philosophers to keep their ideas of *extension* together with their ideas of a *thinking power*, until they have proceeded to search farther into the nature and actions of a spirit, and to converse about the understanding and will, and their operations; and they will find by degrees, that this *extension* can do nothing toward *thinking*, nor is of any use in all their researches into the world of spirits; they will find that it is a foreign idea tied on to a thinking power by *mere custom*; and they will perhaps insensibly drop it by degrees, when they find no use of it in philosophising upon spirits.

I say, this idea of *extension* is tied on to the idea of a *soul* by *custom*, rather than by *pure nature*. A poor young creature in the lowest rank of life being once asked, what she supposed her soul to be; after a little musing replied, *my soul is my think*; whereby it is plain she meant her *power of thinking*. And I believe the greatest part of mankind, if they were asked the same question, would sooner and more readily, reply that it is something in them that enables them to think, speak, move, and gives them the power of thought and action, than they would say, it *was any thing* long, broad or deep.

Another *objection* against a spirit being a thinking power is this, that a spirit itself has several powers, viz. judging, reasoning, wishing, willing, fearing, &c. Now how can one power have other powers? I *answer*, voice is a power in man, and yet a human voice has the power of singing or music; again, singing has a power of gladdening the heart. Why then may not a spirit, which is a substantial power, have several other modal powers and properties in it?

But I proceed to the next consideration, to shew that solid extension and a thinking power may be substances.

Fourthly. If we will but allow these two, viz. *solid extension* and the *power of cogitation* to be substances, we are then furnished with all the *ideas of substance* that are necessary for all the millions of simple and complex ideas of all the different beings, natures, properties, actions and powers that we have; for we may refer them all to one or other of these two substances, and conceive them as inhering therein; and we shall not be forced to search further, nor run to some other unknown and inconceivable being called *substance*, of which we have no idea, to support any of the modes or qualities of mind or body, i. e. of the whole universe of real beings. Allow but these two to be substances, and there is no need of framing any other idea of substance to accommodate all the beings in the universe with something sufficient to uphold all the infinite variety of their properties, or to be the cause of the union of these properties. Solid extension and thinking power will sustain all the modes which we can conceive; now all the substances that we know are body and spirit, and all the modes that we know belong to one of these.

Fifthly. Let it be considered also that the supposition of some utterly unknown being called *substance* to be the *substratum* or subject of all the properties of body, and such an unknown being also to be the subject of all the properties of mind or spirit, is a notion that carries with it some dangerous consequences, and therefore ought not to be too easily embraced. For if the *substance of body* and the *substance of mind* be so much unknown, then the substance of body (as I have hinted already) may be the same with the substance of mind, for ought we know to the contrary. If we know nothing of this substance, but that it is something that subsists by itself, and upholds and unites properties, how can we tell but that the very same individual substance may be the *substratum* or subject both of *solid extension* with all its modes, and of *thinking* with all its modes and may unite the modes or properties of body and mind together? And thus *matter* may be made able to think, or may have the *power of thinking* put into it, and which may inhere in it together with *solid extension*.

And indeed Mr. Locke was very sensible that his opinion

had this tendency, and he even allows the consequence which I call *dangerous:* For book IV. chap. 3. § 6. he to suppose that *matter may think*; for he speaks thus, have the ideas of matter and thinking; but possibly shall be able to know whether any mere material being thinks it being impossible for us by the contemplation of our own without revelation to discover whether omnipotency has not to some systems of matter fitly disposed a power to perceive think," or as he expresses it afterward, *to superadd to a faculty of thinking*; and he goes on in that section to c this his supposition. In his letter to Bishop Stillingfle supposes it possible for the substance of body to be th with the substance of mind, in these words: "The gener of substance being the same every where, the modifica thinking, or the power of thinking joined to it, makes it a without considering what other modifications it has, a ther it has the modification of solidity or no: As c other side, substance that has the modification of s is matter, whether it has the modification of thinking c Let. 1st, to the Bishop of Worcester, p. 66. Thus we maintains his notion of a *general substance* which he had ridiculed. And we may observe, that when he asserts tha *ter cannot think*, he uses some of these epithets, *mere pure, incogitative, insensible matter*, B. 2, c. 23. §. 1. B. 4. c. 10. §. 10, 11, 16. Now why should an auth such limitative terms, as *bare, pure*, &c. *incogitative* if he did not suppose *some matter* might be cogitative?

But if this be true, that matter can have a power of ing given it, then our own souls may be material bein ought we know, and consequently divisible and mortal,

And yet further I add, if this opinion should be tru how can we tell but *God* himself, even the infinite min have also the property of *solid extension*, that is, may s matter or body; and then he may be the same with the u of beings, as *Spinoza* fancied; and thus the whole ni God and this world, may be the same individual sul which *Spinoza* maintains with subtlety; for if there be thing as an universal ulterior *substratum* necessary to *solid extension*, and to support the *power of thinking*, a substance or *substratum* be so unknown a thing as Mr. supposes, how can I deny any thing concerning it? Or how can I be sure that God and the material world ha one common substance? In that section indeed Mr. Lo deavours to guard his principles or doctrines from the da this *objection*, which he supposes very naturally to ari his principles and concessions; but I think he neither do perhaps could he effectually secure them from such unhap sequences.

Sect. IV.—*The Occasions of Mistake on this Subject.*

IN *the last place*, let us consider how it comes to pass that the learned world might happen to mistake in this matter, and why they seem so unwilling to admit this doctrine of *solid extension* and of a *power of thinking* to be two real substances, or sufficient *substrata* or subjects for all the qualities of matter and mind.

The *first occasion of mistake* may be this.

In our daily observation of what passes in the material world, we find many of the qualities or properties of bodies continually altered, and new qualities or properties perpetually succeeding the old ones which are lost or destroyed, but the substance remains still the same: And therefore we suppose, and very justly, that there must be some certain thing called *substance*, which supports all these changing properties and qualities in their successive existence. So a piece of wood put into the fire, loses most of the properties or qualities of wood, and becomes fire itself, or a burning coal; its colour and hardness or firmness are lost, it has acquired a new *colour*, (viz.) Redness and new *power*, (viz.) of heating water, of melting metal, and burning combustible things, &c. In an hour's time this same matter turns into ashes, and then its *colour* is changed again into a dusky white or grey, the cohesion of its parts or consistency is quite lost, and it becomes quite another sort of body, a million of small atoms, a heap of corpuscles or sands; yet we suppose the *substance* which once had the qualities of wood, still continues, as indeed it does; and that is, I say, *solid extension* or *matter*, though it is broke into many little substances or solid extensions. And in the same manner, because we sometimes call *solidity* and *extension* two properties or qualities of body, we are too ready to imagine they may be ranked among those many qualities which may be changed, or removed and lost, while yet the substance remains; whereas this is impossible. And yet perhaps this imagination may be one of the springs of our mistake.

So in a spirit or soul, we find infinite varieties of thoughts, wishes, desires, perpetually altering and succeeding one another, and sometimes contrary to one another; and yet we suppose, (and justly too) that the substance of the spirit remains the same. But since we sometimes call a *power of thinking* a property of a spirit, we are too easily led to rank this also among those many qualities and properties, which may be altered while the substance of the soul remains; which perhaps is impossible; and yet this may be the first occasion of our mistake here.

Secondly, Another spring or ground of mistake may be this: Most of these things which are thus altered, while the substance remains, as in a *logical* view they are called qualities, so in a

grammatical view the names of them end in *sion* or *tion*, or *ness* or *ing* or *ity*, &c. Hence it comes to pass, that whensoever we speak of a thing, which by a *grammatical* termination sounds like a quality, (and is sometimes *logically* represented as a quality) we suppose it loseable while the substance remains; and we fancy it to require some subject in which it inheres, or some *substratum* or substance to support it: Thus for instance: When we speak of *motion*, or when we speak of *gravity*, we mean a a quality or property, which requires something distinct from itself, and more substantial than itself, to support this quality; there must be some substance which may be *moved*, or which may be *heavy*; and on this account, when we speak of *extension* and *solidity* we are ready to infer the same as we do concerning *motion* or *gravity*, i. e. that there must be some being distinct from *extension* and *solidity* to uphold these qualities: But this is an inference made without just reason, and by mere similarity of sound and termination.

I might represent this matter even by those qualities of body, which are called by the very names of *extension* and *solidity* taken in another sense. We use the word *extension*, when we see a piece of cloth or spunge may be extended or stretched to a larger size, or shrunk and contracted to a narrower; and this *extension* or *stretching*, as well as *contraction* or *shrinking*, being alterable while the cloth remains the same, we form an universal idea of *extension*, as a mere quality; and indeed it is so when we use the word to signify *stretching*. So when we feel a piece of wax hard to the touch, we call it *solid:* We melt it, and find it has lost its hardness or *solidity*, and thence we come to call *solidity* universally a quality; and indeed it is so in this sense, when it signifies *hardness:* But it does not at all follow, that *extension*, when it signifies *length*, *breadth* and *depth*, and is joined as it were in one idea with *solidity*, as that signifies *impenetrability*, should be a mere quality, though *extension* and *solidity* are mere qualities, when one signifies *stretching*, and the other signifies *hardness*. When therefore *solid extension* is represented in our way of speaking, as the primary idea of matter; surely it is something more than a mere *quality*. For the sense in which the words are used, when applied to body in general, is very different from the former signification when applied to cloth or wax.

And if we will judge here rationally, according to the rule by which we judge of qualities and substances at other times, *solid extension* may be properly a substance; for whatsoever qualities in bodies are changed, this has the character of substance, for it is immutably the same. Matter is solid extension, and the same solid extension too, through all the infinite varieties of change of its other properties: This can never be lost, till the

matter itself be destroyed or annihilated; nor can this be diminished or encreased, but by diminishing or increasing the matter.

In the same manner when we think of a man that has a *power* of remembering, of inventing, or of composing well, or of moving his limbs, we call these powers *modes, properties,* or *qualities;* we observe that in sickness and disorders of animal nature, a man may in a great measure lose these powers, and yet his soul or spirit continue the same in substance still; and therefore we suppose the powers of a soul universally to be all *qualities;* whereas in truth the *power of thinking,* i. e. of perceiving and willing, is never loseable; it remains as long as the soul continues a soul; and therefore this *power of thinking* may be the very subject or *substance* of the soul, in which all other powers of the soul inhere.

There is yet a *third* reason why we are so ready to make *solid extension* to be two mere *qualities* of body or matter, rather than the *substance* of it; and that is, that we fancy them to be two very different things in the essence of body; and that *solidity* may be destroyed, and yet the extension remain, and become empty space. So that *solidity* looks like a sort of quality, which may be, or may not be added to the same individual portion of *extension:* Whereas in truth *solidity and extension* considered in body, are but as one thing; for if you take away the *extension,* I am sure *solidity* is entirely lost; and if you destroy the *solidity* that very extension and dimension of that body is also destroyed and lost, and there remains nothing but emptiness and void space; which according to my best opinion is a mere nothing or an abstract idea. When therefore you speak of superadding *solidity* or *extension,* or making *body* of it instead of *space,* you do really in your ideas only introduce the substance of body, where before there was mere emptiness, or nothing at all. *Solidity* in its own nature, howsoever the name of it may sound, is really a thing too solid and substantial to be superadded as a mere quality to the *extension* of space; for the solid itself has an individual extension or dimensions of its own, very different from the supposed extension of space. Nor can this superadded quality of solidity turn space into body in any other sense, than by bringing in a real substance in the room of a mere nothing.

Thus I have pointed out some of the causes and springs of our mistake in this matter. Now let it be observed, that having been wont to conceive these ideas of *thinking power* and of *solid extension,* in our *common* and familiar way of discourse, under the form of *qualities,* when we grow *learned,* we range them under the head of *qualities, modes* or *properties* in *logic:* which want substances to support them; and thereby we are more confirmed in supposing there must be some other *substratum* or

substance, or support to uphold them, as all other qualities require.

And this mistake may partly arise, as I hinted before, from the sound of the terminations *ity* in solidity, and *sion* in extension, which are the usual terminations of the names of qualities, which names are called *abstracts*;* and this persuades us that there are some *concretes** belonging to them, i. e. some different subjects or substances upholding and supporting these *abstract* names of qualities: Thus by *grammatical* names and terminations, and by *logical* methods of ranging them, we are led insensibly to suppose *solid extension* and a *power of cogitation* to be mere qualities, and that there is, or must be some unknown sort of thing called *substance* to uphold them: And thus perhaps men frame to themselves new and imaginary beings, which have no existence in nature; and at the same time confess they are unknown and unknowable, and that they have no ideas of them, and know not what they are; and I think I have shewn that *nature* has no need of them, and therefore *fancy* need not give them an existence.

To conclude; I have reason here again to repeat the judicious remark of Mr. Locke, That "we ought to put things together as well as we can; but after all, there are several things which will not be bundled up together under our ways of speaking." We have usually ranged *solidity* and *extension*, and *a power of thinking*, under the general head of qualities or properties; and because we have not so many words as we have ideas, nor particular words for things in the various relations in which we survey them, we seem to have occasion sometimes to speak of these things as *properties* or *qualities*, and sometimes as *substances*. We speak of them as *qualities or properties*, when we call *matter* and *spirit* two substances, which are distinguished by their primary *qualities* or *properties* of solid extension and of cogitation: But this should not forbid us to range them in another view under the general head of *substance* also, since they are two general *substrata* or *subjects* of all other imaginable *qualities* that can belong to body or mind. And if we will but allow these two to be *real substances*, we are furnished with *substrata* or *subjects* sufficient for all our modal or qualitative ideas to inhere in, and we need no further debate about this strange thing *substance*.

* The name of *abstract* is given to a word that signifies a quality, as *whiteness*, without including the substance, or the thing that is white; whereas the word *white* is a *concrete*, because it denotes the thing or substance together with the quality. And by these distinctions of words we are too often drawn into mistakes, and imagine all *abstract* words, and all concrete words, to confine their ideas to the same limits and regulations. But we ought to remember that *things* are made by God and nature; *words* are made by men, and sometimes applied in a way not exactly agreeable to what things and ideas require.

If after all, we find difficulties in adjusting these speculations with a perfect accuracy, let us remember, that our understandings are very imperfect powers; that forms of learning as well as unlearned prejudices sometimes lead us into mistakes; and that all things will not easily be collected and bound up under our *grammatical* and *logical* ways of speaking, and confined to them only.

ESSAY III.

Of the Original of our Perceptions and Ideas.

FATHER Malebranche, who was an admirable writer in the last age, and has many excellent chapters in his treatise of *The Search after Truth*, yet has vented a strange opinion, that *we see all our ideas in God.* It is the known and distinguishing character of this rational author, that he falls into a sort of enthusiasm in his doctrine concerning our ideas of things, and their original. He supposes God to contain in himself all material beings in a spiritual manner; which he calls the intelligible sun, moon, trees, and stars, the intelligible world, and intelligible extension: And that created minds receive all their ideas of external objects, by contemplating this intelligible world which exists in God; which he explains and attempts to prove at large in the sixth chapter of the third book, part II. and to prepare the way, he labours to refute all other opinions in the five chapters preceding. But among all these opinions of the original ideas he has neither exactly proposed nor refuted the true *Cartesian* doctrine, which, with a little alteration, seems the most evident and most defensible of all: And this I shall endeavour to describe in several theses in a distinct manner, wherein we shall see how far God concurs in the ideas formed by the mind.

I. The soul of man is a thinking being, created and preserved with all its capacities by God the Almighty Spirit. The *Cartesian* writers make self-subsistent and perpetual cogitation to be the intimate essence and nature of it: But I had rather say, It is a power of thing, i. e. of perceiving and willing in continual act; and consequently, it is created capable of forming or receiving ideas in the mind, as well as of exerting volitions, or acts of the will. And as it is brought into being by the creative power of God, so it is the almighty conserving power of God that

maintains its being, with this capacity of perception; and it is his common providential concourse that continues it in constant act: By which I mean no more than the same creating, conserving and concurring influence of God, whereby all bodies were produced at first, whereby they persist now in being, and act or are acted according to their natures, and the laws given them by the Creator.

II. How the soul of man forms or acquires spiritual or intellectual ideas, i. e. the ideas of itself, of its own actions, and the ideas of other minds or spirits, we cannot conceive any otherwise than by its own immediate consciousness of itself and its actions, by turning its thoughts inward upon its own existence, nature, perceptions and volitions, operations and affections, and by the remembrance of and reflections upon its own modifications, as well as by its own consciousness of them at first: This is what Mr. Locke calls the knowledge of things, or *gaining ideas by reflection.* It is by this means we form or acquire all our ideas of *understanding, will, spirit, assent, dissent, fear, hope, &c.*

III. How the soul gains any new ideas of bodily things, when it is in a separate state, we are not so well capable of determining, till we arrive at that state ourselves. But in this present state of union with a body, we may give some happy guesses how we come to form corporeal ideas, or to acquire sensations of what relates to the body. This is what Mr. Locke chiefly calls *gaining ideas by sensation.* And in order to this we must first consider, whether a spirit could receive any sensations from matter, without a special union to some particular body; and then what is meant by the union of a spirit to a body.

IV. As to the *first*, we cannot conceive how a spirit can receive any sensations or ideas from corporeal objects, without its particular union to some certain body by that God who created it. Since body and spirit are of such widely different natures, that it is impossible they should touch one another, a body cannot give notice to a soul to raise any idea or perception in it by a jog or shake of any kind.

Besides, when any particular body moves, can all spirits perceive it? No surely. Or can any one spirit receive sensations from the motions of all bodies in the world? By no means.—Either of these is a most extravagant fancy, contrary to all experience. It is evident, that one particular soul receives sensations immediately from one particular animal body, and from that alone: Other bodies can impress no immediate sensations or ideas on that spirit.* Now why is it only from this one

* I do not pretend to determine here, that it is not possible, in the nature of things, for one soul to be conscious of the motions of two, or of twenty bodies;

body, that this one spirit can receive impressions or sensations? The soul did not chuse this body to make itself conscious of its motions; much less doth the body chuse this soul to impress sensations on it: Nor can it be resolved into any thing but the will and appointment of the great God their common Creator, who made this soul and this body, and united them into a man.

V. We are in the *next* place then to enquire, what is meant by the union of a spirit to a particular body, or wherein doth it consist.

When we say *a spirit is united to an animal body*, this doth not mean *mutual touching* of each other; for, as we said before, this is impossible. *Tangere vel tangi nisi corpus nulla potest res.* Lucretius is here in the right: But the chief thing wherein this union between an individual human body and an individual spirit consists, so far as we can find it, lies in these two laws or appointments of God our Creator.

1. That when some particular impressions are made, or particular motions are excited in that part of that individual body which is called the *sensory*, whether they arise within itself, or are conveyed from the outward organs of sense, or any other parts of body by means of the nerves, God hath powerfully ordained, that that individual spirit shall have such particular perceptions or sensations, or such ideas of outward objects.

2. That when that spirit wills to raise such a particular motion in the limbs, or in such parts of the body as God hath subjected to voluntary motion, he hath powerfully ordained that such a motion shall be presently excited by the means of the nerves or muscles in those limbs or those parts, upon the mere volition of of the soul; for we have no knowledge of any other executive power that does this: All that we are conscious of is, that the soul wills, and the body moves. In these two things chiefly consists the union of soul and body.

VI. Here it may be proper to observe, that there is some particular part of that body, which may be called as it were the *common sensory*, or the palace of the soul; not where she resides, as in a proper place, (as will appear hereafter) but where she receives immediate notices of things that relate to the body, and where she hath more immediate influence in moving the nerves and muscles, which serve to move the limbs and moveable parts

nor do I know that the nature of things forbids two or more souls to receive sensations from one body. Either of these, for ought I know, is very possible, if God please to appoint it. All that I maintain here is, that this is not the present course of nature, or settled order of things in our world; and much less have souls or bodies any such original innate power in themselves to hold immediate or reciprocal communications with multitudes.

of the body.* Now this is evidently the brain, or some special part of the brain, which appears from these three things eminently.

1st. Because all the nerves, whose extremities are wrought into the several organs of sense, viz. the eye, the ear, the nose, the tongue and palate, have their spring or origin in the brain; and the nerves which subserve the general sense of feeling, and which are spread through all the body, have their origin there also: And thus when the outward extremity, or other end of those nerves, is moved or affected any way, the motion is communicated immediately to the inward origin of them in the brain, to give notice of all things that affect the outward or any distinct parts of the body, whether they be shapes, motions, colours, sounds, tastes, smells, heats, colds, &c. And it is by means of these nerves also, which have their origin in the brain, that every extreme part of the body is put into motion at the will or command of the soul. It seems proper therefore to suppose the soul to have its more immediate government and operations near the origin of the nerves, which are so much the instruments of its perceptions and operations. Now, to confirm this by experiment, I add,

2dly, If any of the limbs are cut or bruised, while there is a ligament tied so hard round the limb, that there can be no communication of that motion by the nerves to the brain, the soul feels it not, the man hath no perception or sensation of it. And if the nerves which go from the brain to any limb are cut, the will cannot make that limb move.

3dly, When we set ourselves to think or study, we feel and are conscious that we employ some operative power or powers within the scull, and perhaps generally a little within the forehead: And the reason why we feel it there is, because the corporeal motions and traces are there formed, and preserved, and renewed, which serve to raise or awaken ideas in the mind, and which are ordained to minister to the soul in its intellectual or sensitive operations while it is in this united state.

VII. The perceptions which a spirit has by means of its union with the body in this present state, are chiefly of these three kinds.

1. Such as have no external objects for their exemplar, nor do they so much as seem to want any; for they are not representations of objects, but mere sensations of the soul: Such are *hunger*, *thirst*, *pleasure*, *ease*, *pain*, and in general our appetites and passions. Though some of these, viz. *ease*, *pain*, &c. may

* Des Cartes and his followers supposed this common sensory was the *Pineal-Gland*, which is situated almost in the middle of the brain; and some of their reasons for it are not contemptible, though I can by no means confine the *sensory* to such narrow limits.

occasioned by outward objects, yet we are in no great danger re of making a false judgment about them, and of imagining at these perceptions have any resemblance to those outward obcts which are the causes or occasions of them. No man thinks ere is pain in the sword that wounds him and gives him pain. leasure and pain appear to be mere *sensations*, rather than proer ideas; yet it is granted we can form an idea of them afterard, by considering what those sensations are, or by reflecting what we feel? and thence we gain the ideas of *hunger, thirst, in, pleasure, &c.* which very sensations are the exemplars or tterns of those ideas.

2. Another sort of perceptions which we obtain by union ith the body, are such as seem to be proper *ideas* rather than *re sensations*, yet they have no real objects without, which e the proper exemplars of those ideas; there is no outward ing which those ideas are like, and yet they seem to represent me outward originals or exemplars, and we are ready to supse they have something from without that resembles them :— ch are the *secondary* and *sensible qualities* of bodies, viz. *lours, sounds, tastes, smells, cold, heat, &c.* These have been undantly proved by philosophers not to have any real existence outward objects, such as we perceive them; and though we nerally call them *ideas* because they seem to represent outward jects, yet really they are *mere sensations* which the God of nae has ordained to arise in us on occasion of some motions, okes and impressions, which outward objects raise or form on our organs of sense, and which are thence conveyed to the in or common sensory. See Mr. Locke's excellent discourse that subject, Essay, book II. chap. 8.

It is granted here, that the bulk or vulgar part of mankind deceived in passing a rash judgment, that there are such quaes in outward objects as resemble these ideas in the mind; yet re is no inconvenience to human life arising from this mistake; all the valuable purposes in life are answered by these sensans, since we have sufficient notice thereby what objects are the ses of them, whether these objects are real outward exemplars them, and do resemble them or not. If I know that *wormod* will give me a bitter taste, and a *bell* will make a tinkling nd, I can judge as well how or when to use wormwood or a l, while I lie under this mistake, and while I suppose the *rmwood* itself to have the bitterness in it, and the *bell* itself to ve the sound in it, as if I believed this sound and this bitterss to be only sensations in my mind, of which the *bell* and the *rmwood* are the causes or occasions. And as for persons of ence and enquiry, there are ways and means of experiment d *reasoning*, whereby they may find out, and have actually nd out this vulgar mistake; and they are or may be convinced

and assured that these ideas of *sensible qualities* have no externa resemblances to the objects which excite them, and thus they ma undeceive themselves.

Now in forming these ideas of secondary or sensible qualities there is no need that the *traces upon the brain*, which are th more immediate occasion of them, should any way resemble th ideas, since there is no real resemblance in the *outward objects* themselves, which are the prime or remote occasions of them:— But God hath ordained, that whensoever such motions and trace are formed in the brain, the soul should immediately form such ideas, or have such perceptions raised in it.

3. The last sort of perceptions which the soul acquires by it union to the body, are such as have real proper objects without itself, which are the true originals and exemplars of thes ideas or perceptions, as well as the causes or occasions o them; such are the ideas of *extension, solidity, body*, with al the *primary qualities* of it, such as *shape, rest, motion, siz and situation.*

It is most highly probable, if not sufficiently evident, tha these do exist without us in such a manner as we perceiv them; and that for this reason among others, that we have no tice of them by the *touch* as well as by the *sight;* and we canno suppose that God has so formed our natures, that two sense should join to deceive us, when we have no way left to undeceiv ourselves.

In order to prove yet further that these ideas of the third sor have real objects which resemble them, I add, it is very possibl that there may be such real objects, and then we need seek for n other reason why God appoints us to have such ideas, besid the similarity of their objects, since God and nature do eve thing the shortest and plainest way; whereas it is impossible th the ideas of the first and second sort should have any real obje that resemble them, and therefore they must be traced to anoth spring, even to the divine wisdom and volition without any sim larity in the object.

And indeed, unless this be allowed, the world of bodies which we dwell, and of which our bodies are a part, must a mere chimerical and fantastic universe; but it is highly impr bable that God has made so vast a creation of spirits to dwell a world of phantasms for six thousand years successively; rather that each single human spirit should contain in itself su a fantastic world with endless and unavoidable illusions, mistal and suppositions that such a world exists without us. And ho ever some ingenious men have erected such a fantastic world their philosophemes, I can hardly think that any man ever l lieved it: A late author of the *Enquiry into the Nature of t Human Soul* has refuted this opinion, Sect. 7.

these last ideas, we may suppose that the strokes or
h are formed on the organs of sense, and which are
hence to the brain, may in the shapes or motions
some resemblance to the external objects which are
is of them. So the very figures of a triangle or
a house or tree, of a flying bird or falling hail, are
the *retina* or inward net-work of the eye, and per-
ed thence to the common sensory in similar or corres-
ures.

Though the traces and impressions which are made
should never so much resemble the external objects
and impress them there, that is, though a triangle
paper should form a triangle in the eye, and impress
ie same figure to the common sensory, yet these im-
nnot of themselves have an efficacious and immediate
on a mind or spirit, to excite or form similar ideas
since mind and body are two distinct beings so en-
erent in their whole nature, since all contact between
body is impossible, we cannot conceive how any
otions or figures impressed or traced in the brain,
an efficacious power in and of themselves to give
to the soul, or to raise perceptions or ideas in a mind

ot therefore any corporeal traces, motions or impres-
brain, whether similar or dissimilar to the objects or
:h occasion them, that can be in a most proper sense
ficient and effective causes of those special ideas or
in the soul, which are occasioned by them.

et since it appears by universal experience, that when-
particular motions or traces are imprest by outward
he senses, and by them conveyed to the brain, suita-
ıliar ideas are also raised or formed in the mind, we
to suppose that God the Creator ordained by an al-
tion, that this should be the way whereby the mind
uire or form these ideas: And it is God also
ed, that whensoever the soul wills to move the
he body, the body should exert those particular

ideed it is in this divine decree or law of creation,
through all ages, and exerts its perpetual influence
ind, that the *union* or rather *unition* of a particular
rticular body consists. When a human body is so far
be fit to receive such impressions on the brain, and
such motions of the limbs, then it may be probably
ie creating influence of God exerts itself in causing a
iat, and in this manner to be united to this human

Then begins the communication between soul and body which continues during the life of this animal nature: Then the traces in the brain, that are formed by some peculiar dispositions or irritations of the fibres in the stomach or throat, occasion the first sort of sensation, viz. hunger or thirst, pleasure or pain:— After that those peculiar impressions in the brain, which are raised by the secondary or sensible qualities of body, produce in a soul a second sort of perceptions, which are also called ideas, such as the perception of particular colours, tastes, and smells: And then also these special motions or traces on the brain, which are raised by the primary qualities of corporeal objects, such as shape, motion, size, &c. raise in the soul the third sort of perceptions, or those proper ideas which are similar to and correspondent with the outward objects which are the occasions of those impressions. Thus the mind gains these three sorts of perceptions; but all these are originally owing to the powerful appointment of God uniting a soul and body according to these laws.

Thus perhaps in the most strict and philosophical manner of speaking, neither the external objects, nor the impressions made by them on the brain, are sufficient to be the real proper producing or efficient causes of the ideas in the mind, since body cannot affect spirit by any properties that we know in it. Nor is the mind itself a proper, immediate, sole or sovereign cause of her own sensations or corporeal ideas; for how should the mind know what sensations or ideas to form or excite, when any particular strokes are formed in the brain, since she can perceive no real and natural jog or admonition from any corporeal impressions, traces, or images? Besides, if the mind has any hint what ideas to form or excite, then it already perceives those objects, or it has those perceptions, and it is useless to form a new one.

X. It follows then, that the original, true and proper cause of those ideas is the prime almighty volition of God as creator and preserver of all things; which in itself being simple and eternal, produces all manner of simple and complex, modal and substantial beings, in their various determined seasons, by those mediums and according to that order and connexion of things which itself first established in the creation: And the production of all things in this manner may be properly called, *The order or law of nature.*

XI. Therefore we may justly be allowed to use the common methods of expression in this case, viz. that the soul itself has these perceptions *naturally*, and that she *naturally* forms these ideas of corporeal beings; and that the corporeal objects impressing particular traces and images on the brain, are the *occasional* and *natural* causes of these perceptions or ideas.

Thus we must grant also, that the volition of the mind to

move the arm or the tongue, may be called the *natural* cause of the motion of those members, for it is according to a *law of nature*, which God the creator has appointed ; though the influence which that volition has on that motion, be not so properly natural and efficacious, as to be sufficient in and of itself ; but the efficacy rather proceeds from the almighty volition of God thus uniting the soul to an animal body, according to these laws of his own appointment*. Of which see more afterwards.

XII. It is no difficult matter to allow this account of things to be true. Concerning the influence that mind has on body, or body has on mind, and to abscribe it all to the supreme and efficacious appointment or will of God, when great philosophers now-days suppose the mutual influence of bodies moving each other ot to be so evidently the proper, native, and necessary effect of those material beings on each other, but rather of some divine appointment, or certain laws of nature which God has made. Thus we say, that the bowl *A* in motion striking the bowl *B* at rest, naturally causes it to move, or produces motion in it ; although perhaps the motion of the bowl *B* more properly proceeds from the efficacious and original appointment of the Creator, who wills that one body should move when another strikes against it.

Mr. Locke, in book II. of his *Essay*, chap. 23. §. 28. supposes the *communication of motion from one body to another by impulse* to be as hard to be accounted for as the communication of motion to a body by any thoughts or volitions of the mind : And is still more justly supposed, that Sir Isaac Newton's doctrine of the influences of attraction or gravitation which the planets have upon each other at such immense distances of empty space, must be resolved into such a law of nature or efficacious divine appointment.

And yet we still use the common methods of speech, and say, that the bowl *A* striking the bowl *B*, naturally makes it move ; that the sun naturally causes the planets to move or tend towards itself, and thereby keeps them in their several orbits. And in the same manner we say, the soul forms ideas naturally by its understanding or perceptive power, and it moves the limbs of the body naturally by its will : And unless we continue to use such forms of expression, which are the constant language of God and men in scripture, and in all natural and civil affairs, we shall

* *Note*, the words *nature* and *natural* may be taken in two senses ; *First*, they may denote an original power in matter and mind, sufficient mutually to influence each other, arising from their very nature or essence and constitution : Now such a *native* or *natural* power is denied : And yet this power may be called *natural*, with regard to the constitution of man, as consisting of a soul and body united ; because God has appointed them by his almighty will to act in this manner mutually on each other in their state of union, and thus he has made it a *law of their nature*.

almost destroy the very notion of *cause* and *effect* among created beings, and by introducing the divine agency immediately into all particular effects, and forming our expressions according to it, we shall exclude all dependency of created beings upon each other, and their several connexions which the God of nature and of order has ordained among them.

The laws therefore, or appointments which God has made, whereby body moves body, or whereby a spirit moves a body, or whereby a body excites ideas in a spirit, may all be called *natural*, because *nature* is that order which God the creator has appointed among the creatures he has made.

XIII. When these traces or impressions are once formed in the brain, to which such particular sensations or corporeal ideas are attached by divine appointment, it must be observed that whenever these traces or impressions are repeated or awakened in the brain again, though there be no such outward object present, nor any such outward cause to excite them, yet the soul hath the same ideas or sensations raised, repeated or awakened in it; because these ideas or sensations are immediately attached to those particular motions in the brain, and not to the outward objects, or to the first cause of them.

Hence proceed the powers of *imagination*, and *memory*, and *dreaming*, &c. and for this reason we may feel hunger and thirst, pleasure and pain, even in dreams, though there be no external causes to excite them; and when we are awake we may raise ideas of ten thousand shapes and colours of sensible and bodily objects which are absent, when they have once formed their peculiar and proper traces on the brain before.

When the same ideas or perceptions which we had before, are again excited in the soul, without the presence of the same object or the same occasion, this is called *memory*, supposing that we have a consciousness that we had this perception or this idea before; especially when the same ideas have the same qualities, and are joined or situated in the same manner as before: but if the ideas are varied, enlarged, diminished, multiplied, or joined and mingled in forms and qualities different from what we had in our first perceptions of them, this is called *imagination*, or the power of *fancy*.

XIV. Though our intellectual ideas, such as the idea of *thought*, *knowledge*, *will*, *reason*, *spirit*, &c. are not originally formed in us by impressions or traces made on the brain, but by a consciousness of and reflection upon the powers and operations of our own souls, as was said before, yet while we are in this state of union with the body, it is highly probable that these very ideas are quickly attached to some words or sounds which make their impressions on the brain; and therefore when these impressions in the brain are again repeated, or these traces awakened by these

words or sounds, the soul has these intellectual ideas which are attached to them, repeated or raised afresh, and they become actually present to the mind: and thus we are assisted in the memory or recollection even of intellectual things by animal nature in this present state: for though our intellectual ideas themselves cannot be traced, nor drawn, nor painted on the brain, and consequently can have no similar impressions made there, yet they may be closely connected or attached by custom to certain corporeal motions, figures, strokes or traces which may be excited or delineated there; which traces or motions were first raised by the reading or hearing *words* written or spoken, which were designed to signify those incorporeal ideas or objects.

XV. When the soul sets itself by an act of its will to recollect any former ideas, corporeal or intellectual, it is very probable that it employs some finer or more spirituous parts of animal nature to open all the kindred traces that lie in that part of the brain, till at last it lights upon that particular trace which is connected with the desired idea, and immediately the soul perceives and acknowledges it. It is in this manner that we hunt after a name that we have almost forgotten; as for instance, suppose the name be Tompkins, we think of all the names that end in *kins*, viz. Wilkins, Watkins, Jenkins, Hopkins, &c. till at last we light upon the name Tompkins which we sought; or suppose we seek after the name or idea of a *temple*, we rummage over the traces of *house, building, palace, church*, till we light on the idea and word *temple*.

Thus we have seen the way and manner whereby the soul of man comes to acquire its ideas at first, both of corporeal and intellectual objects, and that is, by *sensation and reflection*; we have also made a probable guess how these ideas are treasured up and recollected while the mind is united to the body.

XVI. But besides these two sorts of ideas, there is a third sort which are properly called *abstracted ideas*; such as are not the express representations of any corporeal or spiritual beings just as they exist, but are as it were a part of our ideas of some spiritual or corporeal things abstracted from the other parts; or at least they are ideas drawn from their real or supposed properties abstracted from the beings themselves, or from some modes or affections of these corporeal or spiritual beings, or sometimes from the mere relations that several beings bear to one another. Of these *abstractions* there are several sorts and degrees, and consequently there are ideas which are more or less abstracted.

The first sort of these ideas, which are least abstracted, are *ideas of common and general kinds of being* drawn from particulars or individuals; such as *a man, a bird, a flower, a pigeon, a spirit*, &c. Now these abstract ideas are formed in this manner. I see several *pigeons*, I observe they are birds of such a shape,

and size, and motion ; one is of a dark brown colour, a second is white, a third is speckled : but I omit or leave out these particular colours, and all other peculiarities in which they differ, and abstracting from them the things in which they agree, I keep those only in mind, viz. *a bird of such a shape, size, and motion*, and I call this a *pigeon:* now this is a general name for all the birds of that kind, and this we call an *abstracted idea.* So we form the general idea of a *spirit*, by considering the soul of Peter, Thomas, George, &c. and leaving out their different personal properties and individual circumstances, we retain only those ideas wherein they all agree, and call that a *spirit.*

Note, this first sort of abstract ideas may still be called corporeal or intellectual ideas, according to the nature of the objects whence we derive them, though they are not completely like those objects, because they represent but that part of them only wherein they agree with others of the same kind. Now these abstracted ideas evidently arise from a power that is in the mind itself to abstract or divide one part of an idea from the other, or to separate mingled ideas and conceive them apart.

Another sort of abstracted ideas, and which indeed are more properly called by that name, are *general relations* which arise from comparing one thing with another, and from observing the relations that one thing bears to another : and then the mind abstracts those relations from the things which are related, and treasures up those relations as a distinct set of ideas, even while the things which are related, are neglected or forgotten ; such are *cause, effect, likeness, difference, whole, part, &c.* I might give an instance thus ; when I see a sword wound a man, or when I am conscious that my soul forms an argument, I conceive the sword to be the *cause*, and the wound is the *effect :* or I conceive the soul is the *cause*, and the argument is the *effect* : then I reserve these ideas of *cause* and *effect* for general use, and apply them very properly to a hundred other cases, when I have no further thought of a sword or a soul, which occasioned my first ideas of causality. These are *pure abstract* ideas.

Some *absolute modes, properties or affections* borrowed from individual beings, as well as their *relative modes*, or *relations*, will also afford us such kind of *pure* abstracted ideas ; such are the ideas of *essence, existence, duration, substance, mode*, &c. which are formed in this manner. Suppose I think of a *bowl* as subsisting by itself, and that it is both round and heavy ; I conceive of the bowl as a *substance*, and of roundness and heaviness as *modes* belonging to it : so when I think of a *spirit* as a thing that subsists of itself, and that this spirit is grieved or joyful : I infer that spirit is a *substance*, and joy and grief are *modes* of that substance. Then I abstract the ideas of *substance* and *mode* both from the corporeal and the spiritual ideas which first occasioned

them; and though I think no more of a *bowl* or a *spirit*, of *roundness* or *heaviness*, of *joy* or *grief*, yet I retain the abstracted ideas of *substance* and *mode*, and apply them to a thousand things besides.

As the ideas of *cause* and *substance* and *mode* may be properly called *pure abstracted ideas*, so the *causality* or the *substantiality* of a thing, or its *modality*, are yet *more abstracted ideas*, or have another degree of abstraction; for these words signify only the view or consideration of a thing as a cause, as a substance, or as a mode. Such also are the ideas of *genus* and *species*, of *noun*, *verb*, &c. and a multitude of such very abstracted ideas belong to common speech as well as to learned writings.

Here let it be noted, that the ideas of *cause*, *effect*, *substance*, *mode*, *likeness*, *difference*, and many other abstracted ideas of this sort, are precisely the same ideas, whether they are drawn originally from corporeal or from intellectual beings, and therefore they are plainly different from the first sort of *abstract* ideas which are either intellectual or corporeal; nor can these be ranked under either of those two classes, for they are ideas of another distinct kind, and make a class of their own, *i. e. pure abstract ideas*.

If therefore we confine ourselves strictly and entirely to those two things which Mr. Locke asserts to be the springs and causes of all our ideas, viz. *sensation* and *reflection*, without admitting this third principle, viz. the soul's power of comparing ideas and abstracting one from another, we shall hardly account for the numerous abstracted ideas which we have, whereof many are neither intellectual nor corporeal, though they are all evidently at first derived from corporeal or from spiritual objects and ideas; and the original remote springs of them may be sensation or reflection, though these are not the immediate causes of them. See more in the Treatise of Logic, part I chap. III. sect. I.

ESSAY IV.

Of innate Ideas.

Sect. I.—*The common Opinion well refuted by Mr. Locke.*

THE common opinion of innate notions and innate ideas, against which Mr. Locke so earnestly contends, I take to be this, viz. that there are some certain ideas of things, and some certain propositions both of speculation and practice, or of truth and duty, which are *explicitly* wrought into the very nature of man, and are born with all mankind; which ideas and propositions are supposed to be the first principles of our knowledge, and original rules of all our judgments and reasonings about natural or moral subjects; that they stand in the soul as *notions* or *maxims*, and are the propositional principles of our religion and virtue, of our duty both to God and man, though they lie hid, and we are not actually conscious of them till some special occasion calls them forth to sight.

The propositions are reckoned such as these,

1. Of the natural kind, viz. "What has no being has no real properties; whatsoever acts, is, or exists; one thing cannot be the cause of itself: It is impossible for a thing to be and not to be, in the same sense and at the same time; the whole is greater than each part, &c." 2. Of the moral kind, viz. "Parents must be honoured; falsehood must not be practised to our neighbour; injury must not be done; contracts should be fulfilled, &c." 3. Of the religious kind, viz. "There is a God: God is to be worshipped: God will approve virtue; he will punish vice, &c."

These have been supposed to be actual innate propositions; and all the ideas of which these are composed must certainly then be innate ideas, if they are actually existent in the mind as soon as it begins to be; however, neither the propositions nor ideas may actually appear there to ourselves, till some occasion call them forth.

Now those writers who hold innate ideas in this sense, seem to lie under a great mistake.

Mr. Locke has ingeniously and sufficiently refuted this sort of doctrine of *innate ideas*, and *innate propositions*, in his discourse on that subject; wherein he discovers that there is no necessity from reason, or from religion, to admit them; because God having given the mind of man a capacity of forming ideas of natural and moral things, and of comparing and joining or

disjoining them by judgment, has sufficiently furnished men with necessaries for knowledge; and God having given us a power of reasoning, we are able from the most common and obvious things to infer both his own being and our duty considered merely as creatures; and there is no such necessity of his actual implanting in the mind all those ideas and long trains of propositions, whether natural or moral, which some men have supposed to be innate. Thus far I think we may safely agree, with Mr. Locke, who reasons exceeding well on this subject, and most of his arguments, I think, are just and convincing.

And yet I believe still that many *simple ideas* are innate in some sense, though not actually formed in the mind at the birth; and perhaps also some *general principles* both of *truth* and *duty* may be called in some sense innate, though not in the explicit form of propositions. Let us consider things in the following manner.

SECT. II.—*In what Sense many Ideas are innate.*

FIRST, The simple ideas of light and colours, sounds, tastes and smells, viz. red, blue, sweet, bitter, loud, shrill, cold, hot, &c. even all the *sensible qualities* (which are called the secondary qualities of bodies) with all the infinite variety of their mixtures, though they are not immediately, actually and explicitly impressed at once on the mind at its first union to the body; yet they may be called in some sense *innate*, for they seem to be given to the mind by a divine energy or law of union between soul and body, appointed in the first creation of man; and this law operates or begins its efficacy in all particular instances, as soon as those sensible objects occur which give occasion to these sensible qualities and ideas to be first perceived by the mind.

The reason why I think so is this: The millions of impressions that are made upon the senses by outward objects, do necessarily excite nothing but an equal variety of impressions or motions of certain fibres in the brain, and form perhaps certain courses or traces of some fine fluid, called the *animal spirits*, there. But among this infinite variety of fibrous motions in the brain, or lines and strokes which are drawn there, or traces of the animal spirits; none of them do necessarily and in their own nature raise in the soul the sensations of these *secondary* qualities as they are called, viz. colours, tastes, smells, feeling, sound, &c. such as green, blue, red, sweet, sour, stinking, cold, warm, shrill, loud, &c. Sensation is a very different thing from motion: It is only God the author of our nature who really forms or creates these sensations and all these ideas of sensible qualities in a soul united to a body, and he has appointed these ideas to arise when such particular impressions shall be

made on the brain by sensible objects. And yet man may be said to form them, because what hand soever God has in it, it is by one uniform law of creation or original appointment, which has a lasting efficacy through all generations of men: And on this account these ideas may be so far called *innate*; since it is not all the impressions of objects on the organs of sense, nor the conveyance of these impressions to the brain, could raise or form these ideas in the soul, but only the divine appointment of such effects, according to laws of union which he has established between the souls and bodies of all mankind.

I will not add any thing here concerning our ideas of the qualities of bodies which are called *primary*, such as the figure or shape, size, motion and rest, and situation of the parts of matter; because the strokes which are formed on the brain by these objects or these properties of matter may perhaps resemble the objects themselves; for such kind of lines, and figures, motions, &c. may be formed on the brain itself: And perhaps some persons may imagine that the ideas of these corporeal primary qualities in the mind are raised naturally and entirely from the mere outward impressions on the senses, because these impressions are like their objects; though I think there must be an almighty volition of the Creator to give the soul even these ideas also; for the soul has not proper eyes to see these figures and motions on the brain, though they may never so much resemble these *primary qualities*, i. e. those motions and figures which are found in the objects without us. And a soul being immaterial, can receive of itself no natural impressions from matter or body.

But when we turn our thoughts to the *secondary sensible qualities of body*, we are sure that all possible figures, stamps, motions, alterations, traces, which are made by these sensible objects on the brain, are but *primary qualities* still; they are nothing but shapes, motions, &c. and they do not at all resemble these ideas, sensations, thoughts or perceptions of *sensible or secondary qualities* that are occasioned by such corporeal motions. What possible resemblance is there between the motions of a fibre of the brain raised by the *grass* or the *sky*, and the idea of *green* or *blue*? between the figures or traces imprest on the brain by *sugar* or *wormwood* touching the tongue, and the ideas of *sweet* and *bitter*, which are occasioned by that touch? Yet God our Creator hath by an original almighty volition ordained, that whensoever such motions or traces are made in the brain, the soul by the occasion thereof shall have such a perception of *sweet* or *bitter*, or form such an idea as *green* or *blue*. And this almighty will of God, whereby the soul comes to have such perceptions or to form such ideas, is an uniform law of creation, as I before expressed it; it is one lasting appointment,

nd may be called the *implanting* or *instamping* these ideas pon the mind; since no manner of corporeal motions can have ny necessary and effectual influence of themselves to excite hese perceptions in the mind, because it is a being incorporeal, ntangible and immoveable. And indeed this sort of *innate* ideas, nd in this sense, Mr. Locke himself seems to own, book II. hap. 8. §. 13.

SECT. III.—*In what Sense some Truths may be innate.*

SECONDLY, as these *ideas* may in this sense be called *nnate*, so some *principles of knowledge*, (though not explicit propositions) may be in a sense innate also. It is fully granted hat such axioms as these, "Whatsoever acteth hath a being, he whole is greater than a part, nothing can be the cause of itelf, &c. are not actually inscribed on the mind of man in its irst formation; yet the very nature, make and frame of a raional mind is such that it cannot but judge according to such axioms as these; and whatsoever particular judgments or propositions it forms (though it does not deduce them from such explicit general axioms written within itself, yet) it always judges nd reasons according to these axioms, and cannot judge contrary to them: They are so interwoven, with the very constitution and nature of a reasoning being, that they are the constant principles of all its assent or dissent in particular enquiries: And in this sense perhaps they may be called *innate*. They are, (as Mr. Glanvil calls them in his Vanity of Dogmatizing, 8, p. 81.) 'The very essentials of rationality; and if any ask how the oul came by them, I return, as *quantity* did by *length, breadth nd depth*.

To determine how great is the number of these propositions s impossible, for they are not in the soul as propositions; but it s an undoubted truth, that a mind awaking out of nothing into eing, and presented with particular objects, would not fail at nce to judge concerning them, according to and by the force of ome such innate principles as these, or just as a man would udge who had learnt these explicit propositions, which indeed re so nearly allied to its own nature, that they may be called lmost a part of itself; they are in some sense the very nature of he mind considered as judging or as reasoning, nor is it possible or a reasoning faculty to exist without them.

Therefore I take the mind or soul of man not to be so perfectly indifferent to receive all impressions, as a *rasa tabula*, or *white paper*; and it is so framed by its maker as not to be equally disposed to all sorts of perceptions, nor to embrace all propositions, with an indifferency to judge them true or false; but that antecedently to all the effects of custom, experience, education, or any other contingent causes, as the mind is necessarily ordain-

ed and limited by its Creator to have such and such appointed sensations or ideas raised in it by certain external motions of the matter or body to which it is united, and that while the organs are good and sound it cannot have others, so it is also inclined and almost determined by such principles as are wrought into it by the Creator, to believe some propositions true, others false; and perhaps also some actions good, others evil. Therefore I might add,

SECT. IV.—*In what Sense some rules of Duty may be innate.*

THIRDLY, there may be some practical principles also *innate* in the foregoing sense, though not in the form of propositions: I mean thus; that in the moulding of our souls God has given us faculties to discern the justness or fitness of such and such actions; and together with this discernment he has also inwrought into our souls some concomitant movements to judge aright, at least concerning the more general and obvious instances of *virtue* and *vice*, *religion* and *morality*; such as, "contracts are to be kept; truth and veracity should be practised; murder ought not to be committed; God must be honoured, or he that made us has a right to govern us," &c. though these are acknowledged to be much fainter and feebler than speculative principles, because they have been more corrupted by men, as more frequently contradicting their sensual inclinations and vicious passions; whereas in matters of speculation, there is no such opposition in our natures, in their present degenerate state.

Yet it must be confessed, that at the very first proposal, when the terms are understood, a rational being cannot but assent to this proposition, "He that made me should govern me; it is right and fit that contracts should be kept. He cannot but see the fitness of these moral propositions, as he cannot but see the justness or truth of this natural one, that "all the parts taken together are equal to the whole." It seems to me to be the very nature of his reason so to judge: His soul is not therefore equally indifferent to these propositions, and to the reverse or contraries of them.

SECT. V.—*Of the Foundations of moral Virtue, and of a moral Sense or Instinct.*

THERE has a controversy risen long since these papers were written, between two considerable authors, "Whether the soul of man judges of moral good and evil, by an inward principle or instinct, which is called the moral sense, antecedent to all *reasonings*; or whether it is by its survey of the moral propo*sitions* offered to the understanding, and seeing the rational fitness and unfitness of things, that it judges of them by reason-

g." Methinks we need not be much at a loss to answer this estion. It is plain to me, whensoever such moral propositions re offered to the mind, it judges, or ought to judge of them y surveying the fitness and unfitness of things, the right and e wrong, by the light of reason: But then if you come to ask, Why does reason judge that this is fit and right, the other is rong or unfit, (viz.) that contracts are to be kept rather than roken?" &c. I say, it is the very nature of an intelligent eing to perceive this fitness, and it is the nature of a reasoning ind to judge so, and it cannot judge otherwise when free from ll evil biasses; just as when the eye sees a round globe put up to a neat, round, hollow case, it sees the fitness of these two ings to each other; and the soul judges, and cannot but judge, at there is a mutual fitness between the globe and the round se, and that there is a mutual unfitness between such a globe nd a square case.

I allow therefore, that there is such a sort of *natural sense* the mind (if it may be called so) which beholds these congrui- es and fitnesses of *natural* things, and their relation to each ther, and which inclines and determines it to judge thus con- erning natural propositions or axioms of truth; so that in more pen and obvious instances, the weakest mind can scarce judge therwise. The understanding is like the eye of the soul, it sees he fitness of the subject, and predicate to each other, and in such ropositions it cannot but see it; and thus it judges that they ust be joined together. It is so much the very nature and ake of the soul, to see and judge of things in this manner, that take it to be a part of reason itself, which, as it were, impli- itly contains in it these natural axioms of truth or princi- les of judgment inwrought by the Creator of souls; not in the xplicit form of propositions, but as principles and springs of udgment and reasoning.

I allow also in the same manner, that there is such a thing hich may be called a *moral sense* in the mind, which inclines he man to judge right, and especially in the more general, plain nd obvious queries about virtue and vice: But this *moral sense* still the same thing, is the very nature and make of the mind; t is intelligence or reason itself, considered as capable of dis- erning, discoursing or judging about moral subjects. And it ontains in it these plain and general principles of morality, ot explicitly as propositions, but only as native principles, by hich it judges, and cannot but judge virtue to be fit, and ice unfit, for intelligent and social creatures which God has ade.

As for the word *moral sense*, if it be taken to mean any thing ore, that is, a sort of *pathetic instinct*, or *disposition toward oodness*, I think even this may be allowed so far, that in human

nature there are some few instances of it in most persons, which appear chiefly in the workings of benevolence, and compassion in us towards sensible creatures, with some inward aversions to cruelty, and perhaps also some sort of natural reverence toward the almighty power, whom we call God, when we come to know him. These things are some ruinous remains of that goodness, virtue, or piety which was natural to innocent man, and are partly wrought, perhaps into his animal nature, as well as in his soul: These instincts are certain relics of a spur to duty, and a bridle to restrain from vice, and many times become an auxiliary or ready help to the practice of virtue: But it is still reason exercising itself, and judging of the fitness and unfitness of things, by and according to these native and essential principles of reasoning which I have spoken of, that is the only rule or test of *what is vice*, and *what is virtue*, so far as the light of nature can certainly discover it; for if it should be left to mere instinct to be a general test or rule to judge of vice and virtue, without the superintendency of reason, or the final determination of the fitness and unfitness of things thereby, the concerns of morality and religion would be left at a very great uncertainty.—This has been well argued and determined by an excellent writer on the *foundations of moral goodness*, in a small pamphlet 1728.

