The Scientific Revolution:
Science and Society from the Renaissance to the Early Enlightenment

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Readings for Friday

The Early Enlightenment: Science, Religion, and Society

Voltaire, *Letters Concerning the English Nation* .................................................. 111
Fontenelle, *Conversations on the Plurality of Worlds* ............................................. 113
la Mettrie, *Man a Machine* ....................................................................................... 116
power of supporting combustion and respiration, and of contributing to
the calcination of metals.

Although this experiment furnishes us with a very simple means of obtaining
the two principal elastic fluids which compose our atmosphere, separate
from each other, yet it does not give us an exact idea of the proportion in
which these two enter into its composition: For the attraction of mercury to
the respirable part of the air, or rather to its base, is not sufficiently strong to
overcome all the circumstances which oppose this union. These obstacles
are the mutual adhesion of the two constituent parts of the atmosphere
for each other, and the elective attraction which unites the base of vital air with
caloric; in consequence of these, when the calcination ends, or is at least
carried as far as is possible, in a determinate quantity of atmospheric air,
there still remains a portion of respirable air united to the mephitis, which
the mercury cannot separate. I shall afterwards show, that, at least in our
climate, the atmospheric air is composed of respirable and mephitic airs, in
the proportion of 27 and 73; [...]

I mentioned before, that we have two ways of determining the constituent
parts of atmospheric air, the method of analysis, and that by synthesis.
The calcination of mercury has furnished us with an example of each of
these methods, since, after having robbed the respirable part of its base, by
means of the mercury, we have restored it, so as to recompose an air precisely
similar to that of the atmosphere. But we can equally accomplish this synthetic
composition of atmospheric air, by borrowing the materials of which it is
composed from different kingdoms of nature. We shall see hereafter that,
when animal substances are dissolved in the nitric acid, a great quantity of
gas is disengaged, which extinguishes light, and is unfit for animal respiration,
being exactly similar to the noxious or mephitic part of atmospheric air.
And, if we take 73 parts, by weight, of this elastic fluid, and mix it with
27 parts of highly respirable air, procured from calcined mercury, we will
form an elastic fluid precisely similar to atmospheric air in all its properties.

Chapter Sixteen
Conclusions

163. E. Voltaire, Letters Concerning the English Nation, Letter XIV, 1734,
LETTER XIV.

On Des Cartes and Sir Isaac Newton.

A Frenchman who arrives in London, will find Philosophy, like every Thing
else, very much chang'd there. He had left the World a plemen, and he now
finds it a vacuwm. At Paris the Universe is seen, compos'd of Vortices of
subtile Matter; but nothing like it is seen in London. In France, 'tis the
Pressure of the Moon that causes the Tides; but in England 'tis the Sea that
gravitates towards the Moon; so that when you think that the Moon
should make it Flood with us, those Gentlemen fancy it should be Ebb,
which, very unluckily, cannot be prov'd. For to be able to do this, 'tis necessary
the Moon and the Tides should have been enquir'd into, at the very instant
of the Creation.

You'll observe farther, that the Sun, which in France is said to have nothing
to do in the Affair, comes in here for very near a quarter of its Assistance.
According to your Cartesians, every Thing is perform'd by an Impulsion, of
which we have very little Notion; and according to Sir Isaac Newton, 'tis by
an Attraction, the Cause of which is as much unknown to us. At Paris you
imagine that the Earth is shap'd like a Melon, or of an oblique Figure; at
London it has an oblate one. A Cartesian declares that Light exists in the Air;
but a Newtonian asserts that it comes from the Sun in six Minutes and a half.
The several Operations of your Chymistry are perform'd by Acids, Alkalies
and subtile Matter; but Attraction prevails even in Chymistry among the
English.

The very Essence of Things is totally chang'd. You neither are agreed
upon the Definition of the Soul, nor on that of Matter. Descartes, as I observ'd
in my last, maintains that the Soul is the same Thing with Thought, and Mr. Locke has given a pretty good Proof of the contrary.

Descartes asserts farther, that Extension alone constitutes Matter, but Sir Isaac adds Solidity to it.

How furiously contradictory are these Opinions!
Non nostrum inter vos tantas componere lites.

Virgil, Eclog. III.

Tis not for us to end such great Disputes.

