

*An Abstract of A Treatise of Human Nature***
by
David Hume (1)

This book seems to be written upon the same plan with several other works that have had a great vogue of late years in England. The philosophical spirit, which has been so much improved all over Europe within these last fourscore years, has been carried to as great a length in this kingdom as in any other. Our writers seem even to have started a new kind of philosophy, which promises more, both to the entertainment and advantage of mankind, than any other with which the world has been yet acquainted. Most of the philosophers of antiquity who treated of human nature have shown more of a delicacy of sentiment, a just sense of morals, or a greatness of soul, than a depth of reasoning and reflection. They content themselves with representing the common sense of mankind in the strongest lights, and with the best turn of thought and expression, without following out steadily a chain of propositions, or forming the several truths into a regular science. But it is at least worth while to try if the science of man will not admit of the same accuracy, which several parts of natural philosophy are found susceptible of. There seems to be all the reason in the world to imagine that it may be carried to the greatest degree of exactness. If, in examining several phenomena, we find that they resolve themselves into one common principle, and can trace this principle into another, we shall at last arrive at those few simple principles on which all the rest depend. And though we can never arrive at the ultimate principles, it is a satisfaction to go as far as our faculties will allow us.

This seems to have been the aim of our late philosophers, and, among the rest, of this author. He proposes to anatomize human nature in a regular manner, and promises to draw no conclusions but where he is authorized by experience. He talks with contempt of hypotheses; and insinuates that such of our countrymen as have banished them from moral philosophy, have done a more signal service to the world than my Lord Bacon, whom he considers as the father of experimental physics. He mentions, on this occasion, Mr. Locke, my Lord Shaftesbury, Dr. Mandeville, Mr. Hutcheson, Dr. Butler, who, though they differ in many points among themselves, seem all to agree in founding their accurate disquisitions of human nature entirely upon experience.

Beside the satisfaction of being acquainted with what most nearly concerns us, it may be safely affirmed that almost all the sciences are comprehended in the science of human nature, and are dependent on it. *The sole end of logic is to explain the principles and operations of our reasoning faculty, and the nature of our ideas; morals and criticism regard our tastes and sentiments; and politics consider men as united in society, and dependent on each other.* This treatise, therefore, of human nature seems intended for a system of the sciences. The author has finished what regards logic, and has laid the foundation of the other parts in his account of the passions.

The celebrated Monsieur Leibnitz has observed it to be a defect in the common systems of logic that they are very copious when they explain the operations of the understanding in the forming of demonstrations, but are too concise when they treat of probabilities, and

those other measures of evidence on which life and action entirely depend, and which are our guides even in most of our philosophical speculations. In this censure he comprehends *The Essay on Human Understanding*, *Le Recherche de la Verité*, and *L'Art de Penser*. (2) The author of the *Treatise of Human Nature* seems to have been sensible of this defect in these philosophers, and has endeavoured, as much as he can, to supply it. As his book contains a great number of speculations very new and remarkable, it will be impossible to give the reader a just notion of the whole. We shall, therefore, chiefly confine ourselves to his explication of our reasonings from cause and effect. If we can make this intelligible to the reader, it may serve as a specimen of the whole.

Our author begins with some definitions. He calls a *perception* whatever can be present to the mind, whether we employ our senses, or are actuated with passion, or exercise our thought and reflection. He divides our perceptions into two kinds, viz. *impressions* and *ideas*. When we feel a passion or emotion of any kind, or have the images of external objects conveyed by our senses, the perception of the mind is what he calls an *impression*, which is a word that he employs in a new sense. When we reflect on a passion or an object which is not present, this perception is an *idea*. *Impressions*, therefore, are our lively and strong perceptions; ideas are the fainter and weaker. This distinction is evident; as evident as that betwixt feeling and thinking.

The first proposition he advances is that all our ideas, or weak perceptions, are derived from our impressions, or strong perceptions, and that we can never think of anything which we have not seen without us, or felt in our own minds. This proposition seems to be equivalent to that which Mr. Locke has taken such pains to establish, viz. *that no ideas are innate*. Only it may be observed, as an inaccuracy of that famous philosopher, that he comprehends all our perceptions under the term of idea, in which sense it is false that we have no innate ideas. For it is evident our stronger perceptions or impressions are innate, and that natural affection, love of virtue, resentment, and all the other passions, arise immediately from nature. I am persuaded whoever would take the question in this light, would be easily able to reconcile all parties. Father Malebranche would find himself at a loss to point out any thought of the mind which did not represent something antecedently felt by it, either internally, or by means of the external senses, and must allow that however we may compound, and mix, and augment, and diminish our ideas, they are all derived from these sources. Mr. Locke, on the other hand, would readily acknowledge that all our passions are a kind of natural instincts, derived from nothing but the original constitution of the human mind.