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And I beg leave to add by way of reply, And so we do always feel these principles which I have spoken of influencing our judgment whensoever we judge; therefore, according to his own argument, they are in some sort *innate* or wrought in us by nature, though, (as I have often said) not in the form of propositions. These are the springs of our judgment on natural and moral subjects: And if any should ask why I judge so or so, even in self-evident speculative principles, or why I decide a case thus or thus in moral enquiries, which are equally evident; I answer, because it is the make of my mind, it is its very constitution, and it cannot judge otherwise: And in particular propositions, whether speculative or practical, the mind is influenced by

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ngely blinded, and the judgment strangely perverted by
of man; we are led to false judgments of things by the
lions of our minds, by the unhappy influence that present
e things have over our whole nature, and the empire
ppetite and evil passions have gotten over our superior
s. Blessed be God for scripture and the gospel, wherein
a plain revelation made of our duty to God and man;
the method of divine grace and salvation is set before us,
ereby even in this world, we are sensibly relieved from
kness and error, the mistakes and miseries, which are the
of our fall, and shall be raised to perfect deliverance, to
ruth, and happiness in the other world, if we sincerely
with the proposals of grace and peace.

nature there are some few instances of it in most persons, which appear chiefly in the workings of benevolence, and compassion in us towards sensible creatures, with some inward aversions to cruelty, and perhaps also some sort of natural reverence toward the almighty power, whom we call God, when we come to know him. These things are some ruinous remains of that goodness, virtue, or piety which was natural to innocent man, and are partly wrought, perhaps into his animal nature, as well as in his soul: These instincts are certain relics of a spur to duty, and a bridle to restrain from vice, and many times become an auxiliary or ready help to the practice of virtue: But it is still reason exercising itself, and judging of the fitness and unfitness of things, by and according to these native and essential principles of reasoning which I have spoken of, that is the only rule or test of *what is vice*, and *what is virtue*, so far as the light of nature can certainly discover it; for if it should be left to mere instinct to be a general test or rule to judge of vice and virtue, without the superintendency of reason, or the final determination of the fitness and unfitness of things thereby, the concerns of morality and religion would be left at a very great uncertainty.— This has been well argued and determined by an excellent writer on the *foundations of moral goodness*, in a small pamphlet 1728.

Now I don't think any of Mr. Locke's arguments against *innate ideas* or *propositions*, have force enough in them to disprove the account I have here given of the mind's judging of natural and moral truths, by such sort of native principles. Nor do I imagine Mr. Locke himself would oppose this account. For he owns that there are such things as *innate principles*, see chap. 3, § 3. He calls the *desire of happiness, and the aversion to misery*, that is in all men, *innate practical principles*, and seems to prove them such, because they continue constantly to operate and influence all our actions; and adds, "That if we had any innate truths in the mind, we should always feel them influencing our knowledge.

And I beg leave to add by way of reply, And so we do always feel these principles which I have spoken of influencing our judgment whensoever we judge; therefore, according to his own argument, they are in some sort *innate* or wrought in us by nature, though, (as I have often said) not in the form of propositions. These are the springs of our judgment on natural and moral subjects: And if any should ask why I judge so or so, even in self-evident speculative principles, or why I decide a case thus or thus in moral enquiries, which are equally evident; I answer, because it is the make of my mind, it is its very constitution, and it cannot judge otherwise: And in particular propositions, whether speculative or practical, the mind is influenced to

r dissent by these innate principles, though without ex-
flection on them. Now these principles influence the mind
ıme manner, though not as strongly in all things, as the
happiness, or *aversion to misery*, which are allowed to
te practical principles. After all, it must be confessed
mentation, to the shame and reproach of human nature,
ugh these moral principles of judgment in the mind of
they were well improved, would lead us in the most
ı cases to discern and judge what is our duty, and what
yet the prejudices of evil education, customs of iniquity,
interest, our sensual appetites, and many other evil influ-
ıve so perverted and abused this principle of reason in the
man, that now-a-days the mind often goes astray from
h; and instead of directing us to virtue, hath sometimes
l into gross abominations. The eye of the understanding
gely blinded, and the judgment strangely perverted by
of man; we are led to false judgments of things by the
ons of our minds, by the unhappy influence that present
things have over our whole nature, and the empire
ppetite and evil passions have gotten over our superior
. Blessed be God for scripture and the gospel, wherein
a plain revelation made of our duty to God and man;
the method of divine grace and salvation is set before us,
reby even in this world, we are sensibly relieved from
ness and error, the mistakes and miseries, which are the
f our fall, and shall be raised to perfect deliverance, to
uth, and happiness in the other world, if we sincerely
with the proposals of grace and peace.

ESSAY V.

An Enquiry whether the Soul thinks always.

SECT. I.—*Considerations toward the Proof of it.*

WHEN this great author, Mr. Locke, had proved that we are not born with actual ideas and propositions in our mind, he comes, Book II. Chap. I. to enquire whence we obtain our ideas: And he wisely and evidently derives them originally from these two fruitful and general springs, (viz.) *sensation* and *reflection*. External objects furnish the mind with the ideas of sensible things by sensation; and the mind or soul itself, by *reflection on itself*, furnishes the understanding with ideas of its own powers and operations: But still let the power which the soul has of *abstracting* one idea from another be allowed to be the fountain of our abstract and general ideas, i. e. the immediate cause of them.

Then he proceeds to enquire *whether the soul thinks always*, and he will by no means allow the soul to be always thinking. I have no mind to enter into a full debate of this matter, yet in a few words I would take leave to mention a reason or two, why I am rather inclined to believe the soul always thinks.

But *first*, I suppose it to be granted by the persons whom I dispute with, that *body cannot think*, or that *the soul is not matter*: For as the very nature of matter or body is *solid extension*, so I can have no possible conception what extension or solidity can do towards thinking, judging, reasoning, wishing, willing, &c. The ideas are so entirely different, that they seem to be things as utterly distinct as any two things we can name or mention; not heaven and earth are so different from each other, as thought and matter. I can no more conceive what affinity there is between *solid extension* and *thinking*, than I can conceive any affinity between *green* and the *sound of a violin*, or *red* and the *taste of a cucumber*. The ideas of a *bitter colour*, a *blue smell*, or a *purple sound*, are as clear ideas in my conception, and as intelligible things, as *thinking body*, *conscious matter*, *judging extension*, or *reasoning quantity*: But this point, viz. that matter cannot think, has been proved so largely by many learned writers, particularly by Dr. Clarke, Dr. Bentley, Mr. Grove, and Mr. Ditton, that I say no more on this head.

Now to propose my argument for the soul's perpetual think-

Since the soul is not matter or solid extension, if the soul
es to think, what is it of the soul that then remains existing?
ıfess I have no idea of any thing that remains. It is not solid
nsion, for that is body or matter, and that is already exclu-
by concession. It is not empty or unsolid extension, for that
ıre space, which in my esteem is mere nothing, or at best an
act idea of the mind. If you suppose a soul to be the least
ee more dense or more solid than empty *space*, that is the
idea which I have of *body* or *matter*, let it be never so
ious or subtle; so that as far as my ideas reach, a soul ceases
, if it ceases to think.

Or if you should reply, that there is a *power of thinking*
ining; I ask is this power of thinking the substance of the
or not? If it be not the substance of the soul, then there
other substance, in which this power of thinking inheres.—
what is that besides *mere space*? Or if this power of thiuk-
ıe the very substance of the soul, that is the opinion I am
orting; only I suppose, that it never ceases from actual ex-
e: for if such a power of thinking be the substance of the
and yet it fall asleep, or be unconscious, I have no idea of
remains; nor can I guess how it can awake itself again into
l thought.

I grant the soul is a *power of thinking*, but I cannot allow
it is a *power of not thinking*, or that it has any such power
ıging to it. Let any man use his utmost art and labour, to
thinking, he cannot do it. He may indeed put the animal
into such a temper, i. e. *sleep*, as to be unfit to assist the
in such acts of memory as are suited to its incarnate state,
hen the soul cannot remember its thoughts or ideas; but
s not ceasing to think. Besides, if a soul be extended, be
ver so thin and subtle an extension, it has limits, or it has
if it has no limits, every soul is infinitely extended, or really
te; if the soul has limits, then it has a figure or shape; for
is nothing else but the mere limits of extension; and if it
shape, is not this shape minuable, or may it not be maim-
losing a part?

I would fain know wherein does this bulk or substance of the
hus limited or figured, differ from so much mere space, if
se to think, and be not more solid or dense than space is?
ıgain, what influence can this extended empty figure or shape
upon our thinking, any more than solid matter has? If
extension or matter cannot think, as several modern philo-
rs have undertaken to prove, how can unsolid extension be
le of thinking? If any extension could think, I do not see
olidity could hinder its thinking. Perhaps the strongest
nents against the power of matter to think, arise from the
sion of matter, viz. that it hath parts exterior to one ano-

ther; now this belongs to all extension, whether solid or unsolid; and therefore I cannot but wonder a little at those gentlemen who pretend to prove strongly that matter cannot think, and yet allow a soul to be extended, i. e. allow unsolid extension to have a thinking power. Such sort of thoughts as these, with some others, have inclined me rather to suppose the nature and essence of the soul to consist in thinking.

I own this sort of doctrine concerning the soul is not only out of the way of vulgar opinion, but it is now also in a great measure banished from the schools and sentiments of learned men, since the *Cartesian* philosophy lost its ground in the world. Now though I never was, nor could persuade myself to be a disciple of *Des Cartes* in his doctrine of the nature of matter, or *vacuum*, or of *plenum*, *&c.* and I have many years ago given up his opinions as to the chief phænomena of the corporeal world, yet I have never seen sufficient ground to abandon all his scheme of sentiments of the *nature of mind* or *spirit*, because I could not find a better in the room of it, that should be more free from objections and difficulties.

The large and powerful influence that the name and authority of Mr. Locke has in the world, has carried away multitudes into the supposition that *extension* or *expansion*, as well as *duration*, are the properties of all beings whatsoever; and that therefore spirits as well as bodies are *expanded* or *extended*, which are but two words for the same idea; though it must be owned Mr. Locke himself is so cautious, that I think he doth not any where positively assert it, not even in book II. chap. 15. sect. 11. where he thinks it is "near as hard to conceive any real being without expansion as without duration."

SECT. II.—*Of Dreams, why not remembered.*

BUT my design in this place being chiefly to take notice of the sentiments of this great philosopher, I shall proceed to answer the chief objections which he raises against those who suppose that *the soul always thinks*. His grand argument is that "the soul sleeps as well as the body, and has no thought when it has no dream:" Now there are some persons (says he) who never dream, and others that sleep sometimes for several hours without dreaming; therefore it is plain to him, that all this while the soul has been or existed without thinking. Mr. Locke's chief objection against the soul's thinking in sleep, may be answered by an explication of what we mean by *dreams*, of which dreams the body by the animal spirits (whatever they be) is the occasion, and of which the soul is conscious.

Note, by *animal spirits* I mean those subtle corpuscles, whatsoever they are, whereby such traces or impressions are formed or revived on the brain which correspond to our sensations *or ideas*, and which are usually the occasion of them.

First then, there are some impressions made upon the brain by the animal spirits, which are so soft and gentle, that there are no traces, no footstep of any such motions left upon the brain; yet the soul might be just slightly conscious of them at that moment, and form correspondent ideas, though both the traces and the ideas vanish almost as fast as they are formed.—These might be called *dreams*; but they being all forgotten, as though they had not been, this is not usually called dreaming.

Secondly, There are some impressions which do, more strongly than the former, affect the brain, and occasion idea in the soul, and yet do not with an over-vigorous tide of impressions delude and confound one another; this is usually called *dreaming sleep*, and these dreams we remember and can relate; because the soul was strongly and distinctly conscious of them through their strong distinct traces on the brain which were then made, and in a great measure remain.

Thirdly, There are some impressions which by a too impetuous flux, and too violent a throng of animal spirits crowding through the pores and passages of the brain altogether, mingle, confound, and destroy the perpetual traces which are made; hereby the thoughts or ideas are all confounded and mutually destroy one another, so that we are rendered incapable of recollecting them.

The *first* of these is like a soft touch of a seal upon melted wax which scarce makes any image, or at least such as is lost again as soon as made, by the mere softness of the wax itself not retaining the impression. The *second* of these is like deep and distinct impressions of the seal upon wax, yet not so immoderate either in violence or number as to confound and destroy one another; therefore they remain and we remember them. The *third* is like a multitude of violent impressions on the wax, which perpetually mingle and confound one another, and leave no perfect image of any thing.

Thus the faint impressions of the first kind have much the same effect as the excessive numbers and violence of the third kind, i. e. they leave no distinct traces or memorials.

The *first* is our common and most refreshing sleep, which is usually called *sleep without dreaming*; and very much resembles what is often called *brown study*, while we are awake; that is, when after several minutes of musing thoughtfulness, if we are spoken to or roused out of it on a sudden, we can scarce recollect one thought past, or at least only the very last thought we had; because the traces on the brain, that excited those slightly and passing thoughts, were very faint and superficial.—*They produce but* feeble and indistinct images, like the sight of

a landscape in the twilight, which soon vanishes because the impressions were so feeble.

The *second* more resembles our common wakeful thoughts and actions of life, of which we can recollect many, at least a little after we have finished them; and these are the dreams which we more distinctly remember in the morning. The images are such as when we see a prospect in common day-light, and which abide on the memory.

The *third* is like the deliriums of a fever, or the strong and wild imaginations of a frenzy, when either some violent impressions in an endless variety of figures and traces crowd upon the brain, and are imposed upon the mind, and so far confound one another, that before such distempered persons can give an answer to any question asked them, they have twenty other images which confound the ideas of that question; and therefore the answer is absurd and nothing to the purpose; now in this kind of dreams all the scenes quickly vanish by mutual destruction of each other. These are like millions of objects seen at once in a dazzling sun-shine, all indistinct and very confused.

In the *first*, when we awake we think we have not dreamed at all; just as when a man falls into a swoon, the faint and irregular motions of the animal spirits, together with the languid state of the brain at that time, permit not any one trace to be strong enough to produce any distinct idea in the mind; and when we awake out of a swoon, we conclude we had no thought or perception all the while. Just thus it is when we fall asleep at night, when we awake out of it, forgetful of what has past, and when we conclude we have not thought at all.

In the *second*, when we awake we remember both what we did dream, and what the dream was, either more or less. And these dreams look most like the thoughts and actions of common life, for in these our reason has some little power, though not its complete government.

In the *third* we remember, perhaps, that we did dream, but we can seldom recollect what we dreamt of. Often have I awoke from a dream, wherein a multitude of scenes has been imprest on the mind for an hour or two together, yet with utmost labour I could not recollect enough to fill up one minute, but only short broken hints of the dreaming scene, which very hints have also in a little time vanished; for the images and ideas being joined without any conduct of reason, but by mechanical and more vehement motions of the brain and spirits, over-ruled the reasoning powers, and cannot be remembered by the intelligent mind; and the images themselves or traces of the brain are shattered, confounded and lost by the sudden hurry and vast diversity of motions of the spirits, when upon waking they fly to the limbs and organs of sense, to perform the wakeful functions of nature.

Sect. III.—*Mr. Locke's Objections answered.*

FROM what is said in the foregoing pages, the objections
r. Locke are easily answered; I shall set the chief of them
ler here from book II. chap. I.

. Mr. Locke supposes, sect. 11, 12, that if the soul thinks
the body is sleeping, then it has its own concerns, pleasures,
apart from the body, and Socrates asleep and awake, are
istinct persons.

To this I answer, 1. That it is still the same person, for
he soul and body of Socrates are employed in these ideas,
hat whether sleeping or waking. The ideas of his dreams
f his waking thoughts, though they both exist in the mind,
th of them may be occasioned by the motions of his blood
pirits, and they are the acts or effects of the soul and body,
, i. e. of both the constituent parts of Socrates.

Or, 2. If it were not so, and if the soul alone were employ-
sleep, yet Mr. Locke's objection might be answered, by
ng that the actions of life, which belong only to the body
ir proper principle, or only to the soul, are generally attri-
to the whole man; it is the soul of Socrates that philoso-
, and his body wore a gown, and yet we say it is the same
, it is Socrates *did them both:* So that there is no manner
son to suppose Socrates asleep to be a distinct person from
tes when he is awake, though the soul alone were engaged
aking while he was asleep, without any operations of the

I. Mr. Locke, §, 13, 14, 18, 19, supposes no-body can be
ced that they have been thinking for four hours together,
t know it, &c.

But, it plainly appears by the foregoing pages, that we
know or be conscious of sleeping thoughts at that moment,
they arise, and not retain them the next moment; so that
rgetfulness of our dreams never so soon, is no proof that
d not dream, or had no consciousness of thinking in

II. § 16. Mr. Locke would insinuate, that if the soul
while the body is asleep, and inactive, those thoughts should
re purely the soul's own operations, and consequently
rational.

But it appears from what has been said, that the sleeping
hts of a man being the effects of the various and ungo-
d rovings of the animal spirits in the brain, imposing
s on the soul, are not *more* regular or rational than those
aking man, but far *less;* and therefore they are less worth
emembrance; and it is no inconvenience to us, nor dis-

honour to our nature, that we are so made, as to forget such roving and irregular exercises so easily and so soon.

IV. Another objection of Mr. Locke's is this; § 15. that it is not agreeable to the wisdom of our Creator to make so admirable a faculty as the power of thinking to be so idly and uselessly employed all our sleeping hours, i. e. at least one quarter of our time, as not to be able to recollect, to treasure up or use any of those thoughts for our own or others' advantage.

To this it is answered (1st.) That there are but few, even of our *waking* thoughts, which most men can recollect for particular uses of life, in comparison of those multitudes and millions which vanish and are for ever lost as soon as they are formed; yet this is not esteemed to reflect upon the wisdom of our Creator, who (at least in this present state) has thus constituted us. Let a man who has been awake seventeen hours, or a whole day, try in the eighteenth to recollect what he can of what has past in his mind; and he shall hardly be able to fill up one hour with such recollected thoughts from which he can draw any proper inferences, experiences, or observations, for the use of life; and it may be as well inferred that we have not thought ten hours of that seventeen, as that we did not think the foregoing night in our sleep, merely upon this supposition that God would not make us such creatures as to think so many hours to so little purpose.

(2.) Why may not a thinking being be suffered to think some hours every night to little purpose, as well as to exist without thinking, i. e. to no purpose at all. Useless ideas are at least as good as no ideas; and a soul thinking idly, is as good as a soul sleeping.

(3.) What if we should say, that as the irregular and exorbitant power of sense and imagination, and its ungovernableness by reason when we are awake in many instances, is owing to our fallen state, so our unrecollected and useless dreams may possibly be ascribed in some measure to the same cause? Perhaps innocent man could manage his sleeping ideas better by reason, and make them some way serviceable to his wakeful actions. Or we may borrow from Mr. Lee a fourth answer, viz.

(4.) There seems to be a constant sense of pleasure in sound sleep, which appears by a reluctancy to be disturbed in that pleasure, and strong tendencies to re-enjoy it when we are suddenly awakened; this is at least as demonstrable as that we have no consciousness at all.

And if it be so, then (1.) here is something we are conscious of when sleeping; and (2.) it is not unworthy the wise Contriver of nature to bestow an innocent pleasure on the act of sleeping which himself has made necessary to preserve life, and improve the comforts of it.

V. Another objection of Mr. Locke against the *constancy f thinking in the soul of man*, is his supposition that the reatest part of the time of infants, both before and after their irth, is spent without thinking, and yet it is not supposed they are rithout a soul. See § 21.

I answer, as for the time before the birth it is a great doubt rith me whether the rational mind be united so soon as most peole imagine, since there is no need of it to give or preserve the ere animal life. What if the rational soul be not united to the ody till the birth, I see no great inconvenience in it. But, be ; when it will, it is most reasonable to believe that infants have ultitudes of their most early ideas, if not all, from sensation: efore, at, and after the soul's formation and union to the body, ; is natural to suppose that there are numberless impressions ade on the soft and fluid brain; and why should not these onvey sensations of ease or uneasiness, pleasure or pain, to the oul, as soon as it is united, perhaps according to the supply or efect of proper or improper nourishment? &c.

And that it is also affected with various sensations from the rain of the mother, (if the soul be united before the birth) as ell as from the various motions of its own and its mother's body, annot be reasonably doubted, though the manner of the communication is beyond our skill to trace. If there be any impresions made on the nerves, and conveyed to the brain of the in-ant, which are fit to excite sensations, and the soul be then nited, I cannot see why those sensations should not arise in the oul of the infant. If they be strong enough to mark the infant's body in a very sensible manner, as is generally agreed, surely they are strong enough to excite ideas.

After its birth, it is still imposed upon by the animal spirits in the brain, with new sensations and imaginations; but the only reason why we see so little evidence of thinking in infants, is not only for want of speech or signs to manifest thought, but because their experience is so small, their judgment so weak, and the memory so short and imperfect, by reason of the exceeding softness of the brain, which can hardly retain any traces: Nor can the soul in any rational manner connect many of its ideas; which, for the most part, mutually confound one another, and suffer it to have but very few clear and distinct perceptions. Now these ideas being all confused, are quickly lost, and vanish. As the brain grows harder, and more capable of retaining traces, so the memory is confirmed; whence experience arises, judgment is strengthened and taught to act, and the efforts of a thinking and a reasoning nature appear.

From this I infer, and agree herein with Mr. Locke, (though not upon the same grounds and reasons) that the soul of infants hath very few, or scarce any ideas refined or intellectual, or

which come by *reflection*; not for that it does not think, but because its thoughts are still employed and imposed upon by the brain in *sensations*, as the brain is employed continually by crowding impressions from the objects of sense and feeling from within or without.

Thus I have endeavoured to answer the chief objections of this great writer, against the constant consciousness of the soul. And indeed so far as my ideas reach, or my reasoning powers will help me, *constant* or *perpetual cogitation* seems to belong to the very nature, essence and substance of a spirit, and that when it ceases to think it ceases to be. And herein it bears a very near resemblance to God, and is the fairest image of its maker, whose very being admits of no sleep nor quiescence, but is all conscious activity.

Corollaries.—1. Hence it will follow, that the soul is in its own nature immortal; for nothing but the power which hath given it this active life and being can destroy it. It is entirely out of the reach of all the material world to hurt it: It cannot lay aside its own thinking; it cannot put itself out of being: Nor can we conceive how any other spirit can make it cease to act, i. e. cease to be. Such an active being as a spirit cannot be destroyed but by annihilation; and surely God, whose right and prerogative is to create, or give being to a creature, hath not put it into the power of any creature to annihilate his works, or take away their being.

2. Hence it will follow also, that when the human body dies, the soul exists and continues to think and act in a separate state; and when it is freed from all the avocation of sensation and sensible things, it will live more entirely in the reflection on its own operations, and will commence a state of happiness or misery, according to its own former conduct; either rejoicing in the testimony of a good conscience, or under inward anguish and bitter self-reproaches from the consciousness of its own guilt.

ESSAY VI.

Power of Spirits to move Bodies, of their being in a Place and removing from it.

WHEN the ingenious director of modern philosophy on this subject, in his *Essay on Human Understanding*, I. chap. 23. § 18, 19, 20. he uses the word *motivity* to a power to move bodies, and by *mobility* he means the of a being to change its own place; and makes both these properties belonging to spirits: But let us consider a little, quire whether either of them are the proper native powers irit or a thinking being.

SECT. I.—*Of the Power of a Spirit to move Matter.*

HAT spirits do continually put bodies into motion, is t from the constant experience of our own souls moving nbs, and the various parts of the body, which are subject- voluntary motion: And that angels have many a time ex- otion in several parts of the corporeal word, is manifest e who believe the scripture. It is also clear, beyond all , that God, the infinite and almighty Spirit, hath created terial universe, and has put the several parts of it into as he pleases. But the question is, Whether any created ath any native or innate power in itself to move any part ter? Whether this power be essential, and belong to its Whether its thought or will can effect any change ever in material beings? Or, whether the world of *bodies* world of *minds* are not so entirely different and sepa- their whole nature, substance and special properties, that nnot possibly have any communication with each other, by a particular appointment and commission from God mmon Creator and Sovereign?

the *third* essay, which treats of the *Original of our tions and Ideas*, we have found, that neither the motions re raised within a human body, nor the impressions which de on the organs of sense, or on the brain, by outward objects, are of themselves and in their own nature suffi- raise any ideas or sensations in a spirit: But that all the rain of sensations and corporeal ideas, which belong to nature, are originally owing to divine appointment, one particular spirit to one particular animal body ac- to certain laws of his own prescription. And perhaps a re *considerations* may incline us to believe, that all the powers of a spirit are not sufficient in themselves to move

any part of matter whatsoever, without the same divine appointment.

Consideration I. If spirit be entirely void of all solidity, that is, if a spirit be not matter, it is hard to conceive how it should originally, or in its own nature, have a power of itself to move matter. *It cannot do it by impulse; for there can be no contact, whether immediate or mediate. Nor hath it originally or naturally in itself a power to move bodies by volition;* for there is no natural connection betwixt my willing a stone to move, and its motion: I may will it ten thousand times, and it lies quiescent still: Nay, though it be but a feather or a grain of dust, I cannot conceive how my own volition, or even the strongest volition of an angel, should excite motion in it, unless he has a particular commission from the Almighty Spirit: And if it be so, thence it will follow, that the motion of the stone or feather, which is owing to such a divine commission, depends not so strictly and properly on any native essential power or influence of the angel's own volition, but rather on the divine volition as the prime or efficacious cause.

And this perhaps is the true reason why our animal spirits, nerves, muscles and limbs, are moved at the command of our thoughts or will, viz. because God the Creator has efficaciously decreed or willed from the beginning, and appointed it now as a law of nature, that such a particular machine of matter or flesh, or any of the limbs of it, should move when such a particular spirit willed it: And if we add here, that God has also appointed that this spirit should have such special ideas or consciousnesses according to such peculiar motions or impressions on this animal body, we have the chief part, if not the whole union between soul and body described, as I have shewn in a foregoing Essay.

II. That a spirit cannot of itself originally move any part of matter, will appear more probable, if we enquire of our opponents, *what quantity of matter, or what particular parts of matter, any spirit can be supposed to move.* Surely a created spirit of itself, and by its own essential or native powers, cannot move all matter or the whole material world; that would put the universe of bodies into the power of every single spirit, which is very absurd, and contrary to all experience and reason. If its power of motion be confined to a limited quantity of matter, what is it that limits this quantity? It cannot be the dimensions or shape of the soul; for a soul is not supposed to have any shape, dimensions or magnitude: Or if it had, I have shewn already, and shall shew further, that this cannot give any power to move matter, because these dimensions have no solidity, and cannot touch or impel a body. What is it then but the will of God, that determines what quantity of matter every spirit shall have power to move? And this is the very point which we are *proving.*

Well, but let us imagine, that a common human soul had a ative power to move some quantity, suppose six feet of matter definitely; yet till it be united particularly by the will of God a certain individual body, this individual quantity of matter hich is moveable by it is not particularly determined: Then very spirit has the liberty of a wide range indeed, and may move differently six feet of matter, any where through the world, or hat six feet of matter it pleases; it may rove from place to lace through the earth, and by moving so much matter successively may cause strange alterations in the material system, and istribute blessings or mischiefs through the universe.

Again, Is it reasonable for us to suppose, that any spirit, as dam's for instance, should be essentially, naturally, and of elf able to move any six feet of matter in the universe, where pleases; and yet that it should from the very moment of its extence be confined and restrained to move only the body of dam? And that as soon as it is created, and come into being, should be cut off from its own proper essential power and berty of moving any thing indefinitely of six square feet, and be mited only to move that very six feet of flesh and blood? Can e suppose the spirit of man, even innocent man, in the glory of is creation-state, should be formed in such bondage, and brought to being under such a narrow restraint of its own natural owers? Was man, who was made after the image of God, reated in a state of such imprisonment, with his native faculties far cramped and confined?

Or if we should so far consent, that the *Platonic* philosophy true, as to suppose that a spirit, which was naturally able to ove any parts of matter before, is thurst down into this body of x feet, and confined to it as a prison, wherein it can move only s own house as a snail does; then a dismission from the body ould surely restore it to its native power of moving six feet of atter any where: And why then might it not by its own will and ower assume another body, or why may it not re-assume its own dy again, and set the muscles, blood and juices into all their oper vital motions? Or if it could not do that for want of skill the construction of animal nature, yet why may it not put the ad body in the gross into motion, and become a ghost with a oving carcase, and fright the world? And yet it might secure elf from the assaults of men, by raising the body into the air hen it pleases, upon the first view of danger. Besides, would t this opinion give to a wicked spirit such a release at the death the body, by restoring it to its native power of moving six feet matter, as to enable it to do an unk own quantity of mischief the world? How many spirits go o ut of the body full of rage d revenge, and what murders would they commit?

A good spirit indeed, when released from the body, would

have the same liberty and range to do extensive good offices to men: But what a theatre of contest and combat would this habitable world be between the pious and the wicked spirits, according to their different and contrary inclinations and designs of good and evil, if spirits of themselves could move indefinitely six feet, or even but six inches of solid matter? *Again*, If a good spirit departed from the body had power to move any small portions of matter indefinitely, would not its re-union to one particular body at the resurrection be a sore and unhappy retrenchment of its native liberty, and a confinement to a prison again? And is this sort of philosophy suited to the blessed idea which the scriptures give us of the resurrection of good men? Is not the resurrection of the body designed for their greater advantage and happiness? And is it not more reasonable to believe, that it shall render them capable of more extensive service, by enabling them to have some communications with the material world again, from which they had been cut off by the death of the body?

Upon the whole therefore, is it not far more agreeable to the rules of reason and religion, to suppose that a spirit can of itself move no part of matter, nor hath any power over it, but by the particular appointment of God? And doth not this better account for the first union of each particular spirit to its own body, as a part of the providential government of the world by the will of God? Doth it not also better adjust the powers of departed spirits, by reducing them to their native impotence of moving matter? And give a better representation of the resurrection and the re-union of each spirit to its own body?

III. The argument will still grow upon us, and carry further force in it to prove that a spirit has not in itself a native power to move matter, when we consider *how exceeding limited is the power that a human spirit has over its own body to which it is united*; and thence it will appear, that this power, with its special limitations, was given it merely by special commission from God himself. This spirit, by all its volitions, can move nothing but those particular parts of the body which God has subjected to voluntary motion, and for which proper muscles are provided, together with the nervous powers which are necessary to move those muscular parts. It cannot make the pulse of the heart, which is a great muscle, beat quicker or slower; it cannot accelerate the motion of any of the juices, viz. blood or lymph, &c. in any of the containing vessels, it cannot alter the shape or situation of any atoms of which the flesh, blood and bones are composed, by an immediate act of the will upon them; nor can it move any member, except only in that way of muscular motion which God has appointed in the engine of the human body.

In this view of things there are ten thousand times more mo-

tions of which the several parts and particles of a human body are capable, than those few which the soul has any immediate power to produce. Now if the soul had an innate or native power to move matter, might it not chuse which part of its own body it would move, and in what manner it would move it? If it must be confined to one body, yet how comes it to be so wretchedly restrained from moving the smaller parts of nature, and from rectifying any of the disorders of the solids or fluids in that body by an act of its will? Why is it so poorly limited to a few grosser motions of the members? I confess, in the main these grosser motions serve the common purposes of animal life in this world; but this cannot preserve the body in a state of health, or secure its ease and activity: What! could a spirit move any matter indefinitely before union, and can it not move any parts of that matter to which it is particularly united? Can it by its native power move the whole bulk of the animal body, or the larger parts of it, and yet not put the minute parts of it in motion? Doth not this confinement and limitation of its power sufficiently shew whence all this power comes, and that it is not essential to its nature, but all owing to the special ordination and will of God, in uniting such a body to such a spirit, according to certain rules of his own prescribing?

If we suppose a spirit to have no power of itself to move an atom of matter, except by particular divine commission; then it is easy to conceive that God in great wisdom and goodness, when he united the human mind to the body, has given it a commission to move such parts as are fitted in the main to serve the uses of animal life, and no more. In this case it is a bounty and benefit, to have the government over some part of the material creation; but in the other case it is a restraint, and cutting short of natural power: And if that were true, then we might infer with justice that gross absurdity, viz. that if a soul in its own nature hath power to move matter indefinitely, but by union it is restrained, then a spirit not united to a body would have power to move all the parts of that same body more universally than the spirit which is united to it; and that consequently Milo's spirit, when his body is dead, and itself disunited from it, can move and change those very parts and atoms of it which it could not move or change when the body was living; and if it had skill enough to know which parts to move, it might restore the body of Milo to motion and life again, as was intimated before.

IV. Another argument to prove that spirits have no essential or native power to move matter, is this, *that the evil angels, who are full of malice, wrath and envy, would employ their powers in wild destruction among men.* Devils are supposed to have residence among mankind to tempt them to sin: But they would

not content themselves with the mere temptation of souls, but would be always making wretched mischief in this material world, and over-spreading it with calamities and desolations, with plagues and fire, with earthquakes, and misery, and death, if they had an innate and natural power to move bodies. One foot or two of solid matter divided by an evil angel into millions of particles, and shaped and moved as he pleased, perhaps would form pestilences enough to give disease and death to millions of men, would taint and corrupt the air through many regions, and kill a great part of the animal world. How small and subtle are the particles of matter which the sting of a wasp infuses into the body, the biting of the spider called *tarantula*, or the sharp tooth of a viper? And yet what dismal effects have been sometimes produced in the body of man thereby? And surely evil angels, by their long acquaintance with our world, know these secrets in nature: And what horrible tortures, what lingering or sudden deaths might they inject into the human race, by forming such poisonous atoms and dispersing them among mankind?

But on the contrary, we find that a legion of devils could not enter into a herd of swine, nor drown them, till the Son of God gave commission; Mat. viii. 31, 32. And I think it is a much more probable way of accounting for all the mischief that is done by evil angels in the material world, to suppose that they have no natural or innate power of themselves to move matter, but as they have such and such a proportion of air or water, or other bodies, put under their power by the will of God; or as such particular men or other animals are given up to their influence by a limited commission upon just reasons and for special purposes in providence. *Satan* the *prince of the power of the air*, could not raise a tempest to blow down the house where Job's children were feasting, till God gave him power and leave to do it; and you see with what limitation God lets him afflict the body of Job; *Touch not his life;* Job ii. 6. nor could the rage of that malicious spirit exceed these bounds: and doubtless his dominion in the air and the region of *meteors* is limited also, though he be called the *prince* of it.

In the same manner we may argue, how many of the present calamities and mischiefs in this lower world would the benevolence and compassion of good angels prevent, if they had power to move matter when and how they pleased? But we find in scripture when they do any special services in this lower world, it is God that gives them a particular commission.

Objection. Perhaps it will be said here, that God is a spirit, and he has power, even a natural and unlimited power, to move the whole universe of matter, or any particular parts of it, as he pleases; why then may not other spirits, which are formed after

his natural image, and are said to be his offspring, have a native power to move matter also, in certain proportions, according to their order or rank in the spiritual world?

To this I *answer*, that the great God has a natural, essential, and self-sufficient power to create matter, and make it exist with all its modes of figure and motion; no wonder then that he should have a natural power to move it; but no such powers or properties of creating matter seem to belong to any created spirits, though in many other instances they are made like himself: Though God has an unlimited influence over the worlds of matter and mind, yet created spirits may have no power in a world so foreign to their natures as this material world is. The two worlds of matter and mind are not within each other's reach or influence till God their common maker appoint it.

Besides, why may we not suppose it to be a peculiar prerogative of the great God to move all or any matter, that so the material world may be more entirely under the government of his will, and not be subjected to the capricious and malignant inclinations and volitions of any of his intelligent creatures, and that he may maintain his sovereignty in a more immediate manner over all the worlds which he has made? Is it not more proper to suppose that God has the power of commissioning such a particular spirit to move such an animal body, and to appoint what particular matter any spirit shall move, and what parts of matter shall have power to impress sensations on any particular spirit?

If spirits could move matter without his commission, why might not spirits receive impressions also from matter without his special appointment? And if these mutual influences might be without his order, what infinite and perpetual tempest and tumult would be raised through the universe by the everlasting and promiscuous mutual agencies of bodies and spirits upon one another, which the Creator and Governor of the world had never united by any appointment of his? One might form a scheme of immense confusion, and millions of jarring events, of Milton's war of angels in heaven renewed daily on the earth, of mountains torn up by the roots, with all their woods and forests, and whirled into the air, and of oceans raised high and whelmed over whole nations by the single or united force of the legions of hell? What extensive desolation and ruinous mischief would overspread the face of the whole creation, if the two different worlds of bodies and spirits had a natural and mutual agency or power of acting upon each other? Two comets, or two planets, with all their contents, and all their inhabitants, encountering with full force in the mid-heaven, would not raise such a tremendous storm, nor spread such a scene of multiplied confusions, terrors and devastations, as these two worlds of mind and matter, upon suppos-

tion of their natural and unlimited reciprocal agencies and influences.

SECT. II.—*Of Spirits being in a Place, and removing thence.*

LET us now proceed to the next general head, viz. the *mobility of spirits.* As this author Mr. Locke has described *motivity* to spirits or a power to move body, so he has ascribed *mobility* to them also, or a power to move themselves from place to place. Now if *mobility* be ascribed to spirits, or a power to change their place, then it necessarily follows that they are in a place, and have a proper relation to place. And if we will seek after and follow clear and distinct ideas, this *locality* will be much the same as bodies have; for Mr. Locke himself justly ridicules the distinction between *locus* or *place*, as applied to bodies, and *ubiety* or *whereness*, which is ascribed to spirits, as it is explained by some philosophers.

It is evident that if souls have an *ubi*, as it is called, or a place in which they are so as to be included within it, or to have a real and proper situation or residence in it, they are certainly circumscribed in that *ubi*, and are limited to a certain quantity of space, and must have certain measurable distances from the bodies round about; and this I think is *proper existence in a place:* So that *place* or *locality* and *whereness* or *ubiety*, as thus explained, are really the same things, if we strictly consider the ideas of them: And though I shall endeavour to give another sort of notion of the *ubiety* of spirit in this essay, yet in this notion of it, it is the same with *place.*

Now if souls or spirits are properly in a place, I will prove first that they must be extended, they must be long, broad and deep; and then they must be of some shape or figure, or be liable to all the inconvenience to which dimension and shape expose them.

First, If a spirit is in a place (suppose a parlour) it has a measurable distance from the north wall and from the south; if these two distances added together make not up the whole length of the parlour, then the soul is plainly extended, and its extent is equal to that defect or difference of measure. But if those two added distances do make up the whole length, then the soul is excluded, and it is not in a place: *Quod erat demonstrandum.*

Secondly, If the north and south walls of this parlour by some mighty force be moved uniformly towards one another, they will at last meet and be contiguous or touch each other, or else the soul will hinder their touching; if it does hinder their touch, then it is solid as well as extended, and you make a body of it; if it doth not hinder their touching, then it must be unsolid extension, and must penetrate the two contiguous

lls, and must have one part of it penetrating one wall (sup-
se an inch or two) and the other the other; and thus it is ex-
ded also; or else it must be acknowledged to be excluded
m all place, which is the thing that was to be proved.

But if a soul be extended, it has dimensions, it is certainly
ıped or figured; for since it is not infinite, this extension has
ıits on all sides; and, as has been elsewhere mentioned, the
ıit of all extension whatsoever is figure or shape.

But if a spirit has any shape or figure, I would ask whether
ɔould not lose part of this shape? I am sure our ideas will
ɔw it. Our clearest ideas must allow possible division to every
tended figured being: Whether it will continue after division
be a soul and to think or no, is another question; but what is
ually a long and broad and deep substance, and does not fill
place, doth certainly allow one part of this substance to fill one
ıce, and another another; and why may not the two parts of
s substance be divided, and thus fill two distant places as well as
ɔ adjacent places? It is in vain to talk of its being one *conti-*
uum and being indiscerptible, since it is plain we may conceive
any extended infinite substance as divided, and as existing in
ɔ places when divided. Surely division does not nullify either
rt of what was before an extended and substantial being. This
y be said indeed, but it is said not only without ideas, but con-
ry to them.

Again, If my spirit has any shape, it is surely commensu-
e and correspondent to my whole body, or to some part of it.
ıen I would enquire, whether the soul may not be maimed by
: sudden stroke of a sword or bullet which carries off that part
the body? or whether it contracts or shrinks up itself to avoid
e wound, and thus grows denser in that part than it was before?
ıt such a supposition would imply a degree of solidity, and
luce it into body. In short, if its extension be any thing dif-
ent from empty *space*, and if it has a shape, then according
our clearest ideas it must be divisible in its own nature,
en though it should be never so nimble and watchful to avoid
y corporeal weapons, or though it should be subtle enough to
netrate them; for if it be a finite figured being, it must be
ɪisible.

Again, I would query, whether or no the one whole power
cogitation be extended through the whole shape and bulk of
e soul, or whether a distinct lesser power belongs to every part
it? If cogitation belong to every part of it there are so many
gitative beings, or so many thinking powers in it, as there are
ırts of extension; if the whole is one cogitative power, then I
ɔuld enquire, is the power of thinking as long, and broad, and
ıep, as the whole soul is? Does the whole dimension of the
ul operate in every thought, or a part only? Is the whole

length of the soul engaged in the shortest and slightest thought: Or does one part of the soul perceive one part of a large object and another another? Then a small part of the soul would perceive a small object, and every part of the soul would be a distinct conscious being. *Again*, If part of the soul were separated, whether the same power of cogitation would remain entire in the other part, or would this power be any way impaired or maimed?* In short, it seems to me, that those who suppose a spirit or thinking substance to be extended, do first conceive of the power of thinking and then conceive of an extended being, and join these two in their minds till they think they have made them one, though the things themselves have no cognation.

Upon the whole, as it cannot be conceived how a power of thinking can have any *contact* with body, so neither can I conceive in proper speech, how a being whose nature consists in consciousness and activity, without extension or shape, can have any *nearness* or *juxta-position* to body; for if it be near a body, then it may be nearer and nearer till at last it touches, or till the surfaces of body and spirit unite. But I can have no idea of a soul's touching a body, any more than how a thought can touch or lie near to a piece of flesh or a bone; for the very idea of a thinking power, as well as of a thought, is utterly and entirely distinct from the idea of body, as any two ideas can be; and I think Mr. Locke seems to allow it, § 32, and in other places.

Sect. III.—*The first Objection against the Locality of Spirits answered.*

YOU will immediately exclaim then, and with some shew of reason too, What! cannot a spirit be in a place? Is not your soul in your own body? Surely it cannot be every where, for then it would be infinite? it must therefore be some where, and

* These sort of questions are by no means so ridiculous and of so little weight in this argument, as some persons would pronounce them. The learned Dr. Samuel Clarke is known to favour and suppose the extension or expansion of the soul, and yet he confesses the queries about the extension and the divisibility of a conscious being or spirit to have considerable difficulty in them. These are his words, as they are cited in a *Defence of his Demonstration of the Being of a God*, p. 43. "The only properties we certainly and indisputably know of spirits, namely, *consciousness, and its modes*, do prove that they must necessarily be *indiscerptible* beings. And as evidently as the known properties of matter prove it to be certainly a *discerptible* (or divisible) substance, whatever unknown properties it may be endued with; so evidently the known and confessed properties of *immaterial beings*, prove them to be *indiscerptible*, whatever unknown property they likewise may be endued with. How far such *indiscerptibility* can be reconciled and be consistent with some kind of *expansion*, that is, what unknown properties are joined together with these known ones of *consciousness and indiscerptibility*, is another question of considerable difficulty." It is plain by this confession that that great philosopher was much more sure the soul was conscious, indivisible and immortal, than he was or could be that the soul was extended.

at *some where* must be your body, because it acts upon your ody; for no being can act upon any thing at a distance, accordg to the old maxim, *Nihil agit in distans.*

Answ. It is time, I think, that this axiom or maxim should e now exploded by men of learning, since the philosophy of ir Isaac Newton has prevailed in the world. We find in his ystem, the sun and the planets, which are at prodigious disances, act upon each other by an attractive force, which is called he *law of gravitation*; which force is incessantly influencing ll parts of matter to act upon all other parts of matter in their roportions, be they never so distant. But what is this force of ttraction or gravitation, but a powerful appointment of the Creator? Now, if bodies can act upon each other, without conact or proximity of place, and that by the powerful and general olition or appointment of God, we may well allow spirits to act pon bodies, without any proximity to them, by the same divine ppointment or volition.

It is granted, that the soul, though it be supposed to have its hief residence in the brain, yet moves the limbs only *mediately* y nerves or strings which go from the brain to those limbs which re moved; but it moves the origin or extremities of those nerves, r some spirituous parts about them, which are in the brain *imediately* by its will; that is, when the soul wills to move a limb, ose nerves are first moved. Now I would enquire, does it ove these extremities of nerves ever the easier for being placed ear them? Not at all: for the soul of a ploughman knows em not, and yet moves them as regularly and as well as a phiosopher. None of our souls are conscious of these nerves, or e extremities of them, though your philosophy should place e soul never so close to them; nor does its power of motion xtend to any of the atoms or fibres which compose those nerves hich are so near the soul, so as to be able to replace them, if ecomposed; and yet as soon as the soul wills to move the disnt limbs, according to the laws of animal nature, which God as ordained, these distant limbs obey and move, the soul being norant whether there are any such nerves or no, though it be upposed to reside among them, or close to them. You see then, his supposed situation or residence of the soul, in any part of the ody whatsoever, attains no manner of advantage towards its utting those parts of the body into motion, nor towards its beter knowledge of that part where you suppose it to reside, as hall be proved immediately.

But at present I would endeavour to make this matter yet lainer concerning the soul's power, or rather impotence, to move odies; and to that end let me put this question, viz. whether a eparate soul or spirit must be *locally and actually spread hrough a whole mountain, and co-extended with it*, if God

gave it commission in an immediate manner to move a *mountain*, since a mountain is only a heap of earthy particles, and not an organized body, and therefore is not to be moved by strings or springs of nerves and muscles, as an animal body is? And whether the same spirit must shrink itself up to the size of a *grain of wheat*, if God gave it its next commission only to move so small a thing? Whether these contradictions or shrinkings of the spirit would be performed by mutual penetrations of its own parts? Or rather whether God's powerful appointment both of the *mountain* and the *grain* to be moved at the volition of the spirit, be not a sufficient philosophical account of this spirit's power to move the mountain or the grain by its volition without proximities or contacts, diffusions or contractions?

I would enquire yet further, whether God could not appoint my spirit, while it is united to my body, to exert a volition, which should in an immediate way move a grain of wheat placed at two yards distance from my body? Did he not give the prophets and apostles power by their volition to heal the sick by a word, and make happy changes in several sick bodies which they did not touch? And whether, if my soul had such a power immediately to move a distant grain of wheat, it must be extended through all the intermediate space between my body and that grain, that so it might be nearer to it, in order to act upon it? And if there be no necessity of this extension, or stretching so far as the grain of wheat, in order to move it, why must a soul or spirit be supposed to have any proximity to a body, in order to move it by a volition?

May we not conclude from all these considerations, that the power of a spirit to move a body, or to move several bodies distinct from each other, is not innate in the spirit itself, but rather seems to depend upon the supreme will of God, and his particular appointment or commission? And when this is done according to the common and uniform course of things which God has established in the world, it is called *nature*, or the *law of nature*; but when it is not according to this natural course of things, it is called *miracle*: But that all spirits moving matter have this power only by special divine appointments.

The great law of *attraction* or *gravitation* in the corporeal world, has a considerable resemblance to this doctrine of a *spirit moving bodies*. If one planet act upon another at a great distance by way of attraction, according to the universal and original laws of attraction, it is said to do it *naturally*; but if in any instance this attraction differ from the original law, it is called *miracle*; but both the one and the other are originally the effects of an almighty divine volition or appointment.

Note, All the queries which I have put, with regard to a spirit's *moving* one or more bodies nearer or more distant, may

be repeated in the same manner with regard to a spirit's *consciousness* or *sensation* of the motions of one or more bodies. I have intimated this already, but I will speak of it now a little more particularly. As I cannot conceive how *proximity* between spirit and body should enable it to excite any motion in that body, so neither can *proximity* give that mind any consciousness of that body's motions, and therefore I must impute this also to divine appointment, and to that only.

For let us consider a little. Suppose the soul to reside in the brain, or let it be diffused through the whole body, (it is the same thing in my argument) it is still supposed to penetrate the part where it resides, or to be co-extended with it; but this co-extension with the body, or with any part of it, does by no means give it a consciousness of the parts which it penetrates; for if it did, then every human spirit would know precisely where it dwells, whether it resided in the whole body, or in any particular part of it. If it were diffused through the whole body, every human soul would be an exquisite anatomist, and be conscious of all its bowels, muscles, nerves, veins, arteries, &c. and know what fibres were discomposed when any animal disorder or pain arose in the body; but this is contrary to all experience.

Again, If the soul resided locally in any particular part of the body, or of the brain, and received its consciousnesses from its co-extension with that part, the contests about the *common sensory*, whether it be the *pineal gland*, or the *extreme origin of each nerve*, or the whole *brain*, would quickly be decided by every human spirit, for it would be conscious of the place of its own residence. But this also is contrary to all experience; for the best philosophers are ignorant to this day, what is that precise part of the brain whence the soul immediately derives its notice of sensible things, i. e. where is the *common sensory*.

Yet further, it is evident, that this spirit which is supposed to reside in the brain, because we feel ourselves think as it were in the brain, is much more conscious of other motions in distant parts of the body, than it is of the particles in the brain, which it is supposed to penetrate; it is conscious not only of shapes, motions and magnitudes of outward bodies, by their impressions on the organs of sense, but it is also conscious of sensible qualities, colours, sounds, cold, heat, &c. though they come from far distant bodies: It is conscious of ease, appetite, pain, &c. in parts distant from the brain; it is in short conscious of every thing that God has thought fit to make it conscious of for the preservation and use of animal nature, and for all the purposes of this present life; and yet it is not conscious of the shape, or motion, or situation of the small fibres, or pulpous or nervous parts of the brain, where it is supposed to reside, and which it is supposed to penetrate; all which is a plain proof that it is not

any proximity to the body in place that gives it these sensations and this consciousness, but the sovereign will and appointment of the God of nature.

Perhaps you will ask me then, *how far can this power extend, which God gives a spirit to be conscious of matter, or to move it?* Can a soul be conscious of bodies a mile long? Can a single spirit remove a great mountain by volition? Can a created mind be conscious of every atom in a mountain? Where does its conscious or its motive power end? If these powers arise only from divine appointment, why may it not be conscious of every part of this globe of earth, if God appoint it? Nay, the enquiry (say you) might be enlarged; why may not the same spirit move the moon, or be conscious of the other distant planets, all at the same time, if God please?

To this I *answer*, That we are utterly ignorant of the limits of the power of spirits; but we know they are not infinite; though spirits have no natural consciousness or motivity of matter, but what God gives them by special commission, yet it is possible that some may be capable of receiving more numerous, more extensive, more complicated ideas than others, and consequently may have a larger commission. Some may have a capacity of taking in, and of attending to no more than one idea at once, and some may attend to ten or ten thousand. It is said that Julius Cæsar could write himself, and dictate to several clerks at the same time. It is possible, for ought I know, that a spirit may be united to the sun, and be conscious of every ray, and at once take cognizance of all the effects and influences of those myriads of rays on every planetary world. And it is not unlikely that the motive power may keep pace with such an extensive consciousness. Surely there may be a vast variety in the native capacities of intellectual beings, and yet none of them have communications with the material world, without the appointment of their maker. It is probable, that according to their native powers of receiving a multitude of simultaneous ideas, God may employ some in a vastly larger sphere than others.

And yet also it must be observed, that it is possible the great God may employ some spirits in a wider sphere of consciousness or motivity, without being themselves and in their own nature more capacious of ideas, or more powerful; much less must we suppose them to be longer or broader than their fellows, or to have any manner of shape or dimensions at all. The soul of a dwarf may be as potent in itself as the soul of a giant, but God has given one a commission to move a larger engine of flesh than the other. Neither the intellectual capacities, nor the dimensions of souls should be measured by the bulk or height of the animal.

SECT. IV.—*Other Objections answered against the Locality of Spirits.*

ARE not spirits in some place? Do they not fill up some space? Must they not have some relation of situation to bodies, as being near or distant? It will be exceeding strange to say, *My spirit is not properly or locally in my body;* surely you will tell me, it must exist some where or no where; if it exist some where, it must either fill all space, and exist every where, or it must fill a part of space, and that is still some where; it must either be circumscribed in some part of my body, or be diffused through the whole of it; for *if it exist no where, it has no existence.*

Let us consider this argument in its several parts. First, it is granted, *that spirits do not exist or reside every where, they are not infinite;* and I will grant also, that they do not properly exist or reside *any where,* for they exist without any other relation to place, than what arises from their powers or operations on matter; they have no such relation to *place* as bodies have, and therefore it may be philosophically said, *they exist or reside no where;* that is, though God has given human spirits commission to act immediately on their own particular bodies, and on no other, yet they have no measurable relation to place, they have no proper nearness or distances to or from those bodies, although they act upon them by divine appointment, and receive influences from them; but properly they belong to another rank of natures, another world of beings, which require only activity and consciousness, and do not require any proper situation to be given them any space to possess, or place to exist or reside in, though the objects on which they act, or of which they are conscious, have proper situation or place.

And if there be any sort of separate spirits which have no *vehicles* (as they are called) and which are not united to matter, or which have no commission from God to act upon any material being, or to be conscious of it, they are most properly *no where,* in strict philosophy; that is, they seem to stand more free from all locality or relation to place, since their powers and operations having no material objects, give them no pretences to situation or residence in or near any body whatsoever; and as there is no part of matter which they are related to by mutual action or passion, so neither by *juxta position* or contact. But you will say, if my soul be separated from my body at London, it may know after its separation that it is somewhere near London, that it is not in China, that it is not in the *moon,* not in *Jupiter,* or one of his satellites; it must be conscious of its being and thinking in some place of this universe rather than in another.

I *answer,* Perhaps not; for when once the laws of union

are broken, the soul ceases to be conscious of the presence of body, and of all properties of body, of place, motion, distance from, or proximity to any body whatsoever; for it cannot be conscious of bodies, nor proximity to them, but by the agency of those bodies upon it and exciting sensations in it; but no bodies can act upon a separate spirit, without a new divine appointment, nor excite in it any sensation.

Yet you will *reply*, May not the soul be among bodies and near to them, though it be not conscious of it?

And I *reply* also, By no means; for whatsoever hath proximity to any body, may have a greater and greater proximity till at last it touch, or till its surface be united to the surface of the body; but this we have proved to be utterly contrary to the nature of a spirit, viz. to have any shape or surface.

I come now to answer the *second* part of the dilemma, and that is, that *if a spirit exists no where, it has no existence.* This is a mighty cannon played upon me from among the ancient artillery of axioms, viz. *Quod nullibi est non est*, that which is no where, has no being. But since this axiom is not evident enough to be granted, I think it can never be proved; and since it is borrowed merely from the world of sense and matter, it does not affect the doctrine of minds or spirits, which are thinking powers, and whose essence and life consists in perpetual conscious activity. This corporeal maxim can do no more execution here, than a cannon ball would do on an army of angels; for though a body cannot be without being *some where*, yet a spirit, which is a conscious active power, may have a real existence, and yet have *no proper place*; that is, may reside or be situated *no where* in the sense I have explained it, i. e. have no proximity of situation to bodies, or fill up no supposed dimensions of space.

It is certain, that the forms of speech in all languages are drawn from our converses with corporeal and sensible things round about us, which require *locality*, or a *proper place* to exist in; and our words and phrases are not made for the world of spirits, but the world of bodies; nor can they so happily express the ideas that belong to spirits, as if we could speak of intellectual beings in their own proper language. And since our spirits in this present state are united to animal bodies, or act upon them, we borrow twenty forms of expression concerning our spirits, which originally and properly belong only to bodies; and being trained up from our infancy to this sort of language, we are ready to imagine our souls to be some thin airy sort of bodies, as the soul is pourtrayed, as I remember in *Commenius's Pictus Orbis*, which I learnt at school. We suppose spirits to have a subtle sort of extension and figure, and to require a place to exist in as much as bodies. Nor is it possible, nor is it need-

ul in our way of common discourse, to alter our language and change the form of our expressions concerning spirits which are borrowed from corporeal things, provided when we come to philosophise more accurately about them, we do not explain them in a consistency with the nature of spirits. Let us see then whether we cannot in a philosophical manner declare what is the *Ubi* or *Whereness* of a spirit, and account for the common expressions of a spirit's *existence in such a place*, and its *motion from place to place*.