This famous Newton, this Destroyer of the Cartesian System, died in March Anno 1727. His Countrymen honour’d him in his Life-Time, and interred him as tho’ he had been a King who had made his People happy.

The English read with the highest Satisfaction, and translated into their Tongue, the Elogium of Sir Isaac Newton, which Mr. de Fontenelle, spoke in the Academy of Sciences. Mr. de Fontenelle presides as Judge over Philosophers; and the English expected his Decision, as a solemn Declaration of the Superiority of the English Philosophy over that of the French. But when’twas found that this Gentleman had compos’d Des Cartes to Sir Isaac, the whole Royal Society in London rose up in Arms. So far from acquiescing with Mr. Fontenelle’s Judgment, they criticis’d his Discourse. And even several (who however were not the ablest Philosophers in that Body) were offended at the Comparison; and for no other Reason but because Des Cartes was a Frenchman.

It must be confess’d that these two great Men differ’d very much in Conduct, in Fortune, and in Philosophy.

Nature had indulg’d Des Cartes a shining and strong Imagination, whence he became a very singular Person both in private Life, and in his Manner of Reasoning. This Imagination could not conceal it self even in his philosophical Works, which are every where adorn’d with very shining, ingenious Metaphors and Figures. Nature had almost made him a Poet; and indeed he wrote a Piece of Poetry for the Entertainment of Christina Queen of Sweden, which however was suppress’d in Honour to his Memory.

He embrac’d a Military Life for some Time, and afterwards becoming a complete Philosopher, he did not think the Passion of Love derogatory to his Character. He had by his Mistress a Daughter call’d Frontine, who died young, and was very much regretted by him. Thus he experienc’d every Passion incident to Mankind.

He was a long Time of Opinion, that it would be necessary for him to fly from the Society of his Fellow Creatures, and especially from his native Country, in order to enjoy the Happiness of cultivating his philosophical Studies in full Liberty.

Des Cartes was very right, for his Cotemporaries were not knowing enough to improve and enlighten his Understanding, and were capable of little else than of giving him Uneasiness.

He left France purely to go in search of Truth, which was then persecuted by the wretched Philosophy of the Schools. However, he found that Reason was as much disguis’d and deprav’d in the Universities of Holland, into which he withdrew, as in his own Country. For at the Time that the French condemn’d the only Propositions of his Philosophy which were true, he was persecuted by the pretended Philosophers of Holland, who understood him not better; and who, having a nearer View of his Glory, hated his Person the more, so that he was oblig’d to leave Utrecht. Des Cartes was injuriously accus’d of being an Atheist, the last Refuge of religious Scandal: And he who had employ’d all the Sagacity and Peretration of his Genius, in searching for new Proofs of the Existence of a God, was suspected to believe there was no such Being.

Such a Persecution from all Sides, must necessarily suppose a most exalted Merit as well as a very distinguish’d Reputation, and indeed he possess’d both. Reason at that Time darted a Ray upon the World thro’ the Gloom of the Schools, and the Prejudices of popular Superstition. At last his Name spread so universally, that the French were desirous of bringing him back into his native Country by Rewards, and accordingly offer’d him an annual Pension of a thousand Crowns. Upon these Hopes Des Cartes return’d to France; paid the Fees of his Patent, which was sold at that Time, but no Pension was settled upon him. Thus disappointed, he return’d to his Solitude in North-Holland, where he again pursued the Study of Philosophy, whilst the great Galileo, at fourscore Years of Age, was groaning in the Prisons of the Inquisition, only for having demonstrated the Earth’s Motion.

At last Des Cartes was snatch’d from the World in the Flower of his Age at Stockholm. His Death was owing to a bad Regimen, and he expir’d in the Midst of some Literati who were his Enemies, and under the Hands of a Physician to whom he was odious.

The Progress of Sir Isaac Newton’s Life was quite different. He liv’d happy, and very much honour’d in his native Country, to the Age of fourscore and five Years.

’Twas his peculiar Felicity, not only to be born in a Country of Liberty, but in an Age when all scholastic Impertinencies were banish’d from the World. Reason alone was cultivated, and Mankind cou’d only be his Pupil, not his Enemy.

One very singular Difference in the Lives of these two great Men is, that Sir Isaac, during the long Course of Years he enjoy’d was never sensible to any Passion, was not subject to the common Frailities of Mankind, nor ever had any Commerce with Women; a Circumstance which was assur’d me by the Physician and Surgeon who attended him in his last Moments.