Our author thinks, 'that no discovery could have been made more happily for deciding all controversies concerning ideas than this, that impressions always take the precedency of them, and that every idea with which the imagination is furnished first makes its appearance in a correspondent impression. These latter perceptions are all so clear and evident that they admit of no controversy; though many of our ideas are so obscure that it is almost impossible, even for the mind which forms them, to tell exactly their nature and composition.' Accordingly, wherever any idea is ambiguous, he has always recourse to the impression, which must render it clear and precise. And when he suspects that any philosophical term has no idea annexed to it

(as is too common) he always asks *from what impression that idea is derived?* And if no impression can be produced, he concludes that the term is altogether insignificant. It is after this manner he examines our idea of *substance* and *essence*; and it were to be wished that this rigorous method were more practised in all philosophical debates.

It is evident that all reasonings concerning *matter of fact* are founded on the relation of cause and effect, and that we can never infer the existence of one object from another, unless they be connected together, either mediately or immediately. In order, therefore, to understand these reasonings, we must be perfectly acquainted with the idea of a cause; and in order to that, must look about us to find something that is the cause of another.

Here is a billiard ball lying on the table, and another ball moving towards it with rapidity. They strike; and the ball which was formerly at rest now acquires a motion. This is as perfect an instance of the relation of cause and effect as any which we know, either by sensation or reflection. Let us therefore examine it. It is evident that the two balls touched one another before the motion was communicated, and that there was no interval betwixt the shock and the motion. *Contiguity* in time and place is therefore a requisite circumstance to the operation of all causes. It is evident, likewise, that the motion which was the cause is prior to the motion which was the effect. *Priority* in time is therefore another requisite circumstance in every cause. But this is not all. Let us try any other balls of the same kind in a like situation, and we shall always find that the impulse of the one produces motion in the other. Here, therefore, is a *third* circumstance, viz. that of a *constant conjunction* betwixt the cause and effect. Every object like the cause produces always some object like the effect. Beyond these three circumstances of contiguity, priority, and constant conjunction, I can discover nothing in this cause. The first ball is in motion; touches the second; immediately the second is in motion: and when I try the experiment with the same or like balls, in the same or like circumstances, I find that upon the motion and touch of the one ball, motion always follows in the other. In whatever shape I turn this matter, and however I examine it, I can find nothing farther.

This is the case when both the cause and effect are present to the senses. Let us now see upon what our inference is founded, when we conclude from the one that the other has existed or will exist. Suppose I see a ball moving in a straight line towards another, I immediately conclude that they will shock and that the second will be in motion. This is the inference from cause to effect, and of this nature are all our reasonings in the conduct of life: on this is founded all our belief in history; and from hence is derived all philosophy, excepting only geometry and arithmetic. If we can explain the inference from the shock of two balls, we shall be able to account for this operation of the mind in all instances.

Were a man, such as Adam, created in the full vigour of understanding, without experience, he would never be able to infer motion in the second ball from the motion and impulse of the first. It is not anything that reason sees in the cause which makes us *infer* the effect. Such an inference, were it possible, would amount to a demonstration, as being founded merely on the comparison of ideas. But no inference from cause to effect amounts to a demonstration, of which there is this evident proof. The mind can always

conceive any effect to follow from any cause, and indeed any event to follow upon another: whatever we *conceive* is possible, at least in a metaphysical sense; but wherever a demonstration takes place, the contrary is impossible, and implies a contradiction. There is no demonstration, therefore, for any conjunction of cause and effect. And this is a principle which is generally allowed by philosophers.

It would have been necessary, therefore, for Adam (if he was not inspired) to have had *experience* of the effect which followed upon the impulse of these two balls. He must have seen, in several instances, that when the one ball struck upon the other, the second always acquired motion. If he had seen a sufficient number of instances of this kind, whenever he saw the one ball moving towards the other, he would always conclude without hesitation that the second would acquire motion. His understanding would anticipate his sight and form a conclusion suitable to his past experience.

It follows, then, that all reasonings concerning cause and effect are founded on experience, and that all reasonings from experience are founded on the supposition that the course of nature will continue uniformly the same. We conclude that like causes, in like circumstances, will always produce like effects. It may now be worth while to consider what determines us to form a conclusion of such infinite consequence.

It is evident that Adam, with all his science, would never have been able to *demonstrate* that the course of nature must continue uniformly the same, and that the future must be conformable to the past. What is possible can never be demonstrated to be false; and it is possible the course of nature may change, since we can conceive such a change. Nay, I will go farther, and assert that he could not so much as prove by any probable arguments that the future must be conformable to the past. All probable arguments are built on the supposition that there is this conformity betwixt the future and the past, and therefore can never prove it. This conformity is a *matter of fact*, and, if it must be proved, will admit of no proof but from experience. But our experience in the past can be a proof of nothing for the future, but upon a supposition that there is a resemblance betwixt them. This, therefore, is a point which can admit of no proof at all, and which we take for granted without any proof.