Sect. V.—*The* Ubi *or Whereness of a Spirit.*

SPIRITS, in common and familiar language, are said *to be*, and to have their existence or residence in or near those parts of matter on which they exert their immediate activity, or wherever they have an immediate consciousness. This is properly their *ubi* or *whereness*. So my soul is said to *be in my body*, or *united to this body* of mine, because it is conscious of the motions or impressions made on my body, and has many sensations and imaginations by the means or occasions of this flesh and blood, and because it acts upon or moves this animal engine; whereas it is not conscious of the motions or impressions of other bodies, nor does it act upon them or move them as it does my own.

And this is the proper notion of the *spirit's union to a body*, (viz.) that though my soul has in its own nature, and merely of itself, no consciousness of, or power of agency upon, any particle of matter; yet the great God, the father of spirits, has appointed my soul to be thus conscious of some motions of my body, and to have some power of agency upon it: He has given my soul this individual animal machine, this appointed sphere or station of my body, from which to receive sensations, and in which to excite motions.

Now for this reason *my soul is said to move where my body moves, and to dwell where my body dwells*, because its power of immediate consciousness and activity are confined to this animal body of mine. The body being the gross and visible engine whereby all our human affairs and transactions are carried on, and the soul, the active agent being invisible, we speak of every thing that the man does in language suited to his body rather than to his soul; men generally supposing the soul to be a kind of *appendix* or superadded principle to the body; whereas in philosophical truth, the body is rather the *appendix* or instrument of the soul. But it is proper for us still to conform to the common language of the world in speaking of these subjects, just as the most exquisite astronomers speak of the *sun-rising* and *sun-setting*, and the *motion of the sun and the fixed stars*, though they know that the sun abides in the centre of the planetary world, and the fixed stars have no motion, and that the earth and the other

planets are the only bodies that perform these diurnal, menstrual and annual motions.

For this reason the soul of man may be said to be in *his brain*, because it is more immediately conscious of some present sensible object, when the motions or impressions made on the outward parts of the body or organs of sense are conveyed to the brain by the nerves: And if this conveyance be interrupted between the extreme parts and the brain, the soul has no sensation, no consciousness of what is done to the extreme parts. We say also *the soul resides in the brain*, because it more immediately exerts its motive power upon some parts of the brain, or the origin of the nerves there, whensoever the soul designs to move the body; and also because when we set ourselves to think or to remember any idea, we do as it were feel the soul employing the brain.

Now in the same sense in which we say, *My soul* or *my spirit is in my body*, we may say also concerning the great God, the infinite spirit, that *he is present every where*, i. e. he is immediately conscious of every property, figure and motion of every part of matter in the universe, and of every thought of every created mind. His will hath an actual agency on every created being, at least so far as to maintain or support them in their nature and existence; and he has an immediate and unlimited power of acting upon every part of matter, and upon every created spirit; and therefore God is said to be *omnipresent*, or *present with all things*, even as my soul, which hath a limited consciousness of several of the motions and impressions caused in this my animal body, and a limited power of agency upon it, is said to be *present with my body*.

And if we extend our thoughts beyond all the real creation into the supposed emptiness or imaginary space, we may as well assent, that the ubiety of God reaches to all the supposed infinity of empty space; that is, that his knowledge extends to all things that are, or shall be, or can be, and that he has a power of immediate agency to create what he pleases, through all the infinite void or empty nothing, or wheresoever there is nothing already created.

This immediate and universal consciousness and agency of the supreme spirit on all things, is the *omnipresence* of God, and this perhaps is the only true notion of his *immensity*; and yet this infinite consciousness and activity of God, which are his very self, have no measurable or unmeasurable relation either to body or to space, as the parts of extension or quantity have to each other; and therefore we say, *he is in no place* in strict and philosophical language, though in common speech and in the language of scripture, which is suited to the bulk of mankind, God is said *to fill all things*, and to exist *every where*, in heaven, earth, and hell, because of his immediate consciousness of all beings what and wheresoever they are, and his power of immediate agency

pon them. This is infinite knowledge and infinite power. And ndeed this idea of infinite power and knowledge has no manner f connexion with extension or space, any more than the idea of nfinite space or emptiness has with knowledge and power: They ave nothing at all to do with each other as attributes of the same ubstance.

But now if we could suppose the very substance of the bles-ed God to be really long, broad and deep, and to be actually ex-ended through the whole universe of matter, and through all maginary space, what advantage would be gained by it toward he aggrandizing of his own majesty, or our ideas of him? What ould he do more by this supposed infinite extension of his sub-tance, than to be immediately conscious of all things, and to ave an immediate power and influence upon all, to know all ossibles, and give them existence when he please? And this s as fully and honourably attributed to him in my way of thinking, ithout any of those inconveniences, and those harsh or absurd deas and speeches which arise from attributing extension with all ts consequences to the great and blessed God.

Conclusion.—But after all our best philosophemes on the na-ure of spirits, we must confess our great ignorance of that more lorious and noble part of the creation. We are immersed in the ffairs of sense and matter, and imposed upon perpetually by the rejudices arising thence: And when we endeavour to quit our-elves of them, and to turn our backs entirely upon sensible ideas, we are in danger of wandering into darkness, and sometimes per-haps of going beyond our clear and distinct perceptions. The best thing we can do is, to guard against those ideas of spirits which have any gross absurdities attending them; and particular-ly to stand afar off from those opinions which would bear in any indecent and dishonourable ideas, upon God the supreme Spirit. I would assert nothing with confidence on so abstruse a subject; I would retract all the expressions that savour of too much assu-rance; perhaps I may be mistaken in this whole set of sentiments: I am therefore ready to renounce them all, as soon as I can find another scheme more just and more natural. And if I am forced to retain these opinions, it is only for want of better, till I retire from this world. I hope then to *see as I am seen, and know as I am known;* to have clearer and juster ideas of *what I am* and *what God is;* and to join with the holy millions of spirits in the heavenly world, to pay honours to my *Creator-spirit*, more agree-able to the dignity of my own nature and the incomprehensible grandeurs of his majesty. *Amen.*

ESSAY VII.

The Departing Soul.

SOME persons have been very solicitous to know how the soul goes out of the body when a good man dies; how it passes through the air and etherial regions; and, leaving the stars behind, how it soars up to the third heaven. They are much at a loss to tell how long it is a going this wondrous journey, and in what region of those upper worlds its final mansion is; especially since the new philosophy has found those regions to be so very vast, that a cannon bullet would spend many ages in travelling to the nearest star, or from one star to another. They are yet further puzzled to conceive whether a soul departing from any place, *v. c. from London at noon, would find out its friend who died there the foregoing midnight,* since a direct ascent would encrease their distance and separation, far as the *zenith* is from the *nadir*, and they are as much puzzled to determine, whether the immense outmost space be their dwelling, or some one part of it only.

I confess while we consider human souls united to bodies, we are wont to speak of their *absence* and *presence*, their places of *residence* and their *removes* according to the station, place and motion of those bodies to which they are united. This is the common language of all mankind; nor is there any sufficient reason to alter it. It is evident, and without all controversy, that bodies must necessarily have relation to place: And when angels assume corporeal vehicles, the case is the same with them as with human souls; they may therefore be said to move and fly from place to place. *Gabriel being caused to fly swiftly;* Dan. ix. 21. *touched* Daniel *in the evening*. Angels have their places of residence or removal in this respect.

There is also certainly a *local heaven*, where the body of our blessed *Saviour* is, and Enoch and Elijah, who went from this world and carried their bodies with them; and there are other saints that were the companions of their Lord's resurrection, who doubtless *ascended with him into glory;* Mat. xxvii. 52.

Whether this heaven be one certain determined palace among the planets or near the stars; or whether it be this solar system wherein we dwell, through all parts of which they pass swift as sun-beams, and make this whole planetary world their palace; these things cannot yet be fully determined by us. I confess I much question whether the range of human happy beings extends *through* all the fixed stars.

That expression of *ascending far above all heavens*, which is plied to Christ; Eph. iv. 10. is easily reconcilable to this ieme, though his body rose no higher than to some planet in r solar world; since his *descending into the lower parts of the rth*, in the same text, signifies no more than his going into a pulchre, perhaps a foot or two beneath the ground. So that e exposition of those texts is not to be measured by yards or les; but as the one expresses *great abasement*, so the other *eat exaltation*, in such language as is suited to the apprehen- ns of the vulgar part of mankind, which all learned men ac- owledge to be the common language of scripture.

Now concerning *departed souls*, if we allow them to be im- ediately furnished with new vehicles, so as never to have any igle and separate existence in their own pure spiritual nature, en we may talk of their *rising*, and *moving*, and *residing*, in all e *local* language that belongs to bodies; we may then trace eir ascent through the aerial regions and follow their flight rough the planetary worlds, if we know where to stop and set- e them in a proper place.

Nor am I so averse to this opinion as to renounce or dis- iim it utterly. It is possible it may be so appointed by the bles- d God, the Lord and Ruler of all the worlds of minds and dies. I know not of any person living who is so sagacious as have pryed into all the secrets of the invisible world, and to be le to tell us certainly how spirits live, and act, and converse ere: Nor have we had any of the departed souls among men io have come back to give us an account of these affairs. There a mysterious darkness spread over the face of the unseen re- ons to hide them from mortal view: And it is wisely ordained our Creator *that we should live in this world by faith, and not sight.* We are sure *we must shortly put off these tabernacles*; id though the spirits of good men shall be immediately invested ith a holy and happy immortality, yet whether they shall be othed or furnished with material vehicles of any kind is not so ident, and consequently what they shall have to do with *place* id *motion* is not so easy to determine.

But when we speak of the *places* and *motions* of depart- l souls, and yet conceive them as perfectly separate from l matter, we talk perhaps but in a mere vulgar, figurative or proper way, and in such language as our infancy and prejudice orrow from sensible objects round us; and not agreeable to the ilosophical nature and reason of things; in which respect pure irits do not seem to be capable of confinement to a place, or any oper local motion to or from it, because they have no figure, ape nor dimensions.

All the foregoing problems and hard questions about the ly soul's passing through the airy regions, and getting up

above the planets and stars, &c. are therefore easily answered, and all those difficulties removed, if we consider the soul as a pure intellectual being, a substantial thinking power, without any dimensions of length or breadth, and consequently without any proper relation to place. Then it will follow, that human spirits which were united to bodies, when they enter into a state of separation, need not have any thing to do with a real proper motion or flight, or change of places. An embodied soul, (that is, a soul acting in concert with an animal body) when it becomes a separate soul (that is, a soul acting in its own pure intellectual capacity without a body) does not need properly to alter its place, but only its manner of thinking and acting, in order to be in heaven and hell, i. e. happy in the presence of God, or miserable in the midst of devils, acting and thinking without bodies.

In order to give us some faint idea of this matter, and to help our conceptions while they are so incumbered with corporeal and local images, let us conceive the whole intelligent creation, or all created spirits, as one set of beings, acting in different manners (and if you please) in one open and infinite space; for we cannot utterly throw off all these kind of ideas in the present state.

Some spirits are said to be united to a body, that is, are influenced in their actions by animal bodies, and it is their business to move and manage those engines; but by the perpetual agency of animal nature upon them, the re-action upon it, and their converse with the material world by the means of that animal, they are restrained from more immediate converse with separate spirits, or even with God the infinite Spirit.

Others are free or disengaged from bodies, and these have a more immediate perception of God the infinite spirit, and converse with each other perhaps under no confinement, or under such lesser limitations as their Creator's will and their own finite natures make necessary. They become conscious of one another's thoughts and volitions by some unknown way that God has appointed; for as an embodied spirit is conscious of the motions of that animal to which it is united by the appointment of God, as it becomes conscious of the motions of other bodies round about it by the organs of that particular animal, and as it is also conscious of the thoughts of other embodied spirits by the motions or voices of their several engines or animal bodies, so doubtless there is a way which God the Creator-Spirit has ordained, whereby created spirits, which are social beings, shall maintain society and friendly communion with other created spirits when they are in their native state, separate from material engines.

Now death is but the cessation of animal life, in that

ly or engine which is united to any particular spirit: That ly then becomes a moveless mass, and not an animal; it is no re capable of obeying the volitions or commands of the soul, of communicating any external motions by the nerves to the ain, to give the soul notice of any sensible object. Thence it lows by divine appointment, that that spirit is no more con- ous of what passes in that body, and no more employed in naging it, or acting upon it, or conversing with the material ation by the organs of that engine.

Being therefore unemployed and unimprest by the *corporeal* rld, its thoughts perhaps are more purely *intellectual*, or at st it has no new sensations, but its ideas are raised in another nner. It reflects upon its own temper and actions in this life; a conscious of its virtues or its vices; it has an endless spring peace and joy within, flowing from the sense of its wise and y behaviour in the state of trial, or it is tormented with the ler anguish of a self-condemning conscience in the reflection its past crimes. This is one great part of heaven and hell.

And then with regard to God and its fellow-creatures, if speak of them in this our incarnate state, we must be forced use language borrowed from corporeal things, and say, This parted soul appears at once in the pure intellectual or separate rld, like a native there; it stands among innumerable millions spirits, itself a kindred spirit, gains swift acquaintance with m, grows conscious of their ideas and actions in their own y and method, which God has not yet revealed to us in this : And above all, it has an immediate perception of God the nite spirit, a consciousness of his power and presence, and an mate and delightful taste of his love, or a dreadful sense of anger; and thus the soul feels immediately, and possesses a ond part of its heaven or its hell; and all this without any al motion, or any relation to a place, or change of distances. ight illustrate this by two similes, and especially apply them the case of holy souls departing.

1. Suppose a torch inclosed in a cell of earth, in the midst ten thousand thousand torches that shine at large in a spa- us amphitheatre. While it is inclosed, its beams strike only the walls of its own cell, and it has no communion with those hout: But let this cell fall down at once, and the torch that ment has full communion with all those ten thousands; it nes as freely as they do, and receives and gives assistance to of them, and joins to add glory to that illustrious place.

2. Or suppose a man born and brought up in a dark prison, he midst of a fair and populous city; he lives there in a close finement, perhaps he enjoys only the twinkling light of a mp, with thick air, and much ignorance; though he has some tant hints and reports of the surrounding city and its affairs,

yet he sees and knows nothing immediately, but what is done in his own prison, till in some happy minute the walls fall down; then he finds himself at once in a large and populous town, encompassed with a thousand blessings; with surprize he beholds the king in all his glory, and holds converse with the sprightly inhabitants; he can speak their language, and finds his nature suited to such communion; he breathes free air, stands in the open light, he shakes himself, and exults in his own liberty. Such is a soul existing in a moment in the separate world of holy and happy souls, and before a present God, when the prison walls of flesh fall to the ground.

Perhaps it will be *objected* here, that holy souls, when they are *absent from the body*, are encouraged to expect they shall be *present with the Lord Jesus*, and then it seems necessary they should be in the place where his body is. They hope to *be with Christ*, and behold him in the glories of his exalted human nature, when they *depart* from the flesh; 2 Cor. v. 8. Phil. i. 23. Now in all this philosophical account of the separate state of the souls of good men, there is no provision made for this part of our promised blessedness.

To this I *answer*, That if the souls of good men at their death be admitted to a more intimate converse with the deity itself, and with the human soul of Christ Jesus, there is no necessity of any communication with his glorified body, till their bodies also are raised at the last day. Now the human soul of Christ, especially in its exalted state, has an extensive power to converse with pure spirits, whether angels or human souls, to impress his sacred influences of authority or love upon them by command or consolation, and enable them to exercise and maintain mutual converse with himself. Doubtless our blessed Lord has all the freedoms, powers and prerogatives of a pure separate spirit in his state of bodily resurrection, exaltation and glory; and he can make the spirits of his faithful followers as happy in his own presence, as is proper for their state of separation from the body; and he can also make the souls of impenitent sinners, as well as evil angels, sensible of his resentments against their crimes. His raised and exalted body is no hindrance to his influences on unbodied spirits. If in his incarnate state and humiliation, when his body was mere flesh and blood, he had converse with good angels, and power over devils, we may well suppose, that in his exalted state of union to a glorified body, he can converse as he pleases with the world of spirits, and enable them to hold converse with himself.

After all, let it be noted, that I have only represented in this place, how far it is possible for the heaven or the hell of departed spirits to commence in this state of separation from the flesh, without a new union to any corporeal vehicle. Yet I assert

nothing with certainty; I am conscious of my ignorance. Perhaps it is probable enough that there may be some vehicles of grosser or more refined matter assigned to every human spirit, when the body of flesh expires, and is no longer capable of maintaining its reciprocal communion with the spirit. What are the circumstances, what are the laws, what is the situation, and what is the language of the world of spirits, must and will be a matter of darkness and mystery to us, while we dwell in flesh and blood. We must each of us wait our appointed hour, and then shall our curiosity be better satisfied, either in a delightful or in a dreadful manner, according to our behaviour in the present life.

ESSAY VIII.

The Resurrection of the same Body.

THERE has been a warm dispute among men of learning, and particularly between Mr. Locke and Bishop Stillingfleet, whether the same individual body which is buried shall be raised at the resurrection of the dead? Or, whether it may not be another new-made body, composed of any other atoms, and united to the same soul. Those, who with Bishop Stillingfleet affirm the resurrection of the same body, may give such reasons as these for it.

1. It is fit and proper, that the same body which has been a companion and instrument of the soul in duties of holiness should arise and share with the soul in the reward of heaven; and that the same body, which has been a temptation or instrument of the soul in sin, should also rise to share the torment. I must confess, I do not think this argument has very great weight in it; because the body alone is mere insensible matter, and can neither share in pleasure or pain. It is the soul only that has sense of pain and pleasure, and whatsoever body it is vitally united to, is still its own body, and may be the medium of pleasure or pain to it.

2. Since body and soul united constitute the man, if it be not the same body that died which is raised, then one essential part of man is lost. If it be another body, it is another man that is raised from the earth, and not the same man that died. Besides, the soul never dies; and if the same animal body that died be not raised to life, there is nothing at all raised to life:

There may be another inanimate body which has life given to it indeed, but nothing is revived. Perhaps this sort of argumentation may have some weight in it.

3. Christ himself saith; John v. 28. *They that are in the graves shall come forth:* This must refer to the same body that died; for it is not the soul, nor is it any other body that was properly put into the grave, but the animal body of man which is now inanimate dead.

4. It seems to be the design of the apostle, to shew that it is the same body which died in some respects, though not in all respects, which shall be raised again to life: 1 Cor. xv. 42. *So is the resurrection of the dead.* It, i. e. the body, *is sown in corruption, it is raised in incorruption, &c.* It, i. e. the body, *is sown a natural body, it is raised a spiritual body.* It is the same human body still, but with different qualities. So ver. 52, 53. "The dead shall be raised incorruptible, and we shall be changed. This corruptible shall put on incorruption, this mortal shall put on immortality;" which seems to be spoken both with regard to those who shall be raised from the dead, as well as those who shall be changed at the coming of Christ. It is this *mortal and this corruptible*, that is, this very animal body, which was mortal and corruptible, must be raised immortal.

To this I might add, that the apostle, Rom. viii. 11. speaks of these very mortal bodies which we now have, and affirms they shall be quickened, &c. and Phil. iii. ult. "this body of our vileness or humiliation is to be changed, and made like to the glorious body of Christ." Surely such expressions denote the same body. But the substance and strength of all the arguments derived from scripture to prove the resurrection of the same body, may be found well put together in Dr. Whitby's Preface to the First Epistle to the Corinthians. Those who with Mr. Locke make the resurrection of the same individual body needless, may alledge such reasons as these.

1. It attains no valuable purpose to confine the resurrection to the same atoms of matter; for if the same soul be united to any mass of the same sort of substance, i. e. to any matter, there is a sufficient provision for every thing that regards the happiness or misery of the rising dead: Since the body itself, or mere matter, has no sensation; and the soul will have the same sort of sensations, (whether pleasant to reward it, or painful to punish it) whatsoever other particles of matter it may be united to, as if it were united to the same particles it had in this world, and in which it obeyed or sinned.

Besides it is worthy of our observation what Mr. Locke says on this subject. "If it should be demanded what greater *congruity* the soul hath to any particles of matter which were once

vitally united to it, but are now so no longer, than it hath to particles of matter to which it was never united, this would be hard to determine."

2. The apostle shews it shall be different matter from that which was laid in the grave, by the very manner of his arguing: For when he uses the simile of a "grain of wheat dying in the ground," he says, ver. 37, 38. "Thou sowest not that body that shall be, but thou sowest a bare grain; and God giveth it a body (i. e. another body) as pleaseth him. And then he goes on to shew what different sorts of bodies there are, and how different the bodies in the resurrection shall be from what were buried.

3. It is hardly possible that all the very same bodies should rise; that is, all the same atoms or particles that were buried: For when bodies turn to dust, this dust or earth grows up in vegetation, and becomes the body of grass or plants; sheep and oxen eat these plants, and other men eat the sheep and oxen; and thus the particles of one man's body may frequently become the parts of another man's body. And this is more conspicuous in the country of *cannibals*, where they kill and eat their slaves. How then is it possible that each human body should have its own particles?

4. There is sufficient ground to say, the same person rises again from the dead though there be not one atom of the same matter that was buried, which goes to make up the body in the resurrection; for *Methuselah*, when a child, and when one, two, three, four, or five hundred years old, and when he had lived nine hundred and sixty years before his death, had actually by perspiration, and attrition, &c. changed the atoms that composed his body perhaps thirty or forty times over, and yet it is the same compound substance of soul and body, the same conscious being or person still, it is *Methuselah* both at his birth, at five hundred years old, and at his death. Besides, If all the same atoms that ever belonged to *Methuselah* must be raised, what a bulky man would that be? And further, what need is there that the last dying withering particles should be raised to make Methuselah again, when any other atoms that ever belonged to him, and in which he practised virtue or vice, are as much the same Methuselah? And yet all of these cannot be crouded into his body, without making a giant of him. So that we see there is no need of the same atoms or particles to make the same person, if there be but the same thinking mind conscious of his actions in this life, united to a proper portion of matter. It is consciousness makes the person.

This is the force of the arguments of those who deny the necessity of having the same body raised. And I think the arguments on both sides have some real strength in them. Now I

would humbly enquire, whether all the differences of these disputants, which I have endeavoured briefly to set in their strongest light, may not be compromised in this manner.

I. It is granted that it cannot be the very same body in all the particles or atoms of it which were united to the soul in this world, that shall be raised and united to it in the resurrection:

(1.) Because all the atoms that ever belonged to the animal body of Methuselah in nine hundred and sixty-nine years would make a most bulky and disproportionate figure at the resurrection: And for the same reason all the antidiluvians, who lived so many hundred years, would be raised as giants in comparison of us in later days. And on the same account also, every man at the resurrection would be so much larger than his contemporaries and neighbours, as he lived longer on earth; which is a vain and groundless conceit.

(2.) All the same particles, even of the body when it died and was buried, can hardly be raised again and united to the soul of any man, because several of the particles that made one man's body at the time of his death are very probably turned to grass or plants, and so become food for cattle, or other men, and are become part of the bodies of other men several times over. And thus there might be great confusion, because the self-same particles would belong to the bodies of several men. Besides, here's one pious man perhaps died of a dropsy, or excessive fat and unwieldy; must he be raised in that unwieldy bulk and those extravagant dimensions? Another was worn out to a mere skeleton by a consumption; must his raised body be of this slender and withered shape or size? Others it may be from their very birth were in some part defective, or redundant; and in these cases must not some particles be left out or added in the resurrection to form a proper body for the glorified soul? All these considerations prove that all the precise number of atoms that ever made up a man's body here on earth, or even those that belonged to it at the hour of death, are not necessary to be summoned together to form the same man at the resurrection.

II. It is also granted, that it must be in some sense the same body raised which was buried, in order to answer several expressions both of Jesus Christ, and of the apostle Paul in their discourses of the resurrection. And we may allow without any difficulty, that so many of the same particles of any man's body which were buried may go to constitute the new-raised body, as justly to denominate it the same body, and which being united to the same soul, do render the new-raised man the same man and the same person who died: For it is evident that a very few of the same atoms or particles which were laid in *the grave* are sufficient for this purpose, if we consider these *two things*:—

I. It is very probable that a new-born infant in its muscles ıd nerves (and especially in its bowels and bones) has some origi-. ıl, essential, and constituent tubes, fibres or staminal particles (if I ay so call them) which remain the same and unchanged through l the stages and changes of life in following years, how much ıever the external and fleshy parts may be changed. And some ıilosophers maintain that the growth of the animal body is no- ing but the dilatation, stretching or spreading of these essential ıd staminal parts, these fibres, tubes or membranes, by the in- rposition of new additional particles; which additional and acci- ıntal particles are the only things which are in perpetual flux, d always changing. And it may be added also, that perhaps ese essential staminal particles are of such a nature as not to in and unite with other animal or human bodies, and become an ıential constituent part of them: And therefore if mankind ere all *cannibals*, and eat one another as well as the flesh of asts, yet the same staminal or constituent particles cannot belong the bodies of two or more human persons. It has been said some philosophers that the mere membranaceous parts of an imal body, though eaten by other animals, will not easily if at digest; and then they cannot be sanguified or turned into ood, nor become nutritive juices, nor form the constituent d essential parts of other animals: Now a great many of e original constituent parts of human bodies are membrana- ous; for some suppose almost the whole body to be made tubes and juices, with little interspersed fibres which are ded by nutrition. And how far the bones, i. e. original mere seous substances may be indigestible also, who can tell?

Upon the whole, it seems that these essential, constituent staminal particles, whatsoever they be, whether osseous, or embranaceous, or of any other quality, and how many or how w soever they be, always abide the same, even when the body greatly enlarged by the perpetual new interposition of additional tritive particles, which are in continual flux. I say also, that seems that these unchanging parts, whether few or many, in ion with the same soul, are abundantly sufficient to denominate *ethusaleh the infant, and Methusaleh the aged*, the same per- n; and then also these few essential constituent particles pre- ved by divine providence, and raised in the formation of the w body, and united to the same soul, are sufficient to denomi- te *Methuselah dying*, and *Methuselah rising* the same person ll, both soul and body.

Here it may be *objected* indeed, that there is no need of run- ıg to such *essential constituent particles* of the body of a man order to denominate him the *same* man at sixteen or sixty, six hundred years of age; for these philosophical ideas of *stituent particles* come not within the notice of the bulk of

mankind, and yet all mankind agree to call *Methuselah* the *same man*, and his body the *same body*, though it be maintained by the continual succession of new particles of matter, since they are united to the same soul. This seems to be sufficient for this purpose.

This *objection* may be *answered* two ways, (1.) that as these constituent and unchangeable particles of the body do not come within the notice of the bulk of mankind, so neither does the continual change and succession of new particles by perspiration and nutrition come within their notice; and therefore the bulk of mankind call it the *same body* because it appears in the gross to be the same: But if you prove *it is not the same* by insensible alterations, I may prove *it is the same* by these insensible unchanging parts. In one case the alteration is insensible; and the constituent particles abide unchanged without sensible notice in the other case; and if one disputant borrows his objection from *philosophical ideas*, the other may borrow his solution from *philosophical ideas* too.

It may be answered (2.) that the language of scripture and the reasons for the resurrection of the body, in some respects *the same* with that which was buried, are so strong, that I think they cannot well be answered without supposing so many particles of the same body which was buried to be raised again, as may be sufficient upon some just principles to give it the name of the *same body*, and there can be no more required.

2. The similitude which the apostle uses in that discourse concerning *a grain of wheat*, v. 37, 38. plainly teaches us, that though there should be but a very few of the same individual particles raised from the dust, and mixed with a multitude of other new particles, yet these few are sufficient to denominate it the *same body*, so far as the apostle's argument requires it. For it is evident that when a grain of wheat is sown into the ground, far the greatest part of the grain quickly dies and rots in the earth; and there are but a very few small particles of the same grain which compose the *germen* or bud of the new plant, and which do really grow up into, and help to form and compose the new stalk and the ear of corn, together with the addition of a multitude of other new atoms borrowed from the earth and water.

In the same manner the apostle leads us to suppose there may be a few of the same original and essential parts of the body of a man which are buried in the grave, which are the original, the spring and foundation of the new-raised body, though there may be thousands of other new atoms mixt with them. Now it is easy to suppose, that the power and providence of God may according to this supposition, preserve and raise the same body at the resurrection. For if the new-raised body has

but as many essential atoms of the dead body in it, as the new stalk and ear of wheat has of the grain that was sowed, it is enough: And the union of the same conscious mind or spirit, makes it the same man.

I would ask leave to conclude this Essay with this short and plain remark. There are some of those who follow Mr. Locke and his way of thinking in many of these matters, who also go a step further, and suppose the spirit or conscious principle in man to lose all consciousness when the body dies, and that at the resurrection God shall give consciousness to the person again, or make a conscious principle to exist in the new-raised body. Now if this be the case, then it is neither the same body nor the same spirit that is raised from the dead, but a new spirit and a new body, which I think must necessarily be called *another person*, as well as Mr. Locke would call call it *another man:* and I am sure such a new-made creature consisting of another mass of matter, and another conscious principle, can never be justly rewarded or punished for *personal* virtues and vices, good or evil actions done in the former life by a different body and spirit, i. e. by *another person.**

* I have not observed any distinction here between the *same man* and the *same person*, though Mr. Locke makes a great difference. Of this matter see *Essay 12. Sect. ult.*

ESSAY IX.

Of the Production, Nourishment and Operations of Plants and Animals.

SECT. I.—*Creatures produce their own Kind.*

WHEN I survey the works of nature with a more attentive eye, I am surprised to find with what marvellous exactness every creature draws its own picture, or propagates its own likeness, though in different manners of operation. The fox produces a living fox, the goose drops her egg, and hatches the young goose, and the tulip lets fall its seed into the earth, which ferments and swells and labours long in the ground, till at last it brings forth a tulip. Is it the natural sagacity of foxes that enables them to form their own image so accurately? By no means; for the goose and the flower do the like: The sprightly and the stupid, the sensible and the senseless, work this wonder with equal regularity and perfection; and the plant performs as well as the animal.

It is not possible that any of them should effect this by any peculiar rules of art and contrivance, for neither the one nor the other are at all acquainted with the composition or progress of their work. The bird is entirely ignorant of the wondrous vital ferment of her own egg, either in the formation of it, or the incubation; and the mother-plant knows as much of the parts of the young plant, as the mother-animal knows of the inward springs and movements of the young little animal. There could be no contrivance here, for not any of them had any thought or design of the final production: They were all moved, both the beast, bird and flower, by the material and mechanical springs of their own nature to continue their own species, but without any such intent or purpose.

Give souls to all the animal race, and make those souls as immaterial and as intelligent as you can; attribute to them what good sense you please in other affairs of their puny life; allow the brutes to be as rational and as cunning as you could wish or fancy, and to perform a thousand tricks by their own sagacity; yet in this matter those intellectual powers must all stand by as useless; the senseless vegetable has as much skill here as the animal; the goose is completely as wise as the fox or the greyhound; they draw their own portraits with as exquisite art and accuracy, and leave as perfect images behind them to perpetuate *their kind*.

Amazing proof, and incontestible argument of some supe-
or wisdom! Some transcendent contriving mind, some divine
rtificer that made all these wondrous machines,* and set them
t work! The animal and the vegetable in these productions
re but mere instruments under his supreme ruling power; like
rtless pencils in a painter's hand, to form the images that his
hought had before designed: And it is that God alone who
efore all worlds contrived these models of every species in his
wn original idea, that appoints what under-agents he will em-
loy to copy them.

In the week of the creation, he bid the *earth* teem with
easts and plants; and the *earth* like a common mother brought
orth the lion, the fox, and the dog, as well as the cedar and
he tulip; Gen. i. 11, 24. He commanded the *water* to pro-
uce the first fish and the fowl; behold the *waters* grow preg-
ant; the trout and the dolphin break forth into life, the goose
nd the sparrow arise and shake their wings; Gen. i. 20, 21.—
ut two common parents *earth* and *water* to the whole ani-
al and vegetable world! A God needs no more. And
ough he was pleased to make use of the water and the earth
these first productions, yet the power and the skill were
uch the same as if he had made them immediately with his
wn hands.

Ever since that week of creative wonders God has ordered
l these creatures to fill the world with inhabitants of their own
nd; and they have obeyed him in a long succession of almost
x thousand years. He has granted (shall I say) a divine pa-
nt to each creature for the sole production of its own likeness,
ith an utter prohibition to all the rest; but still under the ever-
sting influence of his own supreme agency upon the moving
oms that form these plants or animals. God himself is the
reator still. And it is evident, that he has kept a reserve of
vereignty to himself, and has displayed the ensigns of it in
me important hours. Egypt was once a glorious and tremen-
us scene of this sovereignty: It was there that he ordered
e rod of Moses, a dry and lifeless vegetable, to raise a swarm
living animals, to call up a brood of lice in millions without
parent, and to animate the dust of the ground into a noisome
my. It was there he bid Aaron wave the same rod over the
reams and the ponds, and the silent rod, under divine influence,
uld bring forth croaking legions out of the waters without end
number.

But these are his works of miracle and astonishment, when

* Note, I call them all *machines* here, not presuming to determine that the
ure of brutes is mere machinery; but when I speak of the natural production
their bodies, I think these bodies, as well as the bodies of men, are mere ma-
es or *machines*, whatsoever souls may be united to them.

he has a mind to shew himself the sovereign and the controller of nature: Without his immediate commission not one creature can invade the province of another, nor perform any thing of this work but within its own peculiar tribe. Even man the glory of this lower creation, and the wisest thing on earth, would in vain attempt to make one of these common vegetables, or these curious animated moving machines. Not all the united powers of human nature, nor a council or club of the nicest artificers with all their enginry and skill can form the least part of these works, can compose a fox's-tail, a goose-quill, or a tulip-leaf. Nature is the art of God, and it it must for ever be unrivalled by the sons of men.

Yet man can produce a man. Admirable effect, but artless cause! A poor, limited, inferior agent! The plant and the brute in this matter are his rivals, and his equals too. The human parent and the parent-bird form their own images with equal skill, and are confined each to its own work. So the iron seal transfers its own figure to the clay with as much exactness and curiosity as the golden one: Both can transfer only their own figure.

This appears to me a glorious instance wherein the wisdom and power of God maintain their own supremacy, and triumph over all the boasted reason and intellectual skill of men; that the wisest son of Adam in this noblest work of nature, can do no more than a flower or a fly; and if he would go out of his own species and the appointed order of things, he is not able to make a fly, nor a flower; no, not a worm nor a simple bulrush. In those productions wherein mankind are merely the instruments of the God of nature, their work is vital and divine; but if they would set up for prime artificers, they can do nothing: A dead statue, a painted shadow on a canvass, or perhaps a little brazen clock-work is the supreme pride of their art, their highest excellence and perfection.

Let the atheist then exert his utmost stretch of understanding, let him try the force of all his mechanical powers, to compose the wing of a butterfly, or the meanest feather of a sparrow: Let him labour, and sweat and faint, and acknowledge his own weakness: then let him turn his eye, and look at those wondrous composures, his son or his little daughter: and when their infant tongues shall enquire of him, and say, *Father, who made us?* Let him not dare to assume the honour of that work to himself, but teach the young creatures that *there is a God,* and fall down on his face, and repent and worship.

It was God who said at first, *Let the earth bring forth grass, and the herb yielding seed—after his kind—and the living creature after his kind;* and when this was done, then with a creating voice he bid those herbs and those living creatures, *be fruit-*

l and multiply, to all future generations. *Great things doth : which we cannot comprehend.—But he sealeth up the hand of ery man, that all men may know his divine work*; Gen. i. l, 25. Job xxxvii. 5, 7.

ECT. II.—*The Laws of Nature sufficient for the Production of Animals and Vegetables.*

IT was a work of wisdom, infinitely various to form all the ariety of creatures that swim or fly, that run, creep, or move in ie air, earth and water, and to fit every one of them with rgans and con-natural motions suited to the purposes of their ifferent life : And it is the same wisdom which dictated the laws f nature and motion in the first week of the creation, and the ame power which first put them in execution, that proceed by the orce of those unchanging dictates, to produce all the successive ations and ages of the animal and vegetable worlds. Those reat prolific words, *Be ye fruitful and multiply*, have almighty ower in them, and reach to the end of time. God himself is the upreme agent and mover, in all the fermenting materials that eem with plants and animals, and he acts still according to the riginal and uniform laws of motion which his wisdom first dicta- ed, and his power imposed on the parts of matter.

But there have been some philosopers and divines who magine, that because they cannot solve the production of plants nd animals by those obvious laws of motion and matter which we are acquainted with, therefore no plant or animal is produced without some new, immediate and present interposure of the skill, nd power, and agency of God, different from the original dic- ates or laws of motion. Thus the common laws of nature which God has established, being in their esteem not sufficient for this end, they introduce his own immediate hand in millions of instan- ces to counterwork those laws, or to assist the deficiency of them by a creating power. By this means God is as it were constrained to exert a miraculous influence at the generation and production of every new animal throughout the world, as though it were im- possible that a mouse, a pigeon, or a butterfly should be formed without it ; and thus his work of creation is never finished, and miracles are wrought by millions every day : for whatsoever is done by him in the material world not according to the laws of nature, is *miracle*.

In my opinion it is a rash and venturous thing to determine that these productions are impossible according to the common ap- pointed laws of nature and motion ; and to set intellectual agents at work upon them, merely because our knowledge of these laws of matter is not yet sufficient to describe the manner how it may be done.

Would it not be a ridiculous and unphilosophical account of

the motion of all the planets with all their satellites or moons in our age, to tell the world that so many distinct angels rolled them round the sun, and gave us day and night, summer and winter? Let us run back to the old solid spheres and their epicycles again, and please ourselves and our hearers with describing, how they are turned round by angelic powers with sweet and heavenly music, and this is the harmony of the spheres. But is this philosophy? May not the original projectile force proposed by Sir Isaac Newton, which he supposes restrained by the centripetal force or gravitation, completely answer this end without the incessant labours of an angel? And is not this law of nature, supposing it to be originally appointed and still preserved by the Creator? Is there any need of immediate new interpositions of his almighty influence in any different manner to keep all the planetary worlds in their proper motions so long as he designs them to move? And does not this single principle of gravitation, or the mutual attraction of all matter, perform various millions of effects in this our globe of earth and water among inanimate as well as animated beings?

It may not be amiss to take notice here also, that some very ingenious moderns have supposed the peculiar powers of *magnetism, electricity, elasticity,* and others, are divine laws of motion appointed by God himself in the material creation, and superadded to the *essential properties of matter* considered merely as an extended solid substance.

And what if we should suppose there may be some other such general law of motion superadded to the *vegetable* world as the peculiar spring of all vegetation? How simple a principle is *gravity* in itself? How multiform and infinite are its effects? May not all plants in their rise and growth, their verdant foliage, their beautiful bloom and seed in successive ages, take their origin from another such simple principle applied by the skill of the divine artificer, who gave all these vegetable beauties their first existence?

And what if we should go one step further? Perhaps the laws of motion which God has ordained in the animal world may still be somewhat different from, or superadded to those of the *vegetable*; and these additional laws may be sufficient to form all the eggs and animals in the world: and if these laws are settled and constant, this is nature as much as the other. It is very unphilosophical to introduce the divine agency, either contrary to or different from, the settled rules of his own creation, without a just apparent necessity, or where the case requires not a proper *miracle* to be wrought: yet how frequently is this done by men who pretend to philosophy? Or if God himself be not immediately set at work afresh, what sort of strange inferior agents, what *anima mundi's*, what *plastic powers* have been invented and employed to mould and form every new plant and animal?

And as this sort of solution of difficulties is unphilosophical, so neither is it very honourable for a divine to say concerning God our Creator, that the rules of natural motion which he hath established in the world, are not sufficient for the hourly and necessary purposes and effects of providence. Let us grant that the bodies of a fly or a mite, as well as an ox or an eagle, contain in them innumerable vessels and humours, tubes and strings through which animal life is diffused, and reigns there in a thousand regular motions and surprising appearances: let us also allow that the formation of one of these animal engines by two others, *i. e.* the propagation of their species is incomparably the nicest and most surprising effect that these creatures ever perform: What then? surely you will not say, that their own sense or reason, or any conscious powers they may be endowed with, are sufficient for this purpose, or are capable of such productions: you will never grant it is owing to the skill of the parent-animals, that such swarms of wondrous young animals are propagated in successive ages: Why then may we not attribute to the all-wise God the glory of assuming them as his instruments into his grand scheme of providence, and employing them according to the common laws of nature and motion, which he hath established each to produce his own image? Why may not a God have such an all-pervading stretch of thought, as to supply the universe with inhabitants in a perpetual succession, by the rules which he at first ordained amongst them, rules which he stamped with his own authority? And as he then pronounced them the laws of nature, so he continues their agency by his divine and universal influence through all generations.

Will you suppose that it derogates from the glory of Divine Providence, to represent the great engine of this visible world, as moving onward in its appointed course, without the continual interposure of his hand? It is granted indeed, that his hand is ever active in preserving all the parts of matter in all their motions according to these uniform laws: but I think it is rather derogatory to his infinite wisdom, to imagine that he could not make the vegetable and animal, as well as the inanimate world of such sort of workmanship, as might regularly move onward in this manner for five or six thousand years, without putting a new hand to it ten thousand times every hour: I say *ten thousand times every hour;* for there is not an hour nor a moment passes, wherein there are not many millions of animals actually forming in the *southern* or *northern* climates.

He that can make a clock with a great variety of beauties and motions to go regularly a twelve-month together, is certainly a skilful artist; but if he must put his own hand to assist those motions every hour, or else the engine will stand still, or the wheels move at random, we conceive a much meaner opinion of

his performance and his skill. On the other hand, how glorious and divine an artificer would he be called, that should have made two of these pieces of clock-work above five thousand years ago, and contrived such hidden springs and motions within them, that they should have joined together, to perpetuate the species, and thus continue the same sort of clocks in more than a hundred successions down to this day? Though each of their springs might fail in forty years time, and their motions cease, or their materials decay, yet that by the means of these two original engines, there should be engines of the same kind multiplied upon the face of the earth, by the same rules of motion which the artist had established in the day when he first formed them.

Such is the workmanship of God; for *nature* is nothing but his *art*. Such is the amazing penetration of divine skill, such the long reach of his foresight, who has long ago set his instruments at work, and guarded against all their possible deficiencies; who has provided to replenish the world with plants and animals to the end of time, by the wondrous contrivance of his first creation, and the laws he then ordained.

Thus every whale, eagle, and apple-tree, every lion and rose, fly and worm in our age, are as really the work of God, as the first which he made of the kind. It is so far from being a derogation to his honour, to perpetuate all the species by such instruments of his agency for many ages, that it rather aggrandizes the character of the Creator, and gives new lustre to divine wisdom; for if any thing can be said to be easier or harder in this sort of almighty work, we may suppose it a more glorious difficulty for a God to employ a sparrow or an oyster to make a sparrow or an oyster, than to make one immediately with his own hand. Perhaps there is not a wasp nor a butterfly now in the world, but has gone through almost six thousand ancestors, and yet the work of the last parent is exquisitely perfect in shape, in colour, and in every perfection of beauty; but it is all owing to the first cause. This is wisdom becoming a God, and demands an eternal tribute of wonder and worship.

APPENDIX.

I KNOW some modern philosophers have supposed that *the formation of plants and animals is beyond the reach and power of the laws of nature*, and therefore they conceive that the Creator himself in the first individuals of every kind, actually formed and included all the future plants and animals that should ever proceed from them complete in all their parts; and these were contained in their distinct seeds, and perhaps decreasing in bulk successively in proportion almost infinitely less and less, as the seed is less than the plant or animal, and as each animal and plant in this miniature or minute form, is less than the same plant

and animal full grown; and they suppose that the daily productions of nature are nothing else but the unveiling of these little plants and animals in continual succession, bringing them forth into light, and stretching and enlarging their parts by new interwoven fibres, and pulpous matter coming between.

One great reason they give for this is, that in the minute bud of a plant, suppose a tulip even in the winter, they can by a microscope discern the little stalk and leaves of the flower, and the small triangular pod of seed in it; and since matter is *infinitely divisible*, say they, why may not this minute tulip contain another, and that contain a third, and that a fourth, even to the number of many thousands in their diminished proportions?

To this I answer, in general, that from this one position, viz. that the microscope shews the formation of a perfect plant in its bud a few months before the time of its appearance in full growth, it is a vast leap to the conclusion, that therefore it may contain thousands and millions of such perfect plants in their infinitely decreasing proportions, and that for five or six thousand years before the times of their appearance. But I would give several particular reasons against this opinion.

1. *If we consider the exceeding small proportion* that is between the little supposed animals or vegetables which are contained in the seed, and the animals or vegetables in their full growth, it will appear that in the fourth, fifth, or sixth generation they will be smaller than the homogeneous particles of the subtilest liquors, and therefore they cannot be organized and living bodies, all which require tubes with liquids in them.—How much more impossible is this supposition when we attempt to derive one hundred generations of men or brutes in this manner, or six thousand generations or successions of annual insects or plants?

2. If to relieve this difficulty, you run into *infinite possible divisibilities of matter*, yet there is all the reason to infer these cannot be actually so in nature, i. e. not infinitely small particles, because of the determined limit of the size of all homogeneous particles of liquors, which have ever yet fallen under the search of philosophy. I add here further, that this sort of argument from the infinite *divisibility of matter* would be as powerful to prove this strange doctrine, if the world had stood six hundred thousand years, or even in an eternal world, as it is in a world of six thousand years standing. And let it be observed, that arguments drawn merely from *infinites*, lead our finite reasoning powers so far out of their own depth, that we are lost in them, and can hardly ever be well assured that our arguments are effectually conclusive, or our inferences well drawn. See Essay 12. Sect. 3.

3. Suppose every acorn that grew on the first oak should contain in the little germ or bud of it (which is a very small part of the acorn itself) all the oaks that might be produced from thence even to the end of the world in one single line of direct succession, this is prodigious and astonishing beyond all reasonable belief; but according to this hypothesis, we must suppose, that the germs or buds in each of these acorns *do actually contain also all the acorns that those oaks might annually produce,* together with all their annual leaves; and again, all the younger oaks which might be produced from each of these acorns in ten thousand collateral successions; now this raises the number to such millions of millions, that nothing but the incomprehensible idea of *infinite,* can ever be supposed to answer; and at best in this controversy, it seems rather to be a refuge of darkness to hide in than a clear explication.

4. We find many plants may be produced *by slips or twigs of the same plant,* and that of trees as well as herbs and flowers, such as the vine, the willow, &c. And it is not to be supposed that each *twig* and *slip* have had all these future seeds and trees actually formed in them, together with all their leaves and fruits the first week of the creation, even though we should allow every *seed* to contain all these infinite successions of their species.

5. Have we not reason to conceive *that every seed of a plant is formed alike?* Has not then every acorn and every bean that is devoured by animals for their food, and every grain of corn as well as all the fruits of the trees and their seeds which are eaten by men and birds, the same millions of these complete trees or plants, corn or herbage contained in them in miniature which are ascribed to those other seeds and fruits which are actually sown or planted out, in order to produce new vegetables of their own kind? Now if it be so, what an infinite number of complete trees, flowers, plants and herbs would be made by the exquisite artifice of the Creator to no purpose? And thus a vastly greater part of the original and immediate workmanship of God in the first week of creation, would be labour in vain since none of it attains its proper end, but only in those few seeds and fruits which afterwards grow up into complete plants or trees, which is not one to ten thousand or perhaps to a million.

The same thing might be said of animals. If every male animal contains in it millions of animalcules, as Mr. Lewenhoeck supposes by the use of his microscope, and every such male animalcule actually contains millions of less animalcules, and so on in progression for a hundred or a thousand generations of men, brutes or insects, since the days of Adam, what an *immense waste* of creatures is here? What an amazing and superfluous multi-

tude of dogs, cats, lions, bears, horses, elephants, eagles, and whales, worms and flies, as well as of men and women, all formed with their millions of tubes and fibres by exquisite wisdom, and all designed to be mere *waste of nature*, except those very few comparatively which come into the visible world as distinct animals; since for every animal that comes to be born there would be many millions lost and wasted according to this hypothesis? Is it possible that the wisdom and work of a Creator should be wasted in so insignificant a manner to support such an hypothesis or conjecture?

6. When a limb of an animal, or some necessary part of a plant has been broken off, what powerful efforts has sometimes been observed in the operations of nature towards *the formation of a new limb*, or part of the same kind? I have seen the claw of a crab rising up in a less form, in the room of one which the creature seems to have been deprived of by some injurious accident; now I would enquire whether this creature was formed at first in its minute original, with three claws? Or whether there was an actual provision made for every such accident in the first week of the creation?

In the vegetable world these regular productions of the new parts of a plant, are much more common. When the top of an ash is cut off to make a pollard of it, or of a plum-tree to make it bear more, or better fruit, I beg leave to enquire, whether all the branches, leaves, and fruit, that sprout afterward from the stock yearly in twenty, thirty, or forty years were formed actually in the first ash, or plum-tree, that God created? Did the Creator provide actually sufficient leaves and fruit in every first tree, to answer for such voluntary mutilations or loppings of the gardener in five or six thousand years to come? How unreasonable is it to suppose this? But on the other hand, if the natural laws of motion are left to form the limb of an animal, or the leaves, branches and fruit of a vegetable, on such occasions, why might not the same same divine wisdom contrive laws which might form the whole animal or vegetable in its appointed successions in the course of nature?

In the formation of insects, and especially of larger animals, daily experiment destroys this hypothesis, by shewing us, that the animal, in several parts and members of it, *is imperfect and defective in the embryo*, the work is unfinished, and the laws of nature finish it by degrees, till it becomes ripe for production.*

* This account seems more exactly conformable to the words of scripture; Ps. cxxxix. 16. "Thine eyes did see my substance, yet being imperfect, and in thy book my members were written, which in continuance were fashioned, when as yet there was none of them."

This same doctrine of the gradual formation of animals is maintained by plain reasoning upon fact by Dr. Woodward in his Vindication of his Essay on the Natural History of the Earth, cited out of the Manuscript by Mr. Holloway,

I think this argument is conclusive alone, but all the considerations put together, give us abundant reason to believe, that it is by the continual and uniform agency of God upon the material world, according to certain laws of matter and motion which he has appointed in the vegetable and animal world, that there is a continual succession of plants and animals formed and maintained through all ages, and the honour of such a wondrous contrivance is due to the great Creator.*

Sect. III.—*Of the Nourishment and Growth of Plants.*

IN the beginning of time and nature at the command of God, the earth brought forth plants and herbs, and four-footed animals in their various kinds; but the birds of the air, as well as the fishes, were produced by the same command out of the waters. This was intimated in a former section. The water and the earth were the first appointed *mothers*, if I may so express it, of all the animal and vegetable creation. Since that time they cease to be *parents* indeed, but they are the common *nurses* of all that breathes, and of all that grows. Nor is the wisdom of God much less conspicuous in constituting two such plain and simple beings as the earth and water, to be the springs of nourishment and growth to such an innumerable variety of creatures, than it was in the formation of them out of two such materials. Is it not counted an admirable piece of divine contrivance and wisdom, that the single principle of *gravitation* should be employed by the Creator, to answer so many millions of purposes among the heavenly bodies in their regular revolutions, as well as among the inhabitants, and the furniture of this earthly globe where we dwell? And may it not be esteemed as astonishing an effect of the same supreme wisdom, that two such simple things as *water* and *earth* should be the common material out of which all the standing ornaments, the vegetable beauties, and the moving inhabitants of this our world, whether flying or creeping

in that part which is called the Translator's Introduction, from p. 18. to p. 28, where he refutes Lewenhoeck's Notion of Generation rising from the Animals in Semine Masculino. This book was published in 8° in 1726. But I am informed that this notion of all animals being contained in the first male animal is now exploded among the wiser philosophers of the age.

* Perhaps after all it may be enquired here, Whether plants and animals can possibly be formed by the *mechanical notions and powers of* matter? To this I answer, If by the word *mechanical*, we mean nothing else but those motions and powers, which proceed from the essential properties of matter considered as mere solid extended substance, then I cannot allow the proposition to be true: But if we include in the word *mechanism*, all those additional powers and motions also, which arise from the original laws of motion which God imposed upon matter at first, such as *gravitation or mutual attraction*, and others of the same kind, then I allow that all things in the successive ages of the world are formed *mechanically*; always supposing the divine agency preserving all the atoms of matter and their motions, according to these laws. And it is my opinion, that all beyond this is miracle.

lking or swimming, should receive their continual sustenance, l their increase.

Let us first consider this as it relates to the vegetable part the creation. What a profusion of beauty and fragrancy, of ıpes and colours, of smells and tastes is scattered among the :bs and flowers of the ground, among the shrubs, the trees, l the fruits of the field! Colouring in its original glory and ·fection triumphs here; red, yellow, green, blue, purple, with ıtly more diversities than the rainbow ever knew, or the prism ı represent, are distributed among the flowers and blossoms: d what variety of tastes, both original and compounded, of eet, bitter, sharp, with a thousand nameless flavours, are found ong the herbs of the garden? What an amazing difference shapes and sizes appears amongst the trees of the field and est in their branches and their leaves: and what a luxurious l elegant distinction in their several fruits? How very nu- rous are their distinct properties and their uses in human life? l yet these two common elements, *earth* and *water*, are the y materials, out of which they are all composed, from the be- ning to the end of nature and time.

Let the gardener dress for himself one field of fresh earth, make it as uniform as he can; then let him plant therein all varieties of the vegetable world, in their roots or in their ls, as he shall think most proper; yet out of this common th, under the droppings of common water from heaven, every of these plants shall be nourished, and grow up in their pro- forms; all the infinite diversity of shapes and sizes, colours :es and smells, which constitute and adorn the vegetable world, uld the climate permit) might be produced out of the same ls. What rich and surprising wisdom, appears in that ighty operator, who out of the same matter shall perfume bosom of the rose, and give the garlic its offensive and nau- us powers? who from the same spot of ground, shall raise the ıorice and the wormwood, and dress the cheek of the tulip in its glowing beauties? What a surprise to see the same field nish the pomegranate and the orange tree, with their juicy it, and the stalks of corn with their dry and husky grains?— observe the oak raised from a little acorn, into its stately ·wth and solid timber; and that pillars for the support of fu- e temples and palaces should spring out of the same bed of th, that sent up the vine with such soft and feeble limbs as are ible to support themselves? What a natural kind of prodigy t, that chilling and burning vegetables should arise out of the ne spot? that the fever and frenzy should start up from the ne bed where the palsy and the lethargy lie dormant in their ds? Is it not exceeding strange, that healthful and poisonous :es should rise up in their proper plants out of the same com-

mon glebe, and that life and death should grow and thrive within an inch of each other.

What wondrous and inimitable skill must be attributed to that supreme power, that first cause, who can so infinitely diversify the effects, where the servile second cause is so uniform, and always the same* ?

It is not for me in this place to enter into a long detail of philosophy, and shew how the minute fibres and tubes of the different seeds and roots of vegetables take hold of, attract, and receive the little particles of earth and water proper for their own growth; how they form them at first into their own shapes, and send them up aspiring above ground by degrees, and mould them so, as to frame the stalks, the branches, the leaves and the buds of every flower, herb and tree. But I presume the world is too weary of *substantial forms*, and *plastic powers* and names without ideas, to be persuaded that these mere creatures of fancy should ever be the operators in this wondrous work. It is much more honourable *to attribute all to the design and long forethought of God the Creator*, who formed the first vegetables in such a manner, and appointed their little parts to ferment under the warm sun-beams, according to such established laws of motion, as to mould the atoms of earth and water which were near them into their own figure, to make them grow up into trunk and branches, which every night should harden into firmness and stability; and again, to mould new atoms of the same element into leaves and bloom, fruit and seed, which last being dropt into the earth, should produce new plants of the same likeness to the end of the world.

If I were to represent this matter to the unlearned part of mankind, I might do it perhaps more intelligibly to them by this rude and coarse simile than by the nicest accuracies of philosophical description. Suppose a mass of uniform green wax of a very soft temperature, and a little mollified by the sun beams, should be strained through small round pieces of cloth of all varieties of texture, shall I name for instance, canvass, sackcloth, holland, diaper, lawn, &c. In some of which I will suppose the threads were so woven, as to make different stripes and figures. Now if the wax were forced upwards through all those cloths, you would see a vast variety, as it were, of rising *stamina* or fibres, which shall be supposed to constitute the different round stalks of these artificial vegetables: These would cer-

Note, I do not pretend that all the particles of which common earth is composed, are exactly *uniform* and *similar*. It is allowed that there are some atoms of it much more suited to vegetation than others, and perhaps to the nourishment of some vegetables rather than others. The same is granted concerning water. But I call these elements, or materials *uniform* in this respect, that in every crumb of earth, and in eve y drop of water, there is no such variety possible, as actually *to contain* the proper parts of every plant in their own form.

tainly make a very various appearance to the eye, according to their shapes and sizes; and perhaps also, in different positions of light and shade might afford glimpses of as different colouring, as the verdure of distinct plants. Suppose yet further, these rising fibres, or threads of wax to be condensed and hardened by the cool air of the night, and continue in their proper forms; and the next day the softer wax should be forced up again, not only through these cloths, but also through the interstices of these hardened threads or fibres: Here would be some plain difference of the next mould in which the growing parts of this plant would be cast, in order to give it some further different shapes. Suppose the branches and leaves to be formed this way; and when these are condensed and hardened at night, then further efforts of straining the wax upward, might go on to represent in a rude manner some gross idea of vegetation. But it is easier for the sons of men to stand and wonder, and adore God the Creator, than to imitate, or even to describe his admirable works. In the best of their descriptions and their imitations of his divine artifice, they do but chatter like Hottentots, and paint like Goths and Vandals.

Sect. IV.—*Of the Nourishment and Growth of Animals.*

LET us proceed in the next place to survey new wonders. *All the animals of the creation, as well as the plants, have their original nourishment from these simple materials, earth and water.* For all the animal beings which do not live upon other animals, or the produce of them, take some of the vegetables for their food: And thus the brutes of prey are originally indebted to the plants and herbs, i. e. to the earth for their support, and their drink is the watery element. That *all flesh is grass*, is true in the literal, as well as the metaphorical sense. Does the lion eat the flesh of the lamb? Doth the lamb suck the milk of the ewe? But the ewe is nourished by the grass of the field. Does the kite devour the chicken, and the chicken the little caterpillars or insects of the spring? But these insects are ever feeding on the tender plants, and the green products of the ground. The earth moistened with water, is the common nurse of all. Even the fishes of the sea are nourished with some green vegetables that spring up there, or by preying on lesser fishes which feed on these vegetables. But let us give our meditations a loose on this entertaining subject, and we shall find numerous instances of wonder in this scene of divine contrivance.

1. *What very different animals are nourished by the same vegetable food!* The self-same herbage or fruits of the earth by the divine laws of nature and providence, are converted into animated bodies of very distinct kinds. Could you imagine that

half the fowls of the air, as different as they are, from the crow to the tit-mouse, should derive their flesh and blood from the productions of the same tree, where the swine watches under the boughs of it and is nourished by the droppings of the fruit? Nor need I stay to take notice what numerous insects find their nests and their food all the summer season from the same apples or apricots, plums or cherries, which feed hogs and crows, and a hundred small birds. Would you think that the black and the brindled kine, with the horses both grey and bay, should clothe themselves with their hairy skins of so various colours out of the same green pasture where the sheep feeds, and covers himself with his white and woolly fleece? And at the same time the goose is cropping part of the grass to nourish its own flesh, and to array itself with down and feathers. Strange and stupendous texture of the bodies of these creatures, that should convert the common green herbage of the field into their different natures, and their more different clothing! But this leads me to another remark.

2. *What exceeding great diversity is found in the several parts, limbs, and coverings even of the same creature!* An animated body is made up of flesh and blood, bones and membranes, long hollow tubes, with a variety of liquors contained in them, together with many strings and tendons, and a thousand other things which escaped the naked sight, and for which anatomy has hardly found a name: Yet the very same food is by the wondrous skill and appointment of the God of nature formed into all these amazing differences. Let us take an ox to pieces, and survey the wondrous composition. Besides the flesh of this huge living structure, and the bones on which it is built, what variety of tender coats and humours belong to that admirable organ the eye? How solid and hard are the teeth which grind the food? How firm the general ligaments that tie the joints of that creature together? what horny hoofs are his support, and with what different sort of horny weapons has nature furnished his forehead? Yet they are all framed of the same grassy materials: The calf grazes upon the verdant pasture, and all its limbs and powers grow up out of the food to the size and firmness of an ox. Can it be supposed, that all these corpuscles, of which the several inward and outward parts of the brute are composed, are actually found in different and proper forms in the vegetable food? Does every spire of grass actually contain the specific parts of the horn and the hoof, the teeth and the tendons, the glands and membranes, the humours and coats of the eye, the liquids and solids, with all their innumerable varieties in their proper distinct forms? This is a most unreasonable supposition and vain philosophy. No, it is the wisdom of the God of

ire that distributes this uniform * food into the several parts he animal by his appointed laws, and gives proper nourish- nt to each of them.

Again, 3dly. If the food of which one single animal par- ea be never so various and different, yet the same laws of ion, which God has ordained in the animal world, *convert m all to the same purposes of nourishment for that crea- e.* Behold the little bee gathering its honey from a thousand rers, and laying up the precious store for its winter food. rk how the crow preys upon a carcase, anon it crops a cherry m the tree; and both are changed into the flesh and feathers of row. Observe the kine in the meadows feeding on a hundred ieties of herbs and flowers, yet all the different parts of their lies are nourished thereby in a proper manner: Every flower the field is made use of to increase the flesh of the heifer, and nake beef for men: And out of all these varieties there is a le milky juice flowing to the udder which provides nourish- nt for young children.

So near a-kin is man the lord of the creation, in respect his body, to the brutes that are his slaves, that the very same d will compose the flesh of both of them, and make them ow up to their appointed stature. This is evident beyond ubt in daily and everlasting experiments. The same bread- n which we eat at our tables will give rich support to sparrows d pigeons, to the turkey and the duck, and all the fowls of yard: The mouse steals it and feeds on it in his dark retire- nts; while the hog in the sty, and the horse in the manger, uld be glad to partake. When the poor cottager has nursed a couple of geese, the fox seizes one of them for the sup- rt of her cubs, and perhaps the table of the landlord is rnished with the other to regale his friends. Nor is it an common thing to see the favourite lap-dog fed out of the same wl of milk which is prepared for the heir of a wealthy family, t which nature had originally designed to nourish a calf. ie same milky material will make calves, lap-dogs and human dies.

How various are our dishes at an entertainment? how has xury even tired itself in the invention of meats and drinks in excessive and endless variety? Yet when they pass into the

* By the word "uniform" here I do not mean, that all the parts of each re of grass, by which animals are nourished and increased, are perfectly simi- , any more than the parts of earth and water, by which vegetables are nou- hed and grow, are all perfectly of one shape and size; but I believe it will be nily granted me, that the parts of every spire of grass are not so various and ltiform, as to answer all the various parts of the animal which are supported increased by it, as well as the flesh and limbs, &c. of different animals. This l be yet more evident, if we consider that nature turns all food whatsoever o the uniform substance of "chyle," before the animal is nourished by it, ich shall be shewn immediately.

common boiler of the stomach, and are carried thence through the intestines, there is a white juice strained out of the strange mixture called *chyle*, which from the lacteal vessels is conveyed into the blood, and by the laws of nature is converted into the same crimson liquor. This being distributed through all the body by the arteries, is farther strained again through proper vessels, and becomes the spring of nourishment to every different part of the animal. Thus the God of nature has ordained, that how diverse soever our meats are, they shall first be reduced to an uniform milky liquid, that by new contrivances and divine art, it may be again diversified into flesh and bones, nerves and membranes. How conspicuous, and yet how admirable are the operations of divine wisdom in this single instance of nourishment! But it is no wonder that a God who could create such astonishing and exquisite pieces of machinery as plants and animals, could prescribe such laws to matter and motion as to nourish and preserve the individuals, as well as to propagate the species through all ages to the end of time.

Sect. V.—*An amusing Digression concerning the Changes of Matter.*

PERHAPS it may not be amiss to follow a track of pleasing amusement, which by a very easy and natural inference arises from the subject in hand, and which was very happily represented in a late conversation among some of the great and the wise. Theron, a man of wealth and figure, but unacquainted with philosophic science, sat in the midst of his friends of both sexes in a stately room with rich variety of furniture. Among other conversation Theron was complaining, that he had heard it often said, *how much we were all indebted to the country and the plough;* but for his part he knew no obligation that we had to that low rank of mankind, whose life is taken up in the fields, the woods and the meadows, but that they paid their rents well, that the gentlemen might live at their ease. Crito was pleased to seize the occasion, and entertained the gay audience with a surprising lecture of philosophy.

Permit me, Theron, said he, to be an advocate for the peasant, and I can draw up a long account of particulars, for which you are indebted to the field and the forest, and to the men that cultivate the ground, and are engaged in rural business. Look around you on all the elegant furniture of the room, survey your own cloathing, cast your eyes on all the spendid array of Therina, and Persis, and the other ladies near them, and you will find, that except a few glittering stones, and a little gold and silver which was dug out of the bowels of the earth, you can scarce see any thing that was not once growing green upon the ground, through the various labours of the planter and the ploughman. *Whence* came the floor you tread on, part whereof is inlaid with

ood of different colours? Whence these fair *pannals of wain-ot*, and the *cornish* that encompasses and adorns the room? Vhence this lofty *roof of cedar*, and the carved ornaments of ? Are they not all the spoils of the trees of the forest? Were it these once the verdant standards of the grove or the moun-in? What are your *hangings of gay tapestry?* Are they not ring to the fleece of the sheep which borrowed their nourish-ent from the grass of the meadows? Thus the finery of your rlour once was grass; and should you favour me with a turn to your bed-chamber, I could shew that the curtains, and the ien, and the costly coverings, where you take your nightly re-se were some years ago all growing in the field.

But I need not retire from the room where we are seated to ive you abundant discoveries of this truth. Is not the hair of mels a part of the materials which compose those rich *curtains* hich hang down by the window, and the easy *chairs* which commodate your friends? and if you think a little, you will id that camels with their hair were made of grass as well as ie sheep and their wool. I confess the *chimney* and the *coals*, ith the implements of the hearth, the brass and iron, were dug it of the ground from their beds of different kinds, and you ust go below the surface of the earth to fetch them: But what ink you of those nice tables of *mosaic* work? They confess ie forest their parent. What are the *books* which lie in the win-ow, and the little implements of *paper*, and *wax*, *pens*, and *afers*, which I presume may be found in the scruitoire? And ay I not add to these, that inch of *wax-candle*, which stands eady to seal a letter, or perhaps to light a pipe! You must rant they have all the same original, they were once mere ve-etables. Paper and books owe their being to the tatters of linen, hich was woven of the threads of flax or hemp: The paste-board covers are composed of paper, and the leather is the skin of the calf that drew its life and sustenance from the meadows. The pen that you write with was plucked from the wings of the goose, which lives upon the grass of the common: The ink-horn was borrowed from the front of the grazing ox; the wafer is made of the paste of bread-corn; the sealing-wax is said to be formed chiefly of the gum of a tree, and the wax for the can-dle is originally plundered from the bee, who stole it out of a thousand flowers.

Permit me, ladies, said the philosopher, to mention your dress: Too nice a subject indeed for a scholar to pretend any skill in it: But I persuade myself your candour will not resent my naming the rich materials, since I leave those more important points, the fashion and the air, to be decided entirely by your superior skill. Shall I enquire then, who gave Persis the silken habit which she wears; did she not borrow it from the worm that spun those shining threads? And whence did the worm

borrow it but from the leaves of the mulberry-tree, which was planted and nourished for this purpose by the country swain? May I ask again, how came Therina by those ornaments of fine lace which she is pleased to appear in, and the costly lace of Flanders that surrounds it? Was it not all made of the stalks of flax that grew up in the field like other vegetables? And are not the finest of your muslins owing to the Indian cotton-tree. Nor can you tell me, Theron, one upper garment you have, whether coat, cloak, or night-gown, from your shoulders to your very feet, as rich and as new as you think it, which the sheep, or the poor silk-worm had not worn before you. It is certain, the beaver bore your hat on his skin; that soft fur was his covering before it was yours; and the materials of your very shoes, both the upper part and the soles of them, covered the calf or the heifer, before they were put on your feet: all this was grass at first, for we have seen that all the animal world owes its being to vegetables.

The company seemed strangely surprized, and thought they had been led into fairy-land; they imagined themselves decoyed into the midst of inchantments, while their fancy roved through all these transformations. Yet the discourse seemed to carry such evidence and conviction with it, that though they retained their wonder, they could not withhold their assent.

When Crito had given them leave to muse a little he took up the argument again. Give me leave, madam, said he to Therina, without offence, to lead you into further wonders. You have seen that the furniture of the place where we are, as well as the precious attire in which you are drest, were lately the production, and the ornaments of the forest, the meadow or the garden. But could you forgive me, madam, if I should attempt to persuade you, that that beautiful body of yours, those features, and those limbs, were once growing also in the fields and the meadows? I see, lady, you are a little shocked and surprized at the thought. I confess the ideas and sentiments of philosophy are not always so courtly and so favourable to human nature as to be addrest to the tender sex: But pardon me, Therina, if I enquire, was not your infancy nursed with milk and bread-corn? Have you not been fed with wheat, though it was of the finest kind? And your drink, what has it been but either the infusion of barley, or the juice of the grape, or, for variety, perhaps the cyder-grove has supplied you? The flesh with which you have been nourished to such a well-proportioned stature belonged to four-footed animals, or to the fowls of the air; and each of these have either been fed with corn or grass: Whence then, madam, has your own body been supported, and what do you think it is made of?

But it is safer to transfer the argument to myself. These

bs of mine, Therina, owe themselves entirely to the animal vegetable food, to the roots or the stalks, to the leaves or the it of plants, or to the flesh of brute creatures which have past ough my mouth for these fifty years, or the mouths of my ents before me: This hand would have been worn to a mere leton, my arms had been dry bones, and my trunk and ribs statue of death, had they not all received perpetual recruits m the field. These lips which now address you, are of the ne materials, and they were once growing like the grass of the th. This very flesh which I call mine now, did belong to the ep or the ox, before it was a part of me; and it served to the their bones before it covered mine. You know, Theron, u are a gentleman who delight in rural sports when you reside your country-seat, and you love to feast on the game that you re pursued. Did you ever suppose that any part of yourself s once hurried through the air in the breast of a frighted par-lge, which came before night into your net? Or that any ce of you was ever driven through the fields before the full-uthed hounds, on the legs of a hunted hare, which was the xt day prepared for your table? Had you ever so strange a ught as this is? And can you believe it now? Or upon a vey of my argument, can you tell how to deny it? And what hares and partridges made of but growing herbage or shat-ed corn?

It is true, you have sometimes tasted of fish, either from the or the rivers, but even these in their original also are a sort grass; they have been fed partly by sea weeds, and partly by ser fish which they have devoured, whose prime and natural arishment was from some vegetable matter in the watry world. short, sir, I am free to declare, that whether I have eaten eese or butter, bread or milk; whether I have fed on the ox or e sheep, or the fowls of the air, or the fish of the sea, I am rtain that this body, and these limbs of mine, even to my teeth d nails, and the hairs of my head, are all borrowed originally om the vegetable creation. Every thing of me that is not a *inking power*, that is not *mind or spirit*, was once growing e grass on the ground, or was made of the roots which sup-rted some green herbage.

And now, Theron, what think you of all these paradoxes? Which of them do you cavil at? Which leaves you room for oubt or question? Is not philosophy an entertaining study, iat teaches us our original, and these astonishing operations f divine wisdom and providence? But it teaches us also to ave humble thoughts of ourselves, and to remember whence e came.

Theron, to conclude the discourse, confessed his surprize and onviction; he acknowledged the justice of Crito's whole argu-

ment, gave him hearty thanks for his instructive lecture, and resolved to remember these amazing scenes of the operations of nature, and the adorable wisdom of God his Maker. Nor shall I ever forget, said he, the strange and unsuspected dependence of man on all the meaner parts of the creation. I am convinced that *pride was never made for man*, when I see how much a-kin his body is to the fowls of the air and brutes of the earth. And I think, said he, I am more indebted to my tenants than ever I could have imagined, nor will I cast such a scornful eye again on the grazier and the farmer, since this flesh and blood of mine, as well as the furniture of my house, and the clothes I wear, were once growing in the fields or the woods under their care or cultivation; and I, find I am nearer a-kin to them, since this self of mine, with all the finery that covers it, was made originally of the same materials with them and their coarser coverings.

SECT. VI.—*The similar Operations of Plants and Animals.*

IT is with admiration and pleasure we take notice of the regular actions of animals, even in their earliest hours of life, before they can possibly be taught any thing by remark or imagination. Observe the young *sparrows* in the nest, see how the little naked creatures open their mouths wide to their dam, as though they were sensible of their dependence on her care for food and nourishment: but the *chicken* just released from the prison of the shell, can pick up its food with its own bill, and therefore it doth not open its mouth to beg food of the hen that hatched it. Yet the chicken seems to shew its dependence too, for when the first danger appears, you see it run and fly to the wing of its dam for protection; as though it knew, that though it could feed itself, yet it was not able to defend itself, but must trust to better security and a parent's wing. We admire these little creatures and their remarkable sagacity; we are surprized to find that they distinguish so happily, and pursue their proper interest; that they are so soon acquainted with their abilities and their wants, and come to use their *understanding* so very early; for it is evident, that the mere faculty of sense, that is, the passive reception of images or ideas, can never be sufficient to account for these wondrous imitations of reason; *sense* has nothing to do but with the present impression, and includes no reflection or prospect of the past or the future, no contrivance of means to an end, nor any action in order to obtain it.

But what shall we say, or how shall we account for it, if we are told, there are instances almost as admirable as these to be found in the vegetable world, where we never suspect sense or reason? The *vine*, as though it were sensible of its own weakness, thrusts forth its long tendrils, which curl round the branches of any stronger tree that stands near, and thus it hangs its weighty

usters upon the arms of the elm that support it. Nay, every uster has a tendril belongs to it, and if any stronger twig of its vn be within its reach, it hangs itself there by this tendril for pport. The *hop* and the *lupin*, or *French-bean*, as though ey knew they could not stand by themselves, find another way raise their heads on high; they twine the whole length of eir bodies round the poles or the rods which are planted near em; and thus their growth and their fruit are upheld from rotng upon the ground. The *ivy*, for the same reason, but by nother contrivance, climbs up the oak, and sticks close to its sides: id the feeble plant which we vulgarly call the *creeper*, that n hardly raise itself three feet high alone, thrusts out its aws at proper distances, fixes them fast in the neighbouring all or building, and mounts by this means to the tops of highest uses. What variety of artifice is found here among these feee vegetables to support themselves!

Yet we believe these plants have no *understanding*, and ankind are all agreed they have no such thing as *sense* belongg to them; and we immediately recur to the wisdom of God e Creator, and ascribe the contrivance and the honour of it to m alone. It was he (we say) who gave the *vine* its curling tenils, and the *creeper* its hooky claws: it was he instructed the e to bind itself with natural winding cords to the boughs of a ronger tree, and he taught the other, as it were, to nail itself ainst the wall. It was he shewed the *ivy* to ascend straight up e oak; and the *hop* and the *lupin*, in long spiral lines, to twine und their proper supporters.

Let us enquire now, what do we mean by such expressions these? Truly nothing but this; that God formed the natures these vegetables in such a manner, as that by certain and apinted rules of mechanical motion, they should grow up and ve their bodies and their branches so as to raise and to uphold emselves and their fruit. Thus the wisdom of God, the great tificer, is glorified in the vegetable world.

And why should we not give God the Creator the same nour of his wisdom in the animal world also? Why may we t suppose that he has formed the bodies of brute creatures, and their inward springs of motion, with such exquisite art, as en in their youngest hours, without reasoning and without imiion, to pursue those methods as regularly, which are necessary r their life and their defence, by the same laws of motion and the me unthinking powers? This is nature when God has appointl it. This seems to be the true idea, and the clearest explication that obscure word, *instinct*.

If we allow these young animals to perform all their affairs their own contrivance and sagacity, why don't we ascribe e same sagacity and artifice to *vines* and *ivy*, that we do to

young *sparrows* or *chickens?* The motions of the plants are slower indeed, but as regular and rational as those of the animals; they shew as much design and contrivance, and are as necessary and proper to attain their end. Besides, if we imagine these little young birds to practise their different forms of motion for their nourishment or defence by any springs of *reason or thought, meaning or design in themselves*, do we not ascribe understanding to them a little too soon, and confess their knowledge is much superior to our own, and their reason of more early growth? Do we not make *men*, or rather *angels*, of them, instead of *brute* creatures? But if we suppose them to be acted by the peculiar laws of animal motion, which God the Creator by a long foresight has established amongst his works, we give him the honour of that early and superior reason, and we adore the divine artificer; Psal. cxlv. 10. *All thy works shall praise thee, O Lord.*

But we are lost among these wonders of thy wisdom, we are ignorant of thy divine and inimitable contrivances. What shall we say to thee thou all-wise creating Power! Thy works surprize us; the plants and the brutes puzzle and confound our reasonings: We gaze at thy workmanship with sacred amazement, thy ways in the kingdom of nature are untraceable, and thy wonders past finding out.

Sect. VII.—*Of the Principles of Action in Brutes and Men.*

BUT what will some readers say when they peruse these discourses? Are *plants* and *brutes* so very near a-kin to each other, creatures which we have always distinguished into the *sensible* and the *senseless?* Have birds and beasts no more perception or feeling, knowledge or consciousness, understanding or will than the herbs, the trees and the flowers? Is the grass of the field as wise a thing as the animal which eats it? Excuse me here, my friends; I dare assert no such paradoxes. What if some of the early actions of brute creatures are merely the effects of such machinery and instinct as I before described? It does not follow thence that all the actions and operations of their lives must be ascribed to such a mechanical principle. Even in human nature, where there is an undoubted principle of sense and reasoning, there are some early actions which seem to be the proper effects of such instinct or mechanism, and are owing to the wondrous divine artifice in the contrivance of their animal bodies, and not to any exercise of their own reasoning powers. How doth the infant hunt after the breast, and take it into its mouth, moving the lips, tongue, and palate in the most proper forms for sucking in the milk to nourish it? How does it readily shut the eyes to cover them from any danger near? How does it raise its cries and wailings aloud for help

when it is hurt? These are certainly the effects of instinct in their outward members, as much as the circulation of their blood and digestion of their food in their bowels and inward parts.

It is certain there are several operations in the lives of brute creatures which seem to be more perfect imitations of reason, and bid fairer for the real effect of a reasoning principle within them than these early actions which I have mentioned. What strange subtlety and contrivance seem to be found in the actions of dogs and foxes? What artifices appear to be used both by birds and beasts of prey, in order to seize the animals which were appointed for their food, as well as in the weaker creatures to avoid and escape the devourer? How few are there of the passions as well as the appetites of human nature, which are not found among several of the brute creatures? What resentment and rage do they discover? What jealousy and fear, what hope and desire, what wondrous instances of love and joy, of gratitude and revenge? What amazing appearances of this nature are observed in birds and beasts of the more docile and domestic kind, that they utterly puzzle and pose the wisest of philosophers to give a plain, fair and satisfactory account how all these things can be performed by mechanism, or the mere laws of matter and motion? I confess it is impossible for us to determine with any certainty how far the powers of mechanism can go, when under the direction of infinite wisdom in the original formation of these engines; and how far certain general laws of animal motion may be at first appointed by God the Creator which may reach to perform all the visible appearance in the brutal creation for six thousand years together. But if this be machinery contrived by an all-pervading mind, it is certain that it is not be explained by all the present sciences and reasonings of men.

I confess also on the other hand I am not very fond of allowing to brutes such an immaterial soul, such a thinking and reasoning power, which in its own nature must carry immortality with it. Every emmet upon a mole-hill, and every bee in a swarm, lays as just a claim to such a spirit as an ox or an elephant. The amazing instances of appearing sagacity and reasoning, design and choice, which discover themselves in these little creatures make as good pretence to such a sublime principle of consciousness, judgment and liberty. And why may not the millions of mites in a cheese, and the nations of other animalcules which swarm invisible to the naked eye, be entitled to the same reasoning powers or spirits, since their motions, so far as glasses discover them, are as happily suited to the ends of animal life? It is difficult to bring one's self to believe that an immaterial spirit is prepared for each of these minute creatures so soon as their body is formed, and that at the death of the body it ceases to exist, or that it passes by divine appointment from one animal to another, by certain unknown laws of transmigration.

The late Bishop Burnet, who was no indiligent enquirer into various knowledge, seems to determine in his *Exposition of* the *First Article* of the Church of England, ed. 8. page 34. that one of these two opinions is now 'the result of the thoughts of the learned (viz.) that either brutes are mere machines, or that they have reasonable souls. "It is certain," says he, "that either beasts have no thought or liberty at all, and are only pieces of finely organized matter, capable of many subtle motions that come to them from objects without them; but that they have no sensation nor thought at all about them;" or,—But he supposes, that "human nature can hardly receive or bear this notion, because there are such evident indications of even high degrees of reason among the beasts;" he concludes therefore, "It is more reasonable to imagine, that there may be spirits of a lower order in beasts, that have in them a capacity of thinking and chusing; but that it is so entirely under the impressions of matter, that they are not capable of that largeness either of thought or liberty, that is necessary to make them capable of good or evil, of rewards and punishments; and that therefore they may be perpetually rolling about from one body to another, i. e. by perpetual transmigrations from body to body.

It is far beyond all my skill in philosophy to adjust and determine these differences, and to decide this question. Sometimes I think it is hard to allow even *sensation* to brutes, or to imagine that their Creator, who is perfect equity and goodness, should expose creatures, who are innocent and could never sin, to such a life of intense toil, anguish and misery, and to such cruel deaths as some of them sustain. At other times I can hardly avoid ascribing *reason* to them, when I observe so many signatures of all the violent and the tender passions, both in their motions, their eyes, and their countenance, and so many appearances of thought, contrivance, and design. Every ant and worm puzzles my reasonings, and baffles all my science.

But on which side soever this question be determined, I desire to lay down this bar or caution against the inference that *atheists* or *materialists* would make on this subject; and that is, that how many actions soever may be performed by brute creatures, without any principle of sense or consciousness, reason or reflection, yet these things can never be applied to human nature. It can never be said, that man may be an engine too, that man may be only a finer sort of machine, without a rational and immortal spirit. And the reason is this. Each of us feel and are conscious within ourselves, that we think, that we reason, that we reflect, that we contrive and design, that we judge and chuse with freedom, and determine our own actions: We can have no stronger principle of assent to any thing than present, immediate, intellectual consciousness. If I am assured of the truth of any

nference whatsoever, it is because I am sure of my consciousness of the premises, and of my consciousness that I derive this inference from them. My consciousness of these premises therefore is a prior ground of assurance, and the foundation of all my certainty of the inferences. Let a thousand reasons therefore be laid before me, to prove that I am nothing but an engine, my own inward present consciousness of this proposition, that I have thoughts, that I have reasoning powers, and that I have a will and free choice, is a full evidence to me that these are false reasonings, and deceitful arguments: I know and am assured, by what I feel every moment, that I have a spirit within me capable of knowing God, and of honouring and dishonouring my Maker, of chusing good or evil, of practising vice or virtue; and that I hereby am bound to approve myself to the Almighty Being that made and governs me, who will reward me in some future state or other, according to my behaviour in this.

And as I can certainly determine this truth, with regard to my own nature, so when I see creatures round about me of the very same species with myself, I justly infer the same truth concerning them also; I conclude with assurance, that they are not mere engines, but have such reasonable and immortal spirits in them, as I find in myself. It is this inference of similar and equal causes from similar and equal effects that makes a great part of the science of mankind.

Besides, I daily hear men discoursing with me on any subject, and giving as regular and reasonable answers to my enquiries, as I do to theirs; I feel within myself, it is impossible for me do this without thinking, without the careful exercise of my intellectual and reasoning faculties superior to all the powers of mechanism; and thence I infer it is as impossible for them to practise the same discourse or conversation, without the powers of a rational and intelligent spirit, which in its own nature is neither material nor mortal. Let the question therefore which relates to brute creatures be determined to any side, it does not at all affect the nature, the reason or the religion of mankind. It is beyond all doubt that man is a creature which has an intelligent mind to govern the machine of his body, that man has knowledge, and judgment, and free choice; and unless he approve his conduct to the eyes of his Creator and his Judge in this state of mortality and trial, he exposes himself to the just vengeance of God in his future and immortal state.

It is certain, that the all-wise and all-righteous Governor of intelligent creatures, will not appoint the very same fate and period to the pious and the profane; neither his wisdom, his equity, nor his goodness, will suffer him to deal out the same blessings and the same events in every state of existence, to those who have loved him with all their souls, and those who have

hated and blasphemed his name. It is the glory and the interest of the supreme Ruler of the universe, to make a conspicuous and awful distinction in one world or another, between those who have endeavoured to serve him, and to render his majesty honourable among men, and those who have impiously abused all his favours, ridiculed his thunder, and robbed him of his choicest honours. But if philosophy should fail us here, if it were possible for creatures of such different characters to have nothing in their own natures which was immortal, yet it is a very reasonable thing, that the great Judge of all should prolong their beings beyond this mortal state, that the sons of vice might not go triumphant off the stage of existence, and that the men of virtue might not be always oppressed, nor come to a period of their being, without some testimony of the approbation of the God that made them.

ESSAY X.

Of Sun-Beams and Star-Beams.

SECT. I.—*Is the* Ether *beyond our Atmosphere a mere Vacuity?*

Answ. NO; by no means: For there is not one minute spot in all the solar system, where the pupil of an eye might not be placed, and see a hemisphere of stars. Suppose the visible stars to be no more in number than the ancients counted them; viz. a thousand and twenty-six, or for the sake of a round number, one thousand only; yet the other stars visible to the naked eye, together with those which are visible by a telescope, would amount at least to many thousands more. Suppose between the least of these telescopical stars, and the visible stars of the first magnitude, the apparent difference be no greater than that of one to a hundred: Suppose again, that from the least of these stars but one single ray came to one eye, then from the biggest star there must proceed a hundred rays: This would multiply the rays of all the stars in a hemisphere, which came to each eye with sensible notice, by the assistance of a telescope, at least to a hundred thousand, without standing to make a nice computation. What millions of millions of star-beams then must be for ever passing through the ethereal space, to be able to meet every eye placed in any part of this vast sphere of our world, if there be not a spot upon it so big as the pupil of an eye, but must admit of so many thousand beams; what infinite rencounters and decussations, meetings and crossings through all the parts of our solar system?

Next, let us suppose each of these pupils were turned inward toward the sun; each will meet with a far greater number of beams of light from the sun, in such a proportion as the full blaze of day is superior to the glimmering light of the star-beams. The vast addition of rays from the sun does almost infinitely increase the rencounters and decussations: Sun-beams and star-beams, ever meeting in innumerable myriads throughout the ether of our solar world; since we have allowed that there is not a spot in it whence a hemisphere of stars might not be seen by night, and whence also we may not see a hemisphere of blazing day-light.

Let it be remembered also, that these motions of the particles of light both from the sun and stars, are and have been incessant ever since the creation, both by night and day: For

our night and day are only distinguished by the little globe of our earth turning its different sides toward the sun, which is an inconsiderable thing in the vast solar world, or planetary system. The reason why we do not discern the stars by day, being only the superior quantity and force of the sun-beams striking the eye, whereas the star-beams strike also constantly, but so feebly, as not to be noticed: And the reason why we do not see the sun by night, being the interposition of the earth, and the sun-beams that go beside the earth, fly from our eyes, and not toward them: But the same quantity of sun and star-beams are perpetually flowing through the ether in every minute part of it, except only those few places, where the planets or their satellites intercept them, and stop their motion. Now the corollaries that may be drawn from these suppositions are,

1. That since light is a body, which has been sufficiently proved by its reflexions and refractions, &c. *the ether is not so void a space as perhaps some have been ready to imagine*, since there is not a minute spot in it, wherein there are not many thousand bodies always moving with prodigious swiftness all manner of ways. And it may be enquired whether the planets moving through such a fluid, would not by degrees be retarded in their courses; but the next corollary perhaps may answer it.

2. *How amazing must be the subtlety and smallness of these rays*, which have been shooting from the sun and stars for almost six thousand years, and yet no sensible addition is made to the bulk of our globe where they seem to be all lost, nor any sensible diminution of the sun or stars whence they all proceed? And if these corpuscles which compose this wondrous thing called *light*, are so inconceivably small, and the body be so rare, perhaps the planets may pass through it without sensible retardation. And yet Dr. E. Halley has told us in *Miscellanea Curiosa*, p. 59. he thinks he can demonstrate, that the opposition of the ether to the motion of the planets in long time becomes sensible.

3. *What a surprising work of God is vision*, that notwithstanding all these infinite meetings and crossings of star-beams and sun-beams night and day, through all our solar world, there should be such a regular conveyance of light to every eye, as to discern each star so distinctly by night, as well as all other objects on earth by day? And this difficulty and wonder will be greatly increased by considering the innumerable double, treble, and ten fold reflections and refractions of sun-beams or day light near our earth, and among the various bodies on the surface of it. Let ten thousand men stand round a large elevated amphitheatre; in the middle of it, on a black plain, let ten thousand white round plates be placed, of two inches diameter, and at two inches distance;

very eye must receive many rays of light reflected from every plate, in order to perceive its shape and colour; now if there were but one ray of light came from each plate, here would be ten thousand rays falling on every single eye, which would make twenty thousand times ten thousand, that is two hundred millions of rays crossing each other in direct lines, in order to make every plate visible to every man. But if we suppose that each plate reflected one hundred rays, which is no unreasonable supposition, this would rise to twenty thousand millions. What an amazing thing is the distinct vision of the shape and colour of each plate by every eye, notwithstanding these confused crossings of rays? What an astonishing composition is the eye in all the coats and all the humours of it, to convey those ten thousand white images, or those millions of rays so distinct to the *retina*, and to impress or paint them all there? And what further amazement attends us, if we follow the image on the *retina*, conveying itself by the optic nerves into the common sensory without confusion? Can a rational being survey this scene, and say there is no God? Can a mind think on this stupendous bodily organ, *the eye*, and not adore the wisdom that contrived it?

SECT. II.—*Doth the World grow bigger or less?*

LET us suppose, according to modern philosophy, that the universe is of vastly larger extent and compass, than ever our ancestors imagined, and that each of the innumerable multitude of stars is a sun to some system of planetary worlds, which are continually rolling round it: Yet I now take it for granted, that the number of these stars is not actually infinite; for the number of the star-beams would then be almost infinitely greater than infinite; besides other absurdities, which I think would follow from the supposed infinity of the universe. We will determine therefore at present, without further debate, *that it must have some limit*: Now this limit must be either some hard and capacious body including the whole world, as in a box or a hollow sphere, restraining the particles of light from a further progress, or else it must be the actual agency of the power of God, confining the utmost star-beams in their flight, and saying, *hitherto shall ye go, and no further.*

The reason I give for it is this, (viz.) If a star-beam, or the light of one of the uttermost stars continues its motion in a direct line from the star to the present limit of the universe, and be not powerfully stopped and confined there by some solid body, or the almighty will of God, it will move onward infinitely in the void space in a direct line, according to the first law of motion, (viz.) That a body moving will ever move in a direct line, onward, unless some other being divert or restrain it. Thus the universe would be for ever enlarging its bounds, as the light pro-

ceeds further in its progress, and gains upon the void space: The world would be for ever growing and increasing in extent without end. And what is said here concerning one star, may be asserted concerning our sun and every star, and the greatest part of the rays they send forth.

And if light move so swiftly, as to pass through one hundred and fourscore thousand miles in the second of a minute, as modern philosophy asserts, with what a prodigious speed must this world increase its extent, and be for ever increasing it?

Now if these star-beams have been moving through the infinite void with such an astonishing swiftness, ever since the world has been created, *i. e.* at the rate of one hundred and fourscore thousand miles in the second of a minute, what prodigious expansion has the universe arrived at, if according to Moses, we count the beginning of all things to have been but six thousand years ago? But if the Mosaic history of the creation has regard only to our earth, or to the planetary system of our sun, then, for ought we know, the universe might be created sixty thousand or six hundred thousand years ago; and how amazingly must it be dilated by such a supposition, yet continually enlarging its bounds, and gaining upon the boundless *void*?

As the universe upon this supposition will be for ever enlarging its limits, so it will be for ever diminishing its solid substance, till in time the lucid bodies are in a great measure wasted away, or at least till the luminous atoms are all fled away and gone: And then, not only the planets, but whatsoever more of solid matter remains in the stars, also will be buried in eternal darkness: And if the world had been eternal, as some persons have imagined it, it must have been long ago reduced by this means to universal midnight and desolation.

I can think but of one objection to be raised against this way of reasoning, and that is, that gravitation toward the stars or their planets would withhold these atoms of light, these luminous rays, from such a prodigious and eternal excursion into the infinite *void*.

But may it not be answered, that since gravitation could not so restrain the motion of these bright atoms, these star-beams when they were much nearer to the star and its planetary worlds, but that light when it was omitted from the star, fled with such a prodigious swiftness, even to so vast a distance, can it be supposed, that gravitation will have so much influence as to stop its motion, when it is arrived at this vast distance from the star, and all its planets?

Yet after all, I know it may be replied again, that gravitation is a power which is not limited in its agency by any conceivable distances whatsoever; and therefore when these star-beams

are run out never so far into the infinite void by the force of their first emission from the star, yet their gravitation towards the star (or some of the planetary worlds, which sometimes perhaps may be nearer to it) has perpetual influence to retard their motion by degrees, even as the motion of a comet is retarded by its gravitation towards the sun, though it flies to such a prodigious distance from the sun; and in time it is stopped and drawn back again and made to return towards its centre. And just so may we suppose all the sun-beams and star-beams that ever were emitted, even to the borders of the creation, to have been restrained by degrees by this principle of gravitation, till moving slower and slower, at last they are stopped in their progress, and made to return towards their own or some other planetary system. And if so, *then there is a perpetual return of the beams of light* towards some or other of their bright originals, an everlasting circulation of these lucid atoms, which will hinder this eternal dilatation of the bounds of the universe, and at the same time will equally prevent the wasting of the substance of the lucid bodies, the sun or stars.

Well, but if this power of restraining and reducing the flight of star-beams be ascribed to this principle of gravitation, let us enquire what is this *gravitation*, which prevents the universe from such a perpetual waste of light? It cannot be supposed to be any real property or natural power inhering in matter or body, which exerts its influence at so prodigious a distance. I think therefore it is generally agreed, and with great reason, that it is properly the influence of a divine power upon every atom of matter, which in a most exact proportion to its bulk and distance, *causes it to gravitate towards all other material beings*, and which makes all the bulky beings in the universe, viz. the sun, planets and stars attract the bodies that are near them towards themselves. Now this law of nature being settled at first by God the Creator, and being constantly maintained in the course of his providence, it is esteemed as an effect of nature, and as a property of matter, though in truth it is owing to the almighty and all-pervading power of God exerting its incessant dominion and influence through the whole material creation, producing an infinite variety of change, which we observe among bodies, confining the universe to its appointed limits, restraining the swift motion of the beams of light, and preserving this vast system of beings from waste and ruin, from desolation and darkness. If there be a world there is a God: If there be a sun or stars, every ray points to their Creator; not a beam of light from all the lucid globes, but acknowledges its mission from the wisdom and will of God, and feels the restraint of his laws, that it may not be an eternal wanderer.

But I call my thoughts to retire from these extravagant rovings, beyond the limits of creation. What do these amusements

teach us, but the inconceivable grandeur, extent and magnificence of the works and the power of God, the astonishing contrivances of his wisdom, and the poverty, the weakness and narrowness of our own understandings, all which are lessons well becoming a creature?

ESSAY XI.

On some Metaphysical Subjects.

SECT. I.—*Of Nature and Essence*.*

THE *nature* or *essence* of any being consists in a union of all those things, whether substances, or modes and properties, which are necessary to make that thing be what it is. So it is the nature of a *triangle* to have three lines so joined as to make three angles; and the nature of a *spirit* to be a thinking self-subsisting being; even as extended solid substance is the nature of body: It is the *nature* or *essence* of a grove to be a spot of ground thick set with trees, and the nature of *man* to be a spirit united to an animal of such a particular shape; and it is the essence or nature of a *rose*, to be a flower whose leaves are of such a special figure and such a beautiful faint reddish colour, with such a peculiar smell as are all united in the plant to which we give that name. The nature of a thing, by philosophers, is called its *essence*: and a thing may be said to have an essence, or nature, when it is not actually in being, if the mind of man can clearly conceive it as possible to be; so an *English* rose in *January*, *snow* in *Guinea*, or an *innocent man* on *earth*, may be said to have an essence among the nature of things, though perhaps there are not such things actually in being.

Note, The essence of *mathematical beings*, which are but a sort of abstract ideas, are eternal and immutable, and may be said in the language of the schools to consist in an indivisible point; for if a *square*, a *triangle*, or a *circle*, want the least part, or degree of its perfection, it fails of some of the properties of that figure, it loses its nature, and ceases to be that figure. But the essences of *natural beings*, as well as *artificial* or *moral*, are not so immutable as philosophers have formerly thought them; nor do they consist in an indivisible point; for natural beings are not ranged by God or man into distinct *species*, or *kinds*, so very

* *Note*, This Essay is little more than an amplification of the second chapter of the sketch of Ontology, written when the author had some thoughts of composing a larger system of that science.

ectly, that if any of the ideas which go to compose the essence any particular kind of being be never so little varied by addition, diminution, or alteration, it destroys that *kind*, and makes omething else.

Ancient scholastic writers indeed were almost universally reed, that all *natural* beings are thus exactly distributed into tinct *species*, and that each hath its own indivisible and unangeable essence: But in our age we are taught to philosophize h more caution on this subject; and that great genius Mr. cke has done much toward teaching us. We use the word *cies*, to signify a rank of beings, in each of which we find a lection of those ideas united, which we call its *nature* or *essence*, d which we usually join together under one name, and make it stand for the name of a *species*; so we call one set of creaes *men*, another *monkeys*; some are named *beasts* and others *ds*; this metal is *gold*, that is *silver*, and the other is *lead*, acding to the different ideas which we have joined together to ke up each of these *species* or kinds in our way of thinking and aking.

Now in many things it is evident, that by dropping or diminiing some of those ideas which are usually called *essential*, and adding or altering others, there may be a considerable change ade in some individual being, and yet we range it still in the me *species*, and give it the same name. We usually suppose *ur feet and a tail, and a power of barking*, to be essential to a g; but suppose a *dog had neither a tail, or a tongue*, do we not ll it a *dog* still? Or if the beast should be a little monstrous d should have *five feet*, would it cease to be a *dog*?

But if these ideas which we usually call *essential* should be ry greatly changed, thence there would arise so great a variaon from what we call *one kind* of beings, and such an approxiation towards *another*, that it may sometimes be very hard to ow under what kind or *species* to rank the being in question, d what general name to give it. This is very easy to conceive things *moral* or *artificial* (1.) in moral ideas: The will of a rent may be manifested to a son in such soft and persuasive rt of language, that it is hard to say whether it must be called *counsel* or a *command*. A voluntary action may have so many rcumstances in it both good and bad, that it may be a difficulty determine whether it is virtuous or vicious, lawful or unlawful. 2.) In things artificial: A *hat* and a *cap* are different kinds of overings for the head: A *hat* has brims all round; a *cap* has ot: Yet the brims of the *hat* may be so lessened by degrees, r cut into such a shape, that you would not know whether to call a *cap* or a *hat*. The same gradual change may be made in a *hair or stool*, by lessening or enlarging the back of it. And so *a garden or orchard*, by multiplying or diminishing the numr of *fruit-trees*.

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On some Metaphysical Subjects.

SECT. I.—*Of Nature and Essence*.*

THE *nature* or *essence* of any being consists in a union of all those things, whether substances, or modes and properties, which are necessary to make that thing be what it is. So it is the nature of a *triangle* to have three lines so joined as to make three angles; and the nature of a *spirit* to be a thinking self-subsisting being; even as extended solid substance is the nature of body: It is the *nature* or *essence* of a grove to be a spot of ground thick set with trees, and the nature of *man* to be a spirit united to an animal of such a particular shape; and it is the essence or nature of a *rose*, to be a flower whose leaves are of such a special figure and such a beautiful faint reddish colour, with such a peculiar smell as are all united in the plant to which we give that name. The nature of a thing, by philosophers, is called its *essence*: and a thing may be said to have an essence, or nature, when it is not actually in being, if the mind of man can clearly conceive it as possible to be; so an *English* rose in *January*, *snow* in *Guinea*, or an *innocent man* on *earth*, may be said to have an essence among the nature of things, though perhaps there are not such things actually in being.

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And why may we not suppose that natural beings are in some measure, at least, left under the same sort of uncertainty? A tincture of *gambogia* is yellow; add a small tincture of *ultramarine* to it, and it becomes doubtful whether it is yellow or green: Put in several more degrees of *ultramarina*, so as to overwhelm the *gambogia*, and the yellow is quite lost; it is a doubt then whether it be green or blue. The gold of Africa and that of the East-Indies usually differ in their colour, one being more ruddy than the other; perhaps a few more degrees of *redness* with a small alteration of the weight, might make a chymist doubt whether it were gold or no. *Silver* and *baser metal* are sometimes so intermingled in the mines, that it is hard to say whether this clod be *true silver* ore. So by different graftings and artful unions of different kinds of trees, the fruit thereof may so change its qualities, as to be ranked under a new kind, whether of pears or apples, &c. Nor are instances wanting amongst animal beings: A creature may be born so monstrous, with so many parts or properties like a man, and so many like a monkey, that we may be at a loss whether to call it a *monkey* or a *man*; and much more may such a thing happen in the species of *horses* and *asses*, *dogs* and *foxes*; and there is a creature which we call a *bat*, which we doubt whether to place among the species of *birds* or *beasts*.

Yet it must be granted, that *natural beings* which are the works of God, have, or seem to have something more of a regular and constant limitation of their essences than moral or artificial beings which are the works of man. God the Creator in the course of his providence generally keeps up the successive production of natural beings, whether meteors, metals, plants, or animals, in such a regular uniformity, as to establish or maintain such constant and real boundaries of their different *species*, as are sufficient for all the uses of the natural world, and for the purposes of human life; and therefore in all ordinary cases we may say, that God has given boundaries to the different *species* of natural things; but the hints which have here been given, do also sufficiently prove the falsehood of that axiom of the schools, viz. "That all natures or essences of things are unchangeable, or that they consist in an indivisible point," and that other axiom also, that *in essences there are no degrees*. See what is written on this subject in Logic, part 1st, chap. 6. sect. 6. And Mr. Locke has discoursed on this subject very copiously, in his treatise on the *Human Understanding*, book III. chap. 3, 4, 5 and 6. where he seems to make the ranging of all beings into different species, to be only the work of the mind of man, and that the essences of all things, as we distinguish them, are mere *nominal essences*. So far as I can recollect his sentiments, he scarce allows any more real and established bounds of distinction between

essences of different kinds of *natural* beings which God has de, viz. lions, snakes, apples, roses or sun-beams, than there between the essences of *moral* beings, or ideas, which the nds of men form, such as murder, theft, idolatry, governnt, or the *artificial* beings which their hands produce, such as uses, pins, and paper. Whether some of his expressions on s subject be not a little too strong, let the learned enquire and termine, since it is granted, that the essences and species of tural beings are generally kept sufficiently distinct by the God nature.

Sect. II.—*Of Matter and Form.*

THE nature of every *particular body* consists of *matter and rm.* We need not change the terms of the old philosophy, but ere is great need of mending the sense of them. The *matter* body is the solid extended substance of which it is made, which ems to be uniform, and the same in all bodies. If the *Aristotians* meant nothing else by their *materia prima*, they have ext up their sentiments very oddly. The *form* of each particur body is the combination either of those primary and real quaies, or of those secondary and sensible qualities, or of both gether which belong to that body, and make it be what it is; d thus far we may agree with the definition of the schools, *rma est id per quod res est id quod est.*

The primary or real qualities are that particular shape or gure, and that size or quantity, with those degrees of motion rest, and that situation, both of the sensible and imperceptible rts of it, as is proper only to that kind of body, and belongs no other. The secondary or sensible qualities of a body are particular colour, taste, smell, coldness, heat, hardness, &c. is from the different modifications and dispositions of these imary qualities, viz. *shape, motion, quantity, situation, &c.* at all the secondary or sensible qualities arise, such as *colour, ste, weight, hardness, &c.* whereby we commonly distinguish ost bodies of different kinds from one another.

In some bodies indeed, any sort of matter with such a parcular and determined outward and visible shape and size, is fficient to make up the nature and essence of them, or to make ose bodies be what they are; as for instance, any sort of solid xtended substance with a figure every way round, is the *matter nd form of a ball or globe*, without regard to its sensible quaties of colour, hardness, &c. Any building of whatsoever aterials, if it be framed and fitted for men to dwell in, is called house; any long piece of matter bent round like a hoop, may be alled a *ring*, and any small open hollow vessel to wash our ands in, may be called a *bason*.

In other bodies there must be such a particular inward conxture of the parts, that is, such a peculiar shape and situation,

and intestine motion or rest of the small invisible and imperceptible particles of matter of which it is composed, to complete the nature of them, and to give them those sensible qualities of *colour, hardness, &c.* and to make them be what they are. This is required in the bodies which we call *water, quicksilver, gold, wood or clay;* but it is no matter what the outward and gross shape of them is, for that makes no difference, nor belongs to the nature of them.

But in the other bodies there must be both the outward visible figure, as well as the inward shape, situation, rest or motion, and fermentation of the imperceptible solid or fluid parts to compose the nature of it, or make it be what it is; this is evident in a *gold ring*, a *rope*, an *egg;* and the same is true of all *plants* and *animals*, as a rose, an oak, a horse, an eagle.

It is granted, that the sharpest understanding can penetrate but a very little way into the natures of essences of *natural* beings and the special forms of them, in the present state; we know and distinguish the bodies that are round about us by their outward figures and sizes, and by their sensible qualities, by their effects upon our senses, and their sensible operations upon one another, much more than we do by any of the figures or intestine motions of those little imperceptible atoms and particles of which they are composed, for these being invisible to us for the most part, lie out of the reach of our knowledge. And therefore our description of natural bodies is much more drawn from their sensible qualities.

The *matter* of which a body is made, is either *proxime* or *remote;* the proxime matter of which a *house* is made, is *bricks, tiles*, and *mortar, beams* and *rafters, boards* and *nails.* The remote matter is *clay, sand* and *lime, trees* and *iron;* and they are called remote, because *bricks* and *tiles* are made of *clay, mortar* is made of *sand* and *lime; beams, rafters*, and *planks* are cut out of *trees*, and *nails* are formed of *iron.* The proxime matter of a *book*, is its *leaves printed with words, bound up in covers;* but *paper* and *printer's ink* are the remote matter of it, together with *pasteboard* and *leather.*

Note, Matter and form have been by the *Aristotelian* philosophers, generally ranked amongst the *causes*, and treated of there, but without any just reason; yet they may be justly called the *constituent principles* of things, though they are not proper *causes.*

Note, Matter and form are words which have been transferred from corporeal beings to several other things which relate to the intellectual world, with some analogous or kindred signification: the *matter* of the science of *anatomy*, or that about which it converses, is the *body of man:* the form is a skilful dissection and knowledge, or description of the several parts of

the body, their proper figure, situation and design. The *matter* of a *sermon* is any theme in divinity, suppose it be the worship of God, or love to man, the evil of sin, the redemption of *Christ*, or the glory of heaven; the *form* of the *sermon* is that particular manner, both in regard to sense, order and style in which the preacher treats of those subjects, whether it be in propositions, doctrines, reasons, inferences; whether it be in a way of argument or harangue; whether in rude or polite language.

From the various application of these terms, *matter* and *form*, proceeds that old and famous distinction of *material* and *formal*, which is usefully applied to a thousand various subjects; thus the river of Thames is *formally the same* as it was in our grandfathers' days, because it runs between the same banks, but *materially* it is very *different*, for perhaps, there is not a drop of the same water. Thus Dryden's and Ogilby's *Virgil* are *materially the same*, because they are English translations of the same *Latin* poet; but considered *formally*, they are exceeding different, i. e. as to the elegance of the verse.

Sect. III.—*Of the different Senses of the Word Nature.*

HAVING spoken of the nature of particular beings which consists in a *collection of those things which make it be what it is*, it is proper also to observe, that the word *nature* sometimes is so limited, as to signify any one particular attribute or property of a being, as it is the *nature* of a *dog* to bark, and of *fire* to burn. Sometimes it is so far enlarged, as to denote the whole world, or the universe of things; as, when we speak of a *Centaur* or *Griffin*, and say there is no such thing *in nature*.

Sometimes also the word *nature* is taken for the necessary and eternal order and connection of things in idea, and the unchangeable relations of them to each other. So we say, it is according to the *nature* of things, that "creatures are mutable, that three and three make six; or that two mathematical circles can touch each other but in a point.