We may admire Sir Isaac Newton on this Occasion, but then we must not censure Des Cartes.

The Opinion that generally prevails in England with regard to these two Philosophers is, that the latter was a Dreamer, and the former a Sage.
Very few People in England read Descartes, whose Works indeed are now useless. On the other Side, but a small Number peruse those of Sir Isaac, because to do this the Student must be deeply skil’d in the Mathematicks, otherwise those Works will be unintelligible to him. But notwithstanding this, these great Men are the Subject of every One’s Discourse. Sir Isaac Newton is allow’d every Advantage, whilst Des Cartes is not indulg’d a single one. According to some, ‘tis to the former that we owe the Discovery of a Vacuum, that the Air is a heavy Body, and the Invention of Telescopes. In a Word, Sir Isaac Newton is here as the Hercules of fabulous Story, to whom the Ignorant ascrib’d all the Feats of ancient Heroes.

In a Critique that was made in London on Mr. de Fontenelle’s Discourse, the Writer presum’d to assert that Des Cartes was not a great Geometrician. Those who make such a Declaration may justly be reproach’d with flying in their Master’s Face. Des Cartes extended the Limits of Geometry as far beyond the Place where he found them, as Sir Isaac did after him. The former first taught the Method of expressing Curves by Equations. This Geometry which, Thanks to him for it, is now grown common, was so abstruse in his Time, that not so much as one Professor would undertake to explain it; and Schotten in Holland, and Format in France, were the only Men who understood it.

He applied this geometrical and inventive Genius to Dioptricks, which, when treated of by him, became a new Art. And if he was mistaken in some Things, the Reason of that is, a Man who discovers a new Tract of Land cannot at once know all the Properties of the Soil. Those who come after him, and make these Lands fruitful, are at least oblig’d to him for the Discovery. I will not deny but that there are innumerable Errors in the rest of Des Cartes’s Works.

Geometry was a Guide he himself had in some Measure fashion’d, which would have conducted him safely thro’ the several Paths of natural Philosophy. Nevertheless he at last abandon’d this Guide, and gave entirely into the Humour of forming Hypotheses; and then Philosophy was no more than an ingenious Romance, fit only to amuse the Ignorant. He was mistaken in the Nature of the Soul, in the Proofs of the Existence of a God, in Matter, in the Laws of Motion, and in the Nature of Light. He admitted innate Ideas, he invented new Elements, he created a World; he made Man according to his own Fancy; and ‘tis justly said, that the Man of Des Cartes is in Fact that of Des Cartes only, very different from the real one.

He push’d his metaphysical Errors so far, as to declare that two and two make four, for no other Reason but because God would have it so. However, ‘twill not be making him too great a Compliment if we affirm that he was valuable even in his Mistakes. He deceiv’d himself, but then it was at least in a methodical Way. He destroy’d all the absurd Chimera’s with which Youth had been infatuated for two thousand Years. He taught his Contemporaries how to reason, and enabled them to employ his own Weapons against himself. If Des Cartes did not pay in good Money, he however did great Service in crying down that of a base Alloy.

I indeed believe, that very few will presume to compare his Philosophy in any respect with that of Sir Isaac Newton. The former is an Essay, the latter a Master-Piece: But then the Man who first brought us to the Path of Truth, was perhaps as great a Genius as he who afterwards conducted us through it.

Des Cartes gave Sight to the Blind. These saw the Errors of Antiquity and of the Sciences. The Path he struck out is since become boundless. Rohault’s little Work was during some Years a complete System of Physics; but now all the Transactions of the several Academies in Europe put together do not form so much as the Beginning of a System. In fathoming this Abyss no Bottom has been found. We are now to examine what Discoveries Sir Isaac Newton has made in it.

16.2 Bernard le Bovier de Fontenelle, Conversations on the Flurality of Worlds, 1686, 1687 ('The Sixth Evening')

THE SIXTH EVENING.

[... ] 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, or 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 enterprise (which) 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 this 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 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 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. […]

...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 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 on her designs in it: in case of new discoveries, we should not be too 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 judgement 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 surprising and wonderful, as some observations which I read the other day in an abridgment 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 Phenomena 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 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
Some unenlightened or hypocritical persons have ventured to profess their hostility to the arts and sciences. If they have been allowed to slander that which does most honour to humanity, we must be all the more entitled to defend it, for that is the duty of all who love society and who are grateful for what they owe to literature. Unfortunately, paradox often makes a greater impression on the public than truth; it is then that we must disabuse the public and refute the authors of such nonsense, not with insults but with sound reason. I am ashamed to state in this Academy that people have had the effrontery to ask whether the sciences are useful or harmful to society, a subject on which no one should entertain the slightest doubt. If we have any superiority over animals, it is certainly not in our bodily faculties, but in the greater understanding which nature has given us; and what distinguishes one man from another is genius and learning. Where lies the infinite difference between a civilized people and barbarians if not in the fact that the former are enlightened, while the others vegetate in brutish ignorance?

The nations which have enjoyed this superiority have been grateful to those who brought them this advantage. Hence the reputation justly enjoyed by those great thinkers of the world, those sages, who through their learned works, have enlightened their compatriots and their age.

Man in himself is little enough; he is born with faculties more or less ripe for development. But they require cultivation; his knowledge must increase if his ideas are to broaden; his memory must be filled if it is to supply the imagination with material on which to work, and his judgement must be refined if it is to discriminate between its own products. The greatest mind, without knowledge, is only a rough diamond that will acquire value only after it has been cut by the hands of a skilful jeweller. What minds have been thus lost to society, what great men of every kind stifled in the bud, whether through ignorance, or through the abject state in which they found themselves placed?

The true benefit of the State, its advantage and glory demand therefore that the people in it should be as well educated and enlightened as possible.

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1 Rousseau in his Discourse on the Arts and Sciences (1750).
attends experience, is explained to be nothing but a peculiar sentiment, or lively conception produced by habit. Nor is this all, when we believe anything of external existence, or suppose an object to exist a moment after it is no longer perceived, this belief is nothing but a sentiment of the same kind. Our author insists upon several other skeptical topics; and upon the whole concludes, that we assent to our faculties, and employ our reason only because we cannot help it. Philosophy would render us entirely Pyrrhonian, were not nature too strong for it.

MAN A MACHINE

JULIEN OFFRAY DE LA METTRIE

The French physician and philosopher la Mettrie (1709–1751) developed a totally mechanistic and materialistic theory of the human mind and of the brain’s functioning. The book from which this selection is taken, Man a Machine (1747), shocked even some of the most irreligious of his fellow philosophers.

A wise man should do more than study nature and truth; he should dare state the truth for the benefit of the few who are willing and able to think. As for the rest, who are the willing slaves of prejudice, they can no more attain truth than frogs can fly.

I reduce to two the systems of philosophers on the subject of man’s soul. The first and older system is materialism; the second is spiritualism.

The metaphysicians who hinted that matter may well be endowed with the faculty of thought did not perhaps reason too badly. Why? Because they had the very real advantage in this case of not expressing their true meaning. For to ask whether matter can think, without considering it otherwise than in itself, is like asking whether matter can tell time. It may be foreseen that we shall avoid this reef on which Locke had the bad luck to founder.

The Leibnitzians with their monads set up an unintelligible hypothesis. They rather spiritualized matter than materialized the soul. How can we define a being whose nature is absolutely unknown to us?

Descartes and all the Cartesians, among whom the followers of Malebranche have long been numbered, made the same mistake. They recognized two distinct substances in man, as if they had seen them, and actually counted them.

Experience and observation should here be our only guides. They are to be found throughout the records of physicians who were philosophers, and not in the works of philosophers who were not physicians. The former have traveled through and illuminated the labyrinth of man; they alone have exposed for us those vital elements hidden beneath the skin, which hides from us so many wonderful things. They alone, tranquilly contemplating our soul, have surprised it, a thousand times, both in its wretchedness and its glory, and have no more despised it in the first state, than admired it in the second. Once again we see that only physicians have the right to speak on this subject. What could the others, especially the theologians, have to tell us? Is it not ridiculous to heap shamelessly dogmatize on a subject which lies completely out of their province and from which on the contrary they have been completely turned aside by obscure studies that have led them to a thousand prejudiced opinions, in a word, to fanaticism, which only increases their ignorance of the mechanism of the body?

But even though we have chosen the best guides, we shall still find many thorns and obstructions in our path.

Man is such a complicated machine that it is impossible to form a clear idea of it beforehand, and hence impossible to define it. For this reason, all the investigations which the greatest philosophers have conducted a priori, that is to say, by attempting in a way to use the wings of the spirit, have been fruitless. Thus it is only a posteriori or by seeking to discover the soul through the organs of the body, so to speak, that we can reach the highest probability concerning man’s own nature, even though one can not discover with certainty what that nature is.

Let us lean then on the staff of experience and pay no attention to the history of all idle philosophical theories. To be blind and to think that we can do without this staff is the worst kind of blindness. How truly a modern writer has said that through vanity alone do we fail to draw from secondary causes the same conclusions as from primary causes! We even should admire all these fine geniuses in their most useless
works, Descartes, Malebranche, Leibnitz, Wolff, and the rest, but what
profit, I ask, has anyone gained from their profound meditations, and
from all their works? Let us start afresh then and discover not what has
been thought, but what must be thought for the sake of repose in life.

There are as many different minds, characters, and customs, as there
are different temperaments. Even Galen knew this truth, which Descartes
carried so far as to claim that medicine alone could change minds and
mores, along with bodies. It is true that melancholy, bile, phlegm,
blood, etc., and the nature, abundance and diverse combinations of these
humors, make one man different from another.

In disease the soul is sometimes hidden, showing no sign of life;
sometimes it is so inflamed by fury that it seems to be doubled; some-
times imbecility vanishes and convalescence turns a fool into a wit.
Sometimes the greatest genius becomes imbecile and no longer recogniz-
able. Farewell then to all that fine knowledge, acquired at so high a
price, and with so much trouble! Here is a paralytic, who asks if his leg
is in bed with him; there is a soldier, who thinks he still has the arm
which has been cut off. The memory of his old sensations, and of the
place to which they were referred by his soul, is the cause of his illusion
and kind of delirium. The mere mention of the member which he has
lost is enough to make him remember all its motions; and this
produces an indefinable and inexpressible kind of imaginary suffering.

This man cries like a child at peace’s approach, while this other
jeers. What was needed to change the bravery of Caius Julius, Seneca
or Petronius into faint-heartedness or cowardice? An obstruction in the
spleen, in the liver, an impediment in the portal vein. Why? Because
the imagination is obstructed along with the viscera, and this gives rise
to all those strange phenomena of hysteria and hypochondria.

What could I add to what has been told of those who imagine
themselves transformed into wolf-men, cock or vampires, or those who
think that the dead suck their blood? Why should I stop to speak of
those who imagine that their noses or some other members are made of
glass and who must be advised to sleep on straw to keep from breaking
them, so that they may recover the use of their flesh-and-blood organs
by setting the straw afire and scaring them—a fright that has sometimes
cured paralysis? I must not tarry over facts that are common knowledge.

Nor shall I dwell at length on the effects of sleep. Take this tired
soldier. He snores in a trench, to the sound of a hundred cannon. His
soul hears nothing; his sleep is perfect apoplexy. A bomb is about to
wipe him out. He will feel the shock less perhaps than an insect under
his foot.

On the other hand, this man who is devoured by jealousy, hatred,
avarice, or ambition, can never find any rest. The most peaceful spot,
the coolest and most calming drinks, all have no effect on a man whose
heart is a prey to the torment of passion.

The soul and the body fall asleep together. As the pulse gradu-
ally slows down, a sweet feeling of peace and quiet spreads throughout
the whole machine. The soul feels itself gently sinking along with the
eyelids and relaxing along with the fibers of the brain; thus little by little it
becomes as if paralyzed along with all the muscles of the body. These
no longer sustain the weight of the head, and the soul can no longer
bear the burden of thought; in sleep it is as if it did not exist.

Is the pulse too quick? the soul cannot sleep. Is the soul too agitated?
the pulse cannot be quieted: the blood gallops through the veins with
an audible murmur. Such are the two interacting causes of insomnia. A
simple fright in our dreams makes the heart beat twice as fast and snatches
us from needed or delightful repose, as a sharp pain or dire necessity
would do. Lastly, just as the cessation of the functions of the soul induces
sleep, the mind, even when we are awake (or in this case half awake),
takes very frequent short naps, or day dreams, which show that the soul
does not always wait for the body to sleep. For if the soul is not fast
sleep, it surely is almost so, since it cannot point out a single object to
which it has paid attention, among the countless confused ideas which,
like so many clouds, so to speak, fill the atmosphere of our brains.