We are determined by *custom* alone to suppose the future conformable to the past. When I see a billiard ball moving towards another, my mind is immediately carried by habit to the usual effect, and anticipates my sight by conceiving the second ball in motion. There is nothing in these objects, abstractly considered, and independent of experience, which leads me to form any such conclusion; and even after I have had experience of many repeated effects of this kind, there is no argument which determines me to suppose that the effect will be conformable to past experience. The powers by which bodies operate are entirely unknown. We perceive only their sensible qualities: and what *reason* have we to think that the same powers will always be conjoined with the same sensible qualities?

It is not, therefore, reason which is the guide of life, but custom. That alone determines the mind, in all instances, to suppose the future conformable to the past. However easy this step may seem, reason would never, to all eternity, be able to make it.

This is a very curious discovery, but leads us to others that are still more curious. When *I see a billiard ball moving towards another, my mind is immediately carried by habit to the usual effect, and anticipates my sight by conceiving the second ball in motion.* But is this all? Do I nothing but *conceive* the motion of the second ball? No, surely. I also *believe* that it will move. What then is this *belief*? And how does it differ from the simple conception of anything? Here is a new question unthought of by philosophers.

When a demonstration convinces me of any proposition, it not only makes me conceive the proposition, but also makes me sensible that it is impossible to conceive anything contrary. What is demonstratively false implies a contradiction; and what implies a contradiction cannot be conceived. But with regard to any matter of fact, however strong the proof may be from experience, I can always conceive the contrary, though I cannot always believe it. The belief, therefore, makes some difference betwixt the conception to which we assent, and that to which we do not assent.

To account for this, there are only two hypotheses. It may be said that belief joins some new idea to those which we may conceive without assenting to them. But this hypothesis is false. For *first*, no such idea can be produced. When we simply conceive an object, we conceive it in all its parts. We conceive it as it might exist, though we do not believe it to exist. Our belief of it would discover no new qualities. We may paint out the entire object in imagination without believing it. We may set it, in a manner, before our eyes, with every circumstance of time and place. It is the very object conceived as it might exist; and when we believe it, we can do no more.

Secondly, the mind has a faculty of joining all ideas together, which involve not a contradiction; and therefore, if belief consisted in some idea, which we add to the simple conception, it would be in a man's power, by adding this idea to it, to believe anything which he can conceive.

Since, therefore, belief implies a conception, and yet is something more; and since it adds no new idea to the conception; it follows that it is a different *manner* of conceiving an object - *something* that is distinguishable to the feeling, and depends not upon our will, as all our ideas do. My mind runs by habit from the visible object of one ball moving towards another, to the usual effect of motion in the second ball. It not only conceives that motion, but *feels* something different in the conception of it from a mere reverie of the imagination. The presence of this visible object, and the constant conjunction of that particular effect, render the idea different to the *feeling* from those loose ideas which come into the mind without any introduction. This conclusion seems a little surprising; but we are led into it by a chain of propositions which admit of no doubt. To ease the reader's memory I shall briefly resume them. No matter of fact can be proved but from its cause or its effect. Nothing can be known to be the cause of another but by experience. We can

give no reason for extending to the future our experience in the past, but are entirely determined by custom when we conceive an effect to follow from its usual cause. But we also believe an effect to follow, as well as conceive it. This belief joins no new idea to the conception. It only varies the manner of conceiving, and makes a difference to the feeling or sentiment. Belief, therefore, in all matters of fact arises only from custom, and is an idea conceived in a peculiar *manner*.

Our author proceeds to explain the manner or feeling, which renders belief different from a loose conception. He seems sensible that it is impossible by words to describe this feeling, which everyone must be conscious of in his own breast. He calls it sometimes a *stronger* conception, sometimes a more *lively*, a more *vivid*, a *firmer*, or a more *intense* conception. And, indeed, whatever name we may give to this feeling which constitutes belief, our author thinks it evident that it has a more forcible effect on the mind than fiction and mere conception. This he proves by its influence on the passions and on the imagination, which are only moved by truth, or what is taken for such. Poetry, with all its art, can never cause a passion like one in real life. It fails in the original conception of its objects, which never *feel* in the same manner as those which command our belief and opinion.

Our author, presuming that he had sufficiently proved that the ideas we assent to are different to the feeling from the other ideas, and that this feeling is more firm and lively than our common conception, endeavours in the next place to explain the cause of this lively feeling by an analogy with other acts of the mind. His reasoning seems to be curious; but could scarce be rendered intelligible, or at least probable to the reader, without a long detail, which would exceed the compass I have prescribed to myself.

I have likewise omitted many arguments which he adduces to prove that belief consists merely in a peculiar feeling or sentiment. I shall only mention one; our past experience is not always uniform. Sometimes one effect follows from a cause, sometimes another: in which case we always believe that that will exist which is most common. I see a billiard ball moving towards another. I cannot distinguish whether it moves upon its axis, or was struck so as to skim along the table. In the first case, I know it will not stop after the shock. In the second it may stop. The first is most common, and therefore I lay my account with that effect. But I also conceive the other effect, and conceive it as possible, and as connected with the cause. Were not the one conception different in the feeling or sentiment from the other, there would be no difference betwixt them.

We have confined ourselves in this whole reasoning to the relation of cause and effect, as discovered in the motions and operations of matter. But the same reasoning extends to the operations of the mind. Whether we consider the influence of the will in moving our body, or in governing our thought, it may safely be affirmed that we could never foretell the effect, merely from the consideration of the cause, without experience. And even after we have experience of these effects, it is custom alone, not reason, which determines us to make it the standard of our future judgments. When the cause is presented, the mind, from habit, immediately passes to the conception and belief of the usual effect. This belief

is something different from the conception. It does not, however, join any new idea to it. It only makes it be felt differently, and renders it stronger and more lively.

Having dispatched this material point concerning the nature of the inference from cause and effect, our author returns upon his footsteps, and examines anew the idea of that relation. In the considering of motion communicated from one ball to another, we could find nothing but contiguity, priority in the cause, and constant conjunction. But, beside these circumstances, it is commonly supposed that there is a necessary connexion betwixt the cause and effect, and that the cause possesses something, which we call a *power*, or *force*, or *energy*. The question is, what idea is annexed to these terms? If all our ideas or thoughts be derived from our impressions, this power must either discover itself to our senses, or to our internal feeling. But so little does any power discover itself to the senses in the operations of matter, that the Cartesians have made no scruple to assert that matter is utterly deprived of energy, and that all its operations are performed merely by the energy of the supreme Being. But the question still recurs, *what idea have we of energy or power even in the supreme Being?* All our idea of a Deity (according to those who deny innate ideas) is nothing but a composition of those ideas which we acquire from reflecting on the operations of our minds. Now our own minds afford us no more notion of energy than matter does. When we consider our will or volition *a priori*, abstracting from experience, we should never be able to infer any effect from it. And when we take the assistance of experience, it only shows us objects contiguous, successive, and constantly conjoined. Upon the whole, then, either we have no idea at all of force and energy, and these words are altogether insignificant, or they can mean nothing but that determination of the thought, acquired by habit, to pass from the cause to its usual effect. But whoever would thoroughly understand this must consult the author himself it is sufficient if I can make the learned world apprehend that there is some difficulty in the case, and that whoever solves the difficulty must say something very new and extraordinary - as new as the difficulty itself.

By all that has been said the reader will easily perceive that the philosophy contained in this book is very sceptical, and tends to give us a notion of the imperfections and narrow limits of human understanding. Almost all reasoning is there reduced to experience; and the belief, which 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 sceptical 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.

I shall conclude the logics of this author with an account of two opinions, which seem to be peculiar to himself, as indeed are most of his opinions. He asserts that the soul, as far as we can conceive it, is nothing but a system or train of different perceptions, those of heat and cold, love and anger, thoughts and sensations, all united together, but without any perfect simplicity or identity. Descartes maintained that thought was the essence of the mind; not this thought or that thought, but thought in general. This seems to be abso-

lutely unintelligible, since everything that exists is particular; and, therefore, it must be our several particular perceptions that compose the mind. I say, *compose* the mind, not *belong* to it. The mind is not a substance, in which the perceptions inhere. That notion is as unintelligible as the Cartesian, that thought or perception in general is the essence of the mind. We have no idea of substance of any kind, since we have no idea but what is derived from some impression, and we have no impression of any substance either material or spiritual. We know nothing but particular qualities and perceptions. As our idea of any body, a peach, for instance, is only that of a particular taste, colour, figure, size, consistence, etc.; so our idea of any mind is only that of particular perceptions, without the notion of anything we call substance, either simple or compound.

The second principle, which I proposed to take notice of, is with regard to geometry. Having denied the infinite divisibility of extension, our author finds himself obliged to refute those mathematical arguments which have been adduced for it; and these indeed are the only ones of any weight. This he does by denying geometry to be a science exact enough to admit of conclusions so subtle as those which regard infinite divisibility. His arguments may be thus explained. All geometry is founded on the notions of equality and inequality, and, therefore, according as we have or have not an exact standard of that relation, the science itself will or will not admit of great exactness. Now there is an exact standard of equality, