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A
CONVERSATION
ON THE
PLURALITY
OF
WORLD S.

Translated from the FRENCH of
Monsieur DE FONTENELLE.

EDINBURGH:

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For WILLIAM GRAY Junior.

M D C C L I I I . 50

CONFESSIO

ON THE

PURITY



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1851

TO
A YOUNG LADY,

WITH

FONTENELLE'S PLURALITY of WORLDS.

IN this small work, all nature's wonders see,
The soften'd features of philosophy.
In truth by easy steps you here advance,
Truth as diverting, as the best romance.
Long had these arts to sages been confin'd,
None saw their beauty, till by poring blind;
By studying spent, like men that cram too full,
From wisdom's feast they rose, not chear'd, but
dull.

The gay and airy smil'd to see them grave,
And fled such wisdom, like Trophonius' cave:
Justly they thought they might those arts despise,
Which made men sullen, ere they could be wise.
Brought down to fight, with ease you view them
here;

Tho' deep the bottom, yet the stream is clear.
Your flutt'ring sex, still, valued science less;
Careless of any but the arts of dress.
Their useles time was idly thrown away
On empty novels, or some new-born play.
The best, perhaps, a few loose hours might spare
For some unmeaning thing, miscall'd a pray'r.
In vain the glittering orbs, each starry night,
With mingling blazes shed a flood of light:

Each nymph with cold indiff'rence saw them rise;
 And, taught by fops, to them prefer'd her eyes.
 None taught the stars were suns so widely fown,
 None dream'd of other worlds, besides our own.
 Well might they boast their charms, when ev'ry fair
 Thought this world all, and her's the brightest here.
 Ah! quit not the large thoughts this book inspires
 For those thin trifles which your sex admires;
 Assert your claim to sense, and shew mankind,
 That reason is not to themselves confin'd.
 The haughty belle, whose beauty's awful shrine
 Twere sacrilege t' imagine not divine,
 Who thought so greatly of her eyes before,
 Bid her read this, and then be vain no more.
 How poor ev'n you, who reign without controul,
 If we except the beauties of your soul!
 Should all beholders feel the same surprize;
 Should all who see you, see you with my eyes;
 Were no sick blasts to make that beauty less;
 Should you be what I think, what all confess:
 'Tis but a narrow space those charms engage;
 One island only, and not half an age!

P R E.

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P R E F A C E.

I Am pretty much in the same case with Cicero, when he undertook to write of philosophical matters in the Latin tongue, there being, then, no books upon that subject, but what were in Greek: he was told, that such an attempt would be useles; because, those, who were lovers of philosophy, would rather take the pains to search for it in Greek writers, than make use of Latin ones, which treated of it, but at second hand; and that those, who had no relish for this science, would never trouble their heads with either Greek or Latin. To these objectors, he answered, it would happen quite otherwise; for, says he, the great ease people will find in reading Latin books, will tempt those to be philosophers who are none; and they who already are philosophers, by reading Greek books, will be very glad to see how the subject is handled in Latin.

CICERO might with good reason answer as he did, because the excellency

of his genius, and the great reputation he had acquired, warranted the success of all he wrote: but in a design, not much unlike his, I am far from having those grounds of confidence which he had. My purpose is to discourse of philosophy, but not directly in a philosophical manner: and to raise it to such a pitch, that it shall not be too dry and insipid a subject to please gentlemen; nor too mean and trifling to entertain scholars. Should I be told, as Cicero was, that such a discourse as this would not please the learned, because it cannot teach them any thing; nor the illiterate, because they will have no mind to learn; I will not answer as he did: it may be, endeavouring to please every body, I have pleased no body. Now, to keep a medium betwixt two extremes, is so very difficult, that I believe, I shall never desire to put myself a second time to the like trouble.

IF I should acquaint those who are to read this book, and have any knowledge of natural philosophy, that I do not pretend to instruct, but only to divert them; by representing to their view, in a gay and pleasing dress, what

what they have already seen in a more grave and solid habit: not but they, to whom the subject is new, may be both diverted and instructed: the first will act contrary to my intention, if they look for profit; and the last, if they seek for nothing but pleasure.

I have chosen that part of philosophy which is most likely to excite curiosity: for I think nothing concerns us more, than to enquire how this world, which we inhabit, is made; and whether there be any other worlds like it, which are also inhabited as this is? But after all, it is at every body's discretion, how far they will run their disquisitions: those, who have any thoughts to lose, may throw them away upon such subjects as these; but, I suppose, such, as can employ their time better, will not be at so vain and fruitless an expence.

IN these discourses, I have introduced a lady, to be instructed in things of which she never heard: and I have made use of this fiction, to render the book the more acceptable, and to give encouragement to ladies, by the example of one of their own sex, who, without any supernatural parts, or
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tincture of learning, understands what is said to her; and, without any confusion, rightly apprehends what vortexes and other worlds are: and why may not there be a woman like this imaginary marchioness, since her conceptions are no other than such as she could not chuse but have?

To penetrate into things either obscure in themselves, or but darkly expressed, requires deep meditation, and an earnest application of the mind; but here, nothing more is requisite than to read, and to imprint an idea of what is read, in the fancy, which will certainly be clear enough. I shall desire no more of the fair sex, than that they will peruse this system of philosophy, with the same application that they do a romance or novel, when they would retain the plot, or find out all its beauties. It is true, that the ideas of this are less familiar to most ladies, than those of romances, but they are not more obscure; for at most, twice or thrice thinking will render them very perspicuous.

I have not composed an airy system, which has no foundation at all: I have made use of some true philosophical
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arguments, and of as many as I thought necessary; but it falls out very luckily in this subject, that the physical ideas are in themselves very diverting; and as they convince and satisfy reason, so, at the same time, they present to the imagination a prospect, which looks as if it were made on purpose to please it.

WHEN I meet with any fragments which are not of this kind, I put them into some pretty strange dress: Virgil has done the like in his Georgics; when his subject is very dry, he adorns it with pleasant digressions: Ovid has done the same in his Art of love; and though his subject be of itself very pleasing, yet he thought it tedious to talk of nothing but love. My subject has more need of digressions than his, yet I have made use of them very sparingly, and of such only, as the natural liberty of conversation allows: I have placed them only where I thought my readers would be pleased to meet with them. The greatest part of them are in the beginning of the book, because the mind cannot at first be so well acquainted with the principal ideas which are presented to it: and, in a word, they are taken from the subject

ject itself; or, as near to it as is possible.

I have related nothing concerning the inhabitants of the several worlds, which may seem fabulous, or chimerical; but have said whatever may be reasonably thought of them; and the visions which I have added have some real foundation; what is true, and what is false, are mingled together, but so as to be easily distinguished: I will not undertake to justify so fantastical and odd a composition, which is the principal point of the work, and yet, for which I can give no very good reason.

THERE remains no more to be said in this place to a sort of people, who perhaps will not be easily satisfied, tho' I have good reasons to give them; but that the best which can be given them will not satisfy them. These are the scrupulous persons, who imagine, that the placing inhabitants any where, but upon the earth, will prove dangerous to religion: I know how excessively tender some are in religious matters; and therefore I am very unwilling to give any offence, in what I publish, to people whose opinion is contrary to that
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I maintain: but religion can receive no prejudice by my system, which fills an infinity of worlds with inhabitants, if a little error of the imagination be but rectified. When it is said the moon is inhabited, some presently fancy that there are such men there as ourselves: and priests, without any more ado, think him an Atheist, who is of that opinion. None of Adam's posterity, cry they, ever travelled so far as the moon; nor were any colonies ever planted in that region. I grant it. The men in the moon are not the sons of Adam. And here again theology would be puzzled, if there should be men any where, who never descended from him. To say no more, this is the great difficulty to which all others may be reduced: to clear it by a larger explanation, I must make use of terms which deserve greater respect, than to put into a treatise, so far from being serious as this is. But perhaps there is no need of answering the objection, for it concerns no body but the men of the moon; and I never yet affirmed there are men there: if any ask what the inhabitants are, if they be not men? all I can say is, that I never saw them; and it is not because

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I have seen them, that I speak of them: let none however think that I say there are no men in the moon, purposely to avoid the objection made against me; for it appears, it is impossible there should be any men there, according to the idea I have framed of that infinite diversity and variety, which is to be observed in the works of nature; this idea runs through the whole book, and cannot be contradicted by any philosopher: nay, I believe, I shall only hear this objection started by such as shall speak of these discourses, without having read them. But is this a point to be depended on? No, on the contrary, I should more probably fear, that the objection might be made to me from many passages.

THE reader will find in this edition, besides many improvements interspersed in the body of the work, one new conversation, in which I have put together those reasonings, which I had omitted in the foregoing ones; and have subjoined some late discoveries in the firmament, several of which have never yet been made public.

FONTENELLE.

TO MONSIEUR L****

TO give you, Sir, a particular detail how I passed my time in the country with the marchioness of G****, would make a large volume; and, what is yet worse, a volume of philosophy: whereas the entertainments you expect are of another kind, as balls, parties at play, or hunting; instead of which, you must take up with vortexes, planets, and new worlds; these were the subject of our conversation. Now, as you have the happiness to be a philosopher, one entertainment is the same to you as another. And I fancy, you will be pleased, that I have brought over the marchioness to our party: we could not have gained a more considerable person; for youth and beauty are ever inestimable: if wisdom would appear with success to mankind, think you she could do it more effectually than in the person of this lady? And yet was her company but half so agreeable, I am perswaded all the world would run mad after wisdom. But, though I tell you all the discourse I had with the lady, you must not expect miracles from me. It is impossible, without her wit, to express her sentiments, in the same manner she delivered them. For my part, I think her very learned, from the great disposition she has to learning. It is not poring upon books that makes a man a scholar: I know many who

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have done nothing else, and yet I fancy are not one title the wiser. But, perhaps, you expect, before I enter upon my subject, I should describe the situation and building of the marchioness's seat; many great palaces have been turned inside outward upon far less occasion: but I intend to save you and myself that labour. Let it suffice, that I tell you, I found no company with the lady; this I was not at all displeas'd at: the first two days drain'd me of all the news I brought from Paris. What I now send you is astronomical conversation; which I will divide into so many parts, as we were evenings together,

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A
 CONVERSATION
 ON THE
 PLURALITY OF WORLDS.

The FIRST EVENING.

*That the earth is a planet, which turns on
 itself, and round the sun.*

ONE evening, after supper, we went to take a turn in the park: the air, from the heat of the preceding day, was extremely refreshing; the moon about an hour high, and her lustre, between the trees, made a most agreeable mixture of light and shade; the stars were arrayed in all their glory, and not a cloud appeared throughout the hemisphere. I was musing on this awful prospect—but who can long contemplate on the moon or stars in the company of a pretty woman? I am much mistaken if that is a time for contemplation: well, madam, says I, to the marchioness, is not the night as pleasant as the day? The

day, replied she, like a fair beauty, is clear and dazling; but the night, like a brown one, more soft and moving. You are generous, madam, answered I, to prefer the brown, who have all the charms that belong to the fair: but, is there any thing more beautiful in nature than the day? the heroines of romances are generally fair; and that beauty must be perfect, which has all the advantages of imagination. Tell me not, says she, of perfect beauty; nothing can be so, that is not moving: but since you talk of romances, why do lovers in their songs and elegies, address themselves to the night? It is the night, madam, replied I, that crowns their joys, and therefore deserves their thanks. But it is the night, answered she, that hears their complaints, and how comes it to pass the day is so little trusted with their secrets? I confess, madam, says I, the night has somewhat a more melancholy air than the day; we fancy the stars march more silently than the sun, and our thoughts wander with the more liberty, whilst we think all the world at rest but ourselves: besides, the day is more uniform; we see nothing but the sun, and one light in the firmament; whilst the night shews us variety of objects, and gives us ten thousand stars, which inspire us with as many pleasant ideas. She replied, what you say is true; I love the stars; there is somewhat charming in them, I could almost be angry with the sun for effacing them. And I cannot, says I, pardon him, for keeping all those worlds.

worlds from my sight. What worlds, says she, looking earnestly upon me, do you mean?

I BEG your pardon, madam, replied I, you have put me upon my folly, and I begin to rave. What folly, answered she; I discover none. Alas, says I, I am ashamed, I must own it, I have had a strong fancy that every star is a world: I will not swear that it is true, but must think so, because it is so pleasant to believe it; it is a fancy come into my head, which is very diverting. If your folly be so diverting, says the marchioness, pray make me sensible of it; provided the pleasure be so great, I will believe as much of the stars as you would have me. I fear, madam, replied I, it is a diversion you will not relish; it is not like reading one of Moliere's plays; it is a pleasure rather of the fancy than of the judgment. I hope, answered she, you do not think me incapable of it; teach me your stars, I will shew you the contrary. No, no, says I, it shall never be said I was talking philosophy at ten o'clock at night, to the most amiable creature in the universe; find your philosophers somewhere else.

BUT vain were my excuses; who could resist such charms? I was forced to yield, and yet I knew not where to begin; for to a person who understands not any thing of natural philosophy, you must go a great way about to prove that the earth may be a planet; the planets so many earths; and all the stars

stars distinct worlds; however, to give her a general notion of philosophy, at last I resolved on this method. Madam, says I, all philosophy is founded upon these two propositions, 1. *That we are too short sighted;* or, 2. *That we are too curious;* for if our eyes were better than they are, we should soon see whether the stars were worlds or not; and if, on the other hand, we were less curious, we should not care whether the stars are worlds or not, which I think is much to the same purpose. But the business is, we have a mind to know more than we see; and again, if we could discern well what we do see, it would be too much known to us; but we see things quite otherwise than they are. So that your true philosopher will not believe what he does see, and is always conjecturing at what he doth not; which, I think, is a life not much to be envied: Upon this I fancy to myself, that nature very much resembles an opera; where you stand, you do not see the stage as it really is, but as it is placed with advantage, and all the wheels and movements hid, to make the representation the more agreeable: nor do you trouble yourself how, or by what means the machines are moved, though certainly an engineer in the pit is affected with what does not touch you; he is pleased with the motion, and is demonstrating to himself on what it depends, and how it comes to pass. This engineer is like a philosopher, though the difficulty be greater on the philosopher's part, the machines of
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the theatre being not near so curious as those of nature, who disposes her wheels and springs so much out of sight, that we have been a long while guessing at the movement of the universe. Let us imagine some of the ancient sages to be at an opera, such as Pythagoras, Plato, or Aristotle, and all the wise men, who have made such a noise in the world, for these many ages: we will suppose them at the representation of Phaeton, where they see the aspiring youth lifted up by the winds, but do not discover the wires by which he mounts, nor know they any thing of what is done behind the scenes. Would you have all the philosophers own themselves to be stark fools, and confess ingenuously they do not know how it comes to pass? No, no, they are not called wise men for nothing; though, let me tell you, most of their wisdom depends upon the ignorance of their neighbours. Every man presently gives his opinion, and how improbable soever, there are fools enough of all sorts to believe them: one tells you, Phaeton is drawn up by a hidden magnetic virtue, no matter where it lies; and perhaps the grave gentleman will take pet, if you ask him the question: another says, Phaeton is composed of certain numbers that make him mount; and after all, the philosopher knows no more of those numbers than a sucking child does of Algebra: a third tells you, Phaeton has a secret love for the top of the theatre, and, like a true lover, cannot be

at rest out of his mistress's company, with an hundred such extravagant fancies, that a man must conclude the old sages were very good banterers: but now comes monsieur Des Cartes, with some of the moderns, and they tell you Phaeton ascends, because a greater weight than he descends; so that now we do not believe a body can move without it is pushed and forced by another body, and, as it were, drawn by cords, so that nothing can rise or fall, but by the means of a counterpoise. To see nature then, as she really is, one must stand behind the scenes at the opera. I perceive, says the lady, philosophy is now become very mechanical. Yes, madam, replied I, so mechanical, that I fear we shall quickly be ashamed of it; they will have the world to be in large, what a watch is in small, that is very regular, and depends only upon the just disposition of the several parts of the movement. But pray tell me, madam, had you not formerly a more sublime idea of the universe? Do not you think then that you honoured it more than it deserved? for most people have the less esteem for it, since they have pretended to know it. I am not of their opinion, says she; I value it the more, since I know it resembles a watch; and the more plain and easy the whole order of nature seems, to me it appears to be the more admirable.

I do not know, answered I, who has inspired you with these solid notions, but I am certain there are few who have them besides

sides yourself: people generally admire what they do not comprehend; they have a veneration for obscurity, and look upon nature, as a kind of magic, while they do not understand her; and despise her below legerdemain, when once they are acquainted with her; but I find you, madam, so much better disposed, that I have nothing to do but to draw the curtain, and shew you the world. That noble expanse which appears farthest from the earth, where we reside, is called the heavens, that azure firmament, where the stars are fastened like so many nails, and are called fixed, because they seem to have no other motion than that of their horizon, which carries them with itself from East to West. Between the earth and this great vault, as I may call it, hang, at different heights, the sun, and the moon, with the other five stars, Mercury, Venus, Mars, Jupiter, and Saturn, which we call the planets. These planets, not being fastened to the same heaven, and having very unequal motions, have diverse aspects and positions: whereas the fixed stars, in respect to one another, are always in the same situation: for example, the Chariot, which you see is composed of these seven stars, has been, and ever will be as it now is, though the moon is sometimes nearer to the sun, and sometimes farther from it; and so it is with the rest of the planets. Thus, things appeared to the old Chaldean shepherds, whose great leisure produced these first observations,

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ons, which have since been the foundation of astronomy; which science had its birth in Chaldea, as geometry sprung from Egypt, where the inundation of the Nile, confounding the bounds of the fields, occasioned their inventing more exact measures to distinguish every one's land from that of his neighbour. So that astronomy was the daughter of idleness, geometry the daughter of interest; and if we did but examine poetry, we should certainly find her the daughter of love.

I AM glad, says the lady, I have learned the genealogy of the sciences, and am convinced I must stick to astronomy; my soul is not mercenary enough for geometry, nor is it tender enough for poetry; but I have as much time to spare as astronomy requires; besides, we are now in the country, and lead a kind of pastoral life, all which suits best with astronomy. Do not deceive yourself, madam, replied I, it is not a true shepherd's life, to talk of the stars and planets: see if they pass their time so in Astrea. That sort of shepherd's craft, answered she, is too dangerous for me to learn; I love the honest Chaldeans, and you must teach me their rules, if you would have me improve in their science. But let us proceed; when they had placed the heavens in the disposition you tell me, pray, what is the next question? The next, says I, is the disposing the several parts of the universe, which the learned call, making a system. But before I expound the first system, I would have you observe,
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we are all naturally like the Athenian idiot, who fancied all the ships that came into the Pyreum port, belonged to him: nor is our folly less extravagant; we believe all things in nature designed for our use; and do but ask a philosopher, to what purpose there is that prodigious company of fixed stars, when a far less number would perform the service they do us? he answers coldly, they were made to please our sight. Upon this principle they imagined the earth rested in the centre of the universe, while all the celestial bodies, which were made for it, took the pains to turn round to give light to it. They placed the moon above the earth, Mercury above the moon, after Venus, the sun, Mars, Jupiter, Saturn; above all these they set the heaven of fixed stars: the earth was just in the middle of those circles which contain the planets; and the greater the circles were, they were the farther distant from the earth, and by consequence the farthest planets took up the most time in finishing their course; which in effect is true. But why, says the marchioness, interrupting me, do you dislike this system? It seems to me very clear and intelligible. However, replied I, madam, I will make it plainer; for should I give it you as it came from Ptolomy its author, or some others who have since studied it, I should frighten you, I fancy, instead of diverting you. Since the motions of the planets are not so regular, but that sometimes they go faster, sometimes slower, sometimes

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are nearer the earth, and sometimes farther from it; the ancients invented I do not know how many orbs or circles, involved one within another, which they thought would salve all objections. This confusion of circles was so great, that, at the time, when they knew no better, a certain king of Castile, a great mathematician, but not much troubled with religion, said, that, *had God consulted him when he made the world, he would have told him how to have framed it better.* The saying was very atheistical, and no doubt the instructions he would have given the almighty, were the suppressing those circles with which he had clogged the celestial motions, and the taking away two or three superfluous heavens, which were placed above the fixed stars; for the philosophers, to explain the motion of the celestial bodies, had above the uppermost heaven, which we see, found another of crystal, to influence and give motion to the inferior heavens; and where-ever they heard of another motion, they presently clapped up a crystal heaven, which cost them nothing. But why, says the lady, must their heaven be of crystal, would nothing else serve as well? No, no, replied I, nothing so well; for the light is to come through them, and yet they are to be solid. Aristotle would have it so, he had found solidity to be one of their excellencies, and when he had once said it, no body would be so rude as to question him. But it seems there were comets much higher than the philosophers expected, which,

which, as they passed along, broke the crystal heavens, and confounded the universe. But, to make the best of a bad market, they presently melted down their broken glass, and to Aristotle's confusion, made the heavens fluid; and by the observations of these latter ages, it is now out of doubt that Venus and Mercury turn round the sun, and not round the earth, according to the ancient system, which is now every-where exploded, and all the authorities not worth a rush. But that which I am going to lay down, will salve all, and is so clear, that the king of Castile himself may spare his advice. Methinks, answered the marchioness, your philosophy is a kind of out-cry, where he, that offers to do the work cheapest, carries it from all the rest. This, says I, is very true; nature is a great housewife, she always makes use of what costs least, let the difference be ever so inconsiderable; and yet this frugality is accompanied with an extraordinary magnificence, which shines through all her works; that is, she is magnificent in the design, but frugal in the execution; and what can be more praise worthy, than a great design accomplished with a little expence? But in our ideas we turn things topsy-turvy, we place our thrift in the design, and are at ten times more charge in workmanship than it requires; which is very ridiculous. Imitate nature then, replied she, in your system, and give me as little trouble as you can to comprehend you. Madam, says I, fear it

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not, we have done with our impertinences: imagine then a German called Copernicus, confounding every thing, tearing in pieces the beloved circles of antiquity, and shattering their crystal heavens like so many glass windows; seized with the noble rage of astronomy, he snatches up the earth from the centre of the universe, sends her packing, and places the sun in the centre, to which it did more justly belong; the planets no longer turn round the earth, nor inclose it in the circles they describe; if they give us light, it is but by chance, and as they meet us in their way: all now turns round the sun, even the earth herself; and Copernicus, to punish the earth for her former laziness, makes her contribute all he can to the motion of the planets and heavens; and now stripped of all the heavenly equipage with which she was so gloriously attended, she has nothing left her, but the moon, which still turns round about her. Fair and softly, says the marchioness; I fancy you yourself are seized with the noble fury of astronomy; a little less rapture, and I shall understand you the better. The sun, you affirm, is in the centre of the universe, and is immoveable; what follows next? It is Mercury, says I; he turns round the sun, so that the sun is the centre of the circle wherein Mercury moves; above Mercury is Venus, who turns also round the sun; after, comes the earth, which being placed higher than Mercury and Venus, makes a greater circle round the sun than either of them;

them; at last comes Mars, Jupiter, and Saturn, in the same order I name them; so that Saturn has the greatest circle round the sun, which is the reason he is longer in making his revolution than any of the other planets. You have forgot the moon, says the marchioness. We shall quickly find her again, replied I; the moon turns round the earth, and does not leave her, but as the earth advances in the circle, which she describes about the sun; and if the moon turns round the sun, it is because she will not quit the earth. I understand you, answered she, and I love the moon for staying with us when all the other planets abandon us: nay, I fear your German would have willingly taken her away too if he could; for in all his proceedings, I find he had a great spite to the earth. It was well done of him, says I, to abate the vanity of mankind, who had taken up the best place in the universe; and it pleases me to see the earth in the crouds of the planets. Sure, answered she, you do not think their vanity extends itself so far as astronomy! Do you believe you have humbled me, in telling me the earth goes round the sun? For my part, I do not think myself the worse for it. I confess, madam, replied I, it is my belief that a fair lady would be much more concerned for her place at a ball, than for her rank in the universe; and the precedence of two planets will not make half such a noise in the world, as that of two ambassadors; however, the same

inclination, which reigns at a ceremony, governs in a system; and if you love the uppermost place in the one, the philosopher desires the centre in the other; he flatters himself that all things were made for him, and insensibly believes a matter of pure speculation to be a point of interest. This is a calumny, says she, you have invented against mankind; why did they receive this system if it was so erroneous? I know not, answered I, but I am sure Copernicus himself distrusted the success of his opinion; it was a long time before he would venture to publish it; nor had he done it then, without the importunity of his friends. But do you know what became of him? the very day they brought him the first printed sheet of his book, he died; foreseeing that he should never be able to reconcile all the contradictions, and therefore very wisely slipped out of the way. I would be just to all the world, says the lady, but it is hard to fancy we move, and yet find we do not change our place; we perceive ourselves in the morning where we lay down at night: perhaps you will tell me the whole earth moves. Yes, certainly, adds I; it is the same case as if you fell asleep in a boat upon the river; when you wake you find yourself in the same place, and the same situation, in respect to all the parts of the boat. It is true, replied she, but there is a great difference; when I wake I find another shore, and that shows me, my boat has changed its place. But it is not the same
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with the earth, I find all things as I left them. No, no, says I, there is another shore too; you know that beyond the circles of the planets are fixed stars; there is our shore. I am upon the earth, and the earth makes a great circle round the sun; I look for the centre of the circle, and see the sun there; then I direct my sight beyond the sun in a right line, and should certainly discover the fixed stars which answer to the sun, but that the light of the sun effaces them: but at night I easily perceive the stars that corresponded with him in the day, which is exactly the same thing; if the earth did not change its place in the circle where it is, I should see the sun always against the same fixed stars; but when the earth changes its place, the sun must answer to other stars; and there again is your shore, which is always changing. And seeing the earth makes her circle in a year, I see the sun likewise in the space of a year answer successively to the whole circle of the fixed stars, which circle is called the zodiac. I will draw you the figure of it, if you please, on the sand. It is no matter, replied the lady, I can do well enough without it; besides, it will give an air of learning to my park, which I would not have in it: for I have heard of a certain philosopher, who being shipwrecked upon an unknown island, seeing several mathematical figures traced on the sea-shore, cried out to those who followed him, *courage, my companions, the isle is inhabited, behold the footsteps*

steps of men. But you may spare your figures, such footsteps are not decent here.

I CONFESS, madam, added I, the footsteps of lovers would better become this place; that is, your name and cypher carved on the trees by your adorers. Tell me not, says she, of lovers and adorers, I am for my beloved sun and planets: but how comes it to pass, that the sun, as to the fixed stars, compleats his course but in a year, and yet goes over our heads every day? Did you never, replied I, observe a bowl on the green? It runs towards the jack, and at the same time turns very often round itself: so that the parts which were above, are below; and those which were below, are above. Just so it is with the earth: at the same time that she advances on the circle, which in a year's space she makes round the sun, in twenty four hours she turns round herself; so that in twenty four hours every part of the earth loses the sun, and recovers him again; and as it turns toward the sun, it seems to rise; and as it turns from him, it seems to fall. It is very pleasant, says she, that the earth must take all upon herself, and the sun do nothing: and when the moon, the other planets, and the fixed stars, seem to go over our heads every twenty four hours, you will say, that too is only fancy. Mere fancy, madam, which proceeds from the same cause: for the planets compleat their courses round the sun at unequal times, according to their unequal distances; and that which to-day
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we see answer to a certain point in the zodiac, or circle of the fixed stars, to-morrow will answer to another point, because it is advanced on its own circle, as well as we are advanced upon ours: we move, and the planets move too, but with more or less rapidity than we do; this puts us in different points of sight in respect to them, and makes us think their courses irregular. But there is no occasion of discoursing to you on that head: it is sufficient to inform you, that what seems irregular in the planets, proceeds only from our motion, when in truth they are all very regular. I will suppose them so, says the lady: but I would not have their regularity put the earth to so great trouble; methinks, you exact too much activity from so ponderous a mass. But, says I, had you rather that the sun and all the stars, which are vast great bodies, should in twenty four hours make a prodigious tour round the earth; and that the fixed stars, which are in a circle of infinite extent, whose movement is always extreme, should run in a day 300,000,000 of leagues, and go further than from hence to China in the time that you would say, 'away, quick to China,' as they needs must, if the earth did not turn round itself every twenty four hours? To say the truth, it is much more reasonable to think that she should make the tour, which at most is not above 9000 leagues; you perceive plainly, that to set 9000 leagues against 300,000,000, is no trifling difference. Oh, says she, the sun

sun

sun and stars are all fire, their motion is not very slow; but the earth, I fancy, is a little unwieldy. That, replied I, signifies nothing; for what think you of a first rate ship, which carries 150 guns, and above 3000 men, besides great quantities of merchandise? one puff of wind, you see, sets her a sailing, because the water is liquid, and being easily separated, very little resists the motion of the ship: or if she ly in the middle of a river, she will without difficulty drive with the stream, because there is nothing to oppose her course. So the earth, though never so weighty, is as easily born up by the celestial matter, which is a thousand times more fluid than the water, and fills all that great space where the planets float; for how else would you have the earth fastened to resist the motion of the celestial matter, and not be driven by it? You may as well fancy a little block of wood can withstand the current of a river. But pray, says she, how can the earth, with all its weight, be born up by your celestial matter, which must be very light, because it is so fluid? It does not argue, answered I, that what is most fluid, is most light: for what think you of the great ship I mentioned just now, which with all its burden is yet lighter than the water it floats on? I will have nothing to do with the great ship, says she, with some warmth; and I begin to apprehend myself in some danger upon such a whirligig as you have made of the earth. There is no danger, replied I; but, madam,
if

if your fears increase, we will have the earth supported by your elephants, as the Indians believe it. Hey day, cried she, here is another system; however, I love those people for taking care of themselves, they have a good foundation to trust to, while we Copernicans are a little too venturous with the celestial matter; and yet I fancy, if the Indians thought the earth in the least danger of sinking, they would double their number of elephants.

THEY do well, says I, laughing at her fancy; who would sleep in fear? And if you have occasion for them to night, we will put as many as you please in our system; we can take them away again by degrees, as you grow better confirmed. I do not think them very necessary, replied she, I have courage enough to turn. You shall turn with pleasure, madam, says I, and shall find delightful ideas in this system. For example, sometimes I fancy myself suspended in the air, without any motion, while the earth turns round me in twenty four hours; I see, I know not how many different faces pass under me, some white, some black, and some tawny; sometimes I see hats, and sometimes turbans; now heads with hair, and then bald pates; here I see cities with steeples, some with spires and crescents, others with towers of Porcelain; and, anon, great countries with nothing but huts; here I see vast oceans, and there most horrible desarts; in
short

short, I discover the infinite variety which is upon the surface of the earth.

I CONFESS, says she, twenty four hours would thus be very well bestowed, so we were in the same place where we are now; I do not mean in the park, but we will suppose ourselves in the air, other people continually passing by, who take up our place, and at the end of twenty four hours we return to it again.

COPERNICUS himself, answered I, could not have comprehended it better; first then we might see the English passing by us, up to the ears in politics, yet settling the nation no better than we do the world in the moon; then follows a great sea, and there perhaps some vessel, not near in that tranquillity as we are; then come some of the Iroquois going to eat a prisoner for their breakfast, who seems as little concerned as his devourers. After appear the women of the land of Jesso, who spend all their time in dressing provisions for their husbands, and painting their lips and eye-brows blue, only to please the greatest brutes in the world. Then the Tartars going devoutly on pilgrimage to their great Prester John, who never comes out of a gloomy apartment all hung with lamps, by the light of which they pay their adoration to him: then the fair Circassians, who make no scruples of granting every thing to the first comer, except what they think essentially belongs to their husbands: then the inhabitants of little Tartary, going to steal concubines.

concubines for the Turks and Persians; and at last, our own dear countrymen, it may be, in some points, as ridiculous as the best of them.

THIS, says the marchioness, is very pleasant; but, to imagine what you tell me, though I were above, and saw all this, I would have the liberty to hasten or retard the motion of the earth, according as the objects pleased me more or less; and I assure you I should quickly send packing the politicians and man-eaters, but should have a great curiosity for the fair Circassians; for methinks they have a custom very particular. But I have a difficulty to solve, and you must be serious. As the earth moves, the air changes every moment, so we breathe the air of another country. Not at all, replied I; for the air which encompasses the earth does not extend above a certain height perhaps twenty leagues; it follows us and turns with us: have you not seen the labours of the silk-worm, the shells which those little insects imprison themselves in, and weave with so much art and closeness; but yet their covering is of a down very loose and soft: so the earth, which is solid, is covered from the surface twenty leagues upwards with a kind of down, which is the air, and like the shell of the silk-worm turns at the same time. Beyond the air is the celestial matter, incomparably more pure and subtle, and much more agitated than the air.

YOUR

YOUR comparison, says she, is somewhat low, and yet what wonders are wrought, what wars, what changes, in this little shell? It is true, replied I; but nature takes no notice of such minute particular motions, but drives us along with the general motion, as if she were at bowls.

METHINKS, says she, it is very ridiculous to be upon a thing that turns, and be in all this perplexity, and yet not be well assured that it does turn; and to tell you the truth, I begin to distrust the reasons you give, why we should not be sensible of the motion of the earth; for is it possible there should not be some little mark left, by which we might perceive it?

ALL motions, replied I, the more common and natural they are, are the less preceptible, and this holds true even in morality? the motion of self-love is so natural to us, that for the most part we are not sensible of it, and we believe we act by other principles. Ah! says the marchioness, now are you moralizing to a question of natural philosophy, which is running wide of the argument: but enough, this lecture is sufficient for the first time; let us now depart, and meet here again to morrow, you with your systems, and I with my ignorance.

IN returning back to the castle, that I might say all I could on the subject, I told her of a third system invented by Tycho-Brache, who had fixed the earth in the centre of the world, turned the sun round the earth,

earth, and the rest of the planets round the sun; for since the new discoveries, there was no way left to have the planets turn round the earth. But the lady, with the quickest apprehension, replied, she thought that too affected a system, that among so many great bodies, the earth only should be exempted from turning round the sun; that it was improper to make the sun turn round the earth, when all the planets turn round the sun; and that though this system was to prove the immobility of the earth, yet she thought it very improbable: so we resolved to stick to Copernicus, whose opinion we thought most uniform, probable, and diverting. In a word, the simplicity of his system convinces us; and the boldness of it surprizes with pleasure.

The

The SECOND EVENING.

That the MOON is an habitable World.

THE next morning, as soon as any one could get admittance, I sent to the marchioness's apartment, to know how she had rested, and whether the motion of the earth had not disturbed her? She returned for answer, that she began to be accustomed to it, and that Copernicus himself had not slept better. Soon after, there came some neighbours to dinner, who staid with her till the evening, according to a tiresome rural custom; nay, and they were very obliging in going then, for the country likewise gives a privilege of extending their visits to the next morning, if they be so disposed, and have not the conscience to break up. The lady and myself, finding ourselves at liberty in the evening, went again to the park, and immediately fell upon our systems: she so well retained what I told her the night before, that she desired I would proceed, without any repetition. Well, madam, says I, since the sun, which is now immoveable, has left off being a planet, and the earth which turns round him is now become one, you will not be surprized when you hear that the moon is an earth too, and a habitable world. I confess, says she, I have often heard talk of the world in the moon, but I
always

always looked upon it as visionary, and mere fancy. And, replied I, it may be so still; I am in this case, as people in a civil war, where the uncertainty of what may happen, makes them hold intelligence with the opposite party, and correspond with their very enemies; for though I do verily believe the moon is inhabited, I live civilly with those who do not believe it; and I am, like some honest gentlemen in point of religion, still ready to embrace the prevailing opinion; but till the unbelievers have a more considerable advantage, I declare for the inhabitants of the moon.

SUPPOSE there had never been any communication between Paris and St. Dennis, and one, who was never beyond the walls of this city, saw St. Dennis from the towers of Notre-Dame; you ask him if he believes St. Dennis is inhabited as Paris is? He presently answers boldly, No; for, says he, I see very well the people at Paris, but those at St. Dennis I do not see at all, nor did I ever hear of any there: it is true, you tell him, that from the towers of Notre-Dame, he cannot perceive any inhabitants of St. Dennis, because of the distance; but all that he does discover of St. Dennis, very much resembles what he sees at Paris, the steeples, houses, and walls, so that it may very well be inhabited as Paris is. All this signifies nothing, my cockney still maintains that St. Dennis is not inhabited, because he sees no body there. The moon is our St. Den-

nis, and every one of us like this Parisian cockney, who never went out of his own city.

You are too severe, says she, upon your fellow citizens; we are not all sure so silly as the cockney; since St. Dennis is just like Paris, he is a fool if he does not think it inhabited: but the moon is not at all like the earth. Take care what you say, madam, replied I, for the moon resembles the earth, you are under a necessity to believe it inhabited. If it be so, says she, I own I cannot be dispensed from believing it, and you seem so confident of it, that I fear I must whether I will or no. It is true, the two motions of the earth, (which I could never imagine till now) do a little stagger me as to all the rest; but yet, how is it possible the earth should enlighten as the moon does, without which they cannot be alike? If that be all, added I, the difference is not great; for it is the sun which is the sole fountain of light; that quality proceeds only from him; and if the planets give light to us, it is because they first receive it from the sun; the sun sends light to the moon, and she reflects it back on the earth; the earth in the same manner receives light from the sun, and sends it to the moon; for the distance is the same between the earth and the moon, as between the moon and the earth.

BUT, says the marchioness, is the earth as fit to send back the light of the sun as the moon is? You are altogether for the moon, said I; she is much obliged to you; but you must

must know that light is made up of certain little balls; which rebound from what is solid, but pass through what admits of an entrance in a right line; as air or glass: so that what makes the moon enlighten us, is that she is a firm and solid body, from which the little balls rebound: and we must deny our senses, if we will not allow the earth the same solidity: in short, the difference is how we are seated; for the moon being at so vast a distance from us, we can only discover her to be a body of light, and do not perceive that she is a great mass, altogether like the earth: whereas, on the contrary, because we are so near the earth, we know her to be a great mass, proper for the furnishing provision for animals; but do not discover her to be a body of light, for want of the due distance. It is just so with us all, says the lady; we are dazzled with the quality and fortune of those who are above us, when, did we but examine things nicely, we should find ourselves upon a level.

It is the very same thing, says I; we would judge of all things, but yet stand in the wrong place; we are too near to judge of ourselves, and too far off to know others; so that the true way to see things as they are, is to stand between the moon and the earth; to be purely a spectator of this world, and not an inhabitant. I shall never be satisfied, says she, for the injustice we do the earth, and the too favourable opinion we have of the moon, till you assure me that the inhabitants

of the moon are as little acquainted with their own advantages, as we are with ours; and that they take our earth for a planet, without knowing theirs is one too. Do not doubt it, answered I; we appear to them to perform very regularly our function of a planet; it is true, they do not see us make a circle round them, but that is no great matter. That half of the moon which was turned towards us at the beginning of the world, has been turned towards us ever since; and those spots in her, which we have fancied look like a face, with eyes, nose, and mouth, are still the same; and if the other opposite half should appear to us, we should, no doubt, fancy another figure, from the different spots that are in it: not but that the moon turns upon herself, and in the same time that she turns round the earth, that is in a month; but while she is making that turn upon herself, and that she should hide a cheek, for example, and appear somewhat else to us, she makes a like part of her circle round the earth, and still presents to us the same cheek; so that the moon, who in respect of the sun and stars, turns round herself, in respect of us does not turn at all; they seem to her to rise and set in the space of fifteen days; but for our earth it appears to her to be held up in the same place of the heavens. It is true, this apparent immobility is not very agreeable to a body which should pass for a planet, but it is not altogether perfect; the moon has a kind of trembling,

bling, which causes a little corner of her face to be sometimes hid from us, and a little corner of the opposite half appears; but then, upon my word, she attributes that trembling to us, and fancies that we have in the heavens the motion of a pendulum, which vibrates to and fro.

I FIND, says the marchioness, the planets are just like us; we cast that upon others which is in ourselves. Says the earth, *it is not I that turn, it is the sun.* Says the moon, *it is not I that shake, it is the earth.* The world is full of error. But I would not advise you, madam, to undertake the reforming it; you had better convince yourself of the entire resemblance of the earth and the moon: imagine then these two great bowls suspended in the heavens; you know that the sun always enlightens the one half of a body that is round, and the other half is in the shadow; there is then one half of the earth, and one half of the moon, which is enlightened by the sun; that is, one half, which is day, and the other half, which is night. Observe also, that as a ball has less force after it has been struck against a wall, and rebounds to the other side, so is light weakned when it is reflected. The pale light, which comes to us from the moon, is the very light of the sun; but it cannot come to us from the moon, but by reflection; it has lost much of the force and lustre it had when it came directly from the sun upon the moon; and that bright light, which shines directly

directly upon us from the sun, and which the earth reflects upon the moon, is as pale and weak when it arrives there; so that the light which appears to us in the moon, and enlightens our nights, is the part of the moon which has day, and that part of the earth which has day, when it is opposite to the part of the moon which has night, gives light to it; all depends upon this, how the moon and the earth behold one another. At the beginning of the month we do not see the moon, because she is between the sun and us; that half of her which has day, is then turned towards the sun; and that half which has night, is turned towards us; we cannot see it then, because it has no light upon it; but that half of the moon which has night, being turned to that half of the earth which has day, sees us without being perceived, and we then appear to them just as the full moon does to us; so that, as I may say, the inhabitants of the moon, have then a full earth; but the moon, being advanced upon her circle of a month, comes from under the sun, and begins to turn towards us a little corner of that half which is light, which is, the crescent; then those parts of the moon which have night do not see all that half of the earth which has day; we are then in the wain to them.

I UNDERSTAND you perfectly, says the marchioness, without hesitation, I can comprehend the rest at pleasure, and I have nothing to do but think a moment, and bring the
moon

moon upon her circle of a month. I see, in general, that the inhabitants of the moon have a month quite contrary to us; when we have a full moon, their half of the moon, which is light, is turned to our half of the earth which is dark; they do not see us at all, and they have then a new earth; this is plain. I would not stand the reproach of requiring a long explication of so easy a point: but now tell me, how come the eclipses? You may easily guess that, madam; when it is new moon, she is between the sun and us, and all her dark half is turned towards us who have light; that obscure shadow is cast upon us; if the moon be directly under the sun, the shadow hides him from us, and at the same time obscures a part of that half of the earth which is light; this is seen by that half of the moon which is dark; here then is an eclipse of the sun to us during our day, and an eclipse of the earth to the moon during her night. When it is full moon, the earth is between her and the sun, and all the dark half of the earth is turned towards all the light half of the moon; the shadow then of the earth casts itself towards the moon, and if it falls on the moon, it obscures that light half which we see, which then has day, and hinders the sun from shining on it: here then is an eclipse of the moon to us during our night, and an eclipse of the sun to the moon during her day: but the reason that we have not eclipses every time that the moon is between the sun and the earth, or

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the earth between the sun and moon, is because these three bodies are not exactly placed in a right line, and by consequence that which should make the eclipse, casts its shadow a little beside that which should be obscured.

I AM greatly surpris'd, says the marchioness, that there should be so little mystery in eclipses, and that the whole world should not know the cause of them. They never will, said I, as some folks go about it. In the East Indies, when the sun and the moon are in eclipse, they believe a certain demon, who has black claws, is seizing on those planets with his talons; and during that time, the rivers are covered with the heads of Indians, who are up to the neck in water, because they esteem it a very devout posture, to implore the sun and moon to defend them against the devil. In America they are persuaded that the sun and moon, when eclipsed, are angry; and what is it they will not do to be reconciled with them? The Greeks, who were so refined a people, believed the moon was then enchanted, and that the magicians forced her to descend from heaven, and shed a malignant juice on the plants; nay, what a panic were we in not many years ago at an eclipse of the sun, when people hid themselves in cellars, and all the philosophers, who treated of its cause, could not persuade them to come out till the eclipse was over?

IN good truth, says the lady, it is scandalous for men to be such cowards: there ought

ought to be a law made to prohibit the discouraging of eclipses, that we might not call to mind the follies which have been occasioned thereby. Your law then, says I, must abolish even the memory of every thing, and forbid us to speak at all; for I know nothing in the world which is not a monument of the folly of man.

BUT what do you think, adds she, of the inhabitants of the moon? are they as fearful of an eclipse as we are? It would be a very good jest to see the Indians there up to the neck in water; that the Americans should believe the earth angry with them; the Greeks fancy we were bewitched, and would destroy their plants; in short, that we should cause the same consternation among them, as they do among us. Why not, madam, I do not at all doubt of it; why should the people in the moon have more wit than we? what right have they to fright us, and not we them? For my part, continued I laughing, I believe, that since a prodigious company of men have been, and still are, such fools to adore the moon, there certainly are people in the moon, who worship the earth, and we really are upon our knees the one to the other. But sure, says she, we do not pretend to send any influences to the moon, and to give a crisis to her sick; if the people have any wit in those parts, they will soon destroy the honour we flatter ourselves with, and, I fear, we shall have the disadvantage.

MADAM,

MADAM, says I, pray fear not that, do you think we are the only fools of the universe? Is it not common for ignorance to spread itself every where? It is true, we can only guess at the folly of the people in the moon, but I no more doubt it, than I do the most authentick news that comes from thence. What authentick news comes from thence, says she? That which the learned bring us, replied I, who travel thither every day with their tubes and telescopes; they will tell you of their discoveries there, of lands, seas, lakes, high mountains, and deep abysses.

INDEED, answered she, I fancy they may discover mountains and abysses, because of the remarkable inequality; but how do they distinguish lands and seas? Very easily, madam, for the waters letting part of the light pass through them, send back but a very little, so that they appear afar off like so many dark spots; whereas the lands, being solid reflect the whole light, and appear to be more bright and shining. The illustrious monsieur Cassini, a most compleat astronomer, has discovered in the moon something which divided, then re-united, and sunk in a kind of well: we may very probably suppose this was a river. Nay, they pretend to be so well acquainted with the several places, that they have given them all names; one they call Copernicus, another Archimedes, and a third Galileus; there is the Caspian-sea, the Black-lake, the Porphyrite mountains;

in short, they have published such exact descriptions of the moon, that a mere almanac-maker will be no more to seek there, than I am in Paris.

I MUST own then, says the marchioness, they are very exact; but what they say to the inside of the country, I would very fain know. It is impossible, replied I; the most learned astronomers of our age cannot inform you. You must ask Astolfo this question, who was carried into the moon by St. John. I am going to tell you one of the agreeable follies of Ariosto, which I am sure you will be well pleased to hear: I must confess he had better have let St. John alone, whose name is so worthy of respect; but it is a poetical licence, and must be allowed. The poem, which is called Orlando Furioso, is dedicated to a cardinal, and a great pope has honoured it with his approbation, which is prefixed to several of the editions: this is the argument.

ORLANDO, nephew to Charlemagne, runs mad, because the fair Angelica prefers Medore to him. Astolfo, a knight-errant, finding himself one day in the terrestrial paradise, which was upon the top of a very high mountain, where he was carried by his flying horse, meets St. John there, who tells him, if he would have Orlando cured, he must make a voyage with him into the moon. Astolfo, who had a great mind to see new countries, did not stand much upon intreaty; there immediately came a fiery chariot, which carried the

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apostle

apostle and the knight up into the air. Astolfo, being no great philosopher, was surprized to find the moon so much bigger than it appeared to him when he was upon the earth; to see rivers, seas, mountains, cities, forests; nay, what would have surprized me too, nymphs hunting in those forests: but that which appeared most remarkable, was a valley where you might find any thing that was lost in our world, of what nature soever; crowns, riches fame, and an infinity of hopes; the time we spend in play, and in searching for the philosopher's stone, the alms we give after our death, the verses we present to great men and princes, and the sighs of lovers.

I do not know, says the marchioness, what became of the sighs of lovers in Ariosto's time, but I fancy there are very few of them ascend to the moon in our days. Ah, madam, replied I, how many does your ladyship send thither every day? Those that are addressed to you will make a considerable heap; and I assure you the moon keeps all safe that is lost here below: Yet I must tell you, Ariosto does but whisper it; though every thing is there, even the donation of Constantine; (the popes having pretended to be masters of Rome and Italy, by virtue of a donation which the emperor Constantine made Silvester; and the truth of it is, no body knows what is become of it;) but what do you think is not to be found in the moon? Folly: all that ever was upon the earth is kept there still; but in lieu of it, it is not to be

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be imagined how many wits, if I may so call them, that are lost here, are got up into the moon; they are so many phials full of a very subtil liquor, which evaporates immediately, if it be not well stopped; and upon every one of these phials the names are written to whom the wits belong: I think Ariosto has heaped them upon another a little confusedly, but for order's sake we will fancy them placed upon shelves in a long gallery; A. Astolfo wondred to see several phials full, inscribed with the names of persons whom he thought considerable for their wisdom. To confess the truth, I begin to fear, since I have entertained you with these philosophical and poetical visions, mine there is not very empty; however, it is some consolation to me, that while you are so attentive, you have a little glass full, as well as your humble servant: the good knight found his own wits among the rest, and with St. John's leave, snuffed it all up his nose, like so much Hungary water; but Ariosto said he did not carry it far, it returned again to the moon a little after.

*The love of one fair nothern lass,
Sent back his wit unto the place it was.**

WELL, he did not forget Orlando's phial, which was the occasion of his voyage; but he was cursedly plagued to carry it, for the

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* Sir J. Harrington's translation of Orlando Furioso, lib. 36.

hero's wits were naturally very heavy, and there did not want one drop of it: to conclude; Ariosto, according to his laudable custom of saying whatever he pleases, addresses himself to his mistress in the following beautiful verses.

*Fair mistress, who for me to heav'n shall fly,
To bring again from thence my wand'ring wit?
Which I still lose, since from that piercing eye
The dart came forth that first my heart did hit:
Nor of my loss at all complain would I,
Might I but keep that which remaineth yet:
But if it still decrease, within short space,
I doubt I shall be in Orlando's case.*

*Yet, well I wot where to recover mine,
Tho' not in paradise, nor Cynthia's sphere,
Yet doubtless in a place no less divine,
In that sweet face of yours, in that fair hair,
That ruby lip, in those two star-like eyn,
There is my wit, I know it wanders there;
And with my lips, if ye would give me leave,
I there would search, I thence would it receive.**

Is not this very merry? To reason like Ariosto, the safest way of losing our wits, is, to be in love; for you see they do not go far from us, we may recover them again at our lips; but when we lose them by other means, as for example, by philosophizing, they are gone with a jerk into the moon, and there is no coming at them again when we would. However, says the marchioness, our phials have an honourable station among the philo-

* Harrington, *ibid.*

sophers, among whom it is forty to one, but love fixes our wits on an object we cannot but be ashamed of: but to take away mine entirely, pray tell me very seriously, if you believe there are any men in the moon, for, methinks, hitherto you have not been very positive. For my part, says I, I don't believe there are men in the moon; do but observe how much the face of nature is changed between this and China; other visages, shapes, manners; nay, almost other principles of reason; and therefore between us and the moon the alteration must be much more considerable. In the lands that have been lately discovered, we can scarce call the inhabitants men, they are rather animals in human shape, and that too sometimes very imperfect, almost without human reason; he therefore who will travel to the moon, must not expect to find men there.

WHAT sort of people are they then, says the lady, with an air of impatience? Troth, madam, replied I, I do not know; for put the case that we ourselves inhabited the moon, and were not men, but rational creatures; could we imagine, do you think, such fantastical people upon the earth, as mankind is? Is it possible we should have an idea of so strange a composition, a creature of such foolish passions, and such wise reflections? allotted so small a span of life, and yet pursuing views of such extent? so learned in trifles, and so stupidly ignorant in matters of the greatest importance? so much concern-

ed for liberty, and yet such great inclinations to servitude? so desirous of happiness, and yet so very incapable of attaining it? The people in the moon must be wise indeed to suppose all this of us. But do not we see ourselves continually, and cannot so much as guess how we were made? So that we are forced to say, the gods when they created us were drunk with nectar; and when they were sober again, could not chuse but laugh at their own handy-work. Well, well, says the marchioness, then, we are safe enough; the inhabitants of the moon know nothing of us, but I could wish we were a little better acquainted with them; for it troubles me that we should see the moon above us, and yet not know what is done there. Why, says I, are not you as much concerned for that part of the earth which is not yet discovered? what creatures inhabit it, and what they do there? For we and they are aboard the same ship; they possess the prow, and we the poop, and yet there is no manner of communication between us: they know not at one end of the vessel, who lives, or what is done at the other; and you would know what passes in the moon, which is another great ship sailing in the heavens at a vast distance from us.

OH, says she, as for the earth, I reckon it all as good as discovered, and can guess at the people, though I never heard a word of them. It is certain they all very much resemble us, and we may know them better, when

whenever we will. Let them stay where they are. It is only going to see them; but we cannot get into the moon if we would, so that I despair of knowing what they do there. You will laugh at me, says I, if I should answer you seriously; perhaps I may deserve it, and yet I fancy I can say a great deal in defence of a whim that is just now come into my head; nay, to use the fool's best argument, I will lay a wager I will make you own, in spite of reason, that one of these days there may be a communication between the earth and the moon, and who knows what great advantages we may reap by it? Do but consider America before it was discovered by Columbus; how profoundly ignorant were those people? they knew nothing at all of arts and sciences, they went naked, had no other arms but bows and arrows, and did not apprehend they might be carried by animals; they looked upon the sea as a wide space, not for the use of men, but thought it was joined to the heavens, and beyond it was nothing: it is true, after having spent whole years in hollowing the trunks of great trees with sharp stones, they put themselves to sea in these trunks, and floated from land to land, as the wind and waves drove them; but how often was their trough overset, and they forced to recover it again by swimming? So that, except when they were on land, it might be said they were continually swimming: and yet had any one but told them of another kind of navigation,

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incomparably more perfect and useful than their own, that would easily convey over that infinite space of water, that they might stop in the middle of the waves, and in some sense command the winds, and make their ship sail fast, or slow, as they pleased; in short, that this impassable ocean should be no obstacle to their conversing with another different people; do you think they would have believed you? And yet at last that day is come: the unheard of, and most surprising, sight appears: enormous bodies, with white wings, are seen to fly upon the sea; to vomit fire from all parts; and to cast on their shores, an unknown people, scaled over with iron; who dispose and govern monsters as they please; carry thunder in their hands, and destroy whoever resists them: from whence came they? who brought them over the sea? who gave them the disposal of the fire of heaven? Are they gods? are they the offspring of the sun? For certainly they are not men.

Do but consider, madam, the surprize of the Americans, there can be nothing greater; and after this, will any one say there shall never be a communication between the moon and the earth? Did the Americans believe there would ever be any between them and Europe, till they saw it? It is true, you must pass this great space of air and heaven, which is between the earth and the moon; but did not those vast seas seem at first impassable to the Americans? You rave, I think, says she.

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Who denies it, madam? said I. Nay, but I will prove it, replies she; I do not care for your bare owning it: did you not own the Americans were so ignorant, that they had not the least conception of crossing the sea? but we, who know a great deal more than they, can imagine and fancy the going through the air, though we are assured it is not to be done. It is somewhat more than fancy, replied I, when it has been already practised; for several have found the secret of fastening wings, which bear them up in the air, to move then as they please, and to fly over rivers, and from steeple to steeple: I cannot say indeed they have yet made an eagle's flight, or that it does not cost now and then a leg or an arm to one of these new-birds; but this may serve to represent the first planks that were launched on the water, and which were the beginning of navigation; there were no vessels then thought of to sail round the world in, and yet you see what great ships are grown, by little and little, from those rude planks. The art of flying is but newly invented; it will improve by degrees, and in time grow perfect; then we may fly as far as the moon. We do not yet pretend to have discovered all things, or that what we have discovered can receive no addition; and therefore, pray let us agree, there are yet many things to be done in the ages to come. Were you to live a thousand years, says the marchioness, I can never believe you will fly, but you must endanger your neck. I will

will not, replied I, be so unmannerly as to contradict a fair lady; but though we cannot learn the art here, I hope you will allow, they may fly better in the moon; it is no great matter whether we go to them, or they come to us: we shall then be like the Americans, who knew nothing of navigation; and yet there were very good ships at the other end of the world. Were it so, says she, in a sort of a passion, the inhabitants of the moon would have been here before now. All in good time, says I; the Europeans were not in America till about 6000 years; so long were they in improving navigation to the point of crossing the ocean. The people in the moon have already made some short voyages in the air; they are exercising continually, and by degrees will be more expert, and when we see them, God knows how we shall be surprized. It is unsufferable, says she, you should banter me at this rate, and justify your ridiculous fancy by such false reasoning. I am going to demonstrate, says I, that you reproach me very unjustly: consider, madam, that the world is unfolded by degrees; for the ancients were very positive, that both the Torrid and Frigid-Zones were not habitable, by reason of their excessive heat and cold; and in the time of the Romans, the general map of the world was but very little extended beyond that of their own empire; which, though in one respect, expressed much grandeur; in
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another sense was a sign of as great ignorance; however, there were men found both in very hot and in very cold countries, so that you see the world is already increased. After this, it was thought that the ocean covered the whole earth, except what was then discovered: there was no talk of the Antipodes nor so much as a thought of them; for who could fancy their heels at top, and their heads at bottom? And yet, after all their fine reasoning, the Antipodes were discovered: here is now another half of the world starts up, and a new reformation of the map. Methinks this, madam, should restrain us, and teach us not to be so positive in our opinions; the world will unfold itself more to us hereafter; we shall then know the people in the moon, as well as we do now the Antipodes: but all things must be done in order, the whole earth must be first discovered; and till we are perfectly acquainted with our own habitation, we shall never know that of our neighbours. Without fooling, says the marchioness, looking earnestly on me, you are so very profound in this point, that I begin to think you are in earnest, and believe what you say. Not so neither, says I, but I would shew you, madam, how easy it is to maintain a chimerical notion, that may perplex a man of understanding, but never convince him: there is not any argument so persuasive as truth, which has no need to exert all its proofs, but enters naturally

turally into our understanding; and when once we have learned it, we do nothing but think of it. I thank you then, says she, for imposing on me no longer; for I confess your false reasoning disturbed me, but now I shall sleep very quietly, if you think fit to retire for to night.

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The THIRD EVENING.

*Particulars concerning the WORLD in the
MOON, and Proofs of the other PLANETS
being habitable.*

THE marchionefs was fo intent upon her notions, that ſhe would fain have engaged me, next day, to proceed where I left off; but I told her, ſince the moon and ſtars were become the ſubject of our diſcourſe, we ſhould truſt our chimeras with no body elſe. At night, therefore, we went again into the park, which was now wholly dedicated to our learned converſation.

WELL, madam, ſays I, I have great news for you; that which I told you laſt night, of the moon's being inhabited, may be otherwiſe now: there is a new fancy got into my head, which puts thoſe people in great danger. I cannot, ſays her ladyſhip, ſuffer ſuch whims to take place. Yeſterday you were preparing me to receive a viſit from the Lunarians, and now you would inſinuate there are no ſuch folks. You muſt not trifſe with me thus; once you would have me believe the moon was inhabited; I ſurmounted that difficulty, and do now believe it. You are a little too nimble, replied I; did not I adviſe you never to be intirely convinced of things of this nature, but to reſerve half of your underſtanding free and diſengaged, that

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you might admit of a contrary opinion, if there should be occasion? I care not for your suppositions, says she, let us come to matter of fact. Are we not to consider the moon as St. Dennis? No, says I, the moon does not so much resemble the earth, as St. Dennis does Paris: the sun draws vapours from the earth, and exhalations from the water, which mounting to a certain height in the air, do there assemble and form the clouds; these uncertain clouds are driven irregularly round the globe, sometimes shadowing one country, and sometimes another; he, then, who beholds the earth from afar off, will see frequent alteration upon its surface, because a great country, overcast with clouds, will appear dark or light, as the clouds stay, or pass over it; he will see the spots on the earth often change their place, and appear or disappear as the clouds remove; but we see none of these changes wrought upon the moon, which would certainly be the same, were there but clouds about her; yet on the contrary, all her spots are fixed and certain, and her light parts continue where they were at first, which indeed is a great misfortune; for by this reason, the sun draws no exhalations or vapours above the moon; so that it appears she is a body infinitely more hard and solid than the earth; whose subtile parts are easily separated from the rest, and mount upwards as soon as heat puts them in motion; but it must be a heap of rock and marble, where there is no evaporation; besides, exhalations

halations are so natural and necessary, where there is water, that there can be no water at all, where there is no exhalation; and what sort of inhabitants must those be, whose country affords no water, is all rock, and produces nothing? This is very fine, says the marchioness; you have forgot since you assured me, we might from hence distinguish seas in the moon. Pray, what is become of your Caspian sea, and your Black lake? All conjecture, madam, replied I, though for your ladyship's sake, I am very sorry for it; for those dark places we took to be seas may perhaps be nothing but large cavities; it is hard to guess right at so great a distance. But will this suffice then, says she, to extirpate the people in the moon? Not altogether, replied I, we will neither determine for nor against them. I must own my weakness, if it be one says she, I cannot be so perfectly undetermined as you would have me to be, but must believe one way or other; therefore, pray fix me quickly in my opinion, as to the inhabitants of the moon; preserve or annihilate them, as you please; and yet methinks, I have a strange inclination for them, and would not have them destroyed, if it were possible to save them. You know, says I, madam, I can deny you nothing; the moon shall be no longer a desert; but to do you service, we will re-people her. Since to all appearance the spots in the moon do not change, I cannot conceive there are any clouds about her, that

sometimes obscure one part, and sometimes another; yet this does not hinder, but that the moon sends forth exhalations and vapours. The clouds, which we see in the air, are nothing but exhalations and vapours, which at their coming out of the earth, were separated into such minute particles, that they could not be discerned; but as they ascend higher, they are condensed by the cold, and by the re-union of their parts, are rendered visible; after which they become great clouds, which fluctuate in the air, their improper region, till they return back again to us in rain; however, these exhalations and vapours sometimes keep themselves so dispersed, that they are imperceptible; or if they do assemble, it is in forming such subtle dews, that they cannot be discerned to fall from any cloud. Now, as it seems incredible the moon should be such a mass, that all its parts are of an equal solidity, all at rest one with another, and all incapable of any alterations from the efficacy of the sun; I am sure we are yet unacquainted with such a body: marble itself is of another nature, and even that, which is most solid, is subject to change and alteration; either from the secret and invisible motion it has within itself, or from that which it receives from without: It may so happen, that the vapours which issue from the moon may not assemble round her in clouds, and may not fall back again in rain, but only in dews. It is sufficient for this, that the air with which the moon is surrounded,

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surrounded, for it is certain she is so, as well as the earth, should somewhat vary from our air, and the vapours of the moon be a little different from those of the earth, which is very probable. Hereupon the matter being otherwise disposed in the moon than on the earth, the effects must be different; tho' it is of no great consequence whether they are or no; for from the moment we have found an inward motion in the parts of the moon, or one produced by foreign causes, here is enough for the new birth of its inhabitants, and a sufficient and necessary fund for their subsistence. This will furnish us with corn, fruit, water, and what else we please; I mean according to the custom or manner of the moon, which I do not pretend to know; and all proportioned to the wants and uses of the inhabitants, with whom I own, I am as little acquainted.

THAT is to say, replied the marchioness, you know all is very well without knowing how it is so; which is a great deal of ignorance founded upon a very little knowledge; however, I comfort myself, that you have restored the moon her inhabitants again, and have enveloped her in an air of her own, without which a planet would seem to me but very naked.

IT is these two different airs, madam, that hinder the communication of the two planets; if it was only flying, as I told you yesterday, who knows but we might improve it to perfection, though I confess there is but

little hopes of it; the great distance between the moon and the earth is a difficulty not easily to be surmounted; yet were the distance but inconsiderable, and the two planets almost contiguous, it would be still impossible to pass from the air of the one, into the air of the other: the water is the air of fishes, they never pass into the air of the birds, nor the birds into the air of the fish; and yet it is not the distance that hinders them, but both are imprisoned by the air they breathe in; we find our air consists of thicker and grosser vapours than the air of the moon. So that one of her inhabitants arriving at the confines of our world, as soon as he enters our air, will inevitably drown himself, and we shall see him fall dead on the earth.

I SHOULD rejoice, says the marchioness, to see a wreck of a good number of these lunar people; how pleasant would it be to behold them lie scattered on the ground, where we might consider at our ease, their extraordinary figures? But, replied I, suppose they could swim on the outward surface of our air, and be as curious to see us, as you are to see them; should they angle, or cast a net for us, as for so many fish, would that please you? Why not, says she, smiling? For my part, I would go into their nets of my own accord, were it but for the pleasure of seeing such strange fishermen.

CONSIDER, madam, you would be very sick, when you were drawn to the top of our air, for there is no respiration in its whole extent,

extent, as may be seen on the tops of some very high mountains: and I admire that they who have the folly to believe that fairies, whom they allow to be corporeal, and to inhabit the most pure and refined air; do not tell us, that the reason why they give us such short and seldom visits, is, that there are very few among them who can dive; and those that can, if it be possible to get through the thick air where we are, cannot stay half so long in it, as your diving fowls can in the water. Here then are natural barricades, which defend the passage out of our world, as well as the entrance into the moon; and as we can only guess at that world, let us fancy all we can of it. For example, I will suppose that we may there see the firmament, the sun, and the stars, of another colour than what they are here; all these appear to us through a kind of natural optics, which change and alter the objects. These spectacles, as we may call them, are our air, mixed as it is with vapours and exhalations, and which does not extend itself very high. Some of our modern philosophers pretend, that of itself it is blue, as well as the water of the sea, and that this colour neither appears in the one nor in the other, but at a great depth: the firmament, say they, where the fixed stars are placed, has no peculiar light of its own, and by consequence must appear black, but we see it through the air, which is blue, and therefore to us it appears blue; which, if so, the beams of the sun and stars cannot pass

pass through the air without being tinged a little with its colour, and losing as much of their own; yet, were the air of no colour, it is very certain that through a great mist the light of a flambeaux at some distance appears red, though it be not its true natural colour. Our air is nothing but a great mist, which changes the true colour both of the sky, sun, and stars; it belongs only to the celestial matter to bring us the light and colours as they really are, in all their purity; so that since the air of the moon is of another nature than our air, or is diversified by another colour, or at least is another kind of mist, which varies the colours of the celestial bodies; in short, as to the people of the moon, their spectacles, through which they see every thing, are changed.

IF it be so, says the marchioness, I prefer this abode before that of the moon; I cannot believe the celestial colours are so well mixed as they are here; for instance, let us put green stars on a red sky, they cannot be so agreeable as stars of gold on an azure firmament. One would think, madam, you was chusing a petticoat, or a suit of knots; but, believe me, nature does not want fancy; leave it to her to chuse colours for the moon, and I will engage they shall be well sorted; she will not fail to vary the prospect of the universe, at every different point of sight, and the alteration shall always be very agreeable.

I KNOW very well, says the marchioness, her skill in this point; she is not at the charge
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of changing the objects, but only the optics, and has the credit of this great variety, without being at any expence; with a blue air, she gives us a blue firmament; and perhaps with a red air, she gives to the inhabitants of the moon a red firmament, and yet still it is but the same firmament; nay, I am of opinion, she has placed this sort of spectacles in our imagination, through which we see all things, and which to every particular man change the objects. Alexander looked on the earth as a fit place to establish a great empire; it seemed to Celadon a proper residence for Astrea; and it appeared to a philosopher a great planet in the heavens, covered with fools: I do not believe the sights vary more between the earth and the moon, than they do between the fancies of two different men.

THIS change in our imagination, says I, is very surprising; for they are still the same objects, though they appear different; when in the moon, we may see other objects we do not see here, or at least, not see all there we do see here; perhaps, in that country, they know not any thing of the dawn and the twilight, before the sun rises, and after the sun sets: the air which encompasseth, and is above us, receives the rays, so that they cannot strike on the earth; and, being gross, stops some of them, and sends them thither, though indeed they were never naturally designed us: so that the day-break, and the twilight, are a favour which nature bestows
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on us; they are lights which do not fall to our share, and which she gives us over and above our due: but in the moon, where the air is apparently more pure, and therefore not so proper to send down the beams it receives from the sun before his rising, and after his setting, these poor wretches have not that light of grace, as I may call it, which growing stronger by degrees, does more agreeably prepare them for the arrival of the sun; and which growing weaker, and diminishing by degrees, does insensibly prepare them for the sun's departure: but they are in a profound darkness, where a curtain, as it were, is drawn all on a sudden, their eyes are immediately dazled with the whole light of the sun in all its glory and brightness; so likewise, they are on a sudden enveloped with utter darkness; the night and the day have no medium between them, but they fall in a moment from one extreme into the other. The rainbow likewise is not known to the inhabitants of the moon; for if the dawn is an effect of the grossness of the air and vapours, the rainbow is formed in the clouds, from whence the rain falls; so that the most beautiful things in the world are produced by those things which have no beauty at all. Since then there are no vapours thick enough, nor no clouds of rain about the moon, farewell dawn, adieu rainbow: what must lovers do for similies to compare their mistresses to, in that country,

when

when such an inexhaustible fund of comparisons is taken from them?

NAY, I shall never lay the loss of their comparisons much to heart, says the lady, and I think them well enough recompensed for the loss of our dawn and rainbow; for by the same reason, they have neither thunder nor lightning, both which are formed in the clouds: how glorious are their days, the sun continually shining? how pleasant their nights, when not the least star is hid from them? They never hear of storms or tempests, which seem plain effects of the wrath of heaven. Do you think then they stand in need of our pity? You are describing the moon, says I, like an enchanted island: but do you think it is so pleasant to have a scorching sun always over our heads, where the days are fifteen times as long as ours, and not the least cloud to moderate its heat? Though I fancy it is for this reason that nature has made great cavities in the moon; we can discern them easily with our telescopes, for they are not mountains, but so many wells or vaults in the middle of a plain; and how can we tell but the inhabitants of the moon, being continually broiled by the excessive heat of the sun, retire into those great wells; perhaps, they live nowhere else, and it is there they build their cities; for we still see in the ruins of old Rome, that part of the city which was under ground was almost as large as that which was above. We need but take that part
away

away, and the rest would remain like one of these lunar towns; the whole people reside in wells, and from one well to another there are subterraneous passages for the communication of the inhabitants. I perceive, madam, you laugh at me, and you are welcome; but to be free with your ladyship, the ridicule turns more against you than me: for you believe the people in the moon must live upon the surface of their planet, because we do so upon ours, but the contrary is evident; for as we dwell upon the superficies of our planet, they cannot dwell upon the superficies of theirs; if things differ so much in this world, what must they do in another?

It is no matter, says the lady, I can never suffer the inhabitants of the moon to live in perpetual darkness. You will be more concerned for them, madam, when I tell you that one of the ancient philosophers long since discovered the moon to be the residence of blessed souls, departed out of this life, and that all their happiness consisted in hearing the music of the spheres, which is made by the motion of the celestial bodies: and that philosopher pretending to know exactly all they do there, he tells you, that when the moon is obscured by the shadow of the earth, they no longer hear the heavenly harmony, but howl like so many souls in purgatory; so that the moon, taking pity on them, makes all the haste she can to get into the light again. Methinks then, says the marchioness,
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we should now and then see some of these blessed souls arrive here from the moon, for certainly they are sent to us; and between the two planets, some think there is a sufficient provision made for the felicity of souls, by their transportation into a new world. I confess indeed, says I, it would be very pleasant to see new worlds; such a voyage, though but in imagination, is very delightful; but what would it be in reality? It would be much better certainly than to go to Japan, which at best is but crawling from one end of the globe to the other, and after all, to see nothing but men. Well then, says she, let us travel over the planets as fast as we can; what should hinder us? Let us place ourselves at all the different prospects, and from thence consider the universe. But first, have we any more to see in the moon? Yes, madam, replied I, our description of that world is not entirely exhausted: you cannot but remember that the two movements, which turn the moon on herself and about us, being equal; the one always presents to our eyes that part, of which the other must consequently deprive us; and so she always to us wears the same face: we have then but one moiety of her which looks on us, and as the moon must be supposed not to turn on her own center, in respect to us, that moiety which sees us always, and that which never sees us, remains fixed in the same point of the firmament. When it is night with her, and her nights are equal to

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fifteen.

fifteen of our days, she at first sees but a little corner of the earth enlightned, after that a larger spot, and so almost by hourly gradations, spreads her light till it covers the whole face of the globe; whereas these same changes do not appear to us to affect the moon, but from one night to another, because we lose her a long time out of our sight. I would give any thing that I could possibly fathom the aukward reasonings of the philosophers of their world, upon our earth's appearing immoveable to them, when all the other celestial bodies rise, and set over their heads, within the compass of fifteen days. It is plain they attribute this immobility to her bigness, for she is forty times larger than the moon; and when their poets have a mind to extol indolent princes, I doubt not but they take care to compare their inactivity to this majestic repose of the earth. However, this opinion is attended with one difficulty; they must very sensibly perceive in the moon, that our earth turns upon her own center. For instance, imagine that Europe, Asia, and America, present themselves one after another to them in miniature, and in different shapes and figures, almost as we see them upon maps. Now this sight must be a novelty to such travellers as pass from that moiety of the moon which never sees us, to that which always does. Good God! How cautious would they be of believing the relation of the first travellers, who should speak of it after their return to that great country, to
which

which we are so utterly unknown? Now I fancy, says the marchioness, that they make a sort of pilgrimage from one side of the country to the other, for their discoveries in our world; and that there are certain honours and privileges assigned to such, as have once in their lives had a view of our gross planet. At least, replied I, those who have had this view obtained the privilege of being better lighted, during their nights; the residence in the other moiety of the moon must of necessity be much less commodious in that respect. But let us continue the journey we proposed to take, madam, from one planet to another, for we have now had a pretty curious survey of the moon, at least, you have seen all I can shew you:

As we leave the moon, on that side next the sun, we see Venus, which puts me again in mind of St. Dennis. Venus turns upon herself, and round the sun, as well as the moon; they likewise discover by their telescopes, that Venus, like the moon, if I may speak after the same manner, is sometimes new, sometimes full, and sometimes in the wane, according to the different situations she is in, with respect of the earth.

THE moon, to all appearance, is inhabited, why should not Venus be so too? You are so full of your whys, and your wherefores, says the marchioness, interrupting me, that I fancy you are sending colonies to all the planets. You may be certain, madam, that is my intention, and I see no reason to

the contrary; we find that all the planets are of the same nature, all obscure bodies, which receive no light but from the sun, and then send it to one another; their motions are the same, so that hitherto they are alike; and yet, if we are to believe that these vast bodies are not inhabited, I think, they were made but to little purpose: why should nature be so partial, as to except only the earth? But let who will say the contrary, I must believe the planets are peopled as well as the earth. I find, says the lady, you have been very well confirmed in your notions this pretty while: it was but some moments since that the moon was a desert, and you were in no concern at it; and at this instant, I see you would be in a violent passion, if any one should presume to say, that all the planets are not as well stocked with inhabitants as the earth. It is true, madam, at the instant you surprized me with your objections, if you had disputed with me the inhabitants of the planets, I should not only have maintained their existence, but perhaps likewise have treated on their creation. We have our seasons of credulity, and I never believed these things more firmly than at that juncture: and even now, and when my senses are somewhat cooler on the matter, I cannot help thinking it would be strange that the earth should be so well peopled, and the other planets not inhabited at all: for do you believe we discover, as I may say, all the inhabitants of the earth? There are as many
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kinds of invisible, as visible creatures; we see from the elephant to the very pismire, beyond which our sight fails us, and yet counting from that minute creature, there are an infinity of lesser animals, which would be imperceptible, without the aid of glasses. We see with magnifying glasses that the least drop of rain-water, vinegar, and all other liquids, are full of little fishes or serpents, which we could never have suspected there; and philosophers believe that the acid taste of these liquids proceeds from a sharpness issued through the forked stings of these animals lodged under their tongues. And therefore, by mixing certain things with any one of these liquors, and exposing them in the sun, or letting them stand and corrupt, will produce a new species of little animals.

SOME even of the most solid bodies are nothing but an immense swarm of imperceptible insects, who find for their respective motions as much room and liberty as they require. A mulberry-leaf is a little world, inhabited by multitudes of these invisible worms, which to them, is a country of vast extent. What mountains, what abysses are there in it? the insects on one side of this leaf know no more of their fellow creatures on the other, than you and I can tell what they are now doing at the antipodes: does it not appear therefore, more reasonable, that a great planet should be inhabited? In the hardest stones, for example, in marble, there are an infinity of worms, which fill up

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the vacuums, and feed upon the substance of the stone; fancy then millions of living creatures to subsist many years on a grain of sand; so that were the moon but one continued rock, I would sooner allow her to be gnawed by these invisible mites, than not to be inhabited: in short, every thing is animated; imagine then those animals which are yet undiscovered, and add them and these which are but lately discovered, to what we have always seen, and you will find the earth swarm with inhabitants, and that nature has so liberally furnished it with animals, that she is not at all concerned for our not seeing above one half of them: why then should nature, which is fruitful to an excess here, be so very sterile in the rest of the planets, as to produce no living things in them? I must own, says the marchioness, you have convinced my reason, but you have confounded my fancy, with such variety, that I cannot imagine how nature, which abhors repetition, should produce so many different kinds. There is no need of fancy, madam, do but trust your eyes, and you will easily perceive how nature diversifies in these several worlds.

ALL human faces, in general, are of the same model; and yet the Europeans and the Africans have two particular moulds, nay commonly every family has a different aspect; what secret then has nature to shew so much variety in the single face? Our world, in respect of the universe, is but a little

little family, wherein every face has some resemblance to each other; in another planet, is another family, whose faces have a different air and make: the difference too increases with the distance; for whosoever should see an inhabitant of the moon, and an inhabitant of the earth, would soon perceive they were nearer neighbours than one of the earth, and one of Saturn: here, for example, we have the use of voice; in another world, they speak by signs; and at a greater distance they do not speak at all: here our reason is formed by experience; in the next world, experience contributes but little towards reason; and in the next to that, old men know no more than children: here we are troubled more with what is to come, than with what is past; in the next world they are more troubled for what is past, than what is to come; and farther off, they are not concerned with either, which, by the bye, I think, is much the better: here, it is thought we want a sixth sense, that would teach us many things, of which we are now ignorant; this sixth sense is apparently in another world, where they want one of the five which we enjoy; nay, perhaps there is a much greater number of senses, but in the partition we have made of them with the inhabitants of the other planets, there are but five fallen to our share, with which we are well contented, for want of being acquainted with the rest: our sciences have bounds, which the wit of man could
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never pass; there is a point where they fail: us on a sudden, the rest is reserved for other worlds, where somewhat which we know, is unknown to them. This planet enjoys the pleasures of love, but lies desolate in several places by the fury of war; in another planet they enjoy perpetual peace, yet in the midst of that peace, know not any thing of love, and time lies on their hands: in a word, that which nature practises here in little, in distributing her gifts among mankind, she does at large in other worlds, where she makes use of that admirable secret she has to diversify all things, and at the same time makes them equal, by compensating for the inequality.

BUT is it not time, madam, now to be serious? how will you dispose of all these notions? Trouble not yourself, says she; fancy is a great traveller; I already comprehend all these worlds, and form to myself their different characters and customs; some of them, I assure you, are very extraordinary; I see, at this moment, a thousand various figures, though I cannot well describe them. O leave them, says I, to your dreams, we shall know to morrow whether they represent the matter faithfully, and what they have taught you, in relation to the inhabitants of any of the planets.

The FOURTH EVENING.

PARTICULARS of the WORLDS of
*Venus, Mercury, Mars, Jupiter, and
 Saturn.*

THE dreams of the marchionefs were not very successful; they still represented to her the same objects we are acquainted with here on earth; and I had room to reproach her ladyship, as those people do us at the sight of our regular pictures, who themselves make only wild and grotesque paintings. *Well, say they, This is only an imitation of men, there is no manner of fancy in it.* We were therefore forced to conclude ourselves ignorant what sort of inhabitants all these planets had, and content ourselves only to guess at them, and continue the voyage we had begun through these several worlds.

WE were come to Venus, and I told her that planet certainly turned on itself, though no-body could tell in what time, and consequently were ignorant how long her day lasted; but her year was composed of eight months, because it is in that time she turns round the sun; and seeing Venus is forty times less than the earth, the earth appears, to them in Venus, to be a planet forty times bigger than Venus appears to us on the earth; and as the moon is forty times lesser than

than the earth, so she seems to be just of the same magnitude to the inhabitants of Venus; as Venus seems here to us.

I SEE then, says the lady, that the earth is not to Venus, what Venus is to the earth; I mean, that the earth is too big to be the mother of love, or the shepherd's star to Venus; but the moon, which appears to Venus of the same bigness which Venus appears to us, is assigned to be the mother of love, and shepherd's star to Venus; for such names are only proper for a little brisk airy planet, bright, and shining as the goddess herself. O, blessed moon, how happy art thou to preside over the amours of those inhabitants of Venus, who must be such masters of gallantry! O, doubtless, says I, the very common people of Venus are all Caledons and Sylvanders, and their most trivial discourses are infinitely finer than any in Clelia. Their very climate inspires love: Venus is much nearer than the earth is to the sun, from whence she receives a more vigorous and active influence.

I FIND, says the marchioness, it is easy enough to guess at the inhabitants of Venus; they resemble what I have read of the Moors of Granada, who were a little black people, scorched with the sun, witty, full of fire, very amorous, much inclin'd to music, and poetry, and ever inventing masks and tournaments in honour of their mistresses. Pardon me, madam, says I, you are little acquainted with this planet; Granada in all its glory was a perfect Greenland to it; and
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your gallant Moors, in comparison with that people, were as stupid as so many Laplanders.

BUT what do you think then of the inhabitants of Mercury? They are yet nearer to the sun, and are so full of fire, that they are absolutely mad: I fancy they have not any memory at all, no more than most of the Negroes; that they make no reflections, and what they do is by sudden starts, and perfect hap-hazard: in short, Mercury is the bedlam of the universe; the sun appears to them much greater than it does to us, because they are much nearer to it than we; it sends them so vast and strong a light, that the most glorious day here, would be no more with them, than a declining twilight. I know not, whether they can distinguish objects; but the heat, to which they are accustomed, is so excessive, that they would be starved with cold in the Torrid Zone; their year is but three months, and we know not the exact length of their day, because Mercury is so little, and so near the sun, it is, as it were, lost in his rays, and is very hardly discovered by the astronomers; so that they cannot observe how it moves on its center; but because it is so small, they fancy it compleats its motion in a little time; so that by consequence, the day there is very short, and the sun appears to them like a vast fiery furnace, at a little distance, whose motion is prodigiously swift and rapid: this is so much the better for them, since it is evident

vident they must long for night; and during their night, Venus and the earth, which must appear considerably large, give light to them: as for the other planets which are beyond the earth, towards the firmament, they appear less to the inhabitants of Mercury, than they do to us here, and they receive but little light from them, perhaps none at all; the fixed stars likewise seem to them less, and some of them totally disappear, which, were I there, I should esteem a very great loss. I should be very uneasy to see this large convex studded with but few stars, and those too of the least magnitude and lustre.

WHAT signifies the loss of a few fixed stars? says the lady; I pity them for the excessive heat they endure; let us give them some relief, and send Mercury a few of those refreshing showers, which continue, sometimes, four months together, in the hottest countries, during their greatest extremity. Your fancy is good, madam, replied I, but we will relieve them another way: In China there are countries which are extremely hot by their situation; yet, in July and August, are so cold, that the rivers are frozen; the reason is, they are full of salt-petre, which being exhaled in great abundance, by the excessive heat of the sun, makes a perfect winter at midsummer. We will fill the little planet with salt-petre, and let the sun shine as hot as he pleases. And yet after all, who knows but the inhabitants of Mercury may have no occasion either for rain, or
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salt-petre? If it is a certain truth, that nature never gives life to any creature, but where that creature may live: then, through custom, and ignorance of a better life, those people may live happily.

AFTER Mercury, comes the sun; but there is no possibility of peopling it, nor any room left for a wherefore. By the earth which is inhabited, we judge that other bodies of the same nature may likewise be inhabited: but the sun is a body not like the earth, or any of the planets; the sun is the source or fountain of light, which, though it is sent from one planet to another, and receives several alterations by the way, yet all originally proceeds from the sun: he draws from himself that precious substance which he emits from all sides, and which reflects when it meets with a solid body, and spreads from one planet to another those long and vast trains of light which cross, strike through, and intermingle in a thousand different fashions, and make, if I may so say, the richest tissues in the world. The sun likewise is placed in the center, from whence with most convenience, he may equally distribute and animate by his heat; it is then a particular body, but what kind of body, has often puzzled better heads than mine. It was thought formerly a body of pure fire, and that opinion passed current till the beginning of this age; when they perceived several spots on its surface. A little after they had discovered new planets, as we shall presently

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hear of, these, some said, were the spots; for those planets moving round the sun, when they turned their dark half to us, must necessarily hide part of it; and had not the learned with these pretended planets made their court before to most of the princes in Europe, giving the name of this prince to one, and of that prince to another planet, I believe they would have quarrelled who should be master of these spots, that they might have named them as they pleased.

I CANNOT approve that notion; it was but the other day, says she, you were describing the moon, and called several places by the names of the most famous astronomers. I was pleased with the fancy; for since the princes have seized on the earth, it is fit the philosophers, who are as proud as the best of them, should reserve the heavens for themselves, without any competitors. O, answered I, trouble not yourself, the philosophers make the best advantage of their territories; and if they part with the least star, it is upon very good terms; but the spots on the sun are fallen to nothing: it is now discovered that they are not planets, but clouds, streams, or dross, which rise upon the sun, sometimes in a great quantity, sometimes in a less; sometimes they are dark, sometimes clear, sometimes they continue a great while, and sometimes they disappear as long. It seems the sun is a liquid matter, some think of melted gold, which seems to boil over continually, and by the force of its motion,
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casts the scum or dross on its surface, where it is consumed, and others rise. Imagine then what strange bodies these are, when some of them are as big as the earth: what a vast quantity must there be of this melted gold, and what must be the extent of this great sea of light and fire which they call the sun? Others say, the sun appears through their telescopes, full of mountains, which vomit fire continually, and are joined together like millions of Etnas. Yet there are those who say these burning mountains are pure vision, caused by a fault in the optics; but what shall we credit, if we must distrust our telescopes, to which we owe the knowledge of so many new objects? But let the sun be what it will, it cannot be at all proper for habitation; and what pity that is, for how pleasant would it be? You might then be at the center of the universe, where you would see all the planets turn regularly about you; but now we are only possessed with extravagant fancies, because we do not stand in the proper place; there is but one place in the world where the study or knowledge of the stars is easily obtained, and what pity it is there is no body there. You forget yourself, sure, says she; were you in the sun you would see nothing, neither planets nor fixed stars; does not the sun efface all? So that could there be any inhabitants there, they might justly think themselves the only people in nature.

I own my mistake, madam; I was thinking of the situation of the sun, and not of the effect of its light: I thank you for your correction; but must take the freedom to tell you, that you are in an error, as well as myself; for were there inhabitants in the sun, they would not see at all; either they could not bear the strength of its light, or for want of a due distance, they could not receive it; so that things well considered, all the people there must be stone-blind, which is another reason why the sun cannot be inhabited; but let us pursue our voyage. We are now arrived at the center, which is always the bottom, or lowest place of what is round; if we go on, we must ascend; then we shall find Mercury, Venus, the earth, the moon, all the planets we have already visited: the next is Mars, who affords nothing curious that I know of; his day is not quite an hour longer than ours, but his year is twice as long; he is a little less than the earth, and the sun seems not altogether so large and so bright to him, as it appears to us: but let us leave Mars, he is not worthy our stay: But what a pretty thing is Jupiter, with his four moons, or yeomen of the guard? they are four little planets which turn round him; as our moon turns round us. But why, says the marchioness, interrupting me, must there be planets to turn round other planets, that are no better than themselves? I should think it would be more regular and uniform, that all the planets, small

small and great, without any distinction, should have one and the same motion round the sun

AH, madam, says I, if you did but know what Des Cartes's whirlpools or vortexes were, whose name is terrible, but their idea pleasant, you would not be of that opinion. Why, says she, smiling, must my head turn round to comprehend them, or must I become a natural fool to understand the mysteries of philosophy? Well, let the world say what it will, go on with your whirlpools. I will, says I, and you shall see the whirlpools are worthy of these transports: that then which we call a whirlpool, or vortex, is a mass of matter, whose parts are separated, or detached from one another, yet have all one uniform motion; and at the same time, every one is allowed, or has a particular motion of its own, provided it follows the general motion: thus a vortex of wind, or whirlwind, is an infinity of little particles of air, which turn round all together, and involve whatever they meet with. You know the planets are born up by the celestial matter, which is very subtle and active; so that this great mass, or ocean of celestial matter, which flows as far as from the sun to the fixed stars, turns round, and bears the planets along with it, making them all turn after the same manner round the sun, who possesses the center; but in a longer, or a shorter time, according as they are farther or nearer in distance to it: there is not any planet next

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the sun, which does not turn, but he turns on himself, because he is just in the middle of this celestial matter; and you must know, by the way, that were the earth in his place, it must turn on itself, as the sun does. This is the great vortex, of which the sun is lord: yet at the same time, the planets make little peculiar vortexes, in imitation of that of the sun; each of them in turning round the sun, does at the same time turn round itself, and makes a certain quantity of celestial matter turn round it likewise, which is always prepared to follow the motion, which the planet gives it, provided it is not diverted from its general motion; this then is the particular vortex of the planet, which pushes it as far as the strength of its motion reaches: and if by chance, a lesser planet falls into the vortex of a greater planet, it is immediately born away by the greater, and is indispensibly forced to turn round, though at the same time, the great planet, the little planet, and the vortex which encloses them, all turn round the sun: It was thus at the beginning of the world, when we made the moon follow us, because she was within the reach of our vortex, and therefore wholly at our disposal: Jupiter was stronger or more fortunate than we, he had four little planets in his neighbourhood, and he brought them all four under his subjection; and no doubt, we, though a principal planet, had had the same fate, had we been within the sphere of his activity; he is ninety times bigger than the earth,

earth, and would certainly have swallowed us into his vortex; we had then been no more than a moon in his family; but now we have one to wait on us; so that you see the advantage of situation often decides all our good fortune.

BUT pray, says she, who can assure us we shall continue as we do now? If we should be such fools as to go near Jupiter, or he so ambitious as to approach us, what will become of us? For if, as you say, the celestial matter is continually under this great motion, it must needs agitate the planets irregularly; sometimes drive them together, and sometimes separate them. Luck is all, says I; we may win as well as lose; and who knows, but we might bring Mercury and Venus under our government? they are little planets, and cannot resist us; but in this particular, madam, we need neither hope nor fear; for the planets keep within their own bounds, and are obliged, as the kings of China were formerly, not to undertake new conquests. Have you not seen when you put water and oil together, the oil swims a-top; and if to these two liquors, you add a very little more, the oil bears it up, and it will not sink to the water, put an heavier liquor, of a just weight, and it will pass through the oil, which is too weak to sustain it, and sink till it comes to the water, which is strong enough to bear it up; so that in this liquid, composed of two liquors, which do not mingle, two bodies of an equal weight

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will naturally assume two different places ; the one will never ascend, the other will never descend ; if we put still other liquors, which do not mingle, and throw other bodies on them, it will be the same thing : fancy then that the celestial matter, which fills this great vortex, has several resting places, one by another, whose weight are different like that of oil, water, and other liquors ; the planets too are of a different weight, and consequently every planet settles in that place which has a just strength to sustain and keep it equilibrate ; so, you see, it is impossible it should ever go beyond.

I VERY well apprehend, says the marchioness, that these weights keep their stations regularly. Would to God our world were as well regulated, and every one among us knew their proper place. I am not now in any fear of being over-run by Jupiter ; and since he lets us alone in our vortex, with our moon, I do not envy him the four which he has. Did you envy him, replied I, you would do him wrong, for he has no more than what he has occasion for ; at the distance he is from the sun, his moons receive, and send him, but a very weak light ; it is true, that as he turns upon himself in ten hours, his nights, by consequence, are but five hours long ; so one would think there is no great occasion for four moons, but there are other things to be considered. Here, under the poles, they have six months day, and six months night, because the poles are the

the two extremities of the earth, the farthest removed from those places where the sun is over them in a perpendicular line. The moon seems to keep almost the same course as the sun, and if the inhabitants of the pole see the sun during one half of his course in the year, and during the other half, do not see him at all; they see the moon likewise during one half of her course of a month; that is, she appears to them fifteen days, but they do not see her during the other half. Jupiter's year is as much as twelve of ours, so that there must be two opposite extremities in that planet, where their night and their day are six years each. A night six years long is a little disconsolate, and it is for that reason, I suppose they have four moons; that which in regard to Jupiter, is uppermost, finishes its course about him in seventeen days, the second in seven, the third in three days and an half, and the fourth in forty two hours; and though they are so unfortunate as to have six years night, yet their course being exactly divided into halves, they never pass above twenty one hours, wherein they do not see at least the last moon, which is a great comfort in so tedious a darkness; so that be where you will, these four moons are sometimes the prettiest sight imaginable; sometimes they rise all four together, and then separate according to the inequality of their course; sometimes they are all in their meridian, ranged one above another; sometimes you see them at equal distances

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on the horizon; sometimes when two rise, the other two go down. O, how I should like to see their perpetual sport of eclipses; for there is not a day passes, but they eclipse the sun, or one another; and they are so accustomed to these eclipses in that planet, that they are certainly the objects of diversion, and not of fear, as with us.

WELL, says the marchioness, I hope you will people these four moons, though you say they are but little secondary planets, appointed to give light to another planet during its night. Do not doubt it, replied I; these planets are not a jot the worse to be inhabited, for being forced to turn round another planet of greater consequence. I would have then, says she, the people of these four moons to be so many colonies under Jupiter's government; they should, if it were possible, receive their laws and customs from him, and consequently pay him a kind of homage, and not view his great planet without paying a deference. Would it not be convenient too, says I, that they should send deputies with addresses to him, to assure him of their fidelity? for he has certainly a more absolute command over his moon, than we have over ours; though his power, after all, is but imaginary, and consists chiefly in making them afraid; for that moon, which is nearest to him, sees that he is 360 times bigger than our moon appears to us; for in truth, he is so much bigger than she; he is also much nearer to
 them,

them, than our moon is to us; which makes him appear the greater; so that this formidable planet hangs continually over their heads, at a very little distance; and if the Gauls were afraid heretofore, that the heavens would fall on them, I think, the inhabitants of that moon may well be apprehensive that Jupiter will at some time or other overwhelm them. I fancy, says the lady, they are possessed with that fear, because they are not concerned at eclipses: every one has their peculiar folly; we are afraid of an eclipse, and they, that Jupiter will fall on their heads. It is very true, says I, the inventor of the third system I told you of the other night, the famous Tycho-Brache, one of the greatest astronomers that ever lived, did not apprehend the least danger from an eclipse, when every body else was under the greatest consternation: but what apprehensions do you think he entertained instead of them? This great man was so unaccountably superstitious, that if an hare did but cross him, or an old woman bolt upon him at his first coming out, he instantly looked upon his journey to be ominous, shut himself up for that day, and would not be concerned in the least business. It would be very unreasonable, replied she, after such a man could not redeem himself from the fear of eclipses, without falling into some other whim as troublesome, that the inhabitants of that moon of Jupiter, whereof we were talking, should come off
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upon easier terms: but we will give them no quarter; they shall come under the general rule, and if they are free from one error, shall fall into another, to put them upon an equivalent: but as I do not trouble myself, because I cannot guess what the next error may be, pray clear up one more difficulty to me, which has given me some pain for several minutes. Tell me, if the earth be so little in comparison of Jupiter, whether his inhabitants do discover us? Indeed, I believe not, says I; for if we appear to him ninety times less than he appears to us, judge you if there be any possibility: yet this we may reasonably conjecture, that there are astronomers in Jupiter, who after they have made the most curious telescopes, and taken the clearest night for their observations, may have discovered a little planet in the heavens, which they never saw before; if they publish their discovery, most people know not what they mean, or laugh at them for fools; nay, the philosophers themselves will not believe them, for fear of destroying their own opinions; yet some few may be a little curious, they continue their observations, discover the little planet again, and are now assured it is no vision; then they conclude it has a motion round the sun, and after a thousand observations, find that it compleats this motion in a year; and at last, thanks to the learned! they know in Jupiter that our earth is a world; every body runs to see it at the
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end of a telescope, though it appears so small, as to be scarcely discernible.

It must be pleasant, says she, to see the astronomers of both planets, levelling their tubes at one another, and mutually asking, *What world is that? What people inhabit it?* Not so fast neither, replied I, for though they may from Jupiter discover our earth; yet they may not know us; that is, they do not in the least suspect it is inhabited; and should any one there chance to have such a fancy, he might be sufficiently ridiculed, if not prosecuted for it; for my part, I believe they have work enough to make discoveries on their own planet, not to trouble their heads with ours. It is so large, that if they have any such thing as navigation, their Christopher Columbus could never want employment; why, I warrant you, they have not yet discovered the hundredth part of their planet. But if Mercury is so small, they are all, as it were, near neighbours, and it is but taking a turn to go round that planet. But if we do not appear to them in Jupiter, they cannot certainly discover Venus and Mercury, which are much less than the earth, and at a greater distance; but in lieu of it, they see Mars, their own four moons, and Saturn with his; this I think is work enough for their astronomers; and nature has been so kind to conceal from them the rest of the universe.

Do you think it a favour then, says she? Yes certainly, replied I, for there are sixteen
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planets in this great vortex: nature saves us the trouble of studying the motions of them all, and shows us but seven, which I think is very obliging, though we know not how to value the kindness, for we have recovered the other nine which were hid from us, and so render the science of astronomy much more difficult than nature designed it.

If there are sixteen planets, says the marchioness, Saturn must have five moons. It is very true, replied I, and two of these five are but lately discovered; but there is somewhat that is more remarkable; since his year makes thirty of ours, and there are consequently in him some countries, where their night is fifteen years long; what can you imagine nature has invented to give light, during a night so dreadful? Why, she has not only given Saturn five moons, but she has encompassed him round with a great circle or ring; this being placed beyond the reach of the shadow, which the body of that planet casts, reflects the light of the sun continually on those places where they cannot see the sun at all.

I PROTEST, says the marchioness, this is very surprizing, and yet all is contrived in such great order, that it is impossible not to think, but nature took time to consider the necessities of all animate beings, and that the disposing of these moons was not a work of chance; for they are only divided among those planets which are farthest distant from the sun, the earth, Jupiter, and Saturn; indeed

deed it was not worth while to give any to Mercury or Venus, they have too much light already; and they account their nights, as short as they are, a greater blessing than their day. But pray, why has not Mars a moon too? It seems he has none, though he is much farther than the earth from the sun. It is very true, says I; no doubt but he has other helps, though we do not know them: you have seen the phosphorus, both liquid and dry, how it receives and imbibes the rays of the sun, and what a great light it will cast in a dark place: perhaps Mars has many great high rocks, which are so many natural phosphoruses, which in the day time take in a certain provision of light, and return it again at night. What think you, madam, is it not very pleasant, when the sun is down, to see those lighted rocks, like so many glorious illuminations, made without any art, and which can do no manner of hurt by their heat? besides, there is a species of birds in America, which reflect such a light, that, you may read by it in the darkest night, and who knows but Mars may have great flocks of these birds, that as soon as it is night disperse themselves into all parts, and spread from their wings a new day?

I AM not at all contented, says she, either with your rocks, or your birds; it is a pretty fancy indeed, but it is a sign that there should be moons in Mars, since nature has given so many to Saturn and Jupiter; and if

all the other worlds that are distant from the sun, have moons, why should Mars only be excepted? Ah, madam, says I, when you are a little more dipped in philosophy, you will find exceptions in the very best systems; there are always some things that agree extremely well; but then there are others which do not accord at all, those you must leave as you found them, if ever you intend to make an end: we will do so by Mars, if you please, and say no more of him, but return to Saturn. What do you think of this great ring, in the form of a semi-circle, that reaches from one end of the horizon to the other, which reflecting the light of the sun, performs the office of a continual moon? And must we not inhabit this ring too, says she, smiling? I confess says I, in the humour I am in, I could almost send colonies every where; and yet I cannot well plant any there, it seems so irregular a habitation; but for the five little moons, they cannot chuse but be inhabited; though some think this ring is a circle of moons which follow close to one another, and have an equal motion; and that the five little moons fell out of this circle; how many worlds are there then in the vortex of Saturn? But let it be how it will, the people in Saturn live very miserably: it is true, this ring gives light to them, but it must be a very poor one, when the sun seems to them but a little pale star, whose light and heat cannot but be very weak at so great a distance. They say Greenland is a

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perfect bagnio, in comparison of this planet, and that they would expire with heat in our coldest countries.

You give me, says she, such an idea of Saturn, as makes me shake with cold, and that of Mercury puts me into a fever. It cannot be otherwise, replied I, for the two worlds, which are the extremities of this great vortex, must be opposite in all things. They must then, says she, be very wise in Saturn, for you told me they were all fools in Mercury. If they are not wise, says I, yet they have all the appearances of being very slegmatic: they are people that know not what it is to laugh, they take a day's time to answer the least question you can ask them; and are so very grave, that were Cato living among them, they would think him a Merry-Andrew.

It is very odd to consider, says she, that the inhabitants of Mercury are all life, and the inhabitants of Saturn quite contrary; but among us, some are brisk, and some are dull; it is, I suppose, because our earth is placed in the middle of the other worlds, and so we participate of both extremes, there is no fixed or determinate character; some are made like the inhabitants of Mercury, others like those of Saturn; we are a mixture of the several kinds which are found in the rest of the planets. Why, says I, do not you approve of the idea? Methinks it is pleasant to be composed of such a fantastical assembly, that one would think we were collected out

of different worlds; we need not travel abroad, when we see the other worlds in epitome at home.

I AM sure, says the marchioness, we have one great convenience in the situation of our world; it is not so hot as Mercury and Venus, nor so cold as Jupiter or Saturn; and our country is so temperately placed, that we have no excess either of heat or cold. I have heard of a philosopher, who gave thanks to nature that he was born a man, and not a beast, a Greek, and not a Barbarian; and for my part, I render thanks that I am seated in the mildest planet of the universe, and in one of the most temperate regions of that planet. You have more reason, says I, to give thanks that you are young, and not old; that you are young and handsome, not young and homely; that you are young, handsome, and a French woman, and not young, handsome, and an Italian; these are more proper subjects for your thanks, than the situation of your vortex, or the temperature of your country.

PRAY, Sir, says she, let me give thanks for all things, to the very vortex in which I am planted: our proportion of happiness is so very small, that we should not lose any, but improve continually what we have, and be grateful for every thing, though ever so common or inconsiderable. If nothing but exquisite pleasure will serve us, we must await a long time, and be sure to pay too dear for it at last. I wish, says I, that philosophy

osophy was the pleasure you propose, that when you think of vortexes, you would not forget an humble servant of your ladyship's. I esteem it a pleasure, answered the lady, while it diverts me with something new, but no longer. I will engage for it till to-morrow, replied I, for the fixed stars are superior to whatever you have yet seen.

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The FIFTH EVENING.

*Shewing that the fixed stars are so many
suns, every one of which gives light to a
WORLD.*

THE marchioness was very impatient to know what would become of the fixed stars; are they peopled, says she, as the planets are, or are they not inhabited at all, or in short, what shall we do with them? You may soon guess, says I, the fixed stars cannot be less distant from the earth than fifty millions of leagues; nay, if you anger an astronomer, he will set them farther. The distance from the sun to the farthest planet, is nothing in comparison of the distance from the sun, or from the earth, to the fixed stars; it is almost beyond arithmetic. You see their light is bright and shining, and did they receive it from the sun, it must needs be very weak, after a passage of fifty millions of leagues; then judge how much it is wasted by reflection, for it comes back again as far to us; so that forwards and backwards, here are an hundred millions of leagues for it to pass, and it is impossible it should be so clear and strong as the light of a fixed star, which cannot but proceed from itself; so that in a word, all the fixed stars are luminous bodies in themselves, and so many suns.

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I PERCEIVE, says the marchioness, where you would carry me; you are going to tell me, that if the fixed stars are so many suns, and our sun the center of a vortex which turns round him, why may not every fixed star be the center of a vortex that turns round the fixed star! Our sun enlightens the planets; why may not every fixed star have planets to which they give light? You have said it, replied I, and I will not contradict you.

BUT you have made the universe so large, says she, that I know not where I am, or what will become of me: what, is it all to be divided into vortexes confusedly, one among another? Is every star the center of a vortex, as big as ours? Is that vast space which comprehends our sun and planets, but an inconsiderable part of the universe? And are there as many such spaces, as there are fixed stars? I protest it is dreadful, the very idea of it confounds and overwhelms me. Dreadful! madam, said I, I think it very pleasant: when the heavens were a little blue arch, stuck with stars, methought the universe was too strait and close, I was almost stifled for want of air; but now it is enlarged in height and breadth, and a thousand and a thousand vortexes taken in; I begin to breathe with more freedom, and think the universe to be incomparably more magnificent than it was before. Nature has spared no cost, even to profuseness, and nothing can be so glorious, as to see such a prodigious

ous number of vortexes, whose several centers are possessed by a particular sun, which makes the very planets turn round it. The inhabitants of a planet of one of these innumerable vortexes behold on all sides these luminous centers of the vortex, with which they are encompassed; but perhaps they do not see the planets, who, receiving but a faint light from the sun, cannot send it beyond their own world.

You present me with a prospect of so vast a length, that no eye can reach to the end of it: I plainly see the inhabitants of the earth, and you have made me discover those who dwell in the moon, and in other planets of our vortex; these inhabitants indeed I can conceive pretty plainly, but I do not see them so clearly as those of the earth: after these, we come to the inhabitants of the planets which are in the other vortexes, but they are sunk into so great a depth, that though I do all I can to see them, yet I must confess I can hardly perceive them; by the expression you make use of in mentioning them, they seem to be almost annihilated; you ought then to call them the inhabitants of one of those innumerable vortexes: we ourselves, for whom the same expression serves, must confess, that we scarce know where we are, in the midst of so many worlds; for my own part, I begin to see the earth so minutely small, that I believe; from henceforward, I shall never be concerned at all
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for any thing; that we so eagerly desire to make ourselves great, that we are always designing, always troubling and harassing ourselves, is certainly because we are ignorant what these vortexes are; but now I hope my new lights will in part justify my laziness, and when any one reproaches me with my indolence, I will answer, ah, did you but know what the fixed stars are! It was not fit, says I, that Alexander should know what they were; for a certain author*, who maintains that the moon is inhabited, very gravely tells us, that Aristotle, from whom no truth could be long concealed, must necessarily be of an opinion, backed with so much reason; but yet he never durst acquaint Alexander with the secret, lest he should run mad with despair, when he knew there was another world which he could not conquer: with much more reason then was this mystery of vortexes and fixed stars kept secret in Alexander's time; for though they had been known in those days, yet it had been but an ill way of making on's court, to have said any thing of them to that ambitious prince; for my part, I that know them, am not a little troubled to find myself not a jot the wiser for all the knowledge I have of them; the most they can do, according to your way of reasoning, is but to cure people of their ambition, and their unquiet restless humour, which are diseases I am not at all troubled

* HUYGENS.

troubled with; I confess I am guilty of so much weakness, as to be in love with what is beautiful; that is my distemper, and I am confident the vortexes can never cure it: what if the other worlds render ours so very little? They cannot spoil fine eyes, or a pretty mouth, their value is still the same, in spite of all the worlds that can possibly exist.

THIS love, replied the marchioness, smiling, is a strange thing; let the world go how it will, it is never in danger, there is no system can do it any harm. But, tell me freely, is your system true? Pray do not conceal any thing from me; I will keep your secret very faithfully; it seems to have for its foundation but a slight probability, which is, that if a fixed star be in itself a luminous body, like the sun, then by consequence, it must, as the sun is, be the center and soul of a world; and have its planets turning round about it: but is there an absolute necessity it must be so? Hear me, madam, says I; since we are in the humour of mingling light gallantries, with a serious discourse, I must tell you, that in love and the mathematics, people reason much alike: allow ever so little to a lover, yet presently after you must grant him more; nay, more and more; which will at last go a great way: in like manner, grant but a mathematician one minute principle, he immediately draws a consequence from it, to which you must neces-
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easily assent; and from this consequence another, till he leads you so far, whether you will or no, that you have much ado to believe him. These two sorts of people, lovers and mathematicians, will always take more than you give them. You grant, that when two things are like one another in all visible respects, it is possible they may be like one another in those respects which are not visible, if you have not some good reason to believe otherwise: Now this way of arguing have I made use of. The moon, says I, is inhabited, because she is like the earth; and the other planets are inhabited, because they are like the moon; I find the fixed stars to be like our sun, therefore I attribute to them what is proper to him: you are now going too far to be able to retreat, therefore you must go forward with a good grace. But, says the lady, if you build upon this resemblance, or likeness, which is between our sun, and the fixed stars, then, to the people of another great vortex, our sun must appear, no bigger than a small fixed star, and can be seen only when it is night with them. Without doubt, madam, says I, it must be so: our sun is much nearer to us, than the suns of other vortexes, and therefore its light makes a much greater impression on our eyes than theirs do: we see nothing but the light of our own sun; and when we see him, it darkens and hinders us from seeing any other light; but in another great vortex,

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there is another sun which rules and governs; and, in his turn, extinguishes the light of our sun, which is never seen there but in the night, with the rest of the other suns; that is, the fixed stars; with them our sun is fastned to the great arched roof of heaven, where it makes a part of some bear or bull: for the planets which turn round about it, our earth for example, as they are not seen at so vast a distance, so no-body will so much as dream of them: all the suns then are day-suns in their own vortexes, but night-suns in other vortexes: in his own world or sphere, every sun is single, and there is but one to be seen; but every where else, they serve only to make a number. May not these worlds, replied she, notwithstanding this great resemblance between them, differ in a thousand other things? for though they may be somewhat alike in one particular, they may greatly differ in others.