The human body is a machine which winds itself up, the living
image of perpetual motion. Food nourishes the movements which fever
excites. Without food, the soul pines away, goes mad, and dies ex-
hausted. It is a candle whose light flares up the moment before it goes
out. But nourish the body, pour into its veins invigorating juices and
strong liquors; then the soul, taking on their strength, arms itself with a
proud courage, and the soldier whom water would have made flee, now
made bold, runs joyously to death to the sound of drums. Thus a warn-
ing drink excites the blood which a cold drink would have calmed.

What power there is in a meal! Joy is born again in a sad heart; it
inflicts the souls of table-companions, who burst into the friendly songs
in which the French excel. The melancholy man alone is dejected, and
the studious man is likewise out of place.

In general, the form and structure of the brains of quadrupeds are
almost the same as in man; the same shape, the same arrangement everywhere, but with this essential difference, that of all the animals man has the largest brain, and, in proportion to its mass, the brain with the most convolutions. Then comes the monkey, the beaver, the elephant, the dog, the fox, the cat, etc., animals which are the most like man; for among them, too, the same progressive analogy can be seen in relation to the corpus callosum, in which Lancisi established the seat of the soul—anticipating the late M. de la Peyronie, who illustrated the theory with a great many experiments.

After all the quadrupeds, birds have the most brains. Fish have large heads, but these are void of sense, like the heads of many men. Fish have no corpus callosum; and very little brain, while insects entirely lack brain.

The imbecile may not lack brain, as commonly observed, but its consistency will be faulty, for instance, in being too soft. The same thing is true of the insane; the defects of their brains do not always escape our investigation; but if the causes of imbecility, insanity, etc., are not perceptible, how can we hope to discover the causes of the diversity of minds in general? They would escape the eyes of a lynx and an Argus. A mere nothing, a tiny fiber, something that the most delicate dissection cannot discover, would have made two idiots of Erasmus and Fontenelle, and Fontenelle himself makes this observation in one of his best dialogues.

From animals to man, the transition is not violent, as good philosophers will admit. What was man before the invention of words and the knowledge of tongues? An animal of his species, who, with much less native instinct than the others, whose king he then considered himself to be, could not be distinguished from the ape and from the rest, except as the ape itself differs from the other animals; which means, by a face giving promise of more intelligence. Reduced to the bare “intuitive knowledge” of the Leibnitzians he saw only shapes and colors, without being able to distinguish between them; the same, old as young, child at all ages, he stammers out his feelings and needs, like a dog who asks for food when he is hungry or, tired of sleeping, wants to be let out.

Words, languages, laws, sciences, and the fine arts, have come, and by them our rough diamond of a mind has been polished. Man has been trained in the same way as animals; he has become an author, as they become beasts of burden. A geometrician has learned to perform the most difficult demonstrations and calculations, as a monkey has learned to take off or put on his little hat to mount his tame dog. All this has been done through signs, every species has learned what it could understand, and in this way men have acquired “symbolic knowledge,” still so called by our German philosophers.

All this knowledge, which blows up the balloon-like brains of our proud pedants, is therefore but a huge mass of words and figures, which form in the brain all the marks by which we distinguish and recall objects. All our ideas are awakened in the same way that a gardener who knows plants recalls, at the sight of them, all the stages of their growth. These words and the objects designated by them are so connected in the brain that it is comparatively rare to imagine a thing without the name or sign that is attached to it.

I always use the word “imagine,” because I think that everything is imagined and that all the faculties of the soul can be correctly reduced to pure imagination, which gives form to them all. Thus judgment, reason and memory, are in no wise absolute parts of the soul, but real modifications of the kind of medullary screen upon which images of the objects painted in the eye are reflected as by a magic lantern.

But if such is the marvelous and incomprehensible result of the structure of the brain, if everything is perceived and explained by imagination, why should we divide the sensitive principle which thinks in man? Is it not this clearly an inconsistency on the part of those who uphold the simplicity of the mind? For a thing that can be divided can no longer without absurdity be regarded as indivisible. This is where we come to through the abuse of language and those fine words “spirituality,” “immateriality,” etc., used haphazardly and not understood even by the most intelligent.

We were not originally made to be learned; we have become so perhaps by a sort of abuse of our organic faculties, and at the expense of the State, which nourishes a host of loafers whom vanity has adorned with the name of “philosophers.” Nature created us all solely to be happy—yes, all, from the crawling worm to the eagle that soars out of sight in the clouds. That is why she has given all animals some share of natural law, a share of greater or less delicacy according to the needs of each animal’s organs when in good condition.

Now how shall we define natural law? It is a feeling which teaches us what we should not do, because we would not wish it to be done to us. Would I dare add to this common idea, that this feeling seems to me but a kind of fear or dread, as salutary to the race as to the individual? For perhaps we respect the purses and lives of others only to save our
own possessions, our honor, and our own lives; like those "Ixions of Christianity" who love God and embrace so many fantastic virtues, merely because of their fear of hell.

You see that natural law is nothing but an intimate feeling which belongs also to the imagination like all other feelings, thought included. Consequently it evidently does not presuppose education, revelation or legislator, unless we confuse it with civil laws, in the ridiculous fashion of the theologians.

The arms of fanaticism may destroy those who maintain these truths, but they will never destroy the truths themselves.

Not that I call in question the existence of a supreme being; on the contrary it seems to me that the greatest degree of probability is in favor of this belief. But since the existence of this being does not prove that one form of worship is more necessary than any other, it is a theoretic truth with very little practical value. Therefore, since we may say, after such long experience, that religion does not imply exact honesty, we are authorized by the same reasons to think that atheism does not exclude it.

Furthermore, who knows whether the reason for man's existence is not simply the fact that he exists? Perhaps he was thrown by chance on some spot of the earth's surface, nobody knows how or why, but simply that he must live and die, like mushrooms that appear from one day to the next, or like the flowers which border ditches and cover walls...

Let us conclude boldly then that man is a machine, and that in the whole universe there is but a single substance with various modifications. This is no hypothesis set up by dint of proposals and assumptions. It is not the work of prejudice, nor even of my reason alone; I would have disdained a guide which I believe so untrustworthy, had not my senses held the torch, so to speak, and induced me to follow reason by lighting the way. Experience has thus spoken to me in behalf of reason; and in this way I have combined the two.

But it must have been noticed that I have not allowed myself even the most forceful and immediately deduced reasoning, except as it followed a multitude of observations which no scholar will contest; and furthermore, I recognize only scientists as judges of the conclusions which I draw, and I hereby challenge every prejudiced man who is not an anatomist, or acquainted with the only philosophy which is to the purpose, that of the human body. Against such a strong and solid oak, what could the weak reeds of theology, metaphysics and scholasticism, avail; childish weapons, like our foils, which may well afford the pleasure of fencing, but can never wound an adversary. Need I say that I refer to the hollow and trivial notions, to the trite and pitiable arguments that will be urged, as long as the shadow of prejudice or superstition remains on earth, for the supposed incompatibility of two substances which meet and interact unceasingly? Such is my system, or rather the truth, unless I am very much mistaken. It is short and simple. Dispute it now who will.

David Hartley

OF IDEAS, THEIR GENERATION AND ASSOCIATIONS

DAVID HARTLEY

An English physician and theologian, Hartley (1705–1757) is associated with the doctrine of "associationism," which sought to explain how the ideas that Locke had suggested originate in sensory sensations become associated in a certain necessary order in the brain. This passage is from his 1749 book, Observations on Man.

I took notice in the Introduction, that those Ideas which resemble Sensations were called Ideas of Sensation; and also that they might be called simple Ideas, in respect of the intellectual ones which are formed from them, and of whose very Essence it is to be complex. But the Ideas of Sensation are not entirely simple, since they must consist of Parts both coexistent and successive, as the generating Sensations themselves do.

Now, that the simple Ideas of Sensation are thus generated, agreeably to the Proposition, appears, because the most vivid of these Ideas are those where the corresponding Sensations are most vigorously impressed, or most frequently renewed; whereas, if the Sensation be faint, or uncommon, the generated Idea is also faint in proportion, and, in extreme Cases, evanescent and imperceptible. The exact Observance of the Order of Place in visible Ideas, and of the Order of Time in audible ones, may likewise serve to show, that these Ideas are Copies and Off-