We call also those *laws*, which God the Creator has established in the world for the management of the grand scheme of his providence, by the term of *nature*; and indeed many times we do not enough distinguish them from the abstracted reason of things, and their necessary and eternal *relations*. In this sense we say it is *natural* for a stone thrown up to fall back towards the earth again, for cork to float in water, and for gold to sink; it is *natural* for the earth to be carried round the sun in 365 days, and for the sun to enliven the vegetable and animal world. We say also, it is *natural* for the soul of man to move his limbs by a volition, or to have a perception of white when he turns his eyes towards the snow. In all these things we

And why may we not suppose that natural beings are in some measure, at least, left under the same sort of uncertainty? A tincture of *gambogia* is yellow; add a small tincture of *ultramarine* to it, and it becomes doubtful whether it is yellow or green: Put in several more degrees of *ultramarine*, so as to overwhelm the *gambogia*, and the yellow is quite lost; it is a doubt then whether it be green or blue. The gold of Africa and that of the East-Indies usually differ in their colour, one being more ruddy than the other; perhaps a few more degrees of *redness* with a small alteration of the weight, might make a chymist doubt whether it were gold or no. *Silver* and *baser metal* are sometimes so intermingled in the mines, that it is hard to say whether this clod be *true silver* ore. So by different graftings and artful unions of different kinds of trees, the fruit thereof may so change its qualities, as to be ranked under a new kind, whether of pears or apples, &c. Nor are instances wanting amongst animal beings: A creature may be born so monstrous, with so many parts or properties like a man, and so many like a monkey, that we may be at a loss whether to call it a *monkey* or a *man*; and much more may such a thing happen in the species of *horses* and *asses*, *dogs* and *foxes*; and there is a creature which we call a *bat*, which we doubt whether to place among the species of *birds* or *beasts*.

Yet it must be granted, that *natural beings* which are the works of God, have, or seem to have something more of a regular and constant limitation of their essences than moral or artificial beings which are the works of man. God the Creator in the course of his providence generally keeps up the successive production of natural beings, whether meteors, metals, plants, or animals, in such a regular uniformity, as to establish or maintain such constant and real boundaries of their different *species*, as are sufficient for all the uses of the natural world, and for the purposes of human life; and therefore in all ordinary cases we may say, that God has given boundaries to the different *species* of natural things; but the hints which have here been given, do also sufficiently prove the falsehood of that axiom of the schools, viz. "That all natures or essences of things are unchangeable, or that they consist in an indivisible point," and that other axiom also, that *in essences there are no degrees*. See what is written on this subject in Logic, part 1st, chap. 6. sect. 6. And Mr. Locke has discoursed on this subject very copiously, in his treatise on the *Human Understanding*, book III. chap. 3, 4, 5 and 6. where he seems to make the ranging of all beings into different species, to be only the work of the mind of man, and that the essences of all things, as we distinguish them, are mere *nominal essences*. So far as I can recollect his sentiments, he scarce allows any more real and established bounds of distinction between

rift arrow, or the fly of a jack. And as for exceeding slow otions, as the hand of a watch, it makes no impression of its otion at all upon the outward organs of sense, or at least so ry weak an impression as that it is not communicated distinctly the inward fibres of the *brain*, or common *sensorium*, where-ever that be; and consequently, the soul can have no sensa-on or idea of it: Thus the motions, which are exceeding swift, exceeding slow, are not distinctly discerned. But in a sepa-te spirit, or in a spirit united to such matter whose motions ight be much swifter than the fibres of our nerves or brain, it ay be possible for us to have many successive ideas in the time herein now we have but one. And then the duration, or time, ight be measured by those spirits, by the usual swiftness of the ccession of their ideas, as well as ours are now, where the usual ccession is more slow.

Sect. III.—*Of Infinity.*

IN this seventeenth chapter of *infinity*, Mr. Locke is ex-eeding large, because it is a notion that has been the spring of many long and endless debates among the learned, and there-re he is pardonable, if by a repetition of the same things in opious language, he endeavours to impress his thoughts upon ur minds: His notions of *infinite* as *an ever growing, and not positive complete idea*, are of admirable use to stop and put n end to those wranglings about *infinity*, in time, extension, wift and slow motion, division, number, &c. which have bounded among some writers. And let us chiefly make this se of this consideration of *infinity*, viz. to shew us how very arrow and bounded our understandings are, and with what an wful sense of the weakness and frailty of our own thoughts and adgments we should reason about an infinite God and his infi-ite affairs.—We finite limited beings soon lose ourselves among nfinites, whether great or small, till we retreat within our own ounds, and reason upon things which are made for our grasp of hought. The great incomprehensible being has reserved perfect, ositive infinity to himself, and though there may be some posi-ions determined with justice and certainty about it, yet the less re mingle it with our arguments, we are perhaps the more se-ure from error.

Sect. IV.—*Of Power.*—Book II. chap. 21.

MR. LOCKE in his 21st chapter of the 2nd book con-erning *power*, sect. 4. supposes that the idea of *active power* is nuch more borrowed from spirits than from bodies; and is far etter derived from the mind's reflection on its own operations, nd its command over the body to put the limbs of it in motion, han it can be from any external sensation whereby we behold ne body having *peculiar* influences over other bodies, to make

changes in them, or to put them into motion; and one reason that he gives for it is, "That when one body, viz. a ball, puts another ball into motion, it only communicates to it the motion it had received itself from some prior moving body, and loses in itself so much as the other received; which thing gives us, says he, but a very obscure idea of an *active power* in body, whilst we observe it only to transfer, but not to produce any motion."

I will not here stand to contest it, whether the clearest idea of *active power* be derived to men and philosophers from bodies or from spirits: But I am very apt to think in children it may be derived much more from their sensations of bodies moving bodies, than from their reflection of any act of their spirits; for when they see a fire burn wood, or their own hands put a ball into motion, or the wind shake the trees, they have as easy and as clear an idea of a power in the wind to shake trees, in their hand to move a ball, or in the fire to burn wood, as any ideas of active power which they derive from the agency of their own wills upon their own limbs.

The query which I beg leave to put in this place, is, Whether that opinion be true which Mr. Locke here supposes, and which is a famous principle in the Cartesian philosophy, viz. *That one body can communicate no more motion to another, than that which is in itself?* The difficulty I would propose is plainly represented in this instance: Suppose a town built with many fair houses and churches, each of them adorned with spires and many ornaments, should be undermined, or have the cellars of it filled with barrels of gun-powder, which have a mutual communication with each other through all the town; and suppose a single spark of fire should fall into one of those barrels, the question is, Whether all the dreadful convulsion and ruin of those buildings, together with the thundering sound that shall be heard for twenty or thirty miles round, be not a proof of a prodigious quantity of motion communicated to the stones, timber, tiles, bricks, and all the materials of those edifices, and to the surrounding air, by that spark of fire, more than could possibly be contained in that single spark? And how can this problem be solved upon this principle? Or rather, Does not this instance prove the falsehood of that Cartesian opinion?

SECT. V.—*Whether Liberty can be ascribed to the Will.*

THE author in the 6th, 17th, 19th and 20th sections, ingeniously declares and proves the *understanding* and *will* not to be two beings distinct from the *mind* or *soul* itself, though they are usually called *two distinct powers* or *faculties*; which manner of speaking, though it be almost necessary in some cases,

and has great conveniency in it, yet I cannot but assent to Mr. Locke's complaint, that it has perhaps been one occasion of leading mankind into some mistaken conceptions about the several actings of the mind of man.

But amongst the rest, he supposes this also to be a mistake That *we ascribe liberty to the will*; for since (argues he) the *will* is a power of the man to determine his own actions, and *liberty* is also a power of the man to act or not to act, &c. both these are properly powers of the man, and one power cannot be ascribed to another, nor liberty ascribed to the will.

And he supposes us guilty of the same mistake, when we say, the *understanding directs the will*, or the *will obeys the understanding*, for they are two powers of the man, which have not an agency or operation upon each; other since operation, saith he, belongs only to *agents*, or real beings, and not to powers. All these agencies of powers on each other therefore he roundly denies, § 17, 18, 19. and says, that the power of thinking, operates not on the power of chusing, nor the power of chusing on the power of thinking.

But I beg leave to observe, that this operation of one power on another, is the common way of thinking and speaking amongst men, with regard to the powers of the body as well as those of the mind, nor do I know any impropriety in it, nor any reason why it should be altered. When the auther speaks of the faculties of the body, he names the *digestive* and *expulsive* faculty; and is it not proper to say, that in an animal, the digestive power operates upon the expulsive, and assists it in its operation? May we not say also, that the masticative or chewing faculty operates upon the digestive, and accelerates it in digestion, without supposing these faculties to be real and distinct beings, different from the body? So, in his other instance of *singing* and *dancing*; Why may we not say, that Apollo's power of singing or music operates on Lesbia's power of dancing, since she dances according to his notes of music? And is it not proper to say, That the power of thinking, whereby I perceive a thing to be good, operates upon the power of chusing it? Or the power of chusing or willing, operates on the power of thinking, when I set myself to think on any particular subject by my volition or choice for an hour together?

Now Mr. Locke's design in all this denial of such attributions to a power, is, as I hinted before, to support his assertion, That *liberty or freedom belongs not to the will*; and therefore he supposes it is as unreasonable and unintelligible a question to ask, *Whether a man's will be free or not*, as it is to ask, Whether his sleep be swift, or his virtue square; for liberty, which in his sense is but a power to act or not to act, belongs only to agents,

and cannot be an attribute, or modification, or power of the will, which is also but a power.

But in answer to this I would say, That perhaps in strict and philosophic speech it may be better to say, *The man*, or *the soul is free*, yet since this is the common language of men, and the usual way of speaking on this subject, and since this way of speaking, viz. ascribing *liberty to the will*, has no such tendency to lead one to mistaken ideas, (if the nature of the soul be but a little explained, and the powers of it proved not to be two distinct beings or substances) I can see no necessity that a philosopher should change the common forms of speech: And notwithstanding all that Mr. Locke has said, I see no impropriety in asking, *Whether the will be free or no*, or in attributing liberty to the will, since it signifies no more than if we enquired, *Whether the mind in its volitions is free to will or not? And to will this or that?* Common forms of speech should not be renounced and abandoned without evident necessity, and Mr. Locke owns this is the meaning of the question in the latter end of section 22.

There is another objection which Mr. Locke raises against the ascribing freedom to the will, (viz.) "That a man in respect of the act of volition, when any action in his power is once proposed to his thoughts, as a thing presently to be done, cannot be free;" for he must will to do it, or to neglect and omit it; and being under this necessity to exert some volition about it, the will is not free, i. e. the man is not free whether to will or not.

But I think this is a mere fallacy, for the question is not whether the man can abstain from all volitions in general, but whether the will can determine itself to chuse or refuse this or that object or act proposed. It is not whether he can *neither* chuse *nor* refuse, but whether he can *either* chuse *or* refuse? For it is this that shews the freedom of the will: And I would remark here, as I have found sometimes occasion to do, that it is possible for a vast and sagacious genius to be not always the fairest disputant; the raising a cloud of dust will sometimes evade the true question, and appear to gain the victory, when the disputant only hides himself.

The debates of Mr. Locke relating to the principle or cause which determines the will to act, and other things relating to that important question are set, I think, in so clear a light in a late *Essay of the Freedom of Will in God and Man*, that I chuse to remit my reader to that little book.

SECT. VI.—*Of complex Ideas, and mixed Modes.*

IN the 12th chapter of the second book of Mr. Locke's *Essay on the Understanding*, in the 18th, 24th, and several

er parts of his work, this author speaks in such a manner as ugh all our complex ideas of substances and mixed or com- x modes, were formed *by taking several simple ideas and ing them in one composition*, to make a complex or com- and idea: and though Mr Locke might not actually advert it in those paragraphs, yet he must certainly grant that we as often obtain a clear knowledge of some compound or com- x beings by receiving them at first into the mind in all their plex nature, and afterwards separating them one from ano- r. Let me give an instance of both ways of acquiring com- x ideas. If a child who is unacquainted with *gold* see a *inea* at some distance, he receives perhaps only the idea of tension and yellowness; bring it nearer to the light it appears nd and shining; nearer yet, and he beholds the stamp of coin; then touching it he finds it is hard, and taking it in hand it is heavy: thus by degrees he joins the ideas of ex- ded yellow, round, shining, the figure of a head, and hard- s altogether, and learns what a *guinea* is; this is the way of *mposition*. But if a *guinea* be given at first into the hand of is child in a bright place, his ideas of extension, yellow, round, ining, hard, heavy, &c. are impressed all at once as one com- ex idea on the mind; and by separation of them, and con- ering them distinct, he may come to clearer notions of some those single ideas; and by reason, observation, and com- rison, he finds what gold is, and what is a guinea: This is a method of learning by division. The same thought may be plied to a *city*, a *fleet*, a *swarm*, a *heap*, a *constellation*, &c. pposing that the first idea the child has of a *house*, *ship*, *ant*, *ain*, *star*, be received in this complex manner by seeing many them together. Thus composition of simple ideas, and divi- n of complex ones, seem both to be used in the obtaining and creasing our knowledge of things, and enlarging our number ideas.

And it must be acknowledged that Mr. Locke allows this ay of coming by some of our complex ideas (*viz.*) by sensation observation of the several ideas at once in their complex state union, when he says, chap. 22. sect 2. "Several of them ight be taken from observation and the existence of several mple ideas so combined." And sect. 9. "Thus by seeing two en wrestle or fence we get the ideas of wrestling and fencing hich are very complex modes."

The author in his 18th chapter, sect. 2. gives us several stances of our ideas of simple modes, such as *sliding*, *creep- g*, *running*, *dancing*, &c. which perhaps may be as well lled *mixed modes* as some which he mentions in his 22d chap- r; for even there, at the end of the 10th section, I think he akes *running* and *speaking* to be mixed modes; he calls them

collections of simple ideas; and indeed it is sometimes very difficult to distinguish ideas simple from *complex*, whether they be ideas of substances or ideas of modes, partly because the acts of the mind perceiving several ideas and uniting them in one complex one, are so swift and undistinguishable, that they seem to be one act, forming one simple idea; and partly because language hath appointed sometimes a *single* word to signify a very *complex idea*, and sometimes an idea much *more simple* needs *many words* to express it. Thus through the mixture and confusion of ideas by words, it is hard to distinguish always which are the simple ones and which the complex, or which are the pure and which the mixed.

Here I might enquire, what difference doth Mr. Locke make between *complex modes* and *mixed modes*? Would it not be better to distinguish them thus? If we apply the term *simple mode* to the simple ideas of modes gotten by sensation only, as *white*, *black*, *motion*, *figure*, or to those gotten only by reflection, as a *thought*, a *desire*, &c. and if several simple ideas combined, whether sensible or intellectual, or both, were called in general *complex modes*; and the particular term mixed mode, were confined only to those ideas, which include both sensible and intellectual ideas, such as *speech*, *conversation*, *witness*, *theft*, &c. we might perhaps discourse more distinctly of these subjects: But as this author himself says in another place, "We ought to put things together as well as we can:" but after all, some things will not be bundled up together under our terms and ways of speaking.

SECT. VII.—*Of Identity and Diversity.*

THE most familiar and common objects of knowledge are often found the most difficult to explain by principles of philosophy in clear and distinct ideas: Time, place, and motion, the fluidity, and the hardness of bodies, the coherence of the parts of matter, and the principle of gravitation are convincing instances hereof. The doctrine of *identity* and *diversity* is as hard to be explained; and while every child pretends to know what it is for one thing to be *the same* with itself and not another thing, philosophers are deeply entangled in the search thereof, and frequently confounded in their thoughts. This author, Mr. Locke, has given us, in his 27th chapter, an ingenious attempt to unfold the mystery of *sameness*, or wherein the *principium individuationis* consists: and he describes it, "existence itself which determines a being of any sort to a particular time and place incommunicable to two beings of the same kind." Which definition, though it is hard to understand in these words, yet he makes much clearer by large instances in the following sections. His meaning is, that *identity* may have various ideas according *as it is* applied to various sorts of beings; so the sameness of an

m is distinct from the sameness of a *mass of atoms;* and that lifferent from the sameness of *vegetables*, of *animals*, of *spirits*, *men.* The *identity* of *modes*, *actions* and *relations*, and those ngs whose existence consists in succession, is pretty clearly ermined in his 2d section, and the identity of *complex beings* his 28th and 29th.

But this author having written more intelligibly on this sub- t than preceding philosophers, grows bold, and asserts, that difficulty of this subject arises from names ill-used, rather n from any obscurity in the thing itself, and that it is want of e and attention that has clouded and confounded the thoughts men. I take leave humbly to remark, that though in his neral scheme of *identity* and *diversity*, as well as in his par- lar application here to *body*, *mind*, *plant*, *animal*, &c. he performed with great ingenuity, yet there remain some dif- lties which want farther care, attention, and assistance to nove.

First, In his second section he asserts that there could be distinction of substances or any thing else one from another; we do not suppose *minds* as well as *bodies* to exclude any of same kind out of the same place: Which is not only opposed the vulgar philosophers, which suppose a thousand *minds* y be in the same *ubi*, but it is very disagreeable also with the ter notion of a *mind*, which being not extended and having relation to place, can neither be said to admit or exclude fel- r-minds from the same place; but that every spirit is suf- ently distinguished from all others by its particular cogitations d consciousness.

And besides, if minds were extended, why may not two ated minds be in the same place, and penetrate each other as ll as he supposes God the infinite mind, to penetrate all minds d all bodies whatsoever? Must God be the *same* with all nds, because he penetrates all minds? If a spirit be never so le denser than space, it is matter; and if spirits be no denser n spaces, why may they not penetrate each other as well as th space and spirit are supposed to penetrate matter? I ught it had been a peculiar property of matter to be impene- ble by a being of its own kind. What! is spirit impenetrable spirit too? Can a spirit penetrate the grossest matter, and t not penetrate that thin extension of a fellow-spirit, which is er than the most refined matter, and as tenuious and unsolid space itself, as mere emptiness.

Secondly, In the 4th, 5th and 6th articles he makes the *ntity of vegetable* and *animal* beings to consist in a partici- tion of the same continued life by constantly fleeting particles matter in succession vitally united to the same organized body. ere I ask leave to remark,

1*st*, Perhaps it would be too hard to ask this author* to explain with great exactness what he means here by *life* and *vitality*; the same *life* in a plant cannot signify the same juice or nutritive particles; for it may be transplanted from clay to chalk, or from a bed of earth to a bottle of water, and still it is the same plant. Nor can life mean the same tubes or the same channels betwixt the fibres, for they may by degrees be obstructed, and new ones found or formed till the old are narrowed, withered, and grown impervious to the juice. Nor can *life* mean the same method of motion of that juice through the plant; for if you bend the head of a plant down to the earth, and let its top take root, as may be done to vines or brambles, then cut off the old stalk near its first root, and the passage of the nourishing juice will be just contrary, and yet perhaps it is the same plant still. I would ask further, when the graft of a pearmain has grown three months, or seven years, upon the stock of a crab, is it the same tree? Has it the same life, or has it not? Or when did it change?

I might say the like concerning the life of animals. It cannot be the same blood that is the *same life*; for in a few months perhaps we have few of the same particles of blood as before; however, by Dr. Lower's experiment of *transfusion*, it may be all changed in an hour. Nor can the same veins, or vessels, make the *same life*, for they are the same when the animal is dead, or they may be changed in life-time. Nor is it the same motion of the blood and juices, that makes the *same life*; for individual motion cannot be communicated to successive parts of matter; since it is perishing every moment, as his 2d section assures us. Besides,

2*dly*, If a tree, or animal, be dead for some time, and by almighty power new life and vital motion be given to the same matter, it is a different life according to this author; for it is not the same continued life, yet it seems to be the same plant and the same animal.

3*dly*, In the end of his 8th section the author asserts, that the same successive body not shifted all at once, and the same immaterial spirit, united to it, goes to make the same man. Here I would ask, Whether it would be the same man if it were shifted all at once? If Goliah at a month old should have all at once received that vast addition to his bulk which increased by degrees in forty or fifty years, it is a doubt whether he would have been the same man or no: and yet why should the whole change in one moment hinder that to be the same thing which the distance of forty years would necessarily make the same? And generally nearness to the same time and place makes more toward the sameness of a thing, than distance of place and time

* The author was living when this was written.

et upon the whole, I think Mr. Locke is in the right, though e point has difficulties.

And perhaps this is the true notion of the sameness of man relating to this world only; (viz.) That the same successive dy changing itself by degrees, according to the laws of animal e, and united to the same conscious mind, must make the same an. How far the doctrine of the resurrection requires the me body, see Essay 8th foregoing.

Thirdly, He comes to enquire in his 9th section, wherein e *sameness of a person* consists, or *personal identity*. Here he st informs us, that he supposes, "A *person* is a thinking intel-ent being, which has reason and reflection, and can consider elf as itself; *i. e.* as the same thinking thing in different times d places, which it does only by that *consciousness*, which is in-parable from thinking." Now I question, whether we may so ily agree with him in this, as a sufficient account of what a rson is.

Let us consider a little. The words *self* and *consciousness self* refer only to the pronoun *I*; but are not the pronouns *u* and *he* personal pronouns as well as *I*? Suppose Armando s slain his neighbour in the sight of Martys and Criton, and uld be seized with such a loss of memory afterward, or such straction, as to blot out the consciousness of this action from the nd. Armando then would say, *It was not I*: But may not artys and Criton still charge him, *thou art the murderer*? ay they not justly say of him, That *he is guilty*, and *he* should put to death? Are they not as good judges of *the same per-* as Armando is himself? What if Armando should deny the t, as having really lost all consciousness of it? Is he not still e *same person* that slew his neighbour? Does not the witness Martys and Criton declare him to be the *same person*? They ow his body to be the same; and according to the laws of na-e, they justly infer his soul must be the same also, whatsoever mando's distraction might dictate concerning *himself*; I think erefore, that the word *person* implies one thinking being, one elligent substance, which is always the same whether it be or not conscious and mindful of its own actions in different times d places.*

But Mr. Locke seems to be of another mind; for he adds, By this consciousness every one is to himself that which he ls *self*; it not being considered in this case, whether the same f be continued in the same or divers substances. In this alone sists *personal identity*, that is, the sameness of a rational ing." And in section 10th, the question is, "What makes the ne person, and not whether it be the same identical substance

* This discourse is entirely confined to personality among creatures, and no *reference to divine* personality here.

which always thinks in the same person, which in this case matters not at all. Different substances by the same consciousness (where they do partake in it) being united into one person, as well as different bodies by the same figure united into one animal, whose identity is preserved in the change of substances by the unity of one continued life; for it being the same consciousness that makes a man be himself to himself, *personal identity* depends on that *only*, whether it be annexed only to one individual substance, or can be continued in a succession of several substances, ——The same consciousness uniting those different actions into the same person, whatever substances contributed to their production."

Any man that reads this, and knows that the author is in doubt whether matter may not think, would be ready to suspect that he is so very solicitous to make the *same substance* unnecessary to *personal identity*, that so he may maintain his supposed possibility of matter being made capable of thinking; and that it may be possible that thinking may inhere in animal nature, whose constituent particles of flesh and blood may be perpetually changed, and yet the animal remain the same, and be the same person too.

But to indulge no further suspicions, let us consider what he affirms plainly, viz. that *personal identity consists only in consciousness*; for, says he, section 10th, "As far as any intelligent being can repeat the idea of any past action, with the same consciousness it had of it at first, or that it has of any present action, so far it is the same personal self; for it is by the consciousness it has of its present thoughts and actions that it is *self* to itself *now*; and so it will be the same *self* as far as the same consciousness can extend to actions past or to come: and he puts these *questions*, section 12th, whether if the same substance which thinks be changed, it can be the same person? or whether if it remain the same, it can be different persons?"

To this he *answers*, This must be allowed to those who place thought in a purely material animal constitution, void of any immaterial substance, because the substances are perpetually changing in animal nature: but supposing immaterial substances only to think, yet he seems to think it hard to shew why personal identity cannot be preserved in the change or variety of immaterial substances, as well as animal identity is preserved in the change of material substances. Thus it is evident, that by his reasonings, he makes the *sameness of a person* to consist entirely, and only in consciousness, which he had before plainly and strongly asserted.

I acknowledge he has offered some plausible arguments for it, and he has also mentioned some formidable objections against his own opinion; but I question whether he has so well refuted

those objections, as to render that opinion of his certain and evident, viz. that the *sameness of persons* consists not in the sameness of substances, either material or thinking, *i. e.* either body or mind, but merely in a consciousness of the same thoughts or actions.

There is no need of debating the point about a man's being the same person with himself at the *present time*, because a man's own present consciousness will secure to him his own personal identity, though perhaps it will not confine it to himself alone. But the chief difficulty relates to his being the same with himself at *distant times*. And here let us consider some of the difficulties he proposes against his own sentiments.

1. He seems to allow, that according to his description of personal identity, two different men may be one and the same person; for in his 13th and 14th sections, as well as in other parts of this chapter, he grants that a different spirit created long after may possibly have the consciousness of actions done by a spirit existent many ages before, imprest upon it; by this means the mayor of Queenborough might suppose his soul had been the soul of Socrates, as section 19th, and this latter soul or spirit, or this man, becomes the *same person* with the former, and thus Socrates and the mayor of Queenborough become one person.

But I deny this to be proper conscious remembrance: It is only a delusive impression on the mind or fancy imitating the act of memory; it is a strong belief of what is false. And can such a frenzy be sufficient to turn two men into one person? Must Domitian be really the same person with Romulus, if his pride could so far impress his imagination, and impose upon his memory, as to persuade him that he built Rome? Is not this contrary to all the sense and reason, as well as the language of mankind? And might not Domitian by the same madness become Ninus, and Darius, and Plato, and twenty persons as well as two?

2. He seems to suppose, that real forgetfulness may make a distinct person as well as fancied memory may make the same; and thus Domitian was not the same person that killed fleas, if standing at the head of his army his pride should so far overpower his memory, as to blot out all the traces of that contemptible employment of his former hours. And suppose that one of his soldiers should by a disorder of his brain imagine, that he was conscious that he himself had thus been employed in the palace of Domitian, and that he was then the emperor; and would this forgetfulness of the one, and frenzy of the other, make two Domitians upon the spot, or two persons of Domitian?

Doth not this author allow in section 19, that if Socrates asleep puts forth any actions, and is not conscious of it when he awakes, sleeping and waking Socrates is not the same person?

And are they not two persons according to his notion? His soul and his body seem to speak the same thing.

The chief answer that he gives hereto, is his distinction betwixt *man* and *person*, he may allow that Socrates is the same man still, *i. e.* the same spirit united to the same animal body; but he doth not allow him to be the same person, because that consisteth by remembrance of his own past thoughts or actions. And so I may be the same man that performed a hundred former actions of mine, though I have entirely forgotten them all; but I am not the same person that performed millions of those actions, since I have entirely forgotten a far larger number of my thoughts than I can recollect. Now, I would only enquire whether such a distinction betwixt *man* and *person*, is either correspondent with the nature and reason of things, or with the common language of all men, or the accurate expressions of true philosophy?

In short, according to this doctrine of *personal identity*, many men may successively or simultaneously be one person; and thus every private soldier in the army of Lewis the XIVth may become the same person as Alexander the Great, if a grenadier frenzy should seize them, and make a strong impression upon their minds, that they fought the battle at Issus, and beat Darius there. And so any one man may become many persons: for if Mr. N. Lee the tragedian in Bedlam hath a strong impression on his fancy, that he taught Plato philosophy, then he is the same person with Socrates; or that he pleaded in the Roman Senate against Mark Antony, then he is Cicero; or that he subdued Gaul, and made himself master of Rome, then he is Julius Cæsar; that he wrote the Æneid, then he is Virgil; that he began the reformation from popery, then he is Martin Luther; and that he reigned in England at the latter end of the sixteenth century, and then he is the same person with Queen Elizabeth.

On the other hand, this doctrine seems to allow us to believe, that if St. Paul should irretrievably forget all the labours and sufferings that he underwent for the sake of the gospel, he would not be the same person that fulfilled his apostleship so gloriously: and if Judas should never think again through all his future existence, that he betrayed the Saviour of the world, he would not be the same person that committed that heinous wickedness.

The way Mr. Locke comes off from the terrible consequences of these possibilities in his 26th section, is by applying the word *person* to man only in a *forensic* sense, as he is the subject of happiness or misery, and is an object of rewards or punishments: and in section 13, he supposes the goodness and justice of God will not suffer such extravagant possibilities to come to pass, which may affect the rewards or punishments of men; but

equity and truth will discover themselves in attributing proper ompences to *men or spirits*, considered only as *persons*, or in ir personal identity, *i. e.* as conscious of their own former ac- is of vice or virtue.

But without running to a *forensic sense*, there are so many onveniences that may arise from such a notion of *personal ieness*, even in the common affairs of human life, as well as hilosophical science, as may utterly discourage our assent to s notion.

The word *person* is often used, if not most frequently, with- any forensic sense: We say, "There were five persons pre- it in the room at such a time, or I had but one person with me, ." And how can we tell how many persons were or were not sent, if the supposed consciousness of five other persons uld place them there at that time, and render them the same sons? Or if the supposed forgetfulness of the persons really sent should take away their personal identity? I fear this nion, if universally received, would bring in endless confu- ns, wheresoever the word *person* was introduced.

Well, if Mr. Locke's opinion will not stand, the remaining estion will be then, "What is personal identity, or wherein s it really consist?"

First, I *would* here observe and allow, that we are now con- lering the word *person* rather in a philosophical than a mere vul- r sense: for I grant there are some modes of vulgar expres- n, wherein the idea of *personality* seems confined to the body man: and thus we say, "A very tall person, or a very comely rson:" Or when a consumption has made a man lean and pale, the small pox has altered the countenance, we are ready to y, that "our friend is not the same person that he was before." is plain, that these phrases relate purely to the qualities of the dy. And sometimes the same mode of speaking is used, with gard merely to the qualities of the mind in union with the body, when by long sickness or old age the memory or reasoning wers are impaired, we say of our neighbour, "He is quite other person than once he was." But our business here is to nsider *personality* rather in its philosophical signification, which t is by no means so very different from the more usual meaning it in common life, as Mr. Locke's account of it is.

I answer therefore *secondly*, that with regard to *mankind*, ich is the only thing we are now concerned about, the same rson in an *incomplete sense*, is the same intelligent substance, the same conscious mind or spirit; but in a *complete sense*, it the same spirit united to the same body, that is, in short, *the le man*; person and man are here the same. Nor is this per- al sameness altered or abolished, though the man should metimes be so imposed upon by frenzy, as to suppose himself

to have a conscious memory of actions which were not his own; or though he should be utterly forgetful of his own proper actions. Here are four questions then arising.

I. Quest. *How can the same body be secured to make a part of this same person since the parts of an animal are in continual flux and change?* I answer, It is most highly probable, that there are some original particles of an animal body, which continue from its birth to its death, through all the gradual and successive changes of other particles, which may be sufficient to pronounce it the same body; and these may probably continue the same even till the great resurrection. See Essay 8. on that subject. An universal change of all the particles of the body at once will hardly allow us to call it *the same body.*

But if there should be no such unchanging particles in the body of man, yet in the same current course of animal life the body may be called *the same*, according to the common laws of nature, continuing the same animal life under slow and successive changes of the particles of matter, while man abides in this world: And whether any particle be the same or no in distant years, perhaps it is not of so much importance in any thing that relates to proper personality in this life, since these particles have nothing to do in thinking or consciousness.

II. Quest. *How is the sameness of the conscious mind or spirit secured to make the other and most considerable part of the same person?* How can we be sure that it is the very same spirit or thinking substance? I *answer*, That supposing a mind or spirit, or any conscious being to be entirely immaterial, and (as I think) inextended also, it is impossible that any part of the substance of it can be changed or diminished, without destroying the whole; because it is so uniform and simple a being, it is a conscious and acting power subsisting by itself. It has no parts, and cannot but exist or cease to exist in the whole or at once. Any new substance therefore coming in the room of this makes it properly a *different person*, it is another self, another intelligent mind or conscious being: And to do Mr. Locke justice, he acknowledges in section 25th, that *the more probable opinion is that this consciousness* (in which he supposes personal identity to consist) *is annexed to one individual immaterial substance.*

III. Quest. But supposing that *frenzy* should so far impose upon one man as to make him fancy himself conscious of the former actions of another man, or that *forgetfulness* should make him unconscious of his own past actions; *how could he know and be assured that he was the same person who performed his own actions, or that he was not the same person who performed the actions of another?* To this I *answer*, that for the common affairs of human life, God has in general ordained that persons should be sufficiently conscious of their own personality and same-

ness with themselves: Or if through any disorder of nature a man should lose or change the true idea of *himself* and his own actions, or falsely ascribe the actions and personality of *another* man to himself, and should say, *I did this*, or *I did not that*, contrary to plain truth and fact, there are generally witnesses enough among his fellow-creatures who are not thus disordered in their minds, to assure him *thou didst not* or *thou didst* according to plain fact and the truth of things: and they are able to make effectual proof to him, if he be capable of receiving it, that *he* is the *same person* with his former self, and that *he* is not *another person*, or that *he* is the same man and not another. By their senses they know his body is the same; and they know that without a miracle his soul must be the same too, because it is contrary to the laws of nature for a new soul to be united to that body.

In matters of great or final importance the equity and goodness of God will take care to prevent that one man shall not be rewarded for actions which he never did, and which he has no pretence to but by his own frenzy and disordered imagination: And also that one man shall not ordinarily suffer any punishment, without reducing to his mind a consciousness of those actions for which he is punished. God, the judge of all, will effectually secure this matter in all his final recompences of mankind. If it be lawful for Mr. Locke to have recourse to the equity and goodness of God to guard against any unhappy consequences which may attend his strange and novel opinion, it is as lawful for a meaner writer to have recourse to the same perfections of God to guard against any ill consequence that may attend an opinion which is so much plainer in itself, and so much more agreeable to the common sense of mankind.

IV. Quest. If you enquire further concerning the separate state of human souls, *what makes the personal identity of man there*, it is sufficient to say, that it is the same individual spirit which was once united to a certain animal body, and performed good or evil actions therein, and which has now commenced its state of recompence separate from the body; and there is and will be a sufficient evidence of the sameness of personality for every separate soul during that time, in its real consciousness of its own former actions without forgetfulness or delusion, though its personality may not be counted so *complete* till the resurrection of the body and its re-union to it. Then shall the whole man receive recompences according to his former behaviour in his complete person both soul and body. *Personality* and *sameness of persons* either in this world or the other must not stand upon such a shifting and changeable principle, as may allow either one man to be two persons, or two men to be one person, or any one man or person to become another, or to be really any thing but himself.

THE END OF THE ESSAYS.

A BRIEF

SCHEME OF ONTOLOGY,

OR THE

SCIENCE OF BEING IN GENERAL;

WHEREIN

ALL THE VARIOUS AFFECTIONS OR PROPERTIES,

ADJUNCTS AND RELATIONS OF IT,

BE CONTRACTED INTO A COMPREHENSIVE VIEW, AND RANGED IN A NATURAL AND EASY METHOD.

PREFACE

TO "A BRIEF SCHEME OF ONTOLOGY."

EVERY man who employs himself in thinking, endeavours to dispose his ideas in such an order as appears to him most comprehensive and perspicuous in itself, and most obvious to his own survey, as well as easiest for his recollection. If I could have met with any such short and plain scheme of Ontology as I wished, among the authors whence I learnt that science, I had never taken pains to form this model or draw the present sketch. I am not conscious that I have admitted into it any of those barren and perplexing subtleties which have over-run this branch of learning, as it has been cultivated in the schools under the title of Metaphysics.

In our days indeed that name is dropt, and with much better reason it is termed Ontology, or the Knowledge of Being in General, with its various affections, i. e. the properties, adjuncts, and relations that belong to it. It is an useful science in itself which teaches us to place every being and every thought and idea in its proper order in our minds, and gives us an extensive and regular survey of things; and I am sure it may be exhibited in such a manner as to secure it effectually from that just censure, and that forbidding character which the learned professor De Vries gives to the metaphysics of the schools in former ages. His satire on it may be thus expressed in English. "This science, saith he, was treated of by the sophisters in such a way, that one would swear they aimed at nothing else but to vex and torture the understanding with difficult trifles, and to infect all language with blundering nonsense, and with the grating horror of barbarous sounds, which have no meaning. These were men of empty and vain subtlety, who built up huge volumes of worthless words and disputes about nothing; whose leaves if they were not divided by the grocers to wrap up spice and sugar, would now lie for ever in heaps to feed moths and bookworms. This is so far from deserving the title of wisdom or prime philosophy, that it is rather the extreme folly of monkish dreams and dotages."

Such just and severe satire as this being spread abroad in some modern schools, and in the polite world, hath tempted our youth to run to another extreme: many of them will sneer at the name of Metaphysics, and pass a scornful censure on all the science of Ontology at once: they are ashamed of knowing it, and therefore renounce all pretence to it with pride and pleasure. The endless multitudes of senseless and empty distinctions of the ancients, their useless and thorny questions and disputes introduced into this science, and the many odd and absurd canons and axioms which they were wont to place among those principles which they called the prime foundations of all learning, have appeared to our age in so ridiculous a light, that we have been too ready to throw away this useful part of philosophy, because of the follies which have been blended with it. But it becomes a philosopher to distinguish between the gold and the dross, and not to renounce and abandon a rich mine because the ore is not refined, or perhaps has been debased with vile mixtures by some foolish labourers and melters.

If we would not suffer ourselves to be imposed upon by a little empty raillery, but take a just view of things in order to pass a right judgment, we should find this part of philosophy is very necessary and of admirable use to all men of science, and that in every branch of the learned professions: To have all the vast multitude of themes and ideas about which we have occasion

to think, speak or write, ranged in a set of regular classes, so that we know where to find and place them all, is of unspeakable advantage in explaining, defining, dividing, distinguishing, illustrating, and arguing upon every subject we take in hand. Nor does this serve only the purposes of the college, and direct, assist, and facilitate the labours of students and the learned world, but gentlemen and persons in every degree of common life might be taught to enlarge the number of their ideas, to extend their reasonings far wider, and dispose their thoughts in more useful order by the assistance of this part of knowledge, if it were displayed in a happy and perspicuous manner, with the exclusion of thorns and straws, and all the perplexing trifles that had over-run the academies of former ages.

I wish some skilful hand would undertake this work: If I was ever able to perform it according to my own idea, yet it is too late in life for me now to return to these studies. What I have here written has in part lain long by me: It pretends to nothing more than a brief and compendious sketch of notions that relate to this science, and a mere arrangement of the most useful themes which should here be treated of, in a contracted view: and though it may be of chief advantage for the recollection of those who have been acquainted with the matters, yet I hope it will not be unserviceable for the instruction of such as have known nothing of them if they will read with attention and care. In some places I define not only the general theme but the particular kinds of it also; in a few others I only just mention the terms of the particular distinctions, and neither add any definitions or examples to them, where the very terms are so plain that a common reader may know the meaning of them without explication: but in most places I give such examples as may sufficiently explain and illustrate the subject and the several divisions and branches of it, without laborious and disputable definitions.

What the metaphysical writers have called axioms or canons, are very numerous almost under every head or theme of discourse; but many of them are so false in the most obvious sense of them, and want such a number of limitations and learned distinctions to reduce them to truth, that I thought it needless to stuff this epitome with them. Many others are so useless to any valuable purposes, that they deserve no room in the mind or memory. Those few which are useful I have placed in their proper chapters as notes, and several others I have added which seemed to me not unprofitable.

It is not often that I divert out of my way to tell the world particularly what the moderns or the ancients have said on these subjects, nor how far I agree with them, or differ from them; but in the main I directly pursue my own track of thoughts, and range this infinite variety of ideas collected from the universe of beings in such a method as appears to me the most comprehensive and natural, plain and easy.

A BRIEF SCHEME OF ONTOLOGY:

OR THE

Science of Being in General;

Wherein all the various Affections, or Properties, Adjuncts and Relations of it are contracted into a comprehensive View, and ranged in a natural and easy Method.

CHAP. I.—*Of Being and Not-being, with a general Scheme of the Affections of Being.*

ONTOLOGY is a discourse of *being* in general, and the various and most universal *modes* or *affections*, as well as the several kinds or divisions of it. The word *being* here includes not only whatsoever actually is, but whatsoever can be. *Being* is the first and most obvious, the most simple and natural conception that we can frame of any thing which we see, hear, feel, or know. It is in some sense included in all our other conceptions of things, and is therefore the most general or universal of all our ideas.

By the *affections* of being are meant all powers, properties, accidents, relations, actions, passions, dispositions, internal qualities, external adjuncts, considerations, conditions or circumstances whatsoever; in a word, all those *modes* which belong to things, either as they are in themselves, or as they stand in relation to other things, or as they are represented or modified by our ideas and conceptions. Since every thing may be greatly distinguished and illustrated by its opposites, here we begin to treat of the affections of *being* in general, we may consider very briefly what sort of notions we may frame of *not-being* or *nothing*.

Not-being, as it excludes all substances and modes whatsoever, is *nihility* or *mere nothing*.

Not-being, as it excludes particular modes or manners of being out of any substance, may be considered, either as a mere *negation*, such is blindness or want of sight in a stone; or as a *privation*, such is blindness or want of sight in a man; of which see Logic, part 1st, chap. II. sect. 6.

Note 1. Pure *nothing* considered merely in itself has no proper affections belonging to it; though our imagination sometimes may so far abuse us as to mistake nothing for something, as in the case of *shadows;* and at other times we mistake something for nothing, and suppose a *room full of light and air*

to have nothing in it. So weak and imperfect is our present state of knowledge.

2. Though a *nonentity* or *not-being* is really nothing in itself, yet as it is introduced by some relation to being it may afford foundation for some sort of thoughts or conceptions, or some relative affections which hereafter will be described. On this account *nonentity* has been usually distinguished from mere *nihility* or pure nothing.

3. Hence it follows that that old axiom of the schools *Nonentis nulla est Scientia*, or *what has no being cannot be known*, must be understood with some limitation: For (1.) we may know things *possible* though they have no actual being: (2.) We may know things *past* and *future* which have no present being: (3.) We may also form a sort of idea of *nonentities* or not beings from their relation to beings; we can see a shadow, and talk of silence: And even when we speak of pure *nihility* or *nothing*, we are ready to frame some sort of notion or idea of it since we reason and discourse about it. Perhaps this may arise from the imperfection of our present state.

4. Though *pure nothing* is that which in truth neither has a being nor affections, nor can be properly made the measure of any being, yet *negative quantities*, which (as mathematicians generally say) are marks and measures of what is *less than nothing*, are of great use and necessity in *algebra*; because this science teaches us to form our ideas of all real and *positive quantities* as so much *more than nothing*.

Having distinguished *being* from its opposites, let us proceed now to lay down a general scheme of the affections of being. The most general and extensive distribution of the affections of being is into *absolute* and *relative*.

Absolute affections belong to each being considered in itself, and these are *nature* or *essence* and *existence*, *duration* and *unity*, *power* and *act*.

Relative affections or *relations* arise from some respect which distinct beings bear to one another, or at least to some part or property of themselves: Now these are *real* or *mental*.

Real relations are those which arise from the constitution of any being among others in the universe to which it has a real reference whether we think of it or no. Such are, *whole* and *part*, *cause* and *effect*, *subject* and *adjunct*, *time* and *place*, *agreement* and *difference*, *number* and *order*, to which may be added *truth* and *goodness*, lest the *mataphysicians* should complain of this omission.

Mental relations are such as arise not from things themselves, but only from our manner of conceiving them and referring one thing to another: Such are *abstracted* or *second no-*

tions, signs, language, and particularly all *extrinsic denominations* and *terms of art.*

Note, All affections of being are not *positive,* but they may be sometimes *negative.* Some men are knowing, some are ignorant or without knowledge.

CHAP. II.—*Of Essence or Nature, Matter and Form.**

AMONG the *absolute affections* of being the first that offers itself is *essence* or *nature;* and it consists in an union of all those things, whether substances or modes, which are necessary to make that thing be what it is; solid extension is the essence of *matter;* an animal *body* and *soul* united are the essence of a *man;* and *many flowers bound together* are the essence of a nosegay.

Note 1. Whatsoever is clearly contained in the nature or essence of a thing, may be affirmed of that thing: *Contingence* is contained in the nature of a creature, and we may say of every creature, *it is contingent* or may not be. *Existence* is contained in the nature or essence of God, and we may therefore affirm that *God has existence,* or *God exists.*

2. The essences of *mathematical* beings are immutable; never so little an alteration destroys the essence of a circle or a square: But the essences of *natural* beings are not so, nor do they consist in an indivisible point, but admit of degrees. A rose with more or fewer leaves may be a rose still. Marble is still marble whether it be tinged yellow or grey, or made a little harder or a little softer. But when the alteration or difference is very great, it is sometimes hard to say whether it retain the same essence so as to deserve the same name: Is a bat a bird or a beast? Is every monster to be called man which is born of a woman?

Query, When Mr. Locke infers from hence that the essences of natural beings are but mere nominal essences, does he carry this matter too far, or not?

Though we do not so well know the distinct essences and natures of particular kinds of *spirits,* as to say certainly what they consist in, yet the essence of every particular kind of *body* certainly consists of *matter* and *form.*

Matter is the solid extended substance which is common to all bodies: The *form* includes and implies those peculiar qualities both real and sensible, which make any particular body be what it is, and distinguish it from all other bodies.

Note, Shape or figure, size or quantity, situation or place, together with motion and rest are called the *real* or *primary qualities* of matter, because they do and would belong to bodies whether there were any sensible being to take notice of them or no. But colour, sound, taste, heat, cold, &c. are called *sen-*

* See this chapter explained more at large in the eleventh essay foregoing, which was written when I designed to have drawn out this "Ontology" into a more complete form.

sible qualities, because they are ideas or modes which we attribute to things merely as they affect ourselves or any sensitive beings. They are called also *secondary qualities*, because they arise from the different combinations and dispositions of those *real* and *primary* qualities before named, and their power to impress our senses in very different manners.

The matter of a body is either *proxime* or *remote*; the *proxime* matter of a ship is timber, the *remote* is trees.

Note 1. *Matter* and *form* have been improperly ranked among the *causes*, yet they may be called constituent principles of things.

2. *Matter* and *form* have been transferred from things corporeal to intellectual: So we speak of the *matter* of a sermon or treatise, which is the theme of discourse; and the *form* of it, which is the manner in which the speaker or writer treats of it. Hence arises the famous distinction of *material* and *formal*, usually and pertinently applied to subjects of various kinds, whether intellectual or corporeal. Wheat is bread *materially*, and ideas or terms are *materially*, a proposition; but neither one nor the other are *formally* so.

Having spoken of the *nature* of things in this chapter, it may not be amiss to take notice of a few distinctions relating to it.

The term *nature* is sometimes taken for the eternal and unchangeable reason of things; so it is necessary in the nature of things that three and four should make seven; and that the three angles of a triangle should be equal to two right angles. Sometimes it signifies the course and order of second causes, whether minds or bodies together with the laws of matter and motion which God the first cause has ordained in this world; in this sense it is natural for the limbs to move when the soul wills, and the four seasons of the year should succeed each other in Europe.

In this latter signification of the word some things are said to be *according to nature*, as when an oak brings forth acorns. Some are *beside nature*, as when an animal brings forth a monster. Some may be called *contrary to nature*, as when the stock of apple-tree brings forth pears by virtue of the twig of a pear-tree grafted into it; Rom. xi. 24. Other things are *above nature*, as are all the instances of divine and miraculous operation; though these are sometimes called *contrary to nature* too, as when the streams of Jordan ran backward, or the sun stood still.

CHAP. III.—*Of Existence, whether actual, possible, or impossible, necessary or contingent, dependent or independent.*

EXISTENCE is distinguished from *essence* as the *actual* being of a thing is distinguished from its mere nature considered as *possible*.

A being is *possible* when the ideas which are supposed to make up its nature may be actually united and have no inconsistency, as a golden mountain or a river of wine; but where the ideas are inconsistent it is called an *impossible*, as an iron animal, or silent thunder. This has neither essence nor existence.

Impossibles may be distinguished into four sorts; some things are *metaphysically* or *absolutely impossible* in the abstracted reason and nature of things, as a cubical circle, a thinking statue, a purple smell, or a bushel of souls. Others may be called *physically* or *naturally impossible*, i. e. according to the present laws of nature, such are three eclipses of the sun in a month, or that a full moon should always last. Others are *morally impossible*, that is improbable in the highest degree; so we may venture to say that it is impossible for an *atheist* to be strictly virtuous, or for a *Hottentot* to form a system of religion or mathematics; and such are many of the legends of the *popish* saints. Other things are said to be *conditionally impossible*, i. e. when such a condition is put as makes that thing impossible, which otherwise would not be so, as a tree bearing fruit on supposition it has no bloom.

Note 1. It is *absolutely* impossible that the same thing should both be and not be in the same sense, and at the same time, and in the same respect. 2. When we pronounce any thing *absolutely* or *naturally* possible or impossible, we should do it with great caution, since we know so little what ideas are or are not mutually consistent, either in abstracted reason, or according to the present laws of nature. 3. God is the only being that carries actual existence in his very nature and essence, and therefore we may say with assurance *God exists*. 4. Proper existence belongs only to individuals, for all general natures, i. e. genus, species, &c. are but abstracted ideas of the mind, and never exist alone, but only in individual beings.

But let us proceed to the ideas of *necessity* and *contingency*, which in this chapter relate to the existence of things, in the sixth chapter to actions.

All things which exist have either a *necessary* existence, i. e. they are because they must be; or they have a contingent existence, i. e. they are, though they might not have been, and may cease to be.

A necessary being wants no cause and is *independent*; but a contingent being is *dependent*, because it wants a cause to make it exist. This dependence is either *total* or *partial*; *constant* or *occasional*; for *existence* or for *duration*, or for *operation*, &c. see more in chap. 4. and in chap. 10.

Note, Independence in the highest sense belongs only to God, and is the same with *self-existence*, and near a-kin to the *idea* of necessary existence.

Necessity of existence may be distinguished into absolute or conditional: *God alone is absolutely necessary*, for he must exist whether any other thing be or be not; but as for creatures, though they are properly *contingent* beings, yet a *conditional necessity* may belong to them, i. e. such a creature or such an event may exist if the causes are put, which will certainly and necessarily produce it; if a hen's egg be hatched it will produce a chicken; if the sun rise there will be day-light; if a man will leap down a vast precipice, he must be destroyed.

It is called also sometimes a *conditional necessity*, when such premises or conditions are put from whence an event may be certainly inferred, though they have no manner of casual influence on this event; so we may say, that it was necessary Antichrist should arise, because the God of truth had foretold it.

Necessity may be divided into *natural, logical, and moral*; by *natural necessity* fire burns, and snow melts in the sun-beams. By *logical necessity* the conclusion of a syllogism follows from the premises. By *moral necessity* intelligent creatures are obliged to worship God, and virtue will be finally rewarded; though I know some writers take the term *moral necessity* in another sense.

Both *necessity* and *contingence* are ideas frequently applied to the events which arise in the natural world, i. e. the world of bodies, whether animate or inanimate; but the events in the moral world are more usually called *contingent*, i. e. the voluntary actions of intelligent creatures; though necessity may in some cases be ascribed to them too, as the blessed God necessarily acts agreeably to his own perfections; a rational and sensible being necessarily hates pain and misery.

Events *in the natural world* are said to be *necessary*, or to arise from natural necessity, when they are derived from the connection of second causes, and those laws of motion which God established in the world at the creation, and which he continues by his providence. This is the chief and most usual meaning of the word *nature*; and indeed *fate* in its derivation and original sense signifies but the dictate or decree of God. But if the appointment of God be left quite out of our thoughts, then fate is a heathenish term to denote a sort of eternal necessary connection of causes, without regard to the first cause; and some of the *heathens* have exalted this fate above the Gods themselves.

Events in the *natural world* are said to be *contingent*, or to arise from *chance* when they are different from what is usual in the course of nature, and utterly unexpected, though indeed the course of nature really produces them by the interposition of

some causes imperceptible to us. Yet the heathens have made this chance and fortune a fort of deities too, for want of their knowledge of the train of second causes, and a due regard to the first cause. Events *in the moral world* which arise from the mere free will and choice of intelligent beings, are called contingent, because they are not brought into existence in a necessary manner by any natural connection of causes; yet they are never ascribed to *chance*, for chance stands as much in opposition to *design* and *freedom*, as it doth to *fate* and *necessity*.

We might here just take occasion to observe, that not only with regard to existence are beings said to be necessary or contingent, but with regard to the manner of their existence also. God is necessary in this respect as well as in the other, and therefore his being and his attributes are unchangeable, but creatures are changeable things, because their manner of existence is contingent, as well as their existence itself.

Note 1. All the future events which arise from natural and necessary causes will not only certainly but necessarily exist; and though we call many of them *contingencies* because they are uncertain to us, yet they are not so to God who knows all things. So we say, *it may or it may not rain to-morrow*.

2. All the future actions of free agents and the events arising from thence (both which are properly contingent) may be certainly foreknown by God; and therefore we may say, *they will certainly exist*, though there be no such determination of them as to make them properly necessary; for the great and unsearchable God, who has foretold many free actions of men, may have ways of knowing things *certainly*, which we cannot so much as guess at. It is too audacious for man to assert that God cannot know things, merely because we cannot find out a medium for his knowledge of them.

See some further considerations of *necessity* in chap. VI. where we treat of freedom.

CHAP. IV.—*Of Duration, Creation, and Conservation.*

DURATION is merely a continuance in being, and this has commonly been divided into permanent and successive. *Permanent duration* belongs to God alone, and implies not only his continuance in existence, but an universal, simultaneous and endless possession of all the same properties and powers without change. *Successive duration* belongs to creatures, and implies the continuance of the same being with changeable and changing modes, powers, properties and actions one after another.

It is only successive duration which is most properly divided into *past*, *present*, and *future*. The present taken in a strict sense is only the moment that *now* exists, and divides the hours or ages past from those which are to come. It is very hard for

us to conceive of any duration without succession: but this permanent duration of God is his *eternity* which carries some things in it above our present ideas. See more in the chapters of time and infinities.

As *creation* gives existence to all created substances, so *conservation* is said to give duration, *i. e.* continuance in existence to all creatures.

Though the most proper idea of *creation* is the causing a substance to exist which had no existence, yet the word is also used in a less proper sense, when any particular bodies are formed out of such a mass of matter as seems utterly unfit for that end; when such changes are made in any substance as are generally supposed to be above the power of creatures and belong to God alone: so God created fish and fowls out of the water, and man and beasts out of the earth; though the creation of the substance of water or earth, or the matter out of which they were made, is the original sense of the word.

Conservation here refers to the same things which are the objects of creation, and on which God is supposed to exercise his almighty power.

Queries. Enquire then, how far do *creation* and *conservation* differ? Is conservation a continued creation? See *Essay* XI. *sect.* ult. If a creature be once formed would it not continue to exist without any divine conserving act? Is it possible the Creator should exist without willing or nilling the continued existence of his creatures?

Note, Substances being once made, a creature cannot of himself destroy them, or make their duration to cease, any more than he could of himself create them: but multitudes of modes are made and destroyed perpetually at the will of creatures, and are placed within their power.

Note, Though *time, place, ubiety,* might be introduced here and connected with *duration,* yet they are all plainly *relative affections,* and therefore I refer them to their more proper place.

CHAP. V.—*Of Unity and Union.*

THE next *absolute affection* to be considered is *unity,* which perhaps had never had the honour to make a chapter in *Metaphysicks,* if it had not been coupled with *verity* and *bonity;* which three properties being ascribed by Plato to God the great and eternal being. Aristotle his scholar ascribes them all to the idea of *being* in general, and thence came these ideas to make such a figure in *ontology*: though it must be confessed that several things have been said on these subjects which furnish the mind with useful distinctions.

Unity is that whereby a thing stands as it were divided in our conceptions from all other things: and this unity is either *simple* or *compounded*; we say *one nosegay* as well as *one flower*, and *one family* as well as *one person*, and *one universe* as well as one creature or one atom. See something further concerning *unity*, *simplicity*, and *multiplicity* in chap. XIV. of *number*.

Here we take occasion to treat of the doctrine of *union*, though perhaps some may call it a *relative* idea. It is that whereby two or more things either *really* become one thing or are considered as one; this distinguishes union into *real* and *mental*.

Real union is either *natural* and *necessary*, as between the root and the tree; or *fortuitous* and *accidental*, as between two apples making a twin; or *designed* and *artificial*, as between the graff and the stock, or drugs united to compound a medicine.

Again, real union is *corporeal*, *spiritual* or *human*.

First, consider *corporeal union* or union of bodies, whether dry or liquid, which is made by blending, mixing, compounding, by contact, aggregation, colligation, &c. Under this head we may also treat of vital and of inanimate unions of corporeal beings. Some of these corporeal unions may communicate properties, as fire joined to wood, a graft joined to a stock, perfume to garments. Others do not, as a bundle of dry sticks, or a heap of stones.

Secondly, consider *spiritual* union or union of minds; which may be called either *intellectual*, by mutual consciousness of each other's thoughts, or by agreement in opinion or it is *moral* by friendship or mutual love; or *supernatural*, as it may relate to God and the sacred themes of revealed religion.

Query, How far an *union of spirits* may arise from a superior spirit assuming an inferior to act by it in the manner of an instrument, or under-agent? In this there is no *real* communication of properties; yet the same actions may be ascribed to both or to either when united, and the same properties too by common figures of speech. But this I leave to theological debate.

In the last place consider *human union*, i. e. the union of an animal body with a spirit to make a man; and what are the effects of this union, viz. sensation, imagination, passion, &c. voluntary motions of the body, &c. And let it be noted, that though there be no real communication of properties here, yet there may be a nominal communication of them; as a *wise head-piece*, *a meagre soul*, *a prudent body*, *a heavy genius*.

Mental union is when several things really distinct and different are considered as one; there are no two beings, nor any

altitude of things so different and distinct; but may by their eneas or agreement, situation or other circumstances, come to considered as one thing, and come under one name. Air, ater, earth, and all the infinite variety of creatures make one *iverse*; all individuals are united in one *species*, and all species der one *genus*; all substances, whether minds or bodies, come der one general name of being; and all the ideas and collec- n of thoughts as well as words in this book make one treatise *ontology*. Note, in all these instances there is a real founda- n for this *mental union*.

In many unions we have occasion to consider not only the *rms* which are the things united, but also the means or bond of ion between these terms. In a nosegay the bond of union is a read; in metals it is solder; in a heap of stones it is juxta- sition and gravitation; between friends the bond of union is ve; between kindred it is birth; between master and servant is contract, &c. But there are many things united where the nd of union is unknown, or must be resolved into the appoint- ent of God. What is it unites the parts of matter in a hard dy? What is it unites the flesh and spirit in man?

Union and composition may give occasion also to speak of *straction*, *division*, *dissolution*, *separation*, *&c.* which stand in position to union.

HAP. VI.—*Of Act and Power, Action and Passion, Neces- sity and Liberty.*

THE next *absolute affections* of being, are *act* and *power*; ough it may be a little doubtful whether there is not enough of *lation* between these two ideas to throw them into the rank of *lative affections*. Each of these viz. *act* and *power* may be dis- nguished three ways:

1. As *actual being* or *existence* is distinguished from *poten- al*, or a *power to be*; So a book already written differs from a ook which may be written, or that is merely possible.

2. As *actual doing or action* is distinguished from a *power do*: So the actual putting bodies in motion differs from mo- ility or a power to move them: So the acts of thinking in spi- s have some sort of difference from the thinking power.

3. As *actual suffering or passion* is distinguished from a *wer to suffer*: So actual division in matter differs from mere visibility; or the actual motion of a body is different from mo- lity or a power to be moved.

Here we treat of *action* which is the exercise of a power to , and *passion* which is the exercise of a power to suffer. ote, *passion* and *suffering* in this philosophical sense signifies ly receiving the act of the *agent* or *doer* by the *patient* or *suf- rer*. When hailstones smite upon a rock, the hailstones are e agents, the rock is the patient; it is no matter whether any

impression be made or no; or when a child honours his father, the father is the patient in a philosopical sense, and the child the agent.

Here it is proper to introduce all the needful distinctions of *action*. (1.) It is immanent or transient. (2.) It is natural, supernatural, voluntary, or accidental. (3.) It is necessary or free.

1. *Immanent action* has no different patient but continues in the agent; so a man forms ideas, or he loves himself. *Transient action* passes over to some other object as a patient: So a man draws a picture on a canvas: So a father loves his son, and feeds or clothes him.

2. *Natural action*; so the fire hardens clay. *Supernatural action*, so Elisha made iron swim by casting a stick into the water. *Voluntary action*; so the potter moulds his clay into a vessel. *Accidental action*; so a servant heedlessly throws down a glass and breaks it.

3. *Necessary action*; so the sun warms the earth; *free action*; so man chuses what food he likes and eats it when he pleases.

Note, *Necessary agents* act always, and that to the utmost of their power, i. e. when things requisite to their agency are present: But free agents act what, and when, and as far as they will.

Perhaps the doctrine of *liberty* and *necessity* might be here properly inserted. We have already spoken of *necessity of existence* as it is opposed to *contingency*: Here *necessity of action* stands rather distinguished from *freedom* or *liberty*, yet is not universally and utterly inconsistent with it, as will appear in what follows.

Necessity has been before distinguished into *natural*, *moral*, and *logical*. See chap. iii. Natural necessity is either *internal* or *external*. *Internal* necessity is that which arises from the very nature of the thing itself, so a sensible being seeks its own preservation, a fish avoids dry land, and a fox the water, and lead sinks in the sea: That necessity is *external* which arises from some outward force of restraint or constraint; so lead is upheld on the surface of the water; so a fox is driven into the sea, or a fish drawn in a net to land, and so a man is constrained to wound himself. This is sometimes called a *forcible necessity*.

Liberty is applied to the *will*, or to the *inferior* and executive *powers*. The will is always free in its choice of what it likes: The lower powers are not always free to act or do what the will chuses. A man close fettered cannot walk, nor can he fight when his hands are tied, though he may will or chuse to do it. On this account freedom is better described by *chusing* than by *acting*.

gain, Liberty of the will is always a *liberty of spontaneity intariness*, without considering whether it can do otherwise : So when an intelligent being wills and pursues its own ed satisfaction or happiness, this being is called free herein, this action be necessary, and it cannot do otherwise.— berty of the will is sometimes a *liberty of choice and indif-*, a freedom or power to chuse or not to chuse among two or hings proposed : So a man chuses to speak or to be silent. reedom is inconsistent with *necessity* ; and this is called by writers *liberty* in the most proper sense ; and perhaps it had en amiss if the term *liberty* had been always confined to nse only, but mankind have not always done so.

There may be also an *absolute* or *perfect* freedom, as when ry man wills to go to dinner ; or a *comparative* freedom, a sick man wills or consents to take some nauseous physic than continue in pain. Let this suffice for the distinction *and necessary actions*. See something more relating to bject in the chap. of *cause* and *effect*.

ome philosophers suppose nothing worthy of the name of or *action* but the *will* and its exercises; and they call all other and their powers and operations merely passive; but this is too great a violence offered to the common sense of , though there may be some appearance of reason for it in ture of things.

Having spoken particularly of *act* and *action* ; let us now say ing more of *power*. We may distinguish several *powers* ne degrees and kinds of them. First, *disposition*, which imperfect power of performing any thing, and but the degree : Next to this is *mere ability* to perform, i. e. with lty and care ; and then a strong *habit*, i. e. to perform with nd certainty.

among powers, some are merely *corporeal* and *inanimate*, power of the sun to melt snow, and to draw up vapour : are *vegetative*, as nourishment, growth : Some are *animal* s, as eating, swallowing, digesting, moving, walking, g, &c. Some are *spiritual*, as meditating, reasoning, re- g, chusing, refusing, &c. Some are *human*, arising from ion of mind and body, as sensation, imagination, language. e *passions* of man and what sort of powers they are, see Doctrine of the Passions explained and improved. Edit. 732.

gain, Of powers some are *natural*, as a man's power to voice : some *acquired*, as music, ploughing, language, d by degrees ; and some are *infused*, as the power of the es to speak many languages. Powers acquired by exercise st properly called *habits*. All powers of *natural action* nals or *artificial* in men, are called *faculties*, as a power

of walking, dancing, singing; in inanimate beings they are *principles*. Powers of *moral action* are called also *principles* or *habits*, as temperance, justice.

Note 1. Though we can draw no inferences from the *power* to the *act*, or that any thing is because it *can be*; yet inferences may be justly drawn from the *act* to the power, or that such a thing *can be* because *it is*.

2. Whatsoever power the agent has to act, yet the action can be received by the patient no further than the power of the patient reaches. This is exprest in scholastic language, *quicquid recipitur, recipitur ad modam recipientis*. A gallon may pour out its liquor into a pint bottle, but the bottle can receive but a pint: And if the neck be narrow it can receive liquor but slowly how fast soever the larger vessel may pour it. A tutor may teach a child all the rules of reading in a day, but a child cannot learn them in a month.

3. Neither the power of creatures nor of God himself extends to things which are inconsistent in nature and self-contradictory: What his infinite wisdom cannot join, his power cannot produce. Nor does this impossibility in things argue any impotence in the blessed God. Yet let it be observed, that it is a much more modest way of speaking generally, to say such things cannot be done, than that God cannot do them.

Chap. VII.—*Of relative Affections or Relations.*

A *RELATIVE affection* is the same with a *relation*: This arises from the respect that one thing bears to some other thing or things in the universe, or to some part or parts, property or properties of itself. The same relation is not confined to two things, but it may belong to many. *Paternity*, and *sonship*, *greatness*, and *smallness*, are relative ideas; and so are a *part* and a *whole*; a king and his subjects; beginning, middle, and end.

In relations we consider first the *subject* of them, that is the thing of which we are speaking; this is called the *relate;* and then the *term* to which this thing is related, which is called the *correlate*. So if we speak of a *father*, that is the subject of the relation; and the *term* or *correlate* is the son; but if we are first speaking of the *son*, then the son is the *relate* or *subject* of the relation, and the *father* is the *term* or *correlate*.

Some relations arise from the *mere existence* of the two beings, so the likeness of *two eggs*. Others require a *foundation* of the relation distinct from the mere existence of the relate and correlate; as in master and scholar, *instruction* is the foundation; in buyer and seller, the foundation is *compact*.

Relations are of several kinds.

1. They are natural or moral, accidental or voluntary. *Natural* relations are between root and branches, father and children, kindred by birth, &c. *Moral* are those relations which

the actions of men bear to a law, and thus they are good or evil, rewardable or punishable; this law is either human or divine, &c. *Accidental relations* are between several persons happening to become neighbours, or between a company of soldiers drawn out by lot, or between flowers springing up from the same bed of earth. Relations are *instituted* and *voluntary*, i. e. *freely chosen*, as between husband and wife, or two or three friends, &c. Sometimes they are *chosen* or *voluntary* only *on one side*, as a carter chuses what horses shall make up his team, or a man what house he will inhabit.

2. Relations may be termed reciprocal or not reciprocal. *Reciprocal* relations are partners, cousins, neighbours, balances, &c. Relations *not-reciprocal* are cause and effect, father and son, uncle and nephew, king and subjects. The first indeed are more usually called *synonymous* relatives, or of the same name; the others we call *heteronymous* or of a different name.

3. Relations are divided into *real* or *mental*; the *real* relations arise evidently from the nature of things. These are the *whole and part, cause and effect, truth and goodness*, &c. as before recited. *Mental* relations are made only by the mind; these will follow in their due order.

CHAP. VIII.—*Of Truth, Goodness and Perfection.*

LEST the *metaphysicians* should take it ill to have these two affections of being (viz.) *truth* and *goodness* so much postponed, let us name them in the first rank of *relative affections* or relations: For real *truth* and *goodness* are plainly ranked among relative ideas, as they consist in a conformity to some things as their rule and standard. And first let us discourse of *truth*.

There are various senses wherein the term *truth* is used.

1. A being is said to be *true* in a *metaphysical* sense, when it is agreeable to the divine idea, which is the grand pattern of all created beings. 2. Things may be said to have a *physical or natural truth*, as, that is *true gold* which has all the necessary properties which are usually united in the idea signified by that word. 3. Some things are called *true in representation*, as when a picture well represents the original, or when an idea in our minds is really conformable to the object of it. 4. Things are said to be *true in signification* when the thing signified answers the sign; as when the proper words are used which commonly signify such an idea. 5. There is also *logical truth* when the proposition or assertion is conformable to things. And indeed this I think is the most common sense wherein this word is used. The propositions themselves are frequently called *truths*. Some of these are called probable, some improbable, some certain, i. e. according to our knowledge of them. *Again*, some truths are necessary, such as *there is a God, the whole is*

bigger than a part, two and two make four; these are called eternal and unchangeable; other truths are contingent, as *the sun shone bright to day, Plato was a philosopher.* 6. There is also *ethical* or *moral truth*, when our words or actions agree to our thoughts, and our deeds to our words, i. e. when we speak or act as we think, or when we believe and practise what we profess and promise. *Sincerity* is the truth of the heart, and *veracity* the truth of the lips.

After *truth* comes *goodness*.

Goodness is sometimes used in a sense near a-kin to truth; so the works of God are *metaphysically good* when they are agreeable to his will and answer his design; *when God surveyed all things that he had made, behold they were very good.*

Things also are *physically* or *naturally good*, when they come up to any supposed standard, or are fitted to answer their end, as *good wheat, good gold, a good air.*

Artificial things are also good in this sense, as *good writing*, a *good picture*, a *good clock.*

There is another sense of *natural good* which is used only with relation to sensible or to rational and intelligent beings, and that is, what is pleasant, or which tends to procure pleasure or happiness.

There is also *moral good*, which relates only to intelligent creatures, and that is called *virtue* when it regards our neighbours or ourselves; or it is called *religion* when it has a regard to God. *Moral good* in general is when the voluntary thoughts, words or actions of creatures are conformable to the reason of things, or to the law of God. Which of these two is the chief or original rule of goodness may be debated, though I rather think it is the will or law of God, gives the proper obligation to obedience.

Note, It seems most proper to call both *natural and revealed religion* the *law* or *will of God*, though one is manifested to us by the exercise of our reasoning powers the other by divine revelation.

The *good of mankind* or of rational beings is wont to be distinguished into the *supreme or chief good* and the *subordinate good*; it is either *real* or *apparent*; it is present or future; it is also divided into *bonum jucundum, utile et honestum*, i. e. pleasant, profitable and honourable. The two first of these come under the idea of *natural* good, the last is near a-kin to *moral* good, though perhaps not exactly the same.

Note, the word *goodness* is also used in somewhat a different sense when it signifies wishing or doing good to others; then it is called *kindness* or benevolence. This belongs either to God or creatures: It comes nearest to the idea of moral good, though

it promotes *natural good*, as it is that which tends to procure the pleasure or happiness of other beings.

Any thing that is *excellent* in its kind is vulgarly called *good*, whether it be *natural*, *artificial* or *moral*.

Note, What *truth* is to the mind that is *good* to the will, i. e. its most proper object.

According to some of these divisions of *truth* and *goodness* it may be proper also to shew what is *falsehood*, and what is *evil*, which are their contraries; and here the moral ideas of *vice* and *sin* may be introduced, which is the unconformity of our voluntary thoughts, words, or actions, to the laws of reason, or to the revealed will of God.

Here we might say, as duties and virtues consist either in action or in abstinence, so sins are distinguished into those of omission or those of commission. We might remark also concerning *good* and *evil*, that of several good things the greatest is to be chosen, and of several evils the least. But these thoughts belong rather to *moral* science.

Let us proceed now to consider what is the true idea of *perfection*.

When *metaphysical* or *physical truth* and *goodness* are united in any being it is called *perfect*, i. e. it contains all the parts and properties which belong to the essence or nature of that thing, without defect or blemish; it comes up to its standard, and it is fitted to answer all its designed or proper ends. Where any of these are wanting the being is called *imperfect*.

A being may be called *perfect absolutely* in all respects; and that belongs to God alone; it may be said to be *perfect in its own kind* as a perfect cube or triangle, or circle; that is a perfect rainbow, which has all its colours and reaches from side to side of the horizon; or it may be called *perfect comparatively*; that is a perfect image, statue or picture, which has no sensible defects or unlikeness to the original, and is superior to all others; so established and knowing christians are called *perfect* in scripture in comparison of novices.

Again, A being is perfect either as *to parts* or as to *degrees*; an infant is a perfect man as to his parts, but his degrees of growth, or of power to stand, to walk, to reason, &c. are imperfect. Yet *further*, a thing may be perfect as to *quantity* and *measure*, as a horse of full grown stature; but this horse may not be perfect as to the *qualities* and *powers* of beauty, or swiftness. So fruit may be perfect as to its size, but not as to its ripeness.

In the last place, things are yet said to be perfect with regard to all their *essentials* (viz.) the natural parts and properties which make the thing be what it is, as a garden just laid out and planted; or it may be perfect with regard to all *circumstantials*

also, which give that thing beauty, ornament, honour, conveniency, &c. such as well grown fruit-trees, shady walks, summer-houses, green-houses, &c. make a perfect garden.

The word *perfect* is sometimes used for *excellent*, as when we say, beasts and birds are more perfect than fishes; spirits are more perfect than bodies; and men more perfect than brutes.

CHAP. IX.—*Of the Whole and Parts.*

A BEING is said to be a *whole* when it is considered as consisting of the several parts of it united in a proper manner. And consequently *parts* are beings, which united, constitute the *whole*. There are four kinds of *whole* reckoned up by writers on this subject, (viz.) *formal* or *metaphysical*, *essential* or *physical*, *integral* or *mathematical*, and *universal* or *logical*. See Logic, part I. chap. sect. 7. These are the terms in which the schools have expressed these distinctions; and since most of the distinctions are useful, it is not necessary to change the terms, though some of them may be applied in a little more proper and perspicuous manner.

A *formal* or *metaphysical whole*, is the definition of a thing, whereof the genus and the difference are the two constituent parts. See Logic, part I. chap. 5. § 4. I think this is no useless distinction.

An *essential* or *physical whole*, is wont to be applied to natural beings, all which were supposed to consist of *matter* and *form*: And thence it is applied to *man* consisting of body and soul; which the *Peripatetics* called the matter and form of man. But I think the sense of it may be better changed or enlarged to include the substance, with all the essential properties of a thing; which joined together make up the whole essence of it.

An *integral whole*, is when any thing is made up of several parts, which have a real and proper existence in nature, and are quite distinct from each other; as the body of man is made up of trunk, head and limbs: An army is made up of soldiers. Number is made up of units. and a day of hours: A book is made up of pages, a page of words, a word of letters; and speech is made up of articulate sounds.

Note, This is called a *mathematical whole*, when it is applied to number, time, dimension, body, or any thing that hath proper quantity, but the term *integral* may have a wider extent.

An *universal whole*, is a genus which includes several species, or a species which includes several individuals. This belongs chiefly to *logic*; and therefore it is called a *logical whole*.

Though spirits have properly no quantitative parts, and therefore cannot be called a *whole of the mathematical kind*, yet the terms *whole* and *parts*, may be applied to them in all

the other senses: As for example, (1.) *Metaphysical*; so a thinking substance is the whole *definition* of a spirit; substance is the *genus*, and thinking the *difference*. (2.) *Physical* or *essential*; so a spirit is a whole, and perception, judgment, reason, and will, may be called its essential parts or powers, without excluding immateriality and immortality, as its properties. (3.) *Integral*; so we say a whole army of angels, a whole heaven of blessed spirits. (4.) *Universal* or *logical*; so a spirit is a *genus* or generic whole, human souls and angels are the *species*, or special parts. As for man, who is a compound being made up of body and soul, I think he may be called as properly an *integral whole*, and then we leave the term *essential whole* to signify only a substance with all its essential properties.

Query, When we say, one of Tully's orations is made up of happy thoughts, just reasonings, warm persuasives, beautiful transitions, pure language, and well-sounding periods, are these *integral* or *essential* parts, and how is the *whole* to be denominated? But let us proceed.

Parts are either *homogeneous*, i. e. of the same kind, as branches are parts of a tree; or *heterogeneous*, i. e. of different kinds, as the several limbs and bowels are parts of an animal. And even *homogeneous* parts may be *similar* or *dissimilar* in several circumstances, as the branches of a tree may be fruitful or unfruitful, long or short, vigorous or withering.

Note 1. That which is a *whole* in one sense, may be a *part* in another. This whole globe of earth is a part of the universe.

2. The *whole* is bigger than each *part* taken separately, and equal to all the parts taken conjunctly.

3. The *part* of a part is also a part of the whole. A finger is a part of the body, because it is a part of the hand.

Chap. X.—*Of Principles, Causes and Effects.*

A PRINCIPLE may be with sufficient propriety distinguished from a cause, as a general nature from one special kind. Principles are any sort of springs whatsoever, either of essence or existence, of knowledge, or of operation.

I. Principles of *essence* or *existence* are either (1.) *Continent*, as herbs, minerals, metals are principles of medicines; for they contain in them the juices, oils, spirits and salts, and medicinal extracts, which are drawn from them by the chymists. Or, (2.) Principles are *constituent*, as compound medicines are made of several simples, as their principles; or as matter and form are the constituent principles of particular bodies; or as stone and timber of a house, or as any parts of a thing are constituents of the whole. Or, (3.) Principles are *causal*, such are all the tribes of causes to be mentioned hereafter.

II. Principles of *knowledge* are either *internal* as perception,

reason; or *external* as objects, books. Both these are either *natural*, as sense, sensible things; or *supernatural*, as visions, inspirations. *Again*, Principles of knowledge are more *simple*, as ideas, or words, or letters; or they are more *complex*, as propositions, and particularly such as are self-evident, as axioms, or such as contain the chief truths or rules of any doctrine, art or science.

III. Principles of *operation* may sometimes include the beings themselves, which operate as writers, warriors, &c. as well as their natural powers, viz. hands, strength, skill, &c. and their moral powers, viz. law, authority, &c. And *supernatural* principles, viz. revelation and divine influences.

Almost all principles, except the *constituent* and *continent*, may be reduced to some or other of the kinds of causes.

A *cause* in general is a principle distinct from the thing itself, and hath some real and proper influence on the existence of that thing. An *effect* is that which is produced, done or obtained by the influence of some other being, which is called the cause.

1. Note, No being can properly be the cause of itself: Yet a fountain may be the cause of a river, though the water in both may be the same *materially*, but not *formally*; for a fountain springs out of the earth, a river runs along on the earth, between a length of banks.

2. Every being, besides the first being, wants a cause: God the first being, is self-existent or independent, and has no cause: He exists from a necessity of nature and self-sufficience, yet not properly as the *cause* of his own being; but all other real beings are derived from him as from their cause.

3. The same thing in different respects may be both a cause and an effect. Clouds and vapours are the *effects* of the sun, but the *cause* of rain.

4. A cause is in order of nature before its effect, but not always in time. For a fire gives heat, and a star gives light as soon as they exist.

Causes in general may be divided many ways.

1. Into *universal* and *particular*: The sun, earth, rain, are all *universal causes* of plants, herbs and flowers; for by the same sort of influences each of them produce various and different effects: But the particular seeds are the *particular causes* of each different herb and flower. *Common* and *proper* causes are very near a-kin to the former distinction.

2. Causes may be divided into *remote* and *proxime*; as an infectious air or *east wind* may be the *remote* cause of the death of men; but the several diseases arising thence are the *proxime* causes. A father is the *proxime* cause of his son, a grandfather the *remote* cause.

3. Causes are *univocal*, as when a lion produces a young lion; when a fountain of water sends forth a stream of water; or when money being lent, gains money by interest; but they are *equivocal* when a man writes a book, when a root produces a stalk and leaves, or when money buys land. In the three first the effect is of the same nature with the cause; in the three last it is different.

4. Again, Causes are *sole* or *solitary*, as when a horse alone eats a gallon of corn; or *social*, when a hen and chickens share it among them. So a pestilence is a *solitary* cause when it destroys a city; but when an army made up of officers and soldiers conquer it, these are *social* causes.

Social causes are either *co-ordinate* as common soldiers fight a battle, or *subordinate*, as the several degrees of officers, viz. colonels, captains, lieutenants, and the common soldiers under them. Among subordinate causes we sometimes consider the *first*, the *last* and the *intermediate*; whether one or more.

Note, In causes acting by a *necessary subordination* the cause of a cause may be justly deemed the cause of the effect. The man who throws in the firebrand, which kindles the gunpowder, which blows up a ship, is the cause of the death of the sailors.

Note, In subordinate causes you must at last come to a first cause, for there is no infinite or endless subordination of causes.

Query, If a round chain of many links were used to bind a vessel of liquor instead of a hoop, is not each link subordinate to its neighbour in their influence? And which of all these is the first cause? Ans. These are all co-ordinate and not subordinate causes; though they are dependent, yet it is on each other mutually, and they are all equally dependent.

5. Yet further, causes in general may be divided into *total* and *partial*. An *absolutely total* cause is much the same as a *sole* cause: But a cause may be *total in its own kind*, though many other causes concur to produce the effect. Alexander the king, Apelles the painter, his idea, his hand, and his pencil, are each a *total* cause of Alexander's picture, for each of these is single and alone in their distinct influences: But the several colours are *partial* causes, for they have all the same influence: and so are the fingers of the painter, for they all join their service in guiding his pencil.

6. Causes are also distinguished into *physical*, which work by natural influence; and *moral*, which work by persuasion.

7. A cause is called *ordinary*, when it works according to the usual course of nature, as when animals produce their own kind: It is *extraordinary* or miraculous, as when the rod of Moses produced swarms of lice in Egypt.

After all these distinctions of *causes in general*, let us now come to distribute causes into their chief *particular kinds*. Instead of dividing them into those common branches of *material* and *formal*, *efficient* and *final*, it may be much more proper to leave out *matter* and *form*, as not being properly *causes*, and then we may distribute the rest into four kinds, viz. *Emanative*, *efficient*, *instructive*, and *suasive*: and as I think none of these are included properly in each other, so these include all the various ideas of positive proper causes in the most natural and easy view and order.

I. An *emanative* cause is, when the effect flows from it without any action to produce it, supposing only that all obstructions be removed. So water flows from a spring, so heat from the fire, or a fragrant scent from spices. This might perhaps be reduced to the rank of *continent principles* whence any thing proceeds, though it much better deserves the name of a *cause* than *matter* and *form*, which are only constituents, and are the effect itself. It belongs chiefly to natural and necessary causes to have the title of *emanative*. Sometimes the effect is *co-eval* with the emanative cause, as light and heat flowing from the sun, or a sweet smell from a violet. Sometimes the cause is *prior* to the effect, as when a plant springs from the seed, or leaves and fruit from a tree, or a long river from a distant fountain.

Query, Whether some of those which are usually called *emanative* causes, because their agency is more insensible and unnoticed, be not as properly ranked among the *efficient* causes? Such as, the sun in emitting its rays, which give both light and heat, and produce innumerable effects throughout the earth and all the planetary worlds? Is it a mere emanative cause of light and heat? *Ans.* This may be debated in *physiology* if it be worth a debate.

II. An *efficient cause* most properly deserves the name of a *cause*, because it produces the effect by some sort of active power or natural agency; as when an archer bends his bow, or when the bow gives flight to an arrow, or when an arrow strikes the mark. All these three are distinct efficient causes with their distinct effects. Efficient causes have many divisions.

1. Efficient causes are either *first* or *second*. The first cause is either *absolutely so*, which is God alone, and all creatures are but second causes: Or it is *first in its own kind*; so a gardener is the first cause of the growth of trees in the garden which he hath planted; all his under agents, whether diggers, waterers or weeders, are second causes.

2. The next division near a-kin to the former is when efficient causes are distinguished into *principal*, *less principal*, and *instrumental*. The principal cause of building a house is the architect; the less principal are adjuvant or assistant causes,

such are bricklayers, carpenters, labourers, &c. the instrumental causes are hammers, axes, trowels, &c.

3. Efficient *internal* causes are distinguished from *external:* when the inward humours of the body produce pain or death, it is different from the case when outward wounds and bruises produce the same effects.

4. Efficient causes may be *exciting* and *disposing*, as when hunger excites a horse to eat, or a farmer holds hay to his mouth: But when a farrier constrains him to take a drench, this is a *compelling* and *constraining* cause.

5. A cause is *forced*, as when a man driven by robbers runs in at his neighbour's window by night for shelter: or it is *free*, as when a robber breaks into the house to plunder it.

6. Yet further, efficient causes may be *necessary*, as when the sea drowns a child who falls into it; or *contingent*, as when a tile falls from a house and kills a child; whereas it might only have wounded him, or perhaps not hurt him, or never touched him.

7. *Again*, Causes may be *accidental*, as when a boy throws a stone at a bird and breaks a window: But when he doth mischief on purpose, the cause is *designing*, and the effect is *designed*. When a groom leads a lame horse to water, the groom is the *designing* cause of the horse's walking, but he is only the *accidental* cause of his halting. The famous pair of causes which in the schools is called *Causa per accidens* and *Causa per se*, may be applied to these two or three last distinctions of efficient causes. *

8. *Again efficient causes* may be either *procuring* or *confirming*, *preventing* or *removing*. So medicines confirm or procure health, and prevent or remove diseases.

9. Efficient causes may be *creative*, *conservative*, *alterative*, or *destructive*. The very names of these describe them sufficiently.

Note, Here might be introduced that famous axiom of the schools, that *every cause contains its effect*, or that *there is nothing in the effect which was not in the cause:* but this must not be understood always *formally*, as a fountain contains water, but sometimes, only *eminently*, i. e. as the root of a tree contains leaves and fruit, because it can produce them; and indeed when we search this axiom to the bottom, it means nothing more than that *every cause can produce its effect*, which is a very dilute and

* I know *accidental* and *contingent* causes are much the same; but I thought it more proper here to multiply the divisions of cause than to crowd all these causes, (viz.) *forced*, *free*, *designing*, *contingent*, and *necessary* into one division, because some of them have two or three opposites, and have their ideas a little distinct, which best appears in distinct pairs. See more in the chap. of *Act* and *Power*, *Necessity* and *Freedom*.

insipid canon, because it is contained in the very definition of a cause. Besides it is a very odd and uncouth manner of speaking, to say, that a whetstone contains in it the sharpness of a scythe, not *formally* but *eminently*, because it can make a scythe sharp. Yet this is the case in a multitude of these metaphysical axioms; I mention this only as an instance at present and as a reason why I have past so many of them over in silence.

III. The third kind of cause is an *instructive cause*. This works either by way of manifestation of truth, or direction in practice, and may be called *manifestative* or *directive*.

1. In the *manifestation of truth* this cause sometimes operates in *silence;* as a book, a diagram, a picture, a map, a mariner's compass, or magnetic needle: Sometimes it is *vocal*; as a tutor, or a watchman in the night, or perhaps a cuckow giving notice of the spring, or a crowing cock of the morning.

2. In the *direction of practice* this cause is either a *rule* which teaches us to act whether by speech or writing; or it is a *pattern* or *example* for us to imitate and copy after. Sometimes this is a living *example* which by acting shews us to act the same; or it is a *guide* which seems to include both the former (*viz*,) teaching and shewing, or rule and example.

Many times the *instructive* causes which primarily manifest truth are in some sense *directive* also, as they are designed also ultimately to direct our practice; so a mariner's needle pointing where the north lies, directs the pilot to steer the ship.

Note, *Active* instructive causes approach toward the idea of an efficient cause; the unactive are quite distinct.

Note, All this sort of causality works its effect chiefly in intellectual agents.

Query, But may not an *instructive* cause sometimes be attributed to brutes? Dogs or horses will teach one another what man has taught them.

Note, The word *directive* may sometimes be applied to physical causality, as when a pilot or steers-man guides a ship by the rudder, or when a tube or ring guides an arrow to the mark, when a canal conveys water to a cistern, or when any hard body by repelling or reflecting, determines any moving body to a particular point. But all these are more properly ranked under *efficient* causes than *directive*, because they do it by mere mechanism, without so much as the appearance of any intellectual influence upon the thing directed, and can never be called *instructive*.

Query, when a sun-dial shews the hour, the sun and the style of the dial seem to be *social efficient* causes; the sun by giving light and the style by limiting it with shade: But what sort of cause is the dial-plane? Is it not *instructive*?

IV. A *suasive* case is properly something from without,

which being apprehended by the mind, excites or inclines a voluntary or free agent to act, and it works either by intreaty or authority, by commands or counsels, by promising or threatening, by rewards or punishments, by fear or hope, or any other motives, all which are called *moral agency* or *influence.*

Suasive causes are either personal or *real.* Personal are chiefly such as these (viz.) Author or persuader, commander, encourager, &c. Real suasive causes are the end or design, the object, occasion, opportunity, merit or demerit. Any being, appearance or circumstance whatsoever, that tends to influence the agent in a *moral* way, *i. e.* to affect and persuade the will, may be properly called a *suasive* cause.

This sort of causes belongs also chiefly if not only to intellectual and voluntary agents.

Yet it it may be queried, whether a pond inviting a horse to drink be a suasive or an efficient cause? Is the influence of this object on the animal properly natural or moral? Food inviting a hungry man to eat has certainly both a natural and a moral influence, because he has both animal nature and reasoning powers.

The *end* or design is one of the chief of *suasive* causes. This is usually called *the final cause,* and makes a considerable figure in the doctrine of causes. It is defined, *That for the sake whereof any thing is done.* An artificer labours hard; his *end* is to procure bread; his labour is called the *means.* The end is the cause, the means the effect.

Under the idea of an *end* all the doctrine of *final causes* with all their divisions should be introduced.

1. Here therefore comes in first the distinction of *ultimate end* or *subordinate:* An ultimate end is either *absolutely* so, such is or should be the end of all our actions, (viz.) the glory of God and our own final happiness, or it is *ultimate in its own kind*; so learning or knowledge is the chief end of reading. *Subordinate* ends are such as tend to some further end, as knowledge is sought in order to practise; practice in order to profit and pleasure in this life, or preparation for the life to come.

Note, There may be many *co-ordinate* ends of the same action which are not *subordinated* to one another. A man rides on horseback for his pleasure, for his health, and for a visit to his friend. If one of these ends be much superior in his eye to the others, that is called the *primary* end, others are but *secondary,* though not *subordinate.*

2. The end is considered as in the *intention* of the prime efficient, or in the *execution.* In the intention it moves or excites the efficient cause to act by a moral influence, and it is in this view it properly comes in among *suasive* causes. But in the execution it becomes the effect of the prime agent by a *natural* influence or causality.

3. Another manifest distinction of final causes is into such as are *private* and *concealed*, or such as are *public and avowed*.

4. There is another distinction which the schools call *finis cujus*, i. e. the end or design of the workman, and *finis cui* which is the end or design of the work. A clock-maker's design is gain, but the design of the clock is to shew the hour.

1. *Query*, Are brutes influenced by final causes? Their actions look very like it. But doth not acting for some design or end imply reasoning? Is this reasoning in themselves or in their Maker only? What is it then in the brutes themselves? Can mere instinct or mechanism perform all these operations?

2. Is it not an evident truth that all causes must have a being before they can act, at least in order of *nature* though not always in time? But may not many *suasive* causes act before they exist? as for instance; a thief is tempted to provide a ladder to-day because there will be an *opportunity* at night to come over the garden wall: And do not *final* causes always act before they exist, since the action of the efficient is designed to produce their existence as the effect? *Answer*. All suasive causes act by the idea of them existing in the mind, whether the things themselves exist or no.

1st Note, The *end* and the *means* are mutually cause and effect to each other. When the end is considered as a *suasive* cause, the means are the effect; but when the *end* is considered as the effect, the means are an *instrumental* or *subordinate efficient* cause under the influence of the principal efficient.

2. The end reconciles the agent to those means which may be painful and unpleasant, and it regulates and limits the use of means. A sick man who seeks health is persuaded to use blisters or bitter potions, and his use of them is regulated and limited by the view of health.

3. In the series of final causes subordinate to each other, that which is *last in execution* is generally *first* or *chief in the intention*; but it is not always so; for when the chief end is obtained, lesser ends may be sometimes pursued. I retire into the country chiefly for my health; but when I am well I design also to visit my friends there, and I seek my health partly with that design.

Besides these four kinds of *causes* which have a plain, a positive and direct influence upon the effect, there are some other principles which also have their distinct sorts of influence, though not in so positive and direct a manner: Yet they have been dignified with the title of *causes* for want of a fitter name. The chief of them are, a *deficient* cause, a *permissive* cause, and a *condition*.

I. A *deficient cause* is when the effect owes its existence in a great measure to the absence of something which would have

prevented it; so that this may be reckoned a *negative* rather than a *positive* cause: The negligence of a gardener, or the want of rain, are the deficient causes of the withering of plants; and the carelessness of the pilot, or the sinking of the tide is the cause of a ship's splitting on a rock: The forgetfulness of a message is the cause of a quarrel among friends or of the punishment of servants: The not bringing a reprieve in time is the cause of a criminal's being executed, and the want of education is the cause why many a child runs headlong into vice and mischief: The blindness of a man or the darkness of the night are the causes of stumbling: A leak in a boat is a deficient cause why the water runs in and the boat sinks; and a hole in a vessel is called a deficient cause why the liquor runs out and is lost. Man is the deficient cause of all his sins of omission, and many of these carry great guilt in them.

II. A *permissive cause* is that which actually removes impediments, and thus it lets the proper causes operate. Now this sort of cause is either *natural* or *moral*.

A *natural permissive cause** removes natural impediments, or obstructions, and this may be called a *de-obstruent cause*. So opening the window-shusters is the cause of light entering into a room: Cleansing the ear may be the cause of a man's hearing music who was deaf before: Breaking down a dam is the cause of the overflowing of water and drowning a town: Letting loose a rope is the cause of a ship's running a-drift: Leaving off a garment is the cause of a cold and a cough; and cutting the bridle of the tongue may be the cause of speech to the dumb.

Note, The cause which removes natural impediments may be a proper efficient cause with regard to that removal, yet it is not properly *efficient*, but merely *permissive*, with regard to the consequences of that removal.

A *moral permissive cause* removes moral impediments, or takes away prohibitions, and gives leave to act: So a master is the permissive cause of his scholars going to play; a general is the same cause of his soldiers plundering a city; and a repeal of a law against foreign silks is the permissive cause why they are worn.

Query, Was not God's permission of *Satan* to afflict *Job* rather natural than moral, since his mischievous actions did not become lawful thereby, and since it is now become his nature to do mischief, where he has no natural restraint.

III. A *condition* has been usually called *causa sine qua non*, or a cause without which the effect is not produced. It is gene-

* If the word *de-obstruent* were always used to denote a cause removing natural obstruction, then we might leave the term *permissive* only to signify moral causes of this kind.

rally applied to something which is requisite in order to the effect, though it hath not a proper actual influence in producing that effect. Day-light is a condition of ploughing, sowing and reaping: Darkness is a condition of our seeing stars and glow-worms: Clearness of the stream is the condition of our spying sand and pebbles at the bottom of it: Being well dress with a head uncovered is a condition of a man's coming into the presence of the king: And paying a pepper-corn yearly is the condition of enjoying an estate. How far the perfect idea of the word *condition* in the civil law may differ from this representation is not my present work to determine.

Note, These three last causes may possibly be all ranked under the general name of *conditions*; but I think it is more proper to distinguish them into their different kinds of causality.

CHAP. XI.—*Of Subject and Adjunct.*

THE greatest part of what is necessary to be said on this theme may be found in *Logic*, where it treats of *substances* and *modes*: But in this place the word *subject* is more usually considered as having *accidental modes* relating to it than those which are *essential*, for so the word *adjunct means* here.

As a being or substance may be a *subject* of inhesion, adhesion or of denomination, so *adjuncts* may perhaps sometimes be used in a large sense to include some *internal qualities* which may inhere in the subject; but the word more generally stands distinguished from inherent qualities, and signifies more properly *external additions* or *appendices*, which adhere to the subject or *names* and *denominations*, by which it is called.

The most considerable *adjuncts* of all appearances or actions are what we call *circumstances*, which include time, place, light, darkness, cloathing, the surrounding situation of things, or persons, and the concomitant, antecedent, or consequent events.

When the word *subject* signifies a subject either of occupation, of operation, of thought or discourse, it may be properly also called an *object*; as a house or timber are *subjects* or *objects* on which a carpenter works, about which he is occupied, or of which he thinks or discourses.

Objects are either *immediate* and *proxime*, or *mediate* and *remote*. The pages and words of a book are the *immediate* object of a student's occupation; notions and opinions, arts and sciences are the *remote* object, because they are taught by these pages. So a displeased superior is the *remote* object of my addresses, but the Mediator by whom I hope for reconciliation is my more *immediate* object. I send letters to my friend *remotely*, but I deliver them *immediately* to the post.

Again, Objects are either common or proper. The shape, and motion, and size of bodies are common objects of two dif-

nt senses, (*viz.*) of *sight* and *feeling:* Colour is the *proper* ject of *sight* alone ; sound of *hearing*, and cold of *feeling*.

The *subjects* of which several sciences treat are called their *iects* : These are either material or formal : The body of man the *common material object* both of anatomy and medicine : ough one considers it as a curious engine whose parts are to be sected and known, the other views it as capable of diseases d healing ; which two considerations added to the human body nstitute the *proper* and *formal objects* of those two sciences.

CHAP. XII.—*Of Time, Place, and Ubiety.*

Time is esteemed a relative affection, for it commonly refers something that measures it.

Time is finite and successive duration, and it is distinguished s I have before observed) into *past, present* and *future;* it is ually measured by the motion of some bodies, whose motions e supposed to be most regular, uniform and certain. And for is reason mankind have generally agreed to measure time by e revolution of the heavenly bodies, sun, moon, and stars ; d God himself appointed them for this end : Thence centu- es, years, months, weeks, days, hours, and minutes have their ie.

But amongst the ruder and more untaught parts of the rld both in ancient and later ages, *time* has sometimes been easured by any of those things which are supposed to keep eir regular returning periods and seasons, as cold and heat, ow and ice, periodical rains or winds, particular fruits, corn, rvest, the coming or departure of certain birds to particular untries, or fish to particular coasts.

All the things before mentioned are a sort of *natural* mea- res or determinations of times and seasons : But hour-glasses, sand or water, clocks, watches, &c. are *artificial* measurers time, and some of them perform it with greater exactness even an the motions of the heavenly bodies, at least in their appear- ces to us on the earth.

As for the *time* or *duration* of spirits while they are united to man bodies or vehicles, or make their appearances on earth, is measured by some of the things we have mentioned : But e duration or time of those spirits which have no relation to our rld, must be measured in some other manner which at present know not.

Here is a famous *question*, whether God's duration or eter- y be not co-existent with our time, and the duration of the rld, and whether such a part of eternity be not commensurate rewith? It is evident this is our common idea of it. But it hardly just, for in truth *eternity* is an idea above our present

reach, and we lose ourselves in an abyss, when we wander into it. See the chapter of *duration*, and the chapter of *infinites*.

A *moment* is called the least part of time: So an atom is the least part of matter: But modern philosophers suppose all sort of quantity to be infinitely divisible, whether it be magnitude which is called permanent quantity; or time, which is called flowing quantity; and then there is properly no atom, no moment.

Place or situation is a relative idea; for it is generally described as that relation of proximity or distance which any being bears to the visible bodies that are round about it, and are usually esteemed quiescent, or at rest.

Place is distinguished indeed by many modern philosophers into absolute and relative: *Absolute place* is made to signify that part of the supposed infinite void or space, which any being fills up and possesses. And *relative place* is the situation of a being among other bodies, which are looked upon as quiescent; and it must be granted we usually conceive things in this manner: But if *space* be a creature of the imagination, and a mere idea of nothing real, then all *place* is properly relative, and a body existing alone has no place.

The place of a spirit has been often called *ubiety*, which may most properly refer to so much of the material world, of which it has a trace evident consciousness, and on which it can act: In God the infinite spirit, his *ubiety* is wheresoever there are objects for his consciousness and activity: And you may extend this to all possible, as well as real and actual worlds, if you please; for he knows and he can do whatsoever can be known or can be done, and therefore he is said to be every where. But with regard to conscious beings, whether created or increated, I confess I have no clear idea how they can have any proper locality, residence, situation, nearness, or juxta-position among bodies, without changing the very essence or nature of them into extended beings, and making them quite other things than they are.

When we say *God the infinite Spirit is every where*, let it be understood therefore, that in a strict philosophical sense we mean that he has an immediate and unlimited consciousness of, and agency upon all things, and that his knowledge and power reach also to all possibles, as well as to all actual beings. When we say *the soul of man is in his body*, we mean, it has a consciousness of certain motions and impressions made on that particular animal engine, and can excite particular motions in it at pleasure. What further ideas are contained in the *ubiety* of spirits I know not.

When we consider bodies as present in a place by their proper situation, this may be called a circumscriptive presence. A

spirit's presence in a place by consciousness or operation hath been called a definitive or limited presence; because its consciousness and operation are not universal or infinite: God's omnipresence, or his being every where, hath been termed his repletive presence, because the scripture says, *God fills heaven and earth*; though this term perhaps does not properly answer the philosophical idea, yet it may be used in a vulgar and figurative way of speaking, which is perfectly agreeable to the language and design of the sacred writers.

CHAP. XIII.—*Of Agreement and Difference, of Sameness, and the Doctrine of Opposites.*

THE *agreement* and *difference* of things are found out by that act of the mind which we call comparison, wherein we compare one thing with another; but we sometimes also compare the same thing with itself at different times or places, or as vested with different qualities, or under different circumstances, or considerations, and in different respects, and so we say a thing agrees with, or differs from itself.

Agreement is either real, that is in substance; or modal, that is in modes, properties or accidents, or it is mental, *i. e.* such as is made only by our conceptions.

Again, Agreement is either internal, *i. e.* in essence, in quantity, or in quality; or it is *external*, that is, in causes, effects, adjuncts, circumstances and names.

Yet further, agreement is either *total* and *perfect*, when there is no manner of difference, or *partial*, which admits a difference in some respect. Perfect agreement in the highest degree is usually called *sameness*, yet this word is sometimes used also to signify lower degrees of it.

Sameness or *identity* is attributed to things which agree in essence, or have an essential agreement; but agreement in quality is properly called *likeness*.

An agreement in quantity, if it be perfect, is sometimes called *sameness*, but more properly *equality*. Agreement in value requires an agreement in quantity, where the quality is the same; so five shillings is the same with a crown, or equal to it, *i. e.* it is the same quantity of silver. But sometimes agreement in value arises from the difference of quality compensating the excess or defect in quantity; so a guinea of gold is equal to twenty-one shillings in silver.

But if the agreement in quantity be not absolute and perfect individual sameness, it is called *proportion*: so we say there is a proportion between sixteen and twenty-four, for one is two-thirds of the other: and so there is between three fives and fifteen, for they are equal.

Agreement in shape or figure is usually called *similarity*, as two equilateral triangles are similar figures.

Two or more things may be said to have the same general essence or nature, so beasts, birds, fishes agree in that they are animals; or they are said to have the same special nature; so hounds and spaniels agree in that they are dogs; Peter and Paul agree in that they are men. But it is only one thing has the same individual nature or essence with itself, as Methuselah when a boy, a youth and an old man is the same. Hence arise the ideas of generical, specifical, and numerical or individual sameness.

Again, Sameness is either *material* or *formal*. Wheat is the same body *materially* when it is a heap of grains, as when it is ground and moulded into bread, but it is not *formally* the same.

One would think it a very easy question, *Whether a thing be the same with itself or no?* But whosoever will read what Mr. Locke has written upon *identity* in chap. 27. book II. of his Essay, will think it a sort of insolvable difficulty in some cases, and almost an impossible thing to answer that query in some particular instances, especially relating to *men*, *animals*, *&c.*— This question in the language of the schools is, *What is the principle of individuation?* i. e. what is necessary to make a thing the same with itself?

Here we may consider the *sameness of single bodies*, as a grain of wheat; of *aggregates*, as a heap of sand; of *compounds*, as a house, a garden; here enquire how small or how great a difference will hinder these from being called the same.

Again, let us consider the *sameness of rivers*, *vegetables*, and *animals*, each of which samenesses consists in very different ideas, and some are difficult to adjust.

Consider yet further the *sameness* of spirits which consists in the same thinking power or substance; and the *sameness of persons*, which consists chiefly in the very same consciousness, the same self, or rather in the same single conscious principle.

Consider here also the *sameness of mankind*, when body and soul are united, or when divided; when fat and lean; when infants or in old age; and the sameness of our bodies in the resurrection with what we now have. All these will afford sufficient labour for philosophy and reason to hunt after the clear and distinct ideas of them. Mr. Locke in this chapter has some excellent reasonings, though I cannot assent to all his sentiments entirely. See Essay XII. sect. ult.

Similitude or *likeness* is an agreement chiefly in qualities, though sometimes it relates also to essences, natures and substances. This may be total and complete, or partial or gradual. There is also likeness in the same kind, as one picture is like to another; and likeness in a different kind, as a picture to a statue;

or poesy to painting; or verse to music; which sort of likeness is sometimes called *cognation* or *analogy*.

The word *analogy* at other times stands for proportion; our idea whereof chiefly arises from our comparison of two quantities together, and considering the relation they bear to each other; now this is properly a relation of agreement, and not of difference; and I think we may say, that proportion includes every sort of agreement in quantity, besides perfect and individual sameness, whether this quantity be magnitude, or number, or time. Hence arise the ideas and terms, equal and unequal, greater and less, more or fewer, &c. but it is not necessary for us here to enter into the mathematical distinctions of proportion, whether arithmetical or geometrical, whether direct or inverse, which belong only to those sciences.

The idea of *proportion* may also be applied to any *qualities* whatsoever, which admit of gradual differences, and to which the ideas of *more or less* may be attributed, as whiteness, cold, good, evil, &c. This proportion is either equality, excess or defect; signified v. c. by the words, as white, whiter or less white. Herein the science of grammar uses its positive and comparative names. Where the excess or defect is extreme, as in whitest or least white, it is called the *superlative*.

Having spoken so much of *agreement*, we should say something of *disagreement* or *difference* too. Observe that difference in this place is not the same idea with that which is mentioned in *Logic* as the primary essential mode of any being, and which is joined to the genus to make a definition. See Logic, part I. chap 6. sect. 4. But difference here includes every distinction of one thing from another. The pointing of this difference is properly called distinguishing.

Difference or *distinction* is either *real*, i. e. substantial, as one substance differs from another; or it is *modal*, as modes, properties or qualities differ from the substance, or from one another; or it is *mental*, which is made only by the mind of man.—And indeed difference or disagreement may admit of most or all the same divisions which belong to the idea of *agreement*, which we need not stand to repeat.

Note, Things which really differ may exist separate, but modal or mental difference between things is not sufficient for the separate existence of both.

Note, The difference between modes or properties is sometimes called a *real difference*, because it is founded in the real nature of things, and so it stands in opposition to *mental*, which is merely the work of the mind of man making distinctions, where things are really the same.

Disagreement in substance or essence is properly called *diversity*; in quality, it is dissimilitude; in quantity it stands in opposition to sameness, and then it is peculiarly called difference;

or it may sometimes stand in opposition to proportion, and then it may be called disproportion, as, there is a disproportion between finites, and infinites, i. e. there is no proportion between them.

The word *disproportion* is generally used in a more vulgar sense; it signifies sometimes a very great difference between two quantities or numbers, as two is disproportionate to two thousand; sometimes it means, that one part or adjunct of a thing is too big or too little for the others; as we say that the large nose of Naso was disproportionate to his face, or the small garden of Diocletian was disproportionate to his former palace.

These two following notes concerning *agreement* and *difference*, belong eminently to Logic, and shew the reason of using a middle term in ratiocination.

1. In whatsoever two things agree to a third, they also agree so far among themselves. This is the foundation of affirmative syllogisms.

2. In two things whereof one differs from a third, while the other agrees to it, these two differ so far among themselves.—This is the foundation of negative syllogisms.

Let us proceed now to consider *opposition* which is counted one of the chief or highest kinds of difference or disagreement.

There are five sorts of *opposites*, which are generally mentioned here, viz. *disparates*, as green, yellow, red, blue, &c. *contraries*, as white and black; *relative opposites*, as father and son; *privative opposites*, as sight and blindness; and *negative opposites*, i. e. *contradictories*, as power and impotence, perfect and imperfect, or seeing and not seeing.

But of these five perhaps three are sufficient; for disparates should not be properly called opposites, since they are only different species under the same genus. Nor can all relatives be properly called opposites, as when two eggs are said to be like each other, or two friends who are entirely unanimous and agreeing in their humours.

We may observe here, that among *contradictories* some are express, others are implied. It is an express contradiction to talk of a godly atheist, though one expression be English and the other Greek; for it signifies a man that owns no God, and yet owns and honours him. But a *godly hypocrite*, is but an implicit contradiction, and so is a *religious villain*, one who owns God in words, but in works denies him.

It may be worth while also to take notice of two sorts of contraries, viz. They are termed *mediate* where there is some middle being or quality that partakes of both the extremes, as *lukewarm* between hot and cold; and *grey* between black and white. They are *immediate* where there is no such middle being or quality, as *straight* and *crooked*.

Note 1. Contraries mutually abate or destroy one another. Black and white mingled, do by degrees take away the whiteness, or blackness of the object; so heat and cold; so virtuous and vicious dispositions.

2. Contradictories can have no proper medium; a chamber is square or it is not square; a man can see or he cannot see.

3. All opposites placed near one another give a mutual illustration to each other, and make their distinct characters appear plainer. Hence proceeds the reason of *foyles* among painters and jewellers, orators and poets.

Chap. XIV. *Of Number and Order.*

NUMBER and *order* are the last among the real relative affections.

Number is a manner of conception, by which we reckon things together, and consider them as more or fewer.

Every thing indeed exists singularly, or as an unit; and so it may be an absolute idea; but as *one* or *unit* is part of a number, so it is *relative;* and since many units do really exist, so the idea of number is a real idea, or a real relation derived from their being more than one.

Number is made up of many units put together, and therefore some ontologists may chuse to treat of it in the chapter of *unity;* but it plainly denotes a relation between two or more beings or ideas.

Number by the schools is called discrete quantity, as a heap of acorns, a row of trees; whereas magnitude is called continual quantity, whether it be in a rock or a river, though one be fluid, the other solid.

Note 1. Number is needless where unity is sufficient for the same ends; and a greater number is needless where a less is sufficient. Nature generally is observed to work in the most simple ways and manners. What infinitely various purposes in the whole universe of bodies does that one simple principle of *gravitation* serve to execute.

2. Therefore in our solving any difficult appearances, we should not multiply beings without necessity. This has been the unhappy cause of introducing into the schools of science so many principles which have no being in nature; such as substantial forms, occult qualities, *materia prima*, real space, substance in general, that is capable either of cogitation or solidity, &c.

Now let us proceed to speak of *order*.

The idea of *order* is derived from the consideration of one thing as being before another, or after another, or together with it. The terms used on this occasion are *prior*, *posterior*, and *simultaneous*.

Order is five-fold. There is the order of *time*, of *nature*, of *place*, of *dignity*, and of *knowledge*. A man is before his son in *time*; the sun before its light in *nature*; the horses before the cart in *place*; a king before a duke in *dignity*; and a line must be *known* before an angle.

Things are said to be *together in time*, either which begin at the same time, as the sun and light, fire and heat; or which in some part of their being, life or time are co-existent with each other; as Plato and Aristotle may be called *contemporaries*, though the master was much elder than the scholar.

CHAP. XV.—*Of mental Relations*, viz. *abstract Notions, Signs, Words, Terms of Art, &c.*

THUS we have finished all the *real relations* and proceed to those that are *mental*.

Mental relations are such as belong not to beings as standing in any real relation to each other, but they are made merely by our minds, and arise only from our manner of conceiving things, or from modes which our minds affix to them. They are known by this mark, viz. that if there were no intelligent beings to conceive of them, these *mental relations* could never have been.

The chief of this kind are *pure abstracted notions*, *signs*, *words*, *terms of art*, and *external denominations*.

Pure abstract notions are what the schools call *second notions*, *second intentions*, or in latin *entia rationis*, i. e. mere creatures of the mind.

Yet it is not every sort or degree of *abstraction* that properly make a *mental relation*: When we first abstract the idea of any special nature from its individual circumstances, v. c. the common idea of a *man* or *humanity* from the particular ideas that distinguish Peter and Paul, this is not a mere *mental affection* or relation, though it is an *abstract idea*, for it is part of the *real* and *absolute idea* of Peter or Paul, because all things contained in the general idea of a *man* have a *real being* in nature; though not really separate from some individual.

But when I abstract this common idea of *humanity* yet further in my mind by considering it as a special nature or notion that agrees to several individuals, and under this precise consideration I call it a *species*; this is a *mental relation*: Or in like manner when I call the abstract idea of *animal* a *genus*; these and the like are more properly termed *pure abstracted notions*, or (if I may use the word) they are *second notions*, because they are made by a *second abstraction*, and so they are at least one remove farther distant from *real beings*. The idea of *predicaments* or *predicables* in *logic* are of the same kind; and I think we may rank the ideas of noun and verb, case and declension in *grammar* under the same class.

The general ideas of *substance* and *mode*, *cause* and *effect*, e abstract ideas also, though they are not abstracted to that de-ee, as to make mere *mental relations*, or *second notions*, of em, since they have a reality and existence in things them-lves.

It is granted, that some of these abstractions are necessary d useful in the sciences; yet *logic* and *metaphysics*, as they ve been taught in the schools, have been too much over-run th these *second notions*, these more *refined abstractions*, which ve exposed them to the contempt and ridicule of the more licious and polite part of mankind.

A *sign* is another mental relation: It is that which being prehended gives notice to the mind of something besides itself, d that it is called the *thing signified*.

The schools generally make a *sign* to be something sensible; t I think there is no necessity for that; for ideas that arise thin the mind, are signs of outward real beings: And some oughts may be so connected with other thoughts or actions the man as to become signs of them. The memory of a rmon is a good sign of attention; and pity is a sign of bene-lence.

1. *Signs* are either natural or instituted. Smoke is a *natu-l* sign of fire. *Instituted* signs are either *divine*, as baptism a sign of washing away sin; or *human*, as a white staff is a gn of an officer at court. Instituted signs are often called *bitrary*.

2. Again, *Signs* are either *mere tokens* or they are both *kens* and *images*. Those are mere *tokens* which do not repre-nt the thing signified, as a rainbow is a token the earth shall not drowned again. Those are *images* as well as *tokens*, which more or less represent the thing signified, such are pictures awn to the life, such also are baptism and the Lord's supper in e christian religion.

3. *Signs* are distinguished into *antecedent*, as the gathering thick clouds is a sign of rain: *Consequent*, as a funeral is a gn of death: And *concomitant*, as shivering is the sign of an ue: And a high pulse, with a thirsty palate, and flesh very hot, e common indications of a fever.

4. That other distinction of *prognostic*, *memorial* and *com-onstrative* signs in many cases is pretty much a-kin to the former. hiccup with an intermitting pulse and limbs growing cold and iff, are *prognostics* of death: A funeral ring is the *memorial* a friend departed: And a tomb is the *commonstrative* sign a person buried there.

5. *Signs* are appoined *to put us in mind* of our interest, to *monish* us of our duty, to *warn* us of the danger of some evil, r to *encourage* our hope of some good.

Yet further, 6thly, *Signs* are either *acts* to signify and confirm what has been done, or *pledges* to denote and assure what is to be done; or *indications* and evidences of what is doing.

In the last place, *Signs* are sometimes *necessary* and *certain*, as the morning star foretels the approaching sun-rise with assurance; and sometimes *contingent*, or only *probable*, as a very dark sky in cold weather is a sign of snow a-coming, but it is a doubtful one.

Note 1. Though there are many cases wherein a sign is really, naturally, and necessarily connected with the thing signified, yet it acquires the proper character of a sign only by the work of the mind, which makes one thing to signify another; and therefore it is properly a *mental relation*.

2. There are scarce any two things in the world so exceeding distant and different from each other, but they may become signs of each other by a voluntary or an accidental association of their ideas in the mind. If a man should happen to see an eclipse of the sun in the water when he was fishing for salmon, he may perhaps never see a salmon, but he may think of an eclipse.

Among all the *signs* that are useful to men, the chief are *words*, which are the most universal signs of our thoughts or ideas: But these arise only from the appointment and agreement of men. See a larger account of this in *logic*.

Though all *words* and *names* are signs found out by the *mind* of man, and stand to signify things by the mere agreement of men, yet those are more eminently *mental* relations which are called *external denominations*; that is, Names given to things upon the account of some conception which the mind affixes to them rather than for any thing that really belongs to them; as when we say, Germany lies on the right side of England, and Ireland on its left: This is a mere external or outward denomination drawn from our usual manner of inspecting a map with our face toward the north part of it: But if we look on it with our face to the south, Ireland will lie on the right, and Germany on the left.

Many terms of art which are called *technical words*, are a sort of *outward denominations* which are used in various sciences to signify the manner of our conception of things. If I say a *dog is a species of beasts*, the word *species* may be called a *logical* term of art: Or when I say the name dog is a *monosyllable*, or it is made up of one *vowel* and two *consonants*, I think these are *grammatical* terms of art, and may be called *mental relations*. *Fa, sol, la, mi*, are the same in music.

Thus far the *affections* of being.

CHAP. XVI.—*The chief Kinds or Divisions of Being, and first of* Substance *and* Mode.

AFTER we have gone through the *various affections of being*, we come now to consider what several *kinds of being* there are: And it is certain they may be distinguished by the mind of man in very various ways, and cast into several kinds or species: But those which are most common in this science, and indeed not universal, are these three divisions of them. *Beings* are either *substances* or *modes*, *finite*, or *infinite*, and *natural*, *artificial* or *moral*.

The first and most general division of *being* is into *substance* and *mode*.

Every being is considered either as subsisting of itself, without the support of any creature, and then it is called *substance*, as an egg, a tree, air, water, a man, an angel; or it is considered as subsisting by virtue of some other being in which it is, or to which it belongs; and then it is called a *mode*, as length, motion, shape, colour, softness, wisdom, knowledge.

Note, When we speak of beings, we do more usually understand *substances*, because they seem to have a more considerable sort of nature and existence; but since many modes, properties and qualities have also a *real* existence in nature, and sometimes have other modes and affections belonging to them, besides vast powers and influences in the universe, I think they cannot well be excluded from the comprehensive idea of *being*.

Those philosophers who are of this opinion, are called the *realists*; whereas the writers who allow only *substances* to have a *real* existence and deny qualities, properties, relations, or any sort of modes *really* to exist, because they do not subsist by themselves, these are called *nominalists* or *nominals*.

It is granted indeed that mere *relative* modes or relations of things one to another, such as likeness, order, place, &c. seem still to partake less of the nature of beings than such *real* modes, as motion, figure and quantity do; yet many of these relations have a *real* foundation in nature, and a sort of reality in things as well as in our conceptions. Query, Must we take them out of all the ranks of *being*, when the word is taken in its very largest sense?

Though there have been fierce contentions on this subject between the *nominals* and *realists*, yet the controversy is not worthy of any warm debate: For while it may be allowed on both sides, that being does not in so full and strong a sense belong to *modes*, as it does to *substances*, the disputants may agree by saying, that self-subsisting beings have a *substantial* essence and existence, whereas the essence or existence of modes is but

modal. Why should names provoke disputes, where our ideas agree?

All *substances* that we know are either material or intelligent, i. e. bodies or spirits. Man indeed is compounded of both of them; but as for *space*, which is neither body nor spirit, I take it to be a *nonentity* or *nothing* real, but a mere idea of the mind, which we are wont to consider, under the form of something long, broad and deep, without solidity. Perhaps these positive conceptions arise by our abstracting some properties of matter from the rest, or only from a prejudice of sense and imagination, as we conceive just of darkness or a shadow to have the dimensions of length and breadth, and fancy it to have shape and motion too, though we know it is properly *not-being*, or a mere absence of light.

After substances, we come to consider *modes of being*, and these have also their various kinds into which they are distributed, viz. essential and accidental, primary and secondary, inherent and adherent, i. e. Qualities and adjuncts, and many others. But in Logic they are treated of largely; and therefore I dismiss the reader to Logic, part I. chap. 2. sect. 3 and 4.

CHAP. XVII.—*Of Finite and Infinite.*

THE ideas of finite and infinite come next to be considered by us.

Finite beings are those which are limited or bounded in their natures, their parts, their quantity, their qualities, their powers and operations, or their duration. *Infinite* is that which is unlimited, and hath no bounds.

When *substances* are called *finite* or *infinite*, it is chiefly in respect of their quantity, or in respect of their powers. All substances are in this sense finite or infinite: But as there are some qualities or modes of being which are called infinite or finite, so there are some to which neither *finite* nor *infinite* can properly agree: We speak of knowledge, goodness, patience, length, breadth, &c. as finite or infinite: But there is no such thing as a finite or infinite blue, red or green; no finite or infinite likeness between two drops of rain: There is no finite or infinite truth in a proposition, nor finite or infinite crookedness in a stick.

The *universe of bodies* is finite in its dimensions or quantity, as well as every single body. I have elsewhere shewn, that the supposed *space* beyond the world is probably nothing at all, and therefore not properly infinite or finite; though we often speak of the *infinite void*; i. e. emptiness or absence of being every where beyond the creation, unbounded by any real being: For as *nihility* may be called the limit of being, so being may be said to limit nihility.

The idea of *finite* belongs to created *spirits* as well as *bo-*
es; not in regard of quantity, if they have no dimensions;
it in regard of their qualities, their knowledge, and power,
id goodness, and all their operations, for all these are confined
certain limits, yet they are allowed to have an everlasting or
limited duration, i. e. with regard to the future, or a *parte*
st, though not with regard to the past, or a *parte ante*, as the
hools speak; that is, though they may have no end, yet they
d a beginning.

This unlimited duration of spirits has been called usually
mortality or *eviternity*. And indeed this property doth really
long also to matter considered in *general* as well as to *mind*;
however variable and mortal the particular forms and compo-
ions of bodies may be, yet as for body or matter itself nothing
n destroy or annihilate it but the God that created it.

We have little to do with the ideas of *infinite*, but in our
nceptions of the everlasting duration of our natures, in our
ntemplations of God, or of mathematical quantities.

How far the duration of our *souls* is infinite, has been
prest.

The infinity of God has been usually distinguished into the
inity of his essence, or his duration, or his attributes.

1. The infinity of his *essence* or *presence* is his immensity
omnipresence: How this to be understood concerning his con-
ousness and power or influence rather than extension. See the
chapter of *time* and *place*.

2. The infinity of his *duration* is his externity, without begin-
g and without end, *a parte antè* as well as *a parte pòst*. See
chapter of *duration*.

3. The infinity of his *attributes* implies that his knowledge
l his power have no bounds; or that his power, knowledge,
iness, wisdom, goodness, are infinite, &c. *i. e.* every way per-
t in the most absolute sense.

When we consider an *infinite* under this idea of actual *abso-*
e perfection, it may be counted a *positive* idea; but if we con-
er it as *without limit*, it is *negative*: Yet some refine further,
l make the word *limit* a negative term, because it denies pro-
ss or increase, and thus *infinite* becomes a sort of *positive*
a again.

Mr. Locke teaches us that our idea of *infinite* is not a com-
te idea, but rather an idea ever growing and receiving addi-
ns; and for the most part this is a just idea of it, for it is cer-
n, that this is the way we come by this idea at first. Yet the
a of an *actual positive infinite* directly contradicts this *growing*
a, for it supposes all addition impossible. We are finite crea-
es, and we soon lose ourselves among infinites.

Indefinite is not a medium between finite and infinite, for they are two contradictory ideas; indefinite therefore only denotes our ignorance of the limits of a thing.

No actual infinite can consist of finite parts, for there is some proportion between the parts and a whole, but between finite and infinite there is no proportion.

Yet mathematicians oftentimes deal in *infinites*, both with regard to *magnitude* and *number*; and though there be not in nature any actual infinite quantity of either kind, for there is no magnitude, there is no number, which cannot receive addition, yet they form a sort of abstracted notion of infinite length, breadth depth, of infinite extension and divisibility, and reason upon them.

There is also *infinite disproportion* when they treat of quantities and their infinitesimals, *i. e.* such as bear no finite proportion to the quantities whose infinitesimals they are.

Their *infinite approximations* may be justly ranked among the ever-growing ideas.

CHAP. XVIII.—*Of natural, moral and artificial Beings and Ideas.*

THE last distribution of beings which I shall take notice of is into natural, moral and artificial.

Natural beings are all those things that have a real and proper existence in the universe, and are considered as formed and ordained by God the Creator; such are bodies, spirits, men, beasts, trees, fruit, strength, countenance, sense, reason, fire, air, light, &c.

Though some of these are produced by others, as *eggs* by a *hen*, and *fruit* from a *tree*, yet God is generally considered as the author of all natural beings; and indeed he is so either immediately by himself, or by the laws of nature, which he has ordained.

Artificial beings are made by the contrivance or operations of men, whether they are of a *mere corporeal* nature, such as houses, windows, pictures, statutes, arms, garments, writing, music, and the various utensils of life; or whether they relate more to *intellectual* matters, as words, sciences, rules, arguments, propositions, verse, prose, &c.

Note, Though in some *natural* beings man is said to be the more immediate author or cause of them, such as a *father* of his *son*, &c. and in all *artificial* beings whatsoever, yet the power of man reaches only to what is *modal* in them; it is God alone can make *substances*, for that is most properly a creation.

Moral beings are those which belong to behaviour, conduct and government of intelligent creatures, or creatures endued with freedom of will, considered as lying under obligations to pur-

ılar actions or abstinences : But these considered as *moral* are y *modal* ; such are law, duty, virtue, vice, sin, righteousness, gment, condemnation, pardon, reward, punishment.

As beings have been thus divided into *natural*, *artificial* and *ral*, I think we might almost in the same manner run through the sciences. and give new names to different beings, by calling m *logical*, *mathematical*, *political*, *&c.* applying these names the subjects which these sciences treat of.

I confess I should chuse rather to call them *different ideas*, ın *different beings*, and under this consideration we may say *ical* ideas are such as genus and species, definition and syllo- m : *Mathematical* ideas are length, breadth, a cube, a circle, ıltiplication, proportion, &c. Our ideas are called *medicinal*, ıen we discourse of *sudorifics* and *boluses*: And when we ak of kings, subjects, laws, rebellion, allegiance, treason, &c. se are *political ideas* ; but God, holiness, christianity, repent- ce, gospel and salvation are *theological*, and of highest import- ce above all other kinds of ideas.

A

DEFENCE

AGAINST THE TEMPTATION TO

SELF-MURDER.

PREFACE

TO "A DEFENCE AGAINST THE TEMPTATION TO SELF-MURDER."

IT can be no importance to the world to know the particular occasion of this composure. It is sufficient to say, that the rude draughts and sketches of it thrown into the form of a letter have been so far honoured by divine grace, as to save a soul from perishing.

The numerous self-murders which we read in our papers of weekly news, inform us that the tempter is not asleep. The last general bill of mortality tells us of fifty-nine who are known to have destroyed themselves the year past; besides seventy-four who were drowned, and forty-three who were said to be found dead: Now among these hundred and seventeen, who can tell how many might be accessary also to their own death, though surviving relatives might conceal it from the notice of the public? This very week I have read four more. Such numbers of these tragical events are a very unhappy, yet a sensible argument that Satan the cruel adversary walks about through every street of this great city as a roaring lion seeking whom he may devour. It is the design of this little treatise to discover the infinite mischief of his temptations, and to teach mankind how they may resist him, and defeat his fatal purposes.

I grant that the sceptical humour and growing atheism of the age, with the disbelief of a future state and of all the terrors of another world, are the profane and deadly principles which influence some of these unnatural and murderous practices.

But professed atheism and infidelity are not the only causes. Suicide is often owing to the shameful neglect of all religion even by those who pretend to believe it, and to their strange thoughtlessness of God and heaven and hell. The wild and ungoverned lusts and passions of mankind, their secret criminal practices and shameful iniquities that are afraid of the light, the frequent crosses and calamities of this life, their raging impatience of mind under disappointments, with a certain horror of poverty and contempt and shame, hurry on foolish and guilty creatures to hide themselves in death and the grave. Besides all this, the dark and sullen complexion and the gloomy melancholy of some persons, their inward uneasiness, their jealousies, and fretful disposition, are such unhappy circumstances as a subtle devil improves for his own pernicious designs. These are the fatal springs of such tragical events in our day: These are the dismal seeds of many a bloody harvest, which the great enemy of God and man reaps daily amongst us.

May the blessed Spirit of God lift up a standard against the destroyer, and make these papers useful to support, defend and relieve those poor deluded creatures, who are worried by his rage and ensnared by his devices! And in the day of the Lord, when every secret thing shall be revealed, may this discourse appear to have been a successful, though a humble instrument in the hand of the Spirit of God for the deliverance and salvation of those who have been tempted, and for the rescue of many a soul from present death and everlasting burnings.

I had some thoughts of adding a few pages at the end of this book concerning a melancholy temper of mind, whether it arises from the disorders of animal nature, or from an uneasy set of thoughts relating to this world or the next. But when I came to review what Mr. Timothy Rogers had written on that subject, and the little discourse that Mr. Clifford had collected out of the writings of the late eminent Mr. Richard Baxter, which was recommended by several ministers, I found it needless for me to attempt any thing further. In those treatises the reader will meet with so particular an account of the nature of this affliction, of the causes of it, and of those methods of relief as may be rendered very serviceable through the blessing of heaven to those who are thus afflicted, or to their friends about them who are concerned for their welfare. And may these methods prove happily successful for their relief! That by the divine aids of providence and grace they may be preserved from so dismal and mournful a death, wherein surviving friends can find little comfort or hope, but what arises from the former religious life of those unhappy creatures, and the apparent symptoms of present distraction.

Though such themes as these are not a very delightful entertainment either to him that writes or reads, yet the calamitous and wretched circumstances both of flesh and spirit in this feeble and dangerous state of frailty, sin and temptation, make such discourses necessary at some seasons to prevent the ruin of mankind. O blessed state of souls in the upper world who are released from this body of sin and death, and enjoy a glorious and sublime security from all the mischievous influences of the tempter: Though we dare not cut the thread of our own lives, nor fly from our present state of trial till our Creator appoint the day of our deliverance, it is yet our duty and our interest to get our souls weaned daily from all the scenes of this lower world, since we know we must shortly leave them. Let us labour chearfully here on earth in the various services of God and men, but with our spirits so attempered to the business and the blessedness of heaven, that we may as chearfully obey the divine summons, and pass the important hour of death with holy serenity and triumph. Amen.

LONDON, JANUARY 28, 1725-6.

A DEFENCE

AGAINST THE

TEMPTATION TO SELF-MURDER.

Section I.—*The Unlawfulness of it displayed.*

WHEN an atheist is tempted to destroy himself, he has no oncern whether it be lawful or no, for he knows of no law nor ower that can reach to punish him. Such a wretch doth not be- eve there is any other world to receive him when he dies out of his, nor any God there to call him to account. He supposes his oul vanishes into air, and his dust is safe from vengeance. hese are the sentiments of atheism; and vile and irrational as hey are, yet they are the only principles that can give any toler- ble colour or pretence for self-murder.

But if a man believes there is a God that made him, if he elieves his soul is immortal, and that his Creator has ordained to dwell in a human body for a season, and to pass a state of robation there in order to eternal reward or punishment, surely his man must confess himself accountable to God hereafter for all is conduct here: And one would think such a person should ever doubt, whether the destruction of his body by his own ands, and the wilful dismission of his soul, were a crime or no. Especially if he profess to believe his bible, one would wonder he ould ever imagine it an innocent thing for him to do violence to imself, and to shed his own blood. But the follies of mankind re amazing, and the strange turns of thought under the deceit- l impressions of the tempter are unaccountable. Poor deluded eatures are first tempted to hope, that they shall put an end to eir present sorrows by a wilful death, then they wink their eyes gainst the glaring guilt of it, and try to persuade themselves at it is no sin.

Some persons have been so hardy as to reason upon this oint, and to argue that self-murder has nothing criminal in it. trange, that hell and destruction should have advocates among e sons of men! that death should have such accomplices in the nd of the living! But since it has been so, let us plead against em in the name of the living God; let us try whether we can- ot by the force of reasoning drawn from the word of God, as ell as from the light of nature, make it appear with bright evi- ence, that suicide or self-destruction is prohibited by the divine

law, both natural and revealed; that it includes aggravated guilt in the nature of it; and consequently that the person who dares commit this crime, stands exposed to severe and terrible punishments in the invisible world.

I. Consider that the great God, the Maker of all things, has assumed to himself the power and lordship of life and death; "I kill and make alive;" Deut. xxxii. 39. It is he sends us into this world, and he expects that we should wait his will to send us out of it. Has not our Creator formed us with infinite wisdom, and placed us by providence to act our parts, maintain our posts, and fulfil some service for him in this part of his dominions? Has he not a right to determine the time of our continuance here, and the moment of our removal? Is it not an invasion of that divine right and prerogative, if we will appoint the time for ourselves without his order and contrary to the rules he has given us for our government? Where is his licence for any man to dismiss himself? A spirit, who is ordained to dwell in flesh, what warrant has he to destroy that flesh at his own pleasure, to quit his appointed station in this visible world, and to force his way into God's invisible dominions, before he obtain the leave of his Maker? Or dares he do this at a venture, according to his own capricious humour without a warrant from on high?

Can a soldier who is fixed in his post, though it rain and blow at midnight, forsake his guard before his General permit? Can such a faithless centinel expect any thing but frowns and death from the General? Is it excuse enough to say, "I broke the orders of my superior because it rained?" What a piece of shameful cowardice is this? And dares a soul that is placed by its Creator to act in a human body, dismiss itself, and fly from its appointed station, as far as the distance of two worlds, and yet hope for approbation? Dares such a soul run from its post, into the immediate presence of its sovereign Lord, in the world of spirits, and say, "I have fled from my post because I found it troublesome, I have done it indeed without leave, and yet I expect a reward?" May not such a wretch rather justly expect to be banished for ever from the presence of his Maker, and be doomed to suffer eternal penalties without mercy and without hope?

Perhaps you will tell me, "There is no want of courage discovered in self-murder: And that it was not accounted cowardice, but a noble instance of fortitude in many of the heathen heroes, who put an end to their lives with their own hands, on various occasions."

Answer. Concerning the heathens who destroyed themselves, I shall speak in another place. It is enough at present to say this, that whatsoever degrees of courage a mistaken fancy may ascribe to those ancients, I must confess I am of a very differen

inion concerning the suicides in our day: The attribution of y honour to a self-murderer has but little reason or justice in at any time, when it is thoroughly examined: And perhaps ch a bare supposition may administer too much fuel to so dread- a temptation, rather than quench the sparks of it.

It is evident to me that the uneasy and impatient man has t courage enough to bear the arrows of adverse providence; has not firmness of mind sufficient to stand the shock of sick- ss or pain; or perhaps his heart has not resolution enough to dure the thoughts of poverty or contempt; he is frighted at e sounds of reproach and infamy; he turns his back and flies om the scene of battle, when poverty or shame stare him in the ce: Or perhaps the mere imaginary terrors which himself has ised, put him to flight; and because he cannot get far enough om them in this world, he throws himself headlong from the ge of life, and leaps into the world of spirits.

Now, if there be any point of courage in this practice, it is impious and diabolical one: It is a rushing into the presence an almighty and dreadful God, to tell him face to face, that u have quitted the station he hath appointed you, that you ve broken his commission, you have disobeyed his orders, and u expect his sentence for eternity. This is tremendous courage deed; and an outrageous fit of impious rashness. All the rest mere weakness of mind; it is egregious cowardice mingled ith extreme folly.

II. Consider the express prohibitions of murder in the ord of God, and the frequent occasional and severe denun- ations of God's wrath against murderers in various parts of ripture.

The sixth command offers itself with bright evidence to his rvice; Exodus xx. 13. "Thou shalt not kill, or thou shalt o no murder," that is, thou shalt not take away the life of man.

You will say, "I may have power and right to take away y own life, though I must not take away my neighbour's." I nswer,

First, The command is expressed in general terms, which clude both ourselves and our neighbours: Now there is no sub- quent limitation of it only to our neighbour either in the word f God, or in the reason of things; and who has given you uthority to limit it?

The rest of the commands of the second table which are apable of being referred to ourselves, do as much exclude the ame practices against ourselves, as against our neighbours. I ust not commit adultery with another person, nor must I defile yself with adultery. I must not bear false witness against my eighbour, nor must I speak a false thing about or against my-

self. I must honour my own parents, and by the same reason, if I am a parent, I must not do any thing to dishonour my own person or parental character in the sight of children. Now since ourselves, as well as our neighbours are taken into consideration in all these commands, wheresoever it is possible in the nature of the thing, I think the destruction of ourselves as well as of our neighbours is equally forbidden by the sixth command.

Thus this law secures the life of every man, woman and child in the world, who have not forfeited their lives to the public justice by some capital crime: And even then it is only the public officer, or the person authorized by the law of the land, who has right to take away the life of the criminal.

Secondly, I answer, The injury forbidden in the sixth command does not only reach to the person who is slain, but to his friends, his relations, his country, and the community to which he belongs. It is upon this account chiefly that human penalties are annexed to murder by men, because the community is hereby deprived of a member, or the prince of a subject, and the various parts of that community are deprived of a helper. It is also upon this account of the injury done to our fellow-creatures, that God has appointed blood to be repaid with blood, as he is the sovereign guardian of human society.

Now I would ask, Whether the same injury is not done to our friends, our kindred and our country, if we murder ourselves, as if another hand murdered us? Yes surely, and in some respects a greater injury too, especially to our friends, as shall appear hereafter.

But besides all this, the injury reaches to God our Creator; it is he has appointed to each person his station in this world for some special service to himself as well as to our fellow-creatures. And as another man must not injure and affront our Creator by removing us from this station, so neither must we do it ourselves.

It is not for any man to say, "I can be of no service to God or man in this world; I am rather a burthen to the earth, a piece of useless lumber; therefore I throw myself out of the way." But can you tell for what services God has reserved you? Are you one of his council? Do you know what future events may arise, wherein you may be made use of, if not in an active manner, yet at least in a passive way, to carry on some part of the divine scheme of providence? Now for this reason no sort of murder is permitted, that so no man may be cut off from all future and possible capacities of service to God or his fellow-creatures. God has not made any man a judge in his own case, to determine for himself concerning his own life and usefulness in opposition to the general sense both of nature and scripture, and the constant judgment of divine as well as human laws.

Since therefore all the injuries that I have mentioned against od and man are committed by the murder of one's self as well one's neighbour, it has pleased God severely to prohibit all urder, and he has fixed the sixth commandment in the table his moral law, where it stands like a cannon planted with en month against the man that dares such a public and spread- g injury to God and man. It is a piece of divine artillery arged with eternal death. 1 *John* iii. 15. "No murderer th eternal life abiding in him," that is, has no right to eternal e, for he has not the principles or seeds of it in his heart; and en surely eternal death belongs to him, and must be his rtion.

Another prohibition of murder is found among the first laws at God gave to the new race of men after the flood; *Gen.* ix. "Whosoever sheddeth man's blood, by man shall his blood shed, for in the image of God made he man." I confess ere is some difficulty in determining precisely in what sense must take the image of God in this place: For the moral age of God which consisted in righteousness and holiness was t by the fall, whereas that part of the divine image which nds here as an argument against the destruction of man is pposed to continue in his fallen estate.

Shall we then suppose it has a reference to the erect posture his body, or the shape and figure of mankind, in which God ght appear to our first parents? Then murder is forbid upon is account because it destroys the honourable figure and cha- cter of human nature, whereby it is superior to all brutal ani- als, and whereby it was dignified either by the appearance of od the Father, or rather his son Jesus Christ in it: Now this ason stands firm against the destruction of ourselves as well as others.

Or does it mean the dominion of man over brute creatures, herein he bears some image or resemblance of God's dominion er this lower world? But that reaches not beyond this life, d therefore there is an end put to this dominion, to this part the divine image, by all murder, whether of others or of our- lves.

Or shall we say, that the immortality of the soul of man is at image of God which is here designed? Now though the ul cannot be slain, yet by murder, an immortal creature is sent to a certain and determined state of happiness or misery, for a ng eternity, and the great God will not suffer any man to take on him to send an immortal soul into so awful an estate on a dden, and by the mere caprices of his own will: And there- re he hath required blood for blood: and since he hath ap- inted that man should execute that sentence on the murderer another man in this world, we have abundant reason to believe

that he will take care to execute his own just vengeance upon a self-murderer in the invisible world, though he hath put himself out of the reach of human vengeance.

Or suppose after all I have not hit upon the exact sense of the image of God in this place, yet this is very certain, that let the image of God signify what it will, this image is as much injured by the murder of one's self, as by the murder of one's neighbour, and therefore the prohibition stands in the same force against both.

III. Consider that our Saviour himself when he had a body prepared for him by the Father, and was sent into the world, seems to acknowledge that as he stood in the rank of men, he had not power or authority to lay down his own life, but by the commandment of God his Father. He speaks of it as a special and peculiar commission, that he had power to lay down his life as well as power to take it again, neither of which other mortals are invested with; *John* x. 18. "I lay down my life of myself; I have power to lay it down, and I have power to take it again: This commandment have I received of my Father." The original word for power is ἐξουσια, which signifies right or authority, which he derived from the peculiarity of his divine commission. Otherwise he had been obliged to have used all his native power and skill to have saved himself from the hands of his enemies. Now if our Saviour himself considered merely as man, and abstracted from his divine nature, had not a right to dispose of his own life at pleasure, without divine commission, certainly no other man may claim this right.

IV. Consider, that had this practice been lawful, all the pious persons from Adam to this day, who had been plunged into extreme distress and anguish of mind or body in this world, might have relieved themselves by this method; all the martyrs and confessors of scripture who were stoned, who were sawn asunder, who were put into lions' dens, who were scourged and tortured, seem to be guilty of great folly, if they themselves might lawfully have put an end to their miseries by this shorter method: And the honours that the bible casts upon these men are vain honours, if they endured these terrible trials, when they might have escaped them all without guilt or transgression.

Let it be noted also, that many good men of old have earnestly wished to die, particularly Elijah, Job, Jeremiah, &c. but not one of them durst indulge a thought of procuring death to themselves, as being under the most certain impressions of the horrible and crying impiety of such a practice: The utmost efforts they made toward it was to pray God to release them, but they never dared to attempt their own release.

V. Consider what sort of men they have been who are recorded in scripture as self-murderers. Ahithophel, a false trai-

, who counselled Absalom to rebel against his father David. ul, a bloody man, who forsook God and was forsaken of God. nri, a most wicked king of Israel, and Judas, who betrayed : blessed Saviour, &c. Good men may be tempted sorely in s matter, but we do not find that they have been given up to mply with the temptation.

You will readily reply, "but what was Samson? Is he t numbered among the ancient and sacred heroes who lived d died in faith; *Heb.* xi. 22. And did he not destroy himself gether with the Philistines when he pulled down the house on their heads? And was not this done also with design and solution, when he said, "let me die with the Philistines?"

Answer I. It is evident the apostle in that chapter is reckon- g up all the glorious effects of faith, whether it be faith of iracles which may be found with sinners, or faith which accom- nies salvation and belongs only to the saints. Now there is ry little of the character of a saint that belongs to Samson ther in his life or in his death. The Spirit of the Lord came on him, indeed, as a spirit of miracles, for the deliverance of rael from oppression, but his life seems to be stained with many imes; and in the moment of his death he desired to be avenged the Philistines for his two eyes: So that we find little or thing of the fruits of the Spirit in him, which the apostle scribes; *Gal.* v. 22. "Gentleness, goodness, meekness, tem- rance," &c.

2. If it should be granted that Samson had religion and rtue enough in him to be called a good man, yet as the other ercises of his miraculous strength were performed under the fluence of the spirit, or by inspiration, so we may suppose that his death he had a divine call, or inspiration, as he had cer- inly miraculous aid, to destroy the Philistines, though he him- lf fell with them; and though it must be confessed there was mixture of his own sinful revenge in his heart, yet the Spirit God might dictate that action in general, though not as ingled with his own revenge. Now since this was done by a ecial divine commission, it cannot be drawn by us into an ex- nple for our imitation.

Well, if suicide cannot be justified by the examples of scrip- re, you will try what the Roman and Greek historians can do wards it. Perhaps, you will say, "Surely had it been so iminal an action, the great and wise men of antiquity would ot have indulged the practice of it, nor would their names have een enrolled among the sons of honour. But we find Curtius nd Cato, Brutus and Otho, and others who destroyed them- lves, celebrated as men of virtue, as noble patriots, and great eroes, even on the account of their death as well as their life."

Answer, Alas, to what purpose should a christian cite the

heathens to justify that which the scripture forbids? They had very little knowledge of the true God, very dark and doubtful notices of their duty to their Creator, to themselves, and to their fellow-creatures: And though the light of nature would have taught them better had they duly and carefully consulted it, yet it is evident that they actually mistook their duty in many instances that were obvious enough to common reason. They imagined that the destruction of a tyrant, the preservation of their country, or the more honour of their own nation, or the guard of their real or fancied virtues, was sufficient to license and sanctify almost any practices whatsoever.

They had many false and foolish notions of courage, greatness and honour which betrayed them into real iniquities. They sent forth their armies to rob and plunder nations to satisfy their own ambition and thirst of honour: they could murder thousands of mankind in order to enlarge their bounds of empire, and for the glory of their king or of their native city: It was no wonder that men of such principles should imbrue their hands in their own blood under the influence of such sort of motives and pretences. Besides this, they were animated with the expectation of fame after death: Immortal memory and renown were the rewards of what they called heroic actions. And thus the heathens might glory in their own shame, but they are not set up for our guides or patterns. A christian must regulate his whole conduct by the law of his God, by the rules of the gospel, by the views and hopes and fears of eternal rewards or punishments, which are revealed to him in a diviner light.

Let it be considered yet further, that the motives, by which some of these heathen heroes were drawn to self-destruction, are such as scarce ever come into the question now-a-days, and do by no means respect men in the ordinary situation of human life. Which of us has any view or hope or pretence to benefit thousands by our death? To save a nation from civil war? To deliver our country from the anger of God and a pestilence by offering ourselves as a sacrifice? To sink in one ruin with the liberties of a state, which we ourselves have long supported?—These are the excuses that are made for those ancient heathens, and covered their names from infamy in such a bloody action. The history of these men, and the honour done them by pagan writers, can give no manner of sanction to those mean and ridiculous motives which are the occasions of self-murder in our weekly news-papers, in the present age. The Romans themselves would have made a jest of those, who pretended to imitate these their heroes, without being placed in the same circumstances, or having equal motives; and, as a modern writer well expresses it, "Should any man now have it in his power to acquaint the ghost of Cato or Brutus that there was a country

men often deliberately and coolly dispatch themselves, ntarily flee out of life; one because his mistress is not is to his passion; another, because his sordid love of as been disappointed; another, because he has dissipated e fortune in the most dissolute and abandoned luxury and ery; another, because his scheme for advancement to las been dashed to pieces; another, because in the midst is of money, he is terrified with the dread of future want; ers, perhaps, because the weather lies heavy upon them, wind blows from an unfavourable corner: And should acquainted, that in all these cases, their names and their es are appealed to; what would they say? They would it a country of madmen and fools, and lament their own be cited for the justification, or excuse of odious, base eemly actions, which have no pretence worthy of a man, them.

Not that I am at all," says this writer, "designing to justify eat men themselves. On the contrary many things might l against those ancients, even upon their own scheme, principles of reason. If I should say that the death of is a mixture of impatience and pride; that he ought in his country to have reserved himself for a better oppor- f serving it; that it is probable, from the events which l, that he might afterwards have been an instrument of it; that he rashly, and in a passion, judged of what he ot well judge of, that it was a sullen pride of heart not to live, because in one trial, his cause had not been suc- and that a true greatness of soul had been more seen, accepting his life, if that had been necessary, at the f the man, in whose power omnipotent providence or fate, e believed irresistible, had put it: And this would be refute upon the principles of any philosophy."

might add yet further, that though some of the philoso- nong the heathens did allow, yet the best of them did condemn this practice, as a rash forsaking the station in he providence of their gods had placed men. Though argued particularly on this head already, yet in this cannot forbid myself the pleasure of citing the strong ions of some of these heathens against self-murder, as e agreeably represented by Dr. Samuel Clarke, in his se of Natural and Revealed Religion. Proposition t.

He that sent us into the world, and alone knows for how ne he appointed us our station here, and when we have all the business he intended we should do, can alone when it is fit for us to be taken hence, and has alone au- to dismiss and discharge us. This reasoning has been

admirably applied by Plato, Cicero, and others of the best philosophers; so that though the Stoics of old, and the deists of late, have in their ranting discourses, and some few of them in their rash practice, contradicted it; yet they have never been able, with any colour of reason, to answer or evade their force of argument: Which indeed to speak the truth has been urged by the forementioned philosophers, with such singular beauty, as well as invincible strength, that it seems not capable of having any thing added to it. Wherefore I shall give it you only in some of their own words." "We men," says Plato in the person of Socrates, "are all by the appointment of God in a certain prison or custody, which we ought not to break out of, and run away. We are as servants, or as cattle in the hands of God: And would not any of us, saith he, if one of our servants should contrary to our direction, and to escape out of our service, kill himself, think we had just reason to be very angry, and, if it was in our power punish him for it?" So likewise Cicero: "God, says he, the supreme governor of all things, forbids us to depart hence without his order: And though when the divine providence does itself offer us a just occasion of leaving this world," as when a man chuses to suffer death rather than commit wickedness, "a wise man will then indeed depart joyfully, as out of a place of sorrow and darkness into light; yet he will not be in such haste as to break his prison contrary to law; but will go when God calls him, as a prisoner when dismissed by the magistrate or lawful power." *Tusculan. questionum libro primo.* Again; "That short remainder of life," saith he, "which old men have a prospect of, they ought neither too eargerly to desire, nor yet on the contrary unreasonably and discontentedly deprive themselves of it; for as Pythagoras teaches, it is as unlawful for a man, without the command of God, to remove himself out of the world; as for a soldier to leave his post without his general's order." *De Senectute.* And in another place: "Unless that God," saith he, "whose temple and palace this whole world is, discharges you himself out of the prison of the body, you can never be received to his favour. Wherefore you, and all pious men, ought to have patience to continue in the body, as long as God shall please, who sent us hither; and not force yourselves out of the world before he calls for you; lest you be deserters of the station appointed you by God." *Somnium Scipionis.* And, to mention no more; that excellent author, Arrian, book the first. "Wait," saith he, "the good pleasure of God: When he signifies it to be his will, that you should be discharged from this service, then depart willingly; but in the mean time have patience, and tarry in the place where he has appointed you:—Wait, and do not hurry yourselves away wilfully and unreasonably." The objections, which the author of the defence of self-murder, prefixed to the oracles of reason, has attempted to ad-

ınce against this argument, are so weak and childish, that it is ident he could not, at the time he wrote them, believe in ear- st that there was any force in them: As when he says, that e reason why it is not lawful for a centinel to leave his station thout his commander's order, is because he entered into the rvice by his own consent; as if God had not a just power to y any commands upon his creatures, without their own consent. r when he says, that there are many lawful ways to seek ath in; as if, because a man may lawfully venture his life many public services, therefore it was lawful for him di- ctly to throw it away upon any foolish discontent. Thus far r. Clarke.

This objection drawn from the practice of the heathens has verted me from my train of arguments: But I proceed,

VI. Reflect upon the nature of the fact: Perhaps it is the st unnatural practice that can come within the reach of man. lf-preservation is such a law of nature, that it is written as it re in the animal as well as in the mind, it is mingled with our sh and blood and our very constitution: we must sin therefore ainst our bodies and our souls together, when we perpetrate s wickedness. It is well expressed by a late writer that "our eator would not have armed life with such a dread of death, ich is rarely overcome, nor involved the contemplation of death so many appalling doubts and apprehensions, if the quitting of e of our own accord had been agreeable to his schemes of pro- dence. It is evident God hath way-laid the roads to death with buscades of terror, on purpose to prevent our voluntary ap- aches to it. Nature itself is passionately abhorrent from it; throws our whole frame into a tumult, and the man who hath olved it finds a drawback within himself that silently with- lds him."

Upon these accounts, it is hardly supposed to be done with- t some strong temptations of the devil, that evil and cruel spi- , who is a murderer from the beginning: And it is he only o finds his account in it, and regales his hellish passions of lice and envy against God and man. This vile spirit is emi- ntly gratified when we give ear to such a temptation: He d the impudence to tempt our blessed Lord in this manner,— Cast thyself down from the pinnacle of the temple;" but our rd repelled him with indignation, and left us an example:— he hour, in which his Father had appointed him to yield up his e, was not yet come.

VII. Consider that if it be lawful for you to put an end to ur own life because you are weary of it, perhaps it would also lawful for any other man to do the same for you with your ave and at your request. But it is not lawful for another man do it, therefore, not for yourself. I borrow my argument from

hereafter be deemed a just sacrifice of divine wrath, and for ever unworthy of pardoning grace.

SECT. II.—*Some general Dissuasions from Self-murder, by shewing the Folly and Danger of it.*

WHEN this bloody practice has been proved to be highly criminal in the sight of God, we can hardly suppose that any other considerations should be more effectual to deter a man who professes christianity from the guilt of so aggravated a sin: Yet it may be possible to set the dangerous and dreadful consequences of this practice in a fuller view, a more diffusive and affecting light; for if you turn it on all sides it has still some new appearances of terror, and furnishes out new dissuasives from the execution of it.

I. Consider that it is too dangerous an attempt to venture upon it unless you had a full assurance of its lawfulness. Now suppose the power of your own iniquities, the artifices of the tempter, and the prevailing ill humours of animal nature should join together so fatally as to blind your eyes against the full conviction of its sinfulness, yet you can never prove that self-murder is certainly a lawful thing. The furthest you can go is to suppose, that possibly it may be lawful; but on the other hand, if you should be under a mistake, it is a dreadful, it is a fatal, it is an eternal one. You put yourself beyond all possibility of rectifying this error through all the long ages of futurity.

Whatsoever vain fancies some of the heathens have indulged who knew not God, and had very little and dark apprehensions of a future state, yet in the christian world the utmost that the most sanguine or most melancholy among this tribe can well pretend is, that perhaps it may be lawful, or at least that it is a little and a very pardonable crime; and they have been forced to wink their eyes against the light to arrive at this perhaps. But if it be not pardonable, then nothing remains for the criminal but everlasting punishment. That terrible word, eternal, eternal, eternal misery, carries such a long doleful accent with it, and includes such an immense train of agonies without hope, that it is infinitely better to bear the sorrows, the trials and uneasinesses of this life for a few short and uncertain years, than rashly to venture upon such a practice, whose pretended and doubtful advantages bear no proportion at all to the infinite and extreme hazard of an endless state of torment.

II. Suppose you could by any false reasonings persuade your consciences that the act of self-destruction was no sin, yet are you so sure of the present goodness of your state towards God, and that all your other sins are pardoned, that you could plunge yourself this moment into eternity? It is generally *under* a fit of impatience that persons are tempted to destroy

themselves; now is this the present frame and temper of your soul such as is fit to appear in before the great tribunal of heaven? You well know that "as the tree falls, so it must lie, to the north or to the south." Eccles. xi. 3. "After death judgment immediately succeeds;" Heb. ix. 27. "There is no faith and repentance in the grave, nor pardoning grace to be implored when the state of trial is past;" Eccles. ix 10. "They that go down to the pit cannot hope for thy truth." Isa. xxxviii. 18. Are you now so sure of your Creator's love, and of your perfect conformity to his laws of judgment? Are you so holy, so innocent, so righteous in yourself, or so certain of your interest in the merits of a Mediator, that you dare rush this moment before the bar of a great and terrible God, and tell him that you are come to have your state determined for all everlasting? If not, be wise and bethink yourself a little; use and improve the delay and opportunity which his grace and providence offers you in this life, for a more effectual securing a better life hereafter.

But if we go a little farther and suppose the action in itself to be criminal, then remember that you send yourself out of this world with the guilt of a wilful criminal action on your conscience; you preclude your own repentance of this sin in this world, and the other world knows no repentance that is available to any good purpose. You shoot yourself headlong into an eternal state; and are you sure that you shall never repent of it in the long future ages of your existence? But, alas! all that repentance comes too late to relieve you from the dismal effects of your rashness. All the repentance of that invisible world, is but the sting of conscience, which, will add exquisite pain to your appointed punishment. Surely you should have the most evident and undeniable proofs of the goodness of that action which can never be reversed, and which puts you for ever beyond all possibility of useful repentance.

Give me leave to add in this place, what is the constant doctrine of the bible and the sense of christians, viz. that a wilful sinner dying impenitent cannot be saved. Now if there be no space given for serious reflection and penitence in the case of a self-murderer, what room is there for hope hereafter? except only where the persons are really distracted, and the great God our judge knows how to distinguish exactly how far every action is influenced by bodily distempers. This is the only hope of surviving friends.

III. Think yet again, what an odium, what scandal and everlasting shame you bring upon your name and character by such a fact. It is a reproach that spreads wide among the kindred of the self-murderer; it descends to his posterity and follows him through many generations.

It may be observed also that in the rubric of the church of

England before the burial service, self-murderers are ranked with excommunicated persons; the church has no hope of them as true christians; and as the church denies them christian burial, so the civil government did heretofore appoint that they should be put into the earth with utmost contempt; and this was generally done in some public cross-way, that the shame and infamy might be made known to every passenger; and that this infamy might be lasting, they were ordained to have a stake driven through their dead bodies, which was not to be removed. It is a pity this practice has been omitted of late years by the too favourable sentence of their neighbours on the jury, who generally pronounce them distracted; and thus they are excused from this public mark of abhorrence. Perhaps it were much better if this practice were revived again; for since the laws of men cannot punish their persons, therefore their dead bodies should be exposed to just and deserved shame, that so this injury might be laid under all the odium that human power and law can cast upon it, to testify a just abhorrence of the fact, and to deter survivors from the like practice.

IV. Can any man of a generous or kind disposition think of all the mischief done to his friends and kindred by the destruction of himself, and yet practise it? Think of the public scandal and disgrace that it spreads over the whole family; think of the shame and inward anguish of spirit that it necessarily gives to surviving friends and relatives; what sorrow of heart for the loss of a father, or mother, or brother, a sister, a daughter, or a son, in such a sudden, such a dreadful, and such a shameful manner of death? What terrible perplexity of spirit, what inconsolable vexation of mind, what fears of eternal misery for the soul of the deceased? This gives them a wound beyond what they are able to bear, and sometimes wears out their life in sorrow, and brings them down to the grave. One would think that the injury done to friends and dear relations would be a sufficient bar against it, to souls who have any sense of justice, or any pretence to goodness and love. If it be so hard for you to bear a little poverty, shame, sorrow, reproach, &c. that you will die rather than bear it, why will you entail these on your kindred and on those who love you best?

In order to work upon persons that have any compassion for their surviving kindred, it is fit they should know also that the English law calls a self-murderer, *Felo de se*, or a felon to himself, and upon this account the estate and effects of the deceased are forfeited by law, and cannot descend to the relatives, unless it appear that the person who laid violent hands upon himself was distracted. Now in this case Bishop Fleetwood finds fault severely with juries, who now-a-days bring in almost all self-murderers distracted, and he desires them to consider,

'Whether the constant mitigation of the rigours of the law against self-murderers, may not give some encouragement to that practice; and whether the favourable verdict they bring in, be always so righteous and so seasonable as they imagine? And since the wisdom of the law intends that the confiscation of estates, the undoing a family, and the shameful burial shall deter them from these horrible attempts, whether the mercy that defeats all these intentions be not more like to continue than to repress these cruel violences? Were a person sure that his estate would be forfeited, and his effects carried away from his wife, children and family, were he sure that his dead body should be publicly exposed, buried in the high-way, and with a stake driven through it as a mark of huge infamy, perhaps he would give way to calmer counsels, and be content to bear a little shame, or pain, or loss, till God saw fit to put an end to all his sufferings by natural means: And therefore an instance or two of such severity, as is legal, well and wisely chosen, might prove a greater preservative against these violences than such a constant and expected mercy, as we always find on these occasions: For men have now no fear of laws; and when they have laid aside the fear of God, they go about this business with great readiness, they are sure of favour in this world, and they will venture the other."

V. Think in the last place, how fatal an influence your example may have to bring death and ruin on others, and that on their immortal souls as well as on their mortal life. Remember what an effect the self-murder of Saul had, when his armour-bearer followed him, and died also by his own sword. And oftentimes where self-murder is practised, it fills the heads of other melancholy and uneasy persons with the same bloody thoughts, and teaches them to enter into the same temptation.

Think then with yourself, "What if I should not only destroy my own soul for ever, but become the dreadful occasion of others destroying their souls, and flinging themselves into the same place of torture? What sharp accents will this add to my anguish of conscience in hell, that I have led others into the same wretchedness without remedy, without hope, and without end? Think and enquire whether every self-murderer who may be influenced hereafter by your example to this impious fact, may not be sent particularly to visit your ghost in those invisible regions, and become a new tormentor. Whether all such future events may not be turned by the just judgment of God to increase your agonies and horrors of soul in that world of despair and misery.

SECT. III.—*The Pretences for Self-murder, and the Motives to it examined and answered*

SOME of the pretences for this criminal practice have been obviated already, while we were displaying the guilt, the folly, and the danger of it: Let us now come to consider the rest of the chief motives wherewith this temptation is enforced: And here we shall see what mere shadows, most of them are, what poor thin colours of argument, such as one would think should never pass upon a creature who retains the exercise of his reason, and pretends to any share of understanding or fore-thought, since the infinite concerns of an eternal futurity so vastly over-balance all present appearances.

I. One person finds his circumstances sinking in the world, or it may be, he is over-whelmed at once with the loss of his estate; "I cannot bear," saith he, "the thoughts of poverty. What! to be brought to a morsel of bread, and live like a beggar! I had rather die than be beholden to charity to keep me alive."

Answer. This is the pride of thy spirit, O man; but is it not incomparably better to mortify this pride, and submit to the will and providence of thy Creator, for a few days here on earth in a state of trial, than to plunge thyself into a state of certain and everlasting wretchedness?

Perhaps it will be replied, "But I am in starving circumstances, I am afraid I shall perish with want, why may I not then hasten my dismission from this world and prevent my fears?"

I answer, whatever fears are prevented by this rash and bloody experiment, your real and more dreadful sorrows will be hastened. You want the supports of life here, but will you therefore send yourself into a world of universal want and sorrow, where you shall have no supply, where your necessities of various and unknown kinds shall be ever raging and violent, and where you shall obtain no manner of relief, no, not a drop of water to cool your tongue in the midst of torments?

Besides, I think there are no persons in such a condition in our nation, but that either by the laws of the land, or by a proper application to persons of beneficence, they may find relief from starving, if they are but sincerely willing to labour as far as their capacity admits, and then apply themselves to proper methods and to proper persons, in order to obtain this relief. The providence of God corresponds with his promises; Ps. xxxiv. 10. "Though the lions roar and suffer hunger, yet they that seek the Lord shall not want any good thing, that is necessary for them;" Ps. xxxiii. 18. 19. "The eye of the Lord is upon them that fear him, upon them that hope in his mercy, to deliver their soul from death, and to keep them alive in famine;" Ps. xxxvii. 3. "Trust in the Lord, and do good, so shalt thou dwell in the land, and verily thou shalt be fed."

III. Another will say, "I have lived in some credit and reputation in the world, and I am now falling into universal disgrace and infamy, and in my opinion shame is worse than death."

Answer. But is shame worse than hell too? That is a proud spirit indeed, that had rather commit the greatest sin against God, than undergo disgrace from men: that had rather venture the weight of the arm of God, in a way of vengeance, than a little noisy and scornful breath of poor perishing mortals. Mortify thy pride, O sinner, and the temptation is at an end; or despise the shame, if it be undeserved.

But perhaps thou hast committed some foul and shameful sin, and thou art afraid of punishment and disgrace together, and therefore thou fliest to the sword, or the halter, to a pond of water, or to poison, to secure thyself from that disgrace.

Wretched reasoning this, and foolish hope! What is there casts a greater blot upon the name of any man, so long as his memory lives in the world, than to say, he hanged, or drowned, he poisoned, or stabbed himself? This is a stain shall never be wiped away: And when thou risest out of thy grave, at the last day, thou shalt arise to everlasting shame and contempt. Besides all thy other sins, this shall be published before angels and men, that thou wert guilty of the most unnatural wickedness in the world. What a senseless practice is it for men to bring upon themselves eternal shame and confusion only for this end, that they may escape what is temporal?

III. The third pretence is this. "I have been disappointed in the greatest and most important affairs of life. When my hopes rose highest they were blasted on a sudden, and quite destroyed. My heart was entirely set upon this blessing, my expectations are dashed, and my heart is broke. All the world besides is insignificant emptiness, or a painful vexation to me, and what should I do any longer in such a world, where I meet with nothing but vexation and emptiness?"

Answer. And do you not know that vanity and vexation has been written upon all this world, by the wisest of men long before you were born? Has not this lesson been taught most men by sad experience in every age? And must you resolve to die because you have learned it? Have not the most flourishing hopes of a thousand other persons been blasted as well as yours, and the fairest blessings of life withered in their hands? And yet the wise and the foolish have survived this loss; what a poor reason is this for you to doom yourself to death, and make yourself your own executioner? Are there no comforts, no friends, no hopes left in this world to support you under the present disquietude and pain of mind? Will not time and patience make that burden easy which now seems unsupportable? Patience and time with their soft and gentle hand have applied medicines to a thousand broken

hearts and healed them. Is your wound incurable? Is there no balm on earth, and no physician in heaven?

Suppose there is a huge vacancy made in your soul by some great and surprising loss, turn your thoughts to that great and almighty God, in whose hands are all the springs of life, and all the blessings of time and eternity: He can fill up that huge vacancy with better blessings and with his own presence. This shall make your loss grow lighter, and set your soul at ease. He can wean your heart from every creature by uniting it more nearly to himself. And since you have acted foolishly in setting up a creature in the room of God, he can set up himself as chief in your heart in the room of that idol creature: And you shall be able to say, "God is my all, what have I to do any more with idols?" By the wondrous methods of his wisdom and providence, he can make your losses turn to your advantage; and instead of hopes or enjoyments that have forsaken and disappointed you, he can give you an interest in his promises, his holy covenant, in the riches of his grace, and the inheritance of his glory. These are hopes which will never fail; these are enjoyments which will never vanish or leave you empty and disappointed. And besides all this, he has all the stores of nature in his hand, and all the comforts of life: He can furnish you with blessings in this world, that may in some measure answer the losses which you mourn, or turn the stream of your thoughts into such a peaceful channel as shall make you forget your sorrows.

Thus much to relieve and support the mourner. But give me leave to reason with you in a more awful manner against the temptation which at present you seem to indulge.

What if you have lost every thing that is desirable on earth, and that without hope of reparation, will you resolve therefore to lose heaven too? Is this world become painful to you, and can you find at present no comforts to be enjoyed in it, and will you therefore throw yourself headlong into a world of eternal pain, where comfort can never come, nor any shadow of pleasure, where there is no rest, no peace, no hope, through all the ages of immortality? Are you disappointed in your dreams of happiness in a creature, and will you therefore abandon your hope in God? Will you profanely say, "he shall not be my happiness?" Will the everlasting wrath of God, the anguish of conscience, and the rage of devils in another world, heal that heart which was broken in this? What monstrous folly and absurdity appears in such pretences! A strange way of relieving ourselves under the loss of a temporal blessing, to plunge into the ocean of eternal misery, and fly into that world which is under the unchangeable curse of God?

IV. "But my temptation is yet greater still," says another person who is contriving to destroy himself; "my circumstances are such that I shall only prolong a life of misery, and pass through

a lingering death of greater pain and torment unless I anticipate the hour, and put an end to my life at once, in an easier and shorter way: I am in captivity or in prison, and sentenced to a dreadful execution; or I am languishing out my life in extreme torments of body, the gout or the stone; or my limbs are broken and I have no hope of ease or healing, why should not I then cut short my life and my anguish together?"

Answer. Think what instances of the same kind may be found in scripture, what their various characters were, and what their practice. Bloody Saul will die by his own hand rather than that the Philistines should slay him; 1 Sam. xxxi. 4. Ahithophel was afraid of being taken and executed for his treason, and therefore he hanged himself. 2 Sam. xvii. 23. When Zimri, a wicked king, saw that the city was taken, and that he must fall into the hands of his enemies, he burned the king's house over him and died; 1 Kings xvi. 18. The heathen jailor fearing his prisoners had escaped, drew his sword and would have killed himself, lest he should be put to death in the room of his prisoners; Acts xvi. 27. These are the men that have chosen sin rather than affliction: They would destroy themselves rather than stay for other men to do it. Are these fit precedents for a christian to follow? Art thou fond of imitating these examples, whose names and characters are loaded with divine contempt in the book of God, except only the jailor, who was prevented by divine mercy from the bloody fact, and became afterwards a penitent and a convert to the christian faith.

On the other hand think of the holy prophets and martyrs, who had the most dreadful sufferings in view, and rather trusted to divine grace for their support under them, than they would indulge such a guilty method of escape; and their names are crowned with honour on earth and in heaven. Job was a very monument of misery, had lost his estate and his children and all his comforts, he was smitten with sore boils from head to foot, so that "his soul, that is, his natural inclination chose strangling and death rather than life;" Job vii. 15. and his wife became an instrument of Satan, and bid him "curse God and die;" Job. ii. 9. yet he resisted all these temptations through the victorious grace of God, he survived all his sorrows, he became a most honourable monument of divine mercy, and a glorious example of patience.

Whatsoever thy condition be, it is better to trust thyself in the hands of divine mercy in a way of duty here on earth, than to rush into the hands of God's avenging justice in hell, in order to escape any of the terrors of this life; Mat. x. 28. "Fear not them who can kill the body and can do no more; but fear him who can destroy both body and soul in hell fire."

Besides, though thou seest no way open for thy relief, yet the infinite wisdom of God, may open a door of escape. He

can heal the most deplorable maladies of the flesh; he can give ease to the acutest pains; he can change thy captive and forlorn estate, into peace, liberty and joy. Remember the history of Job, consider the patience of that holy man, and the happy end of his sufferings through the goodness of the Lord. Art thou in the hands of bloody men, the great God has a thousand ways to rescue thee? He can change the purposes of men and the nature of savage beasts, though they gape to devour thee, though they seem resolved and bent upon cruelty and violence. Remember Daniel in the lion's den. Remember also the deliverance of St. Paul and St. Peter out of prison. He can give thee a dismission from life with his own hand, and prevent thy fears and the rage of men, or he can arm thy soul with divine courage and strength, to bear up under the sharpest agonies, and to glorify him even in the fires: And surely the hope of such a death in the certain favour of God is infinitely to be preferred before a death procured to ourselves, and under a divine curse.

V. Pretence. "Distress of soul through surrounding sorrows within and without, the departure of God, the agonies of conscience, and the fears of eternal damnation; these things become the spring of many a temptation to self-murder." Saul was under some such sort of distress, when God was departed from him, and the Philistines were coming upon him: He refused to eat bread all that day and all night; and as he stabbed himself the next day, so some suppose he would have starved himself the day before; 1 Sam. xxviii. 15, 20, 22, 23. Judas was in horrible distress of conscience when he had betrayed our Lord, and then he betakes himself to the halter. "I have sinned, says he, and betrayed innocent blood;" Mat. xxvii. 4, 5. I cannot bear my own thoughts, and I will die by my own hands. And when inward and outward troubles meet together, as they often do, Satan takes the advantage to propose this dreadful experiment for relief. "I am a poor reprobate creature, for God has left me," says a person under temptation, "and I am sure I shall never be saved: I cannot bear the anguish of my own mind, I cannot bear to live: And besides, if I destroy myself now, I shall have fewer sins to answer for than if I lived longer, and thus my guilt and punishment will be less."

Answer. But how knowest thou that God has utterly left thee, and that thou shalt never be saved? It is not God but Satan who tells thee thou art a reprobate. The God of heaven says no such thing to thee, but he calls thee to look unto him from the ends of the earth, from the borders of hell and despair, that thou mayest be saved; Is. xlv. 22. Wilt thou plunge thyself into certain destruction, and make thy damnation sure, which is

not certain, whilst thou art here in this life, for amongst the living there is hope? The Son of God stands ready to receive the worst of sinners to the arms of his mercy, "The blood of Christ can cleanse from all sin;" 1 John i. 7, 9. "This is a faithful saying and worthy of all acceptation that Jesus Christ came to save the chief of sinners;" 1 Tim. i. 15. And none who ever came to him has been or shall be cast out; Job vi. 37. Why wilt thou seal and confirm for ever the sentence of thy own condemnation? Why wilt thou reject the condescending grace of the Saviour, who delights to relieve the distressed sinner? Art thou so rash and desperately wicked, as to employ thy last moments and thy latest powers in this world, to commit a bold and horrid sin against the God of all grace, to preclude thy own repentance, and forbid the Son of God to save thee?

Besides, This is not true that thy punishment will be the less if thou destroy thyself. For damnation and punishment in hell will be the greater and deeper according to the aggravation of the sins which have brought the sinner thither: Now self-murder is a sin so heinous and aggravated, that if thou die impenitently under the guilt of it, thy damnation will doubtless be the greater for it, and thy torments the more intolerable.

It is a vain and deceitful hope that some persons may have indulged under such a temptation, viz. "That God will not impute sin to them in this matter, because their anguish of mind is so great; and that if it be a crime, they will pray for the pardon of it before they commit it." This is a mere vain delusion of the tempter. Canst thou ever imagine that God will hear such prayers? David was of another mind; Ps. lxvi. 18. "If I regard iniquity in my heart, the Lord will not hear me." If thou comest before God with bloody resolutions in thy heart, God will not accept of thy petitions. Is. i. 15. "When you make many prayers I will not hear; your hands are full of blood." The prayer for pardon of a wilful intended sin, before it is committed, is a most flagrant and complicated piece of folly and impiety, and can never find access even to a throne of grace.

VI. The last pretence I shall mention for the practice of self-murder, is this: Some poor melancholy creature may say, "I am so hurried with vile, wicked, blasphemous thoughts that my life is a burden to me, and I would fain be rid of it. I am surrounded and overwhelmed night and day with such a crowd and tumult of distracting fears, and dismal imaginations, that I can hardly get a moment's rest. My soul longs to be quit of this body, and free from the impetuous, and never-ceasing assault of vexing and disquieting thoughts." Or perhaps the soul complains thus, "I am importuned with the endless buzz and

clamour of diabolical suggestions to put an end to my life; almost every thing I see is proposed to me as an instrument of self-destruction, and I fear I shall not be able always to resist; sometimes I am tempted to believe if I would but once comply, I should sleep in silence, and there would be an end of these disquietudes."

Answer. This is a dangerous form of the temptation: When the natural humours of the body are ruffled by any disease, the great enemy of the soul is swift to make his advantage of it.—When the brain is disturbed almost to a degree of distraction, the mind has not a full power over its own thoughts, resolutions and conduct. But let such a one consider, that whether these hurrying wicked thoughts may arise from the disorders of the body or from Satan, while thou mournest, hatest and resistest them, they shall not be laid to thy charge: But when they are knowingly and willingly indulged, they bring great guilt on the soul: And if they are once complied with, and put in practice, the guilt is highly aggravated, and perhaps no space left for actual repentance, nor grace to practise it.

It is better, infinitely better, to fight and wrestle against these hurries of mind, by dwelling upon some sacred sentences of the word of God. It is incomparably preferable to bear the fatigue of this combat, to strive against the tempter every moment with all thy powers and with perpetual prayers, to renounce these suggestions with the utmost abhorrence, and with equal vehemence to resist such vehement assaults as these. Think this with thyself, poor distressed creature, that if thou yield to the bloody temptation, and send thy soul at once into those regions of darkness, there unclean spirits shall have more complete power thee, there every devil shall insult thee as a sentenced criminal, and that with double fury and with juster pretences. There thou wilt find the stroke of thy own murder to be so far from being a means of relief and silent rest, that it will but plunge thee into agonies of the same kind, much more terrible and without hope of relief. Thou art sensible these are the suggestions of the wicked spirit; for that reason therefore abandon, abhor, detest them, and by the grace of God maintain a perpetual opposition till he give thee complete victory. The conflict cannot be very long, the crown and triumph are eternal. God will not always suffer the adversary to contend thus with thee, lest thy spirit should fail before him, and the soul which he has made be lost for ever.

SECT IV.—*Means of Security against this Temptation, or Advices to the tempted.*

THUS I am led on to the next enquiry, and that is, "What course should we take to secure ourselves against this bloody temptation, and by what means may we most successfully resist and vanquish the great destroyer in such assaults as these?"

I. Advice. Maintain upon your spirit a constant sense of the crying sin of murder. The voice of blood cries to the Lord for vengeance, whoever sheds it. Have a care of indulging a favourable thought of self-murder; look upon it always with an eye of abhorrence, as an unnatural and abominable iniquity, and as one of the most wretched and hopeless practices that a man can be guilty of. Let the terrors of God which set themselves in array against this bloody crime, be set before your minds whensoever this temptation assaults you.

Give me leave here to borrow a page or two from a sermon preached long ago on this subject by the late venerable Doctor Increase Mather, of New-England, whence also I have derived some other sentiments in this discourse. "It is an evil thing, says he, to speak favourably either of self-murder or of self-murderers. There have been those that have undertaken an unhappy work, to justify self-murder in some cases. Pagan writers have celebrated persons who murdered themselves: Famous is the story of Lucretia, who stabbed herself to secure her chastity. In what we call, the second book of the Maccabees, we find celebrated an action of one Rasis, for which the Jews cry him up as a martyr; but Austin censures him for a criminal self-murderer, with reasons that cannot be answered.

"Yea, some christians have commended those, who to save their chastity, and so themselves from disgrace, have destroyed their own lives. And the crying up of such a fact, has given occasion to many others, to become guilty of that unnatural sin.

"To exalt the persons of self-murderers to heaven, is an evil and a dangerous practice. We should rather leave secret things to God, and to the discoveries of the great day. Indeed if a man's life and conservation were as becomes the gospel, we are not positively and absolutely to say, that he is damned, though he killed himself: Because we know not but that he might be, at that time, under the power of distraction: And it is not impossible, but that God may suffer Satan to possess, and torment and kill the bodies of some, whose souls may yet be saved in the day of the Lord. Yet on the other hand; if there were no sign of distraction, appearing in persons before they went to destroy themselves, nor any evidence of repentance after such attempts, we should not say such persons are gone to heaven, lest by being over-charitable to the dead, we become cruel to the living. The asserting that such persons are saved, may occasion and encourage others to do the like, and the everlasting destruction of bodies and souls follow upon it."

II. Advice. Maintain the universal practice of piety, and of every moral virtue. Such temptations to self-murder frequently arise from some indulged iniquity. Men oftentimes run headlong into death, with a design to deliver themselves from

some of the natural consequences of their own crimes in this world. Now it is easier far to watch against those notorious crimes, and to avoid those follies, than when they are committed to guard our minds against the wicked suggestions that may arise. "A man in innocence," says a great writer, "has a mighty command over himself, above what he has when guilt and fear, shame, vexation, and remorse have taken a full possession of him, have bewildered his thoughts, scattered his recollection, and enfeebled his judgment."

Be just in your dealings with men, be sober and temperate in all your personal conduct. Do not indulge yourself in any unlawful and unblessed practices to swell and enlarge your estate, such as gaming or cheating. Do not run into any extravagancies of life, which may waste your estate or your health, or make inroads upon your reason. A thief, a cheat, and a gamester, a covetous miser, and a spend-thrift, a glutton, and a drunkard, lie much exposed to such wicked suggestions of self-murder in an evil hour.

Watch against all enticements to luxury and lewdness Remember that riot and adultery, and midnight scenes of debauch often lead the way to blood. Secret uncleanness is the frequent spring of murder; and that not only of the unlawful offspring, but of the criminal parent too, and that by their own hands. The wanton person cannot bear the just and public shame of his private iniquities, and he plunges himself headlong into hell and the grave, in hopes to cover his head from scandal and the daylight.

Love not any thing in this world so much, as that the loss of it should throw you quite off your guard, and make you abandon yourself to wild and extravagant methods of relief. Let your affections be so subdued, and kept in so good order, that the common calamities of life may not utterly confound, though they may surprise you. If you place your whole happiness in any of the attainments of this world, you expose yourselves to this bloody temptation, when you suffer the loss of those idols.

Set a strict guard upon all the ruffling and disquieting passions of human nature. Avoid envy, resentment, indignation, revenge, fretfulness and vexation of spirit. These often lead the unhappy mind of man into this temptation. Persons who break out into violent passion without check or controul, and give a loose to the wild and unreasonable disquietudes both of animal nature and of the mind, they expose themselves to be made the instruments of the devil in their own destruction, or perhaps to destroy themselves without any fresh influences from the tempter. Learn the practice of meekness, and maintain a strict hand over your sudden risings of resentment. The man of rage is always near to bloody practices: The same sort of passions which ex-

cite a person to give an unhappy and murderous wound to his neighbour, may some time or other most unhappily imbrue his hands in his own blood.

Remember this, that it has scarce ever been known that a man of temperance, sobriety and virtue, and who in the general course of his life has kept his lusts and passions under due restraint, has been much assaulted with this temptation to self-murder, except only in cases of great bodily disorders of prevailing melancholy, and the loss of reason.

The third direction I shall copy from Doctor Mather.

III. Advice. "Beware of such sins as may provoke the holy and righteous God to lead thee unto this horrid evil.

"Beware of pride. When men will rather not be at all, than be what God would have them be; what cursed pride is that? And how dangerous a step toward this sin? This produces murmurings at the providence of God; and causes people to say; 2 *Kings* vi. 33. "What should I wait for the Lord any longer?"

"Beware of self-confidence. Be sensible of thy weakness; 1 *Cor.* x. 13. Let him that stands take heed lest he fall. Be not confident of thy own strength to encounter the adversary. If God should let Satan loose upon thee, he will be too hard for thee.

"Beware of a heart glued to the world. When the world is a man's idol, he will rather part with his life, with his own hands he will give it away, rather than part with the world, and be content to live in poverty.

"Beware of unbelief. Distrust not the fatherly care of thy heavenly Father." The dread of poverty and starving has been sometimes the cause of self destruction; but it is the effect of distrust in God.

"Beware of despair; 1 *Thess.* v. 8. "Putting on for a helmet the hope of salvation." Say not, the day of grace is over with me. Say not, I have sinned unpardonably! Vain imaginations.

"Beware of the more heinous crimes; which are in a special manner God-provoking evils. The sins against nature are so. Some that have been guilty of such sins in secret and have not repented of them, God has for such things left them to this, which is a sin against nature too!

"There are other atrocious crimes; whereof this has been the consequence. Judas and Pilate, are two fearful examples of it!" The sacred history informs us of the tragical end of Judas, and the histories of the church tell us that Pilate also destroyed himself some years afterwards, at Lyons in France.

"Finally; Beware of backslidings from God, and from good beginnings in religion. Remember that word; *Hos.* viii. 3.

"He hath cast off the thing that is good; the enemy shall pursue him. Some have left off prayer in their families; left off their attendance on sermons; left off godly exercises which they have been used to perform. Therefore the enemy of their souls is let loose upon them; and he pursues them even to self-destruction."

IV. Advice. Suffer not yourself to dwell too much alone. Do not indulge solitude and retirement beyond the time that is actually employed in devotion: Nor let your appointed seasons of retired devotion be long. In such a case short and frequent worship is best. Lonesome hours and melancholy solitudes, if they are too much indulged, do not only allow the devil an opportunity to pursue his temptations with vigour, but furnish the bewildered soul with means and instruments of death. Whensoever therefore you are alone, you should be with God.

For the same reason should a person under this temptation avoid all waters, precipices, dangerous places, the use of weapons, &c. And remove every thing as far as may be from his sight that may supply him with the means of self-destruction.

V. Advice. As far as possible endeavour to be always employed; that the powers of your nature, both soul and body, may be engaged in some proper business. Be always doing something, if it be but a mere amusement, a diversion for the thoughts: This is far preferable to idleness. When the hand and the mind have nothing to do, the devil seizes such an opportunity to employ them both for his own wicked purposes.

Do not make the alehouse or the tavern a refuge from your sorrows, but rather drive out your uneasy thoughts by some proper business that may employ them. A sober glass or two may be used to refresh animal nature, and revive a sinking spirit at some particular seasons; but if you once begin to make strong liquors your daily and constant relief, you will be led hereby into a train of mischiefs. When you have drunk a little too freely and your thoughts grow a little confused, you stand then most dreadfully exposed to all the evil impressions of the tempter. Those who may have vanquished huge temptations, while they have been temperate and sober, have been fatally betrayed into the deadly snare by wine and strong drink. A loose, intemperate and unguarded hour has become a hour of blood and death.

VI. Advice. Keep not the devil's counsel, but discover his temptations. It is by no means proper indeed to publish them to the world, but let them be made known to some faithful minister, or to some wise and judicious christian. This will go a great way to break the snare. Entreat the assistance, the advice and prayers of one or two intimate religious friends for you: This method, I am persuaded, has been effectual to prevent the execution of such horrid purposes. Dr. Mather informs us that

one who cut his own throat acknowledged this before his expiration; "O that I had told," said he, "how I was tempted! if I had, I believe, I should never come to this."

VII. Advice. Resist the devil and he will flee from you; *James* iv. 7. This is a divine counsel. Maintain a perpetual conflict with him, and a vigorous opposition. Suffer not yourself in a melancholy season to hold a parley with the tempter, or rather suffer him not to plead and dispute with you, but abandon and renounce and abhor all his suggestions. Let him not have the honour or the advantage of arguing with you upon so dangerous a subject in a gloomy and melancholy hour.

Let your memory be well stored with proper scriptures, and employ the word of God in resisting the devil. This was the practice of Luther, under his great and sore temptations. This has been the successful instrument of defence for all the saints: And this sword of the spirit will put Satan to flight. Jesus, the captain of our salvation has given us himself for a glorious example; he defeated the tempter in all his assaults with these words, "It is written," *Matt.* iv. 4, 7, 10.

And I would give this word of advice to tempted souls, that they every day take some particular useful text of scripture into their minds, that they may run to it perpetually as a refuge, and dwell upon it with a resolute constancy in the midst of their hurries of mind; as a sailor in the midst of a storm ties himself on to the mast, that he may not be driven off into the sea, by the violence of the winds and the waves. Some divine word of promise in such a dark and dismal day, will be as a sacred anchor of hope to the poor weather-beaten spirit, that is tost to and fro upon the billows of this temptation.

VIII. Advice. But after all, the most effectual and successful relief under this temptation is faith and prayer. Be frequent and importunate in prayer to God. Fly to the throne of grace whensoever you are assaulted, "that you may obtain mercy, and find grace to help you in this time of need." *Heb.* iv. 16. Entreat the aids of your Creator against his and your enemy. Trust in his mercy, and seek his power to resist the tempter: the holy Spirit of God, is superior to all the spirits of hell: depend on his aid, and thus by faith and prayer quench the fiery darts of the evil one.

Commit thyself afresh, by earnest requests, to the protection of the Son of God; he is almighty and compassionate, and the appointed guardian of tempted souls; being sheltered by faith in the hands of the Saviour, Satan shall not pluck thee out of his hands. Christ has conquered the adversary, and left him captive in his chains, nor can he stir beyond the limits of his permission. If the enemy pursue thee, make haste and betake thee to Jesus, as to a city of refuge: his name Jesus assures

us that he is and will be a Saviour: "This name of the Lord is a strong tower, the tempted soul flies to it and finds safety." *Prov.* xviii. 10. "They that have known this name, will put their trust therein." *Psal.* ix. 10.

Remember, O poor tempted souls, that our Lord Jesus Christ has been tempted himself, and that in the same manner too, on the pinnacle of the temple; he knows how to succour them that are tempted; *Heb.* ii. 18. He can teach you how to put Satan to flight.

Beg that the Lord your Saviour would secure you from the hurries of your own thoughts: run to his protection hourly being conscious of your own weakness. Plead with him to keep you from this unreasonable and comprehensive temptation, that aims at the ruin of soul and body at once: and though you may think it long to wait and pray under such a sore conflict, yet resolve to continue at the mercy-seat, and go on praying and waiting: "The needy and distressed soul shall not always be forgotten; the expectation of the poor shall not perish for ever; *Psal.* ix. 18. In the proper and appointed time the Lord will awake for your deliverance, and give you a glorious victory. The Shepherd of Israel may permit a beloved sheep to be worried by the roaring lion, but the sheep that keeps near to the Great Shepherd shall not be given up to the mouth of the destroyer.

These are the chief advices of a spiritual or intellectual kind, which at present occur to my thoughts, and which I have here proposed to the reason and conscience of men, as proper means to secure them from the dangerous and dreadful practice of self-murder: And I am well assured that if such counsels as these had been followed, we should not have heard of such frequent and bloody instances of persons in the full exercise of reason putting an end to their own lives, as our weekly newspapers inform us of.

But it must be confessed that where this temptation dwells upon the mind, and hangs heavy upon the spirits, where the soul is vexed and hurried with it from day to day, or where there is a melancholy temper of spirit indulging gloomy apprehensions both of things present, and things to come, there is much ground to suspect that reason is clouded, that the humours of the body are discomposed, and that animal nature is under the power of some distemper. In this case all the directions that are applied to reason and conscience are likely to become useless and ineffectual without the skill of the physician and the application of proper medicines to correct the peccant humours of the body. Friends and kindred and those which dwell in the same house should make wise observations, where they suspect a person to labour under the power of such a malady, or to indulge such a temptation: for many times they

are better judges than the person who is thus afflicted and tempted.

And while they are using proper remedies to remove the disorders of nature, they may also take seasonable hours to set before the mind of a melancholy creature such considerations drawn out of the several parts of this little treatise, as are most suitable to the present case: let them join their hearty prayers together with all the friendly methods of treatment to soften and relieve their distress of spirit: no harsh or severe usage from their friends is proper in this case: bind up the broken-hearted, and comfort them that they may not be unwilling to live. Make every thing easy round about them in this world, and encourage them to hope in the mercies of God for eternal life, if they do not wilfully fling themselves out of the reach of his covenant, and of all the appointed methods of his pardoning love. Treat them gently with all the united influences of advice and medicine. By daily prayer commit them to the healing power and the saving mercy of that God, in whose hands are all the springs of nature and grace. And may the God of all grace condescend to hear and to deliver the lives of the tempted from such a dismal period! May he rescue them by his mercy from the power of the tempter, that they may not plunge their souls into an eternal and unchangeable state at so dreadful an uncertainty! Dreadful indeed, wherein their surviving relatives can find but little room for comfort or hope concerning them, except what arises from the supposition of their loss of reason.

SECT. V.—*Admonitions to those who have been rescued from this Temptation.*

WE have good reason to believe, that there are multitudes in every age, who in some season of their lives have been assaulted with this temptation, and have been delivered from the power of it by some interposing methods of divine providence of special grace. Surely such persons will be ready to receive a word of admonition how to behave themselves after so merciful an escape from death and hell.

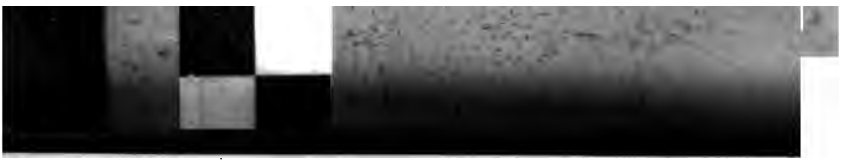
I. Admonition. Think sometimes with yourselves how nigh you have been to the borders of the pit, and what rich grace preserved you from plunging into destruction. Think how dreadfully near you were to death, and to the regions of eternal sorrow, and what an arm of almighty mercy hath rescued you. Say thus to yourselves, "I who now behold the light of this world, and am in the land of hope, might have been roaring out under agonies of spirit in the land of darkness and despair, if the great and blessed God had not prevented it."

Perhaps your conscience was awakened and the temptation broken, before it prevailed so far as to fix the fatal resolve of your own death, or when you were nearest to it, opportunity was

wanting. Perhaps there was some person came happily into the room, at the time of your bloody purpose, or you were not then furnished with some proper instrument of death; perhaps you were prevented from finishing the fatal stroke when you had begun it, or the murderous attempt of your hands was not so strong and so successful as your wretched heart wished and designed it; perhaps your heart relented as you were just going to give death to yourselves; or some sudden turn of thought, some happy word of scripture was brought into your mind, that forbid the mischief and rescued your soul. Let the method of prevention be what it will, it is certain God was there, divine providence was there, divine mercy was there; Psal. lxviii. 20. *Our God is the God of salvation; to God the Lord belong all the issues or escapes from death.* Stand therefore and wonder at the riches of divine grace, and give God the glory of thy rescue from the arms of death and the flames of hell. Amongst thy solemn thanksgivings for received mercies recount this illustrious instance of it. With great humility fall down before the throne of God, and with thy warmest devotions and gratitude appear there at his foot as a humble monument of his surprizing kindness. Remember the nearer thou wert to destruction, the greater and more evident is the mercy of thy deliverance. *Let thy soul and all that is within thee join to praise the name of the Lord, thy deliverer.* Psal. ciii. 1, 2.

II. Take shame to yourself in the sight of God for every murderous thought, every degree of compliance with this temptation. Repent deeply, O sinner, if thou hast indulged any bloody purpose in thy heart, and cry for divine forgiveness. Confess thy sin at the mercy-seat, and seek pardon through the atoning sacrifice of the Son of God. Remember that the blood of Christ cleanses us from all sin, even from the crimes of murder and blood. God has snatched thee from the mischief of thy own hands, lift up those hands to heaven to implore pardoning grace in the name of Jesus the great reconciler; repent and receive the blessing.

III. Meditate on the long train of benefits derived from this deliverance, and survey the weighty obligations that are laid on your soul thereby. Say thus to yourselves, "Every hour of rest and peace that I enjoy is the effect of this peculiar mercy, this divine rescue from death. Every sermon that I hear, every season of grace that is afforded me, is a special favour from that God who delivered me from this destruction. Every opportunity that I have of bending my knees before the throne of grace, every comfortable promise that I read in the gospel, every beam of mercy that I see, and every word of hope that I hear, are all owing to that happy hour of my escape from the violence of my own hands. Wretch that I was! I was cutting off all my hopes, I was cancelling my name out of all the promises, and putting



myself beyond the reach of them all. I was sending myself into a world where there is no gospel, no promises, no prayer, no word of salvation, no beam of mercy. For ever adored be the compassion of my God, that over-ruled all my wicked thoughts, and at last gave me victory over this dreadful temptation! And blessed of the Lord be those relatives, those friends, that were the happy instruments in the hand of God to break this fatal snare!"

Then think of the weighty obligations that lie on you to love and serve the Lord with all your powers. Say, "What shall I render to the Lord for all his benefits?" Ps. cxvi. 14. "He hath delivered me from the gates of the grave when I was just ready to leap into it, while the gates of hell stood open to receive my soul. He is indeed the God of my life, for he has not only given me life at first, and preserved it by the common bounty of his providence, but he has rescued my life out of the hands of the tempter when he would have persuaded me to destroy it. O may every moment of this rescued life be some way or other devoted to his fear and honour? Lord, what wilt thou have me do, to make it manifest that I am entirely thine? I would fain shew to my friends who were acquainted with my dreadful danger, that the vows and the bonds of God are strong upon me, and that this deliverance was not bestowed on me in vain."

IV. At some special seasons make an enquiry what you have done for God, or for the welfare of your own soul since your deliverance. In the successive course of time, when a new year begins, or when you take notice of your returning birth-day, or when the annual season of this deliverance returns, which is like another birth-day, or a new beginning of life, ask your conscience this solemn question, "Have I improved my moments and my mercies answerable to the infinite obligations I lie under?" It may be you had done little for the honour of God in the world before that time; what have you done since? It may be you had never been diligent to make your calling and election sure before; and are they now made sure? Enquire of your own souls and say, "Some months or years are past since the Lord has recovered me from the most pernicious snare of the tempter, and do I still continue his slave in another form, bound in the chains of my own lusts and passions? Surely I was at that time very unfit to die; have I now attained a greater fitness?"

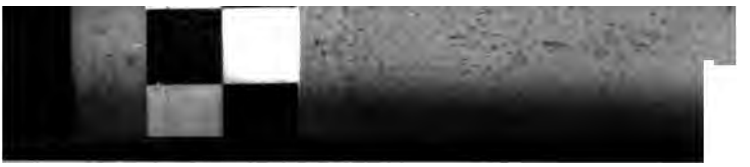
Perhaps you had then acquired but little acquaintance with the grace of Christ, with experimental religion and practical godliness: And are you still a stranger to Christ, a stranger to the pleasure of secret religion, and to holiness in the power and life of it? You stood in that day on the very borders of hell and destruction, the God of mercy secured you from the pit: In

your face now set heaven-ward? And are you arrived within the hopes and confines of heaven? Have you any comfortable or settled expectation of that inheritance of the saints in light? Your mind perhaps was vain and carnal, and made the pleasures, the profits, or the honours of this life the objects of your chief pursuit, and your only happiness; how stands the temper of your spirit now? Is it refined? Is it exalted to pursue diviner interests and hopes? Or think you that God rescued you from the grave, for no other purpose, but to eat and drink and live a brutal life, to grovel in the mire still, and to feed upon the dust, or follow after the wind? God has withheld you from executing the devil's sentence of death on yourself? And are you content still to live under the guilt and condemnation of sin in the sight of God, and wait only till his providence execute his divine sentence upon you? Is this, O sinner, is this all the design for which thy reprieve was given thee? Was it not that thou mightest seek a complete pardon, and obtain a right to heaven through the grace of the gospel? And wilt thou go on to abuse the compassion and the long-suffering of God? Shall that soul perish at last, which has had so loud a warning, and which has been rescued from the very jaws of the pit by the hand of divine love?

Or, it may be, thou hadst made a profession of religion long before the season of thy temptation, and thou hadst backslidden from the Lord, days without number. His hand has saved thee from present death; but is thy soul recovered from its great backslidings? One would think it should be a very awakening hour, when thou wert just within the verge of hell, and plucked as a brand out of the burning: Art thou returned to thy old drowsiness, and fallen asleep again in careless security? How wilt thou lift up thy face before God when he shall make at last a solemn enquiry; "What hast thou done with that life, with those months, with those years? What hast thou done with those sermons and those seasons of grace that I gave thee since the day of thy rescue from thy own bloody purposes, and from the assaults of the temper?"

V. Search into the causes and springs of this temptation which hath assaulted you, and watch against all those things that have had any tendency toward it or any share in it.

Search into your own heart, see what secret seeds of iniquity lurk there which may have grown up to this dangerous height. Read over the second and third advices of the foregoing section, see if any of the vicious practices, or the criminal neglects there mentioned, have been indulged by you, which might lay a foundation for this mischief. These are so many avenues which the adversary hath found to insinuate his wicked suggestions, and convey them to your heart: Watch against all these avenues of



it great destroyer, and set a guard on yourself all round from e assaults of the like temptation in time to come.

VI. Since you have found by dangerous experience how une you are in your own hands, and that your life and soul are t secure there, commit yourself daily by repeated exercises of th and importunate prayer into the hands of Christ: His great ice and divine employment is to take care of the souls which e committed to him, and those "who come unto him shall in wise be cast out;" John vi. 37. The holy apostle "knew om he had believed, or trusted in, and was assured that he was le to keep what he had committed to him against the great y;" 2 Tim. i. 12.

By holy devotions rise often up to heaven; "Dwell in the cret place of the Most High, abide under the shadow of the mighty. Say to the Lord, be thou my refuge and my fortress, y God, in thee will I trust. Surely he shall deliver thee from e snare of the fowler. He shall give his angels charge over ee to keep thee in all thy ways. The lion and the dragon shalt ou trample under thy feet. Thou shalt call and God will answer ee: He will be with thee in trouble, he will deliver and nour thee. With long life he will satisfy thee, and shew thee s salvation;" Ps. xci. 1, 2, 3, 11, 13, 15, 16.

Thus join the two excellent advices of our Saviour toge-er, "watch and pray daily that ye enter not into temptation," d wait for success from heaven: "May the God of peace nctify you throughout, and may your spirit, soul and body be eserved blameless unto the coming of our Lord Jesus Christ;" Thess. v. 23. Amen.

ECT. VI.—*Cautions against all approaches to Self-murder, viz. Intemperance, Duelling, &c.*

IF I were to add any thing to this discourse concerning the of self-murder, I think it might not be utterly improper to it in a caveat against those practices which have a tendency to is sin, and which in some measure partake of the guilt of it, ough the sinner himself does not intend violence against his own e. Give me leave then to name a few of these practices, which hen set in this light, will appear highly criminal, how innocent ever they are esteemed by thoughtless men.

I. The first of this kind that I shall mention is intemperance, d an unguarded indulgence of all the appetites of nature, and e sensualities of the animal life.

Frequent feasting to the full on rich and savoury dishes, atifying the palate with varieties of high-seasoned food, and ading the stomach with daily excesses, is one way of destroying e.

It was a most just and happy censure that a late ingenious writer casts on the gluttony of a modern meal, as he expresses it: "Would not one of the ancient philosophers think a man mad, had he seen him devour fowl, fish and flesh; swallow oil and vinegar, wines and spices, throw down sallads of twenty different herbs, sauces of a hundred ingredients, confections and fruits of numberless sweets and flavours? What unnatural motions and counterferments must such a medley of intemperance produce in the body? For my part, when I behold a fashionable table set out in all its magnificence, I fancy that I see gouts and dropsies, fevers and lethargies, with other innumerable distempers lying in ambuscade among the dishes*.

Surely this author would agree that the indulgence of a riotous appetite in such various and improper food as disturbs and oppresses nature, inflames the blood, and fills the body with distempers, has a plain tendency to self-destruction; and yet how many are there that call themselves christians, who must fall under this accusation, and cannot excuse their guilt? Have we never heard a person say, "I know this dish will make me sick, yet I cannot forbear it? Or I have frequently found this food, or these sauces are hurtful for me, and yet I will venture on them?" There is a common proverb that charges this sort of sensuality with the guilt of self-murder, such a man digs his grave with his teeth: And though he feels his health languish, and his body sinking toward the dust, yet he goes on to dig his grave with his teeth daily, till at last he tumbles into it. The God of life is the judge of men and he hath a terrible charge against such wilful transgressors: For intemperance is a slow poison.

It is the same sort of crime when persons get a habit of drinking, and from a cup of strong drink, which might refresh nature, they grow up to quarts and gallons: From a few moderate glasses at first they learn in time to swallow the contents of whole bottles. They swill wine without measure, and when the common and natural juice of the grape is made so habitual and customary that it ceases to be strong enough to support their spirits, then they have recourse to brandy, and other intoxicating liquors: The art of the chymist is employed to extract burning

* Nature, saith this author, delights in the most plain and simple diet. Were I to consider my readers as my patients, and to prescribe such a kind of temperance as is accommodated to all persons, and such as is particularly suitable to our climate and way of living, I would copy the following rules of a very eminent physician: "Make your whole repast out of one dish. If you indulge in a second, avoid drinking any thing strong till you have finished your meal; at the same time abstain from all such sauces as are not the most plain and simple." A man could not well be guilty of gluttony if he stuck to these few obvious and easy rules. In the first case, there would be no variety of tastes to solicit his palate and occasion excess; nor in the second, any artificial provocatives to relieve satiety and create a false appetite." Thus that great and approved writer Mr. Addison.

spirits out of various materials: These make a fearful waste of the vitals, and destroy all the inward springs of nature and life. Many a poor feeble creature has been deluded into death and the grave by the false and flattering supports which they imagine they had received from their daily drams: Where this custom prevails, it is most pernicious and fatal: The bottle of cordials is perpetually frequented: They want it almost hourly! the stomach is palled, the natural appetite to food is ruined, the pulse continues to beat a few weeks, or a few days, by the force of their beloved liquors; and then they drop into the pit. It is strange that persons should make such haste to their own destruction, especially when friends and physicians around them have given them so many warnings, and would fain call them back from their precipitate and fatal career to the grave!

There are many of the wealthy and polite parts of mankind, and too many of the fairer pieces of human nature, who are betrayed into this snare, and ruined beyond relief, without suspecting the guilt of what they daily practise. All the art of medicine labours in vain to rescue life from the prevailing force of diseases, where the thoughtless patient is perpetually nourishing the disease and takes part with death against the physician.—Their conduct is a medley of inconsistencies; they pray for life, and make no conscience of sinning against their own prayers. Little do those unhappy creatures think how they violate the sixth commandment of the law of God, while they are sipping their deadly potions: And though they are often admonished, yet they will not believe, but go on to drink and die.

And as for the lowest rank of mankind, they send themselve out of the world at all ages in haste by these hot and fiery liquors. Little young wretches are taught the use of drams in the most early parts of life, and begin to destroy their nature betimes. If they survive childhood, they become a sickly race and useless pieces of the nation. The elder people of that rank reel in our streets till the grave receives them:—And unless the venders of these strong liquors be in some measure limited, and their mortal trade restrained, it is certain the church-yards must be enlarged to receive the dead. If a tomb-stone could be well afforded for every such sinner, the inscription of it ought to be this, "Here lies a self-murderer."

II. Another instance wherein some persons thoughtlessly approach to the guilt of self-murder is, that when they feel nature impaired, and distemper growing apace upon them, yet they obstinately refuse the most necessary means of health and recovery.

Some are so passionately engaged in the pursuit of riches

or honours, that in opposition to all the warnings of death, which they receive both from their own disorders of body, and the kind admonition of friends, yet they will fatigue their flesh daily, waste their best spirits, and wear out life apace to accomplish their secular designs. Though it often happens that before they compassed their end they die; their schemes are broken, their projects vanish; and they are gone to appear before the judgment-seat of Christ, to give an account how their life was spent, and why they died so soon.

It is granted indeed that there may be some loud and plain calls of providence to risk our health and even life itself on some special occasions. And when persons of a lower rank amongst mankind must labour for daily food to support themselves and their families, it is very hard to determine precisely how far they should obey the craving necessities of their household, by exposing themselves to great inconveniences and dangers in their daily labours, or how far they should confine themselves in a medicinal way for the recovery of their strength. In such cases every man must put all circumstances into the balance, and by seeking divine direction, and consulting his friends he must determine for himself according to his best prudence: And if death seizes him in the course of his labour and duty, he resigns up his life to providence, and his soul into the hands of a faithful Creator and Redeemer.

But my designed reproof lies here, viz. when it is evident that persons are under no such necessity, and they have no plain call either from God or men, to waste nature and health at so prodigal a rate, yet they wilfully lavish their strength and throw away life itself in the pursuit of things that are by no means necessary in their circumstances. This sort of conduct shews that their hearts are set too eagerly upon this world, and they precipitate themselves rashly into eternity by too vehement a desire of the things of time.

There is another way also, whereby persons may be said to hasten their own death, and that is, when sickness comes upon them, and yet out of mere humour and obstinacy, they renounce all the aids of medicine. They refuse the friendly touch of the lancet, because they were never let blood in their lives, nor their fathers before them. They will not endure a blister to be raised in the most important case that requires it, for, "I am resolved," say they, "never to be flead alive, but will go to the grave with a whole skin."

Or perhaps from the silly squeamishness of a nice imagination they set themselves against those necessary medicines which are the only visible methods of relief. Like children they refuse a potion because it is bitter or nauseous; and yet they can neither be bribed nor flattered, as children are, into a self-denial in this

case, nor be persuaded by all the force of reason to displease their palates and save their own lives. Such a humourous conduct will afford their departing souls but small comfort in the reflection: "I went on in a course of resolute sickness and death, because the doses of physic were bitter to the taste, and the methods of health were troublesome and painful.

I know some will be ready to think this a needless page in the book, for they can hardly conceive any part of mankind can be so obstinately foolish, as to lose health and life in this manner. I wish there might be no future examples of this kind found in the world; but what has been, may be: Human nature is like itself, and all these follies of our species have their rounds; the repetition of them is too often seen in every age, though some of my readers may not have happened to meet with them. Such as have been trained up in a humourous niceness from the cradle, who have been indulged in the strength of their wills, and never been taught to think, nor to use their understandings, are in a fair way to remain in a state of childhood all their lives, and to die for want of learning to obey reason.

III. An ambitious pursuit of glory, in such feats of activity and strength as throw life into the most imminent hazard, this is another frequent method of self-destruction.

There are some persons who assume to themselves so much pride and vanity, from the firmness of their constitution, or the agility of limbs, that God their Creator has bestowed upon them, that they are fond of gaining public applause upon this account. They enter into foolish contracts, and they lay wild wagers of their strength or swiftness: They impose on themselves most excessive burdens, they labour beyond all their strength, they engage to run or ride most unreasonable stages in a few hours, or endure some incredible hardships and fatigues. Hereby they oftentimes break all their boasted powers of nature, and bring themselves in haste to the grave; and they leave their names behind them upon the lists of folly among the men who have sold their lives for a trifle.

There have been others, who have bound themselves by wagers to more brutal and guilty follies, and their death hath been highly criminal and unpitied. One has gloried in the prodigious power of his appetite to devour flesh, and the equal capacity of his stomach for the stowage of a most unreasonable load of eatables. Another hath boasted of his ability to drain whole gallons of common liquors dry, or to swill down amazing quantities of stronger drink. Such wretches are only fit to enter the lists with bears or swine. It is a mortal shame to human nature that such creatures should belong to it, and that any other men should become their rivals. Some of these have died upon the spot, and

been made public martyrs to their own madness. Others having their natures overpowered with these extravagances, have languished and sunk down to death by degrees. But I doubt the holy and righteous sentence of God will excuse neither one nor the other of them from the guilt of self-destroyers.

IV. The bloody trade of prize-fighting is another vile practice, wherein the flesh, and limbs, and lives of men, are wilfully exposed to the strokes of clubs and swords, without any pretence of necessity, or any call from divine providence. What is it but a degree of self-murder, when men out of frolic or humour, out of low ambition of honour, or for the gain of a little pelf, challenge each other to these brutal combats?—Their flesh is hacked and hewed with many a wound, their limbs are bruised and battered sorely, their blood is spilt upon a public stage, and life itself sometimes pays for their folly.

I do not suppose indeed that this sort of combatants will ever come within the reach of conviction by any thing that I can write: They are generally too thoughtless of God and religion, too senseless of all that is serious, to look into treatises that relate to sin and duty. But methinks, I would not have such bloody practices encouraged, by drawing in any spectators, that ever pretend to godliness. I confess I am not acquainted with any persons that make the sight of these combats a part of their entertainment, but it would be well if such things were utterly cashiered and renounced by a nation that professes christianity.

Did we but read with what just and severe reproof the primitive fathers of the church used to inveigh against the barbarous, cruel and murdering spectacles of the gladiators at Rome, we should find that in their sense they were so highly offensive to God, that it was disgraceful for any person, who bore the name of a christian, to appear at such entertainments: And I persuade myself, we should be ready to join with these venerable ancients in an endeavour, as far as lies in us, to root out this practice. Those who go to behold them as a matter of delight, and support, and encourage them by their contribution to such criminal combats, are in some sense partakers of their guilt.

I might add also, that if we feast our eyes with such inhuman sights as these, it makes blood and wounds too familiar to us, it sets human flesh and life at too vile and cheap a rate, it hardens the temper by degrees, and is ready to induce something of cruelty and brutal roughness, into a constitution, that before might have much of humanity in it.

V. The wicked pride of duelling, when men stab and shoot each other by contract and consent, has much of the guilt of self-murder belonging to it.

Is it not a strange madness for men who are called christians

and who profess to be followers of the meek and holy Jesus, to challenge one another to give or receive present death for a little common affront, and to resolve to kill or be killed for a trifling pique of honour? If professed gamesters will quarrel about the cast of a dye, or if two known adulterers will contend about the possession or the reputation of one shameless woman, and resolve to decide their quarrels by the sword or pistol, let them go on to die like atheists as they live; let them be convinced of their madness at the great tribunal of God, who would hearken to no conviction from men; they deserve to feel the terrors of that awful being in the other world, whom they renounced in this. But let not a man pretend to the name of a disciple of Christ, and run so directly counter to the pattern and the laws of his holy Lord and Master.

How is it possible these combatants can excuse themselves from the guilt of wilful-murder in the sight of God? Do they not go into the field to meet a wilful death, or to give it? Do they not freely expose their breasts to each others murdering weapons, and mutually yield up their lives either to the more happy or the more skilful push of the sword? Doth not one of them frequently fall and die on the bloody spot of ground? And sometimes both of them are wounded mortally. Is it not the real language of their fury, "I will send him to the devil, or he shall send me thither?" And which soever of them is slain, I think it is evident, that each of them, in the sight of God is guilty, at least intentionally, of a double murder. Each duelist offers up his own life to the others weapon of destruction, and invites his neighbour to slay him, while each endeavours to slay his neighbour. Here is intended murder on both sides; this is guilt of a dye, and the "Lord will bring upon them both the day of vengeance and destroy them with a double destruction," as the prophet Jeremy expresses it, chapter xvii. verse 18. "Their own and their brother's blood shall be dreadfully required at the hand of both of them, by that God who is the avenger of murder:" For I fear there are but few of these criminals that practise sincere repentance, even if time and space be allowed for it.

But you will say, "Must a man bear all affronts and have no reparation? Must he have the lie given him and take it tamely? Must he be called a fool or a sot without any satisfaction? Our laws have made no provision for the injuries done to a man's honour, therefore I will revenge the injury myself."

Answer 1. For any important injuries done to a man's honour, credit and reputation in the world, whereby he sustains real damage, there are some provisions in the law; but for giving the lie, or calling a man's understanding in question, these are supposed to be such common inconsiderable things, that it was not worth while to make laws about them. Let a

man live so as to render all these imputations incredible; then those names of reproach will die, and do him no hurt. Let him avoid the company where he is so abused, and put himself out of the way of reproach and temptation for time to come.

2. What if our laws have not provided reparation for every little affront, because it was thought below the notice of governors, yet the law hath provided a gibbet for him that escapes the sword, in a duel wherein he hath killed his neighbour. The law of the land calls this murder, and condemns and punishes the murderer by a shameful manner of death. Now because you have been called a liar or a sot, will you therefore resolve either to be stabbed or to be hanged? What a strange reasoning is this for a man, who pretends to the sense and education of a gentleman?

3. But let it be further observed, that the law of Christ requires meekness and patience under many injuries; the law of Christ forbids all revenge and murder; his law absolutely prohibits you to kill your neighbour, or to expose yourself to wilful death on the account of such trifles. Come learn to bridle your passions, and mortify your pride, and then such reproaches will not sit so heavy upon you.

But if you are obstinately resolved to die for a point of honour, go, rush into the other world by the sword, or by the gibbet, and make your appeal for injured honour to the most righteous and supreme tribunal of justice there: God is a just judge; he weighs every circumstance to a grain in a divine balance; but you will find to your terror, that the court of heaven will be so far from approving your conduct, that you will be sentenced to everlasting infamy and shame, as a punishment of your pride; you will be doomed to immortal agonies of conscience, and the wrath of that God whose laws you have impiously broken; and notwithstanding all your fancied self-defence, you will be treated like a man that is guilty of his own and his brother's blood.

Give me leave to finish this head with a few sentiments borrowed from Mr. Collier's discourse of duelling, in the first volume of his essays, which I would recommend to the perusal of those who may be exposed to the danger and temptation of such combats. "It is great pity, saith he, that men who have such opportunities for sense, should be entangled in so monstrous an absurdity! That those who might be the ornament of their age, and defence of their country, should make themselves a misfortune to both. Perhaps the danger of the adventure, may make them think it honourable; but to risk the main, that is, the concerns of life and eternity, without reason or warrant is mere rashness; it is to be more stupid than brave. If a man should leap from a garret, or vault down the monument, do you imagine he

would leave the memory of a hero behind him? Religion will not endure the duelling principle, any more than all the heresies since Simon Magus. It is a principle so full of pride and passion and revenge; so tempestuous and absurd; so absolutely unallied to reason and good nature, that polished heathenism would be ashamed of it. In a word, it is as contrary to the tendency and temper of christianity, as Hobbes' creed is to the apostles, as light is to darkness, as God is to the devil."

Perhaps, you imagine you must part with the character of a gentleman, or a man of honour, if you refuse a challenge; but "fear it not." As long as the laws are on our side, the heraldry is all safe. And if it were otherwise, let us remember we are christians. If there happens a competition between these two pretensions, let us drop the gentleman and keep the christian; for he is a person of the best quality.

"But you are afraid your rival will post you up for a coward, and what then? Why then, you should mind it no more than the railing of a man in a fever, or a proclamation from Bedlam." Thus far that ingenious writer.

But the case is far different, if your enemy draw upon you and assault you; for then, your first business is to keep within the compass of self-defence, as long as you can; and if any mischief happen afterwards, and bloody events ensue, you stand justified by the laws of God and man, and may answer for it with innocence and honour whether in this world or the next.

CONCLUSION.

THUS I think it hath been made abundantly evident, both by the light of reason and scripture, that the practice of self-murder can never be justified, and that it is a crime of heinous and flagrant guilt both in the account of God and man. These immortal spirits of ours are ordained for a season to dwell in tabernacles of flesh and blood; curious tabernacles they are indeed, the work of inimitable skill and the structure of a divine architect. The Almighty Builder is the great proprietor of his own work. We must remember therefore we are but tenants, and not lords: we have no right to demolish these fleshly buildings at our pleasure, but are bound to maintain and repair them under all their totterings and decays, till they become untenantable and can be sustained no longer. If we presume to destroy these earthly dwellings, or suffer them to fall by our ill management, we must give a solemn account of such a guilty conduct to our great and sovereign Lord. I have therefore endeavoured to manifest in various instances, that every step and tendency toward the destruction of one's self has something highly criminal in it, and partakes of the guilt of this sin. We throw ourselves

wilfully out of the hope of the favour of God, when we wilfully violate his laws, and especially in such awful and important instances as relate to life and blood.

When we read therefore the histories of such tragical occurrences, let us endeavour to make a wise and pious improvement of those mischiefs which we cannot prevent. When we hear fresh tidings weekly of such unhappy creatures as lay violent hands on themselves; such as lavish away their lives by riotous extravagances, or thoughtless intemperance; such as run along on the precipices of death, and the very edge of destruction, being hurried on by vain glory or wild wagering; such as expose their blood, their souls, and their eternal hopes, in foolish contests of honour, and upon trifling quarrels; I say, when we hear of these things, let us lift up our eyes and our hearts to heaven, and give thanks to the distinguishing mercy of God, which hath preserved us from these guilty and fatal mischiefs. Blessed be the Lord, that our names are not written in those dreadful stories! That we have been secured by his grace from those temptations, and have been kept thus far walking in the paths of life and peace! and at the same time let us, by a devout wish, entrust our lives and souls to his keeping. Then let us pity poor mankind who are subject to the rage of such criminal and destructive passions, and who feel the dreadful effects of them: And with a spirit of sacred compassion, let us offer up an humble complaint and prayer to our God, and say, "How long, O Lord, how long shall Satan reign and triumph among the children of men? How long shall the adversary of God and souls, make use of the weakness, the folly, and the madness of mankind to hurry them off from the stage of life, and to drag them down to his own dark dominions? O send forth thy light and thy truth, and the power of divine love, to rescue and heal a sinful world, and to save souls from perishing!" *Amen.*

END OF THE EIGHTH VOLUM.

Edward Baines, Printer, Leeds.