It is certainly true, says I; but the difficulty is to know wherein they differ. One vortex has many planets that turn round about its sun; another vortex has but a few: in one vortex there are inferior or less planets, which turn about those that are greater; in another, perhaps there are no inferior planets; here, all the planets are got round about their sun, in form of a little squadron; beyond which is a large void space, which reaches to the neighbouring vor-

vortexes: in another place, the planets take their course towards the outside of their vortex, and leave the middle void. There may be vortexes also quite void, without any planets at all; others may have their sun not exactly in their center; and that sun may so move, as to carry its planets along with it; some may have planets, which in regard of their sun, ascend, and descend, according to the change of their equilibration, which keeps them suspended. In short, what variety can you wish for? But, I think, I have said enough for a man that was never out of his own vortex.

It is not so much, replied the marchioness, considering what a multitude of worlds there are; what you have said is sufficient for five or six, and from hence I see thousands.

WHAT would you say, madam, if I should tell you, there are many more fixed stars than those you see? And that an infinite number are discovered with glasses, which are not perceptible to the naked eye, and that in one single constellation, where perhaps we count twelve or fifteen, there are as many more to be found as usually appear in the whole hemisphere.

I SUBMIT, says she, and beg your pardon: you quite confound me with worlds and vortexes. O, madam, I have a great deal more to tell you, replied I; you see that whiteness in the sky, which some call the milky-way; can you imagine what that is? Why,

it is nothing but an infinity of small stars, not to be seen by our eyes, because they are so very little, and they are sown so thick, one by another, that they seem to be one continued whiteness: I wish you had a glass, to see this ant-hill of stars, and this cluster of worlds, if I may so call them: they are in some sort like the Maldivy-islands: those twelve thousand banks of sand, separated only by narrow channels of the sea, which a man may as easily leap over as a ditch: so near together are the vortexes of the milky-way, that I presume the people in one world may talk, and shake hands, with those of another; at least, I believe, the birds of one world may easily fly into the other; and that pigeons may be trained up to carry letters, as they do in the Levant. These little worlds are excepted out of that general rule, by which one sun in his own vortex as soon as he appears, effaces the light of all other foreign suns: if you were in one of these little vortexes of the milky-way, your sun would not be much nearer to you, and consequently, would not make any much more sensible impression on your eyes, than a hundred thousand other suns of the neighbouring vortexes: you would then see your heaven shine bright with an infinite number of fires, close to one another, and but a little distant from you; so that though you should lose the light of your own particular sun, yet there would still remain visible suns sufficient be-

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side your own, to make your night as light as day, at least, the difference would hardly be perceived; for the truth is, you would never have any light at all: the inhabitants of these worlds, accustomed to perpetual brightness, would be strangely astonished, if they should be told that there are a miserable sort of people, who, where they live, have very dark nights, and when it is day with them, they never see more than one sun; certainly they would think nature had very little kindness for us, and would tremble with horror, to think what a sad condition we are in.

I do not ask you, says the marchioness, whether in those worlds of the milky-way, there are any moons; I see they would be of no use to those principal planets: which have no night, and move in spaces too strait and narrow to cumber themselves with the baggage of inferior planets: yet pray take notice, that by your liberal multiplication of worlds, you have started an objection, not easily answered: the vortexes, whose suns we see, touch the vortex in which we are; and if it be true, that vortexes are round, how then can so many bowls, or globes, all touch a single one? I would fain know how this may be done, but cannot reconcile it to myself.

MADAM, says I, you shew a great deal of wit, in raising this doubt, and likewise in not being able to resolve it; for in itself, the thing seems extremely difficult; and, as

you state the question, no answer can be given to it; and he must be a fool, who goes about to find answers to objections which are unanswerable. If our vortex had the form of a dye, it would have six squares, or flat surfaces, and would be far from being round; and upon every one of these squares, might be placed a vortex of the same figure; but if instead of these six squares, it had twenty, fifty, or 1000; then might 1000 vortexes be placed upon it, one upon every flat; and, you know very well, that the more flat faces any body has on its outside, the nearer it approaches to roundness, just as a diamond cut facewise on every side, if the faces be very many and little, it will look as round as a pearl of the same bigness: It is in this manner, that the vortexes are round; they have an infinite number of faces on their outside, and every one of them has upon it another vortex; these faces are not all equal and alike; but here, some are greater, and there, some less: the least faces of our vortex, for example, answer to the milky-way, and sustain all those little worlds. When two vortexes are supported by the two next flats on which they stand, if they leave beneath any void spaces between them, as it must often happen, nature, who is an excellent housewife, and will not suffer any thing to be useless, presently fills up this void space with a small vortex or two, perhaps with 1000, which never incommode the others, and become one, two, or 1000 worlds more; so that there
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may be many more worlds than our vortex has flat surfaces to bear them. I will lay a good wager, that though these little worlds were made only to be thrown into the corners of the universe, which otherwise would have been void and useless; and though they are unknown to other worlds which they touch, yet they are well satisfied with being what they are: these are the little worlds, whose suns are not to be discovered but with a telescope, and whose number is prodigious: to conclude, all these vortexes are joined to one another in so admirable a manner, that every one turns round about his own sun, without changing place; every one has such a turn as is most easy, and agreeable to its own situation: they take hold of one another, like the wheels of a watch, and mutually help each other's motion: and yet it is certain that they act contrary to one another. Every world, as some say, is like a foot-ball, made of a bladder, covered with leather, which sometimes swells of its own accord, and would extend itself, if it were not prevented. But this swelling world, being pressed by the next to it, returns to its first figure; then swells again, and is again depressed; and some affirm, that the reason why the fixed stars give a twinkling and trembling light, and sometimes seem not to shine at all, is because their vortexes perpetually push and press our vortex, and ours again continually repulses theirs.

I AM in love with these fancies, says madam, and pleased with the foot-balls, which swell every moment, and sink again; and with these worlds, which are continually striving and pushing one another: but above all, I am pleased to see how this juggling keeps up the trade of light, which is certainly the only correspondence that is between them.

No, no, madam, says I; light is not their sole commerce; the neighbouring worlds sometimes pay visits to us, and that in a very magnificent and splendid manner: comets arrive from thence, adorned with bright shining hair, venerable beards, and majestic tails. These, says the marchioness, are ambassadors, whose visits may be well spared, since they serve only to fright us. They scare only children, says I, with their extraordinary train; but, indeed, the number of such children is now a-days very great. Comets are nothing but planets which belong to a neighbouring vortex, they move towards the outside of it; but perhaps this vortex being differently pressed by these vortexes which encompass it above, it is rounder than below, and the lower part is still towards us. These planets, which have begun to move in a circle above, are not aware, that below their vortex will fail them, because it is, as it were, broken. Therefore to continue the circular motion, it is necessary that they enter into another vortex, which we will suppose is ours, and that they cut through
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the outsides of it. They appear to us very high, and are much higher than Saturn; and according to our system, it is absolutely necessary they should be so high, for reasons that do not signify any thing to our present subject. From Saturn downwards to the other side of our vortex, there is a large void space without any planets. Our adversaries often ask us, to what purpose this void space serves? But let them not trouble themselves any more, I have found a use for it. It is the apartment of those strange planets, which come into our world.

I UNDERSTAND you, says she, we do not suffer them to come into the heart of our vortex, among our own planets, but we receive them as the Grand Seignior does the ambassadors who are sent to him; he will not shew them so much respect as to let them reside within the walls of Constantinople, but consigns them one of the suburbs of the city. Madam, says I, we, and the Ottomans, agree likewise in this, that as they receive ambassadors, but never send any, so we never send any of our planets into the worlds that are next us.

By this, says she, it appears that we are very proud? however, I do not yet very well know what I am to believe. These foreign planets, with their tails and their beards, have a terrible countenance; it may be they are sent to affront us; but ours that are of another make, if they should get into our world, they are to come into our world.

other worlds, are not so proper to make people afraid.

NEITHER their beards, nor tails, madam, says I, are real; only phenomena, mere appearances. These foreign planets differ in nothing from ours; but entering into our vortex, they seem to us to have tails or beards; by a certain sort of illumination which they receive from the sun, and which has not been yet well explained. But it is certain, that is but a kind of illumination, and when I am able, I will tell you how it is done. I wish, then, says she, that our Saturn would go take a tail and a beard in another vortex, and fright all the inhabitants of it. Then I would have him come back again, leaving his terrible accoutrements behind him, and, taking his usual place amongst our other planets, fall to his ordinary business. It is better for him, says I, not to go out of our vortex. I have told you how rude and violent the shock is, when two vortexes juttle one another, a poor planet must needs be terribly shaken, and its inhabitants in no better condition. We think ourselves very unhappy when a comet appears, but it is the comet which is in an ill case. I do not believe that, says she, it brings all its inhabitants with it in very good health; there can be nothing so diverting as to change vortexes. We, that never go out of our own sphere, lead but a dull life; if the inhabitants of a comet had but the wit to foresee the time when they are to come into our world,

world, they, who had already made the voyage, could tell their neighbours before-hand what they would see, and could inform them, that they would discover a planet with a great ring about it, meaning our Saturn; they would also say, you shall see another planet which has four little ones to wait on it; and perhaps some of them, resolving to observe the very moment of their entrance into our world, would presently cry out, a new sun, a new sun, as sailors use to cry, land, land.

You have no reason then, says I, to pity the inhabitants of a comet, yet I suppose you will think their condition lamentable, who inhabit a vortex whose sun comes in time to be quite extinguished, and consequently who live in eternal night. How, cried the marchioness, can suns be extinguished? Yes, without doubt, says I, for people some thousand years ago saw fixed stars in the sky, which are now no more to be seen; these were suns which have lost their light, and certainly there must be a strange desolation in their vortexes, and a general mortality over all the planets, for what can people do without a sun? This is a dismal fancy, says the lady, I would not, if I could help it, let it come into my head. I will tell you, if you please, replied I, what is the opinion of learned astronomers as to this particular: They think that the fixed stars, which have disappeared, are not quite extinguished, but that they are half-

suns,

suns, that is, they have one half dark, and the other half light, and turning round upon their own axis or center, they sometimes shew us their light side, and afterwards turning to us their dark one, we see them no more. To oblige you, madam, I will be of this opinion, because it is not so harsh as the other, though I cannot make it good but in relation to some certain stars, because as Huygens has lately observed, those stars have their regulated times of appearing, and disappearing, otherwise there could be no such thing as half-suns. But what shall we say of stars, which totally disappear, and never shew themselves again after they have finished their course of turning round upon their own axis? You are too just, madam, to oblige me to believe that stars are half-suns, However, I will try once more what I can do in favour of your opinion: the suns are not extinct, they are only sunk so low into the immense depth of heaven, that we cannot possibly see them; in this case, the vortex follows his sun, and all is well again. It is true, that the greatest part of the fixed stars have not this motion, by which they remove themselves so far from us, because at other times they might return again nearer to us, and we should see them sometimes bigger, and sometimes less, which never happens. But we will suppose that none but the little, light, and most active vortexes, which slip between the others, make certain voyages, after which they return again, while

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the main body of vortexes remain unmoved. It is likewise very strange that some fixed stars shew themselves to us, and take up a great deal of time in appearing and disappearing, and at last, totally and entirely disappear. Half-suns would appear again at their fixed and regulated time. But suns, which should be sunk low into the depths of heaven, would disappear but once, and not appear again for a vast space of time. Now, madam, declare your opinion boldly: must not these stars, of necessity, be suns, which are so much darkned, as not to be visible to us, yet afterwards shine again, and at last are wholly extinct? How can a sun, says the marchioness, be darkned and quite extinguished, when it is in its own nature a fountain of light? It may be done, madam, says I, with all the ease in the world, if Des Cartes's opinion be true, that our sun has spots; now whether these spots be scum, or thick mists, or what you please, they may thicken and unite, till at last they cover the sun with a crust, which daily grows thicker, and then farewell sun. We have hitherto escaped pretty well; but it is reported, that the sun for some whole years together has looked very pale; for example, the year after Cæsar's death; it was this crust that then began to grow, but the force of the sun broke through, and it was dissipated; had it continued, we had been all a lost people. You make me tremble, replied madam; and now I know the fatal consequences of

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the sun's paleness: I believe, instead of going every morning to the glass, to see how I look myself, I shall cast my eyes up to heaven, to see whether or no the sun looks pale. O! madam, says I, there is a great deal of time required to ruin a world. I grant it, says she, yet it is but time that is required. I confess it, madam; all this immense mass of matter, which composes the universe, is in perpetual motion, no part of it excepted; and since every part is moved, you may be sure that changes must happen sooner or later; but still in times proportioned to the effect. The ancients were merry gentlemen, to imagine that the celestial bodies were in their own nature unchangeable, because they observed no alteration in them; but they did not live long enough to confirm their opinion by their own experience; they were boys in comparison of us. Give me leave, madam, to explain myself by an allegory: if roses, which laste but a day, could write histories, and leave memoirs one to another, and if the first rose should draw an exact picture of his gardener, and after 15,000 rose-ages, it should be left to other roses, and so on still to those that should succeed, without any change in it; should the roses hereupon say, *We have seen every day the same gardener, and in the memory of roses, none ever saw any gardener but this; he is still the same he was, and therefore certainly he will not die, as we do, for there is no change at all in him.* Would not these roses, madam,

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dam, talk very foolishly? and yet there would be more reason in their discourse, than there was in what the ancients said concerning celestial bodies: and though even to this very day there should appear no visible change in the heavens, and the matter of which they are made should have all the signs of an eternal duration, without any change; yet I would not believe them unchangeable, till I had the experience of many more ages. Ought we, whose lives are but a span long, to make our continuance the mensurate duration of any other being? It is not so easy a matter to be eternal: to have lasted many ages of men, one after another, is no sign of immortality. Truly, says the marchioness, I find these worlds are far from being able to pretend to it; I will not do them so much honour as to compare them to the gardener, who lived so much longer than the roses: I begin to think them like the roses themselves, which blow one day, and die the next: for now I understand, that if old stars disappear, new ones will come in their room, because every species must preserve itself. No species, madam, says I, can totally perish; some perhaps will tell you that such new stars are suns, which return to our sight again, after they have been a long time hid from us, in the profundity of heaven: others may tell you they are suns cleared from that thick crust, which once covered them: if I should think all this possible, yet I likewise believe that the universe may be framed in such a

manner that from time to time it may produce new suns; why may not that matter which is proper to make a sun, be dispersed here and there, and gather itself again at long run, into one certain place, and lay the foundation of a new world? I am very much inclined to believe such new productions, because they suit with that glorious and admirable idea which I have of the works of nature. Can we think that all-wise nature knows no more than the secret of making herbs and plants live and die by a continual revolution? I am verily perswaded, and are not you so too, madam, that nature, without much cost or pains, can put the same secret in practice upon the worlds? I now find, says she, the worlds, the heavens, and celestial bodies so subject to change, that I am come to myself again. To recover ourselves the better, replied I, let us say no more of these matters. We are arrived at the very roof and top of all the heavens; and to tell you whether there be any stars beyond it, you must have a more able astronomer than I am; you may place worlds there, or no worlds, as you please: it is the philosopher's empire to describe those vast invisible countries, which are, and are not, or are such as he pleases to make them; it is enough for me to have carried your mind, as far as you can see with your eyes.

WELL now, says the marchioness, I have the whole system of the universe in my head; how learned am I become? Indeed, madam,

madam, says I, you are pretty knowing, and with this advantage, either of believing, or disbelieving, any thing I have said; all the recompence I desire for the pains I have taken, is, that you would never look upon the sun, the heavens, or the stars, without thinking on me.

The SIXTH EVENING.

New observations confirming the preceding ones. And some farther discoveries made in the HEAVENS.

IT is so long, since the marchioness of G***, and I, had any discourse concerning the planetary worlds, that we began to question whether we had ever had any on that subject. When I went one day to visit her, I came in just as two very polite gentlemen had taken their leaves of her. Well, says madam the very moment she perceived me, you see who hath honoured me with a visit; and, I protest, it has given me some room to suspect that it has been in your power to impose upon my judgment. I should be very proud, replied I, if I could flatter myself with such a power, because I look upon it to be the hardest task any one could attempt. As hard as it is, says she, I am afraid you have done it. I do not know how it came about, but our conversation turned upon the plurality of worlds, with my two friends who are just gone: I am not certain, but they might introduce the discourse with a malicious design. I made no scruple to tell them directly, that all the planets were inhabited; one of them replied, he was very well satisfied I did not believe a word of it; and I, with all the simplicity imaginable,

ginable, maintained, that it was my real opinion; he still looked upon it as a piece of dissimulation, designed to divert the company: and I thought, what made him so positive that I did not believe my own sentiments, was, that he had too high an opinion of me to conceive that I could entertain so extravagant a notion. As for the other gentleman, who had not altogether that esteem for me, he took me at my word. For God's sake, why did you put a thing in my head, which people that value me cannot think I maintain seriously? Nay, madam, says I, but why would you attempt to maintain any serious position among a set of people, who, I am sure, never entred into a way of reasoning which had the least cast of seriousness? We should not affront the inhabitants of the planets so highly; but content ourselves with being a little select number of advocates for them, and not communicate our mysteries to the vulgar. How, says the marchioness, do you call my two last visitants the vulgar? They may have wit enough, says I, but they never reason at all. And your reasoners, who are a severe set of people, will not make any difficulty of sorting them with the vulgar. On the other side, these men of fire revenge themselves by ridiculing the reasoners; and think it is a very just principle in nature, that every species despises what it wants. It were right, if it was possible, to conform ourselves to every species; and it had been much better for you to have rail-
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ed on the inhabitants of the planets with your two friends, because they are better at raillery than reasoning, which they never make use of: you had then come off with their joint esteem; and the planets had not lost a single inhabitant by it. Would you have had me sacrifice the truth to a jest? says she: and is that all the conscience you have? I own, answered I, that I have no great zeal for these kind of truths, and I will sacrifice them with all my soul to the least conveniencies of company. For instance, I see what is, and always will be, the reason, why the opinion of the planets being inhabited, is not thought so probable as it really is: the planets always present themselves to our view as bodies which emit light; and not at all like great plains and meadows. We should readily agree that plains and meadows were inhabited; but for luminous bodies to be so too, there is no ground to believe it. Reason may come and tell us over and over, that there are plains and meadows in these planets, but reason comes a day too late; one glance of our eyes has had its effect before her. We will not hear a word she says, the planets must be luminous bodies, and what sort of inhabitants should they have, our imagination of course would presently represent their figures to us. It is what she cannot do, and the shortest way is to believe there are no such beings. Would you have me, for the establishment of these planetary people, whose interests are far from touching me,

go to attack those formidable powers, called sense and imagination? It is an enterprize would require a good stock of courage, and we cannot easily prevail on men to substitute their reason in the place of their eyes. I sometimes meet with reasonable people enow, who are willing, after a thousand demonstrations, to believe that the planets are so many earths: but their belief is not such as it would be, if they had not seen them under a different appearance; they still remember the first idea they entertained, and they cannot well recover themselves from it. It is these kind of people, who, in believing our opinion, seem to do it a courtesy, and only favour it for the sake of a certain pleasure which its singularity gives them.

WELL, says the marchioness, interrupting me, and is not this sufficient for an opinion, which is but barely probable? You would be very much surprized, says I, if I should tell you, probable is a very modest term. Is it simply probable that there ever was such a man as Alexander the great? You hold it very certain that there was, and upon what is this certainty founded? Because you have all the proofs which you could desire in a like matter; and there does not the least subject for doubt present itself, to suspend or arrest your determination: for you never could see this Alexander, and you have not one mathematical demonstration that there ever was such a man. Now what would you say if the inhabitants of the planets were almost

almost in the very same case? We cannot pretend to make you see them, and you cannot insist upon the demonstration here, as you would in a mathematical question; but you have all the proofs you could desire in our world. The entire resemblance of the planets with the earth which is inhabited, the impossibility of conceiving any other use for which they were created, the fecundity and magnificence of nature, the certain regards she seems to have had to the necessities of their inhabitants, as in giving moons to those planets remote from the sun, and more moons still to those yet more remote; and what is still very material, there are all things to be said on one side, and nothing on the other; and you cannot comprehend the least subject for a doubt, unless you will take the eyes and understanding of the vulgar. In short, supposing that these inhabitants of the planets really exist, they could not declare themselves by more marks, or marks more sensible; and after this you are to consider, whether you are willing not to take their case to be more than purely probable. But you would not have me, says she, look upon this to be as certain as that there was such a man as Alexander? Not altogether, madam, says I; for though we have as many proofs touching the inhabitants of the planets, as we can have, in the situation we are, yet the number of these proofs is not great. I must renounce these planetary inhabitants, said her ladyship, interrupting

rupting me, for I cannot conceive how to rank them in my imagination; there is no absolute certainty of them, and yet there is more than a probability; so that I am confounded in my notions. Ah, madam, says I, never put yourself out of conceit with them for that; the most common and ordinary clocks shew the hours, but those are wrought with more art and nicety which shew the minutes. Just so your ordinary capacities are sensible of the difference betwixt a simple probability, and an evident certainty; but it is only your fine spirits that discern the exact proportions of certainty or probability, and can mark, if I may use the phrase, the minutes in their sentiments. Now place the inhabitants of the planets a little below Alexander; yet above many other historical facts which are not so clearly proved: I believe this position will do. I love order, says she, and you oblige me in thus ranging my ideas for me: but pray, why did not you take this care before? Because, says I, should you believe the inhabitants of the planets either a little more or less than they deserve, there will be no great damage in it. I am sure that you do not believe the motion of the earth so fully as it ought to be believed; and have you much reason to complain on that score? Oh! for that matter, replies she, I have discharged myself very well, you have nothing to reproach me with on that account, for I firmly believe that the earth turns. And yet,
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says I, madam, I have not given you the strongest reasons in proving it. Ah! traitor, she cried, to make me believe things upon feeble proofs: then you did not think me worthy of believing upon substantial reasons? I only proved things, says I, upon little plausible reasons, and such as were adapted to your peculiar use: should I have conjured up as strong and solid arguments, as if I had been to attack a doctor in the science? Yes, says she, pray take me for a doctor from this moment, and let me have your full demonstrations of the earth's moving.

WITH all my heart, says I, madam, and I own the proof pleases me strangely, perhaps because I think it was of my own finding; yet it is so good and natural, that I must not presume positively to have been the inventor of it: it is most certain, that if a learned man was puzzled, and desired to make replications to it, he would be obliged to declaim at large, which is the only method in the world to confound a learned man. We must grant that all the celestial bodies, in twenty four hours, turn round the earth, or that the earth turning on itself, imparts this motion to all the celestial bodies. But that they really have this revolution in twenty four hours round the earth, is a matter which has the least probability in the world, though the absurdity does not presently appear to our view. All the planets certainly make their great revolution about the sun; but these revolutions of theirs are unequal, according

according to the distances of the respective planets from the sun; for the most remote ones make their course in a longer time, which is most agreeable to nature: the same order is observed among the little secondary planets in turning about a great one. The four moons of Jupiter, and the five of Saturn, make their circles in more or less time round their great planet, according as they are more or less remote. Besides, it is certain that the planets have motions upon their own centers, and these motions likewise are unequal; we cannot well tell how to account for this inequality, whether it proceeds from the different magnitudes of the planets, on the different swiftness of the particular vortexes which inclose them, and the liquid matters in which they are sustained; but, in short, the inequality is most undoubted; and such is the order of nature in general, that whatever is common to many things, is found at the same time to vary in some different particulars.

I UNDERSTAND you, says the marchioness, interrupting me, and I think, there is a great deal of reason in what you say; I am entirely of your mind, if the planets turned about the earth, they would do it in unequal spaces of time, according to their distances, as they do about the sun: is not that the meaning of what you were saying? Exactly, madam, says I; their unequal distances, with respect to the earth, their different magnitudes, and the different rapidity of the particular vortexes inclosing them, should

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consequently produce differences in their pretended motion round the earth, as well as in all their other motions. And the fixed stars which are at such a prodigious distance from us, and so much elevated above every thing that can take a general motion round us, at least, which are situated in a place whence this motion should be very much weakened, would there not be a very great probability that they did not turn at all about us in twenty four hours, as the moon does who is so near us? And should not comets, which are strangers in our vortex, and which run courses so different one from the other, and with such unequal rapidity, be excused from turning round us in the same space of twenty four hours? But no matter, fixed stars, and comets, and all, must turn round the earth in twenty four hours; yet, if there were some minutes difference in these motions, we might be contented; and they all must make them with the most exact equality, or rather the only exact equality which is in the world, and not one minute more or less allowed. In reality, this matter is strangely to be suspected.

O, SAYS the lady, since it is possible that this grand equality should be only in our imagination, I am entirely convinced it is derived only from thence. I am very well pleased, that any position, which is against the genius of nature, should fall entirely upon ourselves: and that she should stand discharged, though at our expence. For my part,

part, says I, I am such a foe to a perfect equality, that I cannot even allow all the turns, which the earth every day makes on herself, should be precisely in twenty four hours, and always equal one to another; I should be very much inclined to think that there are variations. Variations! cried the lady, why, do not our pendulums mark an entire equality? O, says I, to your pendulums I must object; for they cannot be altogether just; and sometimes when they are, in shewing us that one circuit of twenty four hours, is longer or shorter than another, we should rather be inclined to believe them irregular, than to suspect the earth of any irregularity in her revolutions. What a complaisant respect is this we have for her! I would no more depend on the earth, than on a pendulum; and the very same casualties almost, which will disorder the one, will make the other irregular: Only, I believe, there must be more time allowed for the earth, than a pendulum, to be visibly put out of order; and that is all the advantage we can give on her side. But might she not by degrees draw nearer to the sun? And there finding herself in a situation, where the matter is more agitated, and the motion more rapid, she will in less time make her double-revolution both about the sun and herself; so consequently her years and days will be much shortned, but not to be perceived, because we must still go on to divide the year into 365 days, and the days into twenty four

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hours: so that without living longer than we now do, we shall live more years; and on the other hand, as the earth withdraws from the sun, we shall live fewer years than we do now, and yet have our lives of the same extent. There is a great deal of probability, says she, that whenever it falls out thus, long successions of ages will make but very little variation. I agree with you, madam, replied I, the conduct of nature is very nice, and she has a method of bringing about all things by degrees, which are not sensible, but in very obvious and easy changes: we are scarce able to perceive the change of the seasons, and for some others which are made with a certain deliberation, they do not fail to escape our observance. However all is in a perpetual rotation, and not so much as the lady's face in the moon, which was discovered with telescopes, within these forty years but what is grown considerably old. She had a good tolerable countenance, but now her cheeks are sunk, her nose grown long, and her chin and forehead meet, so that all graces are vanished, and age has made her a terrible spectacle.

WHAT a story do you tell, says the lady, interrupting me! It is no imposition, madam, replied I, they have perceived in the moon a particular figure, which had the air of a woman's head jutting out of rocks, and it is owing to some change that have happened there. Some pieces of mountains have mouldered away, and left us to discover

ver three points, which can only serve to make up the forehead, nose, and chin, of an old woman. Well, says she, but do not you think it is some destiny that had a particular spite to beauty? And very justly it was this female-head, which she would attack above all the moon. Perhaps in recompence, replied I, the changes, which happen upon our earth, dress out some face, which the people in the moon see; I mean something like what we conceive a face in the moon; for every one bestows on objects those ideas of which they themselves are full. Our astronomers see, on the surface of the moon, the faces of women: and may be, if the ladies were to make their speculations, they would discern the physiognomy of fine men. For my part, madam, I do not know whether I should not fancy your ladyship's charms there. I protest, says she, I cannot help being obliged to any one who should find me there. But to come back to what you are mentioning just now: do any considerable changes affect the earth? In all appearance they do, replied I: old fables tell us, that Hercules split asunder with his hands the two mountains, called Calpe and Abila, which stand betwixt Afric and Spain, stopped the ocean from flowing there, and that immediately the sea rushed with violence over the land, and made that great gulph which we call the Mediterranean. Now this is not only fabulous, but a history of those remote times, which has been disguised, either from the

ignorance of the people, or through the love they had for the marvellous, the two most ancient frailties of mankind. That Hercules should separate two mountains, with his two hands, is absolutely incredible; but that in the time of one Hercules, or other, for there were fifty of that name, the ocean should force down two mountains, not so strong as others in the world, perhaps through the assistance of some earthquake, and so take his course betwixt Europe and Afric, gives me no manner of pain to believe. What a notable spot might the lunar-inhabitants all of a sudden discover on our earth; for you know, madam, that seas are spots. It is no less than the common opinion, that Sicily was separated from Italy, and Cyprus from Syria: There are sometimes new islands formed in the seas: earthquakes have swallowed up mountains, others have rose and altered the course of the planets. The philosophers give us apprehensions, that the kingdoms of Naples and Sicily, which are countries founded upon great subterranean vaults full of sulphur, will one day sink in, when those vaults shall no longer be able to resist the flames which they contain, and at this time exhale at those vent-holes, the mouths of Vesuvius and Etna. Is not here enough to diversify the sight which we give to the people in the moon?

I HAD much rather, says the marchioness, that we had disgusted them with the same object always, than diverted them with the swallowing up of provinces. L NO

I do not know, replied I, if within this little time there have not been several burnt up in Jupiter. What, provinces burnt up in Jupiter! cries she; upon my word, that would be considerable news. Very considerable, says I, madam: we have remarked these twenty years in Jupiter a long trail of light, more glaring than the rest of that planet's body. We have, here, had deluges, perhaps they may have suffered great conflagrations in Jupiter: how do we know to the contrary? Jupiter is ninety times bigger than the earth, and turns on his own center in ten hours, whereas we do not turn in less than twenty four, which implies that his motion is 216 times stronger than ours. May it not be possible, that in so rapid a circulation, its most dry and combustible parts should take fire, as we see the axle-trees in wheels, from the rapidity of their motion, will break out into flames? But however it is, this light of Jupiter is by no means comparable to another, which in all probability is as ancient as the world, and yet we have never seen it. How does a light order it to be concealed? says she; there must be some singular address to compass that point.

This light, replied I, never appears but at twilight, which is often strong enough to drown it; and even when twilight suffers it to appear, either the vapours of the horizon rob us of it, or it is so very faint, and hardly to be perceived, that for want of exactness

ness in our knowledge, we mistake it for the twilight. But, in short, they have of late years with much certainty distinguished it; and it has been for some time the delight of the astronomers, whose curiosity wanted to be roused by some novelty, and they could not well have been more touched, if they had discovered some new secondary planets. The two latter moons of Saturn, for instance, did not ravish them to that degree which the guards or moons of Jupiter did: but now we are fully accustomed to it; we see, one month before, and after, the vernal equinox, when the sun is set and the twilight over, a certain whitish light resembling the tail of a comet. We see the same before sun rise, and before the twilight, towards the autumnal equinox; and towards the winter solstice we see it night and morning, except at these times it cannot, as I but now observed, disengage itself from the twilights, which are too strong and lasting; for we suppose it to be a continued light, and in all probability it is so. We have begun to conjecture that it is produced from some prodigious quantity of matter crouded together, which circles round the sun to a certain extent: the greatest part of his rays pierce through this gross circuit, and come down to us in a right line; but some resting on the inner surface of this matter are from thence reflected to us, and come with the direct rays, or else we cannot have them either morning or evening. Now as these re-
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flected rays are shot from a greater height than those which are direct, we must consequently have them sooner, and keep them longer.

ON this foot, I must acquiesce in what I have already mentioned, that the moon must have no twilight for want of being surrounded by such a gross air as the earth. But she can be no loser; her twilights will proceed from that kind of gross air which surrounds the sun, and reflects his rays on places which his direct ones cannot reach. But pray let me know, says the marchioness, are not these twilights settled for all the planets, who will not need every one to be clothed with a distinct gross air, because that, which surrounds the sun alone, may have one general effect for all the planets in the vortex? I am mighty willing to think dame-nature, agreeable to that inclination which I know she has to œconomy, and good management, should make that single means answer her purpose: yet, replied I, notwithstanding this supposed œconomy, she must have, with respect to our earth, two causes for twilight; one whereof, which is the thick air about the sun, will be wholly useless, and can only be an object of curiosity for the students of the observatory; but not to conceal any thing, it is possible that only the earth sends out from herself vapours and exhalations gross enough to produce twilights, and that nature had reason to provide, by one general means, for the necessities of all the other

other planets, which are, if I may so say, of a purer mold, and their evaporations consequently more subtle. We are, perhaps, among all the inhabitants of the worlds in our vortex, the only persons who required to have a more gross and thick air given us to breathe in. With what contempt would the inhabitants of the other planets consider us, if they knew this?

THEY would be out in their reasoning, says the marchioness, we are not to be despised for being enveloped with a thick air, since the sun himself is so surrounded. Pray tell me, is not this air produced by certain vapours, which you have formerly told me issued from the sun, and does it not serve to break the first force of his rays which had else probably been to excess? I conceive that the sun may be veiled by nature, to be more proportioned to our use. Well; madam, replied I, this is some small introduction to a system which you have very happily started. We may add, that these vapours produce a kind of rain, which falling back upon the sun, may cool and refresh it, as we sometimes throw water into a forge, when the fire is too fierce. There is not any thing but what we may imagine, to assist nature's address, but she has another kind of address very particular, which is to conceal herself from us, and we should not willingly be confident that we have found out her method of acting, or her designs in it: in case of new discoveries, we should not be too importunate.

importunate in our reasonings, though we are always fond enough to do it; and your true philosophers are like elephants, who as they go, never put their second foot to the ground, till their first be well fixed. The comparison seems the more rational to me, says she, as the merit of those two species of animals, elephants and philosophers, does not at all consist in exterior agreements. I am willing to mistake the judgment of both. Now teach me some of the latter discoveries, and I promise you not to make any rash systems.

I WILL tell you, madam, replied I, all the news I know from the firmament, and I believe the freshest advices you can have. I am sorry they are not as surprizing and wonderful, as some observations which I read the other day in an abridgement of the Chinese Annals, written in Latin. Those people see thousands of stars, at a time, fall from the sky into the sea, with a prodigious noise, or are dissolved, and melt into rains; and these are things which have been seen more than once in China. I met with this observation at two several times, pretty distant from each other, without reckoning a certain star which goes eastward, and bursts like a squib, always with a great noise. It is great pity that these kinds of Phœnomena should be reserved for China only, and that our part of the globe should never have their share of these sights. It is not long, since all our philosophers were of opinion, that they
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might affirm on good grounds, that the heavens and all the celestial bodies were incorruptible, and therefore incapable of change; and yet at the same time, there were some men in the other part of the earth who saw stars dissolve by thousands, which must produce a very different opinion. But, says the marchioness, did we ever hear it allowed that the Chinese were such great astronomers? It is true, we did not, says I, but the Chinese have an advantage from being divided from us by such a prodigious tract of earth, as the Greeks had over the Romans, by being so much prior in time: distances of every sort, pretend a right of imposing on us. In reality, I think still more and more, that there is a certain genius which has never yet been out of the limits of Europe, or at least not much beyond them; perhaps he may not be permitted to spread over any great extent of the earth at once, and that some fatality prescribes him very narrow bounds. Let us indulge him whilst we have him; the best of it is, he is not linked to the sciences and dry speculations, but launches out with as much success into subjects of pleasure. In which point I question whether any people equal us. These are such topics, madam, as ought to give you entertainment, and compleat your whole system of philosophy.

THE END.

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A
CONVERSATION
ON THE
PLURALITY
OF
WORLD S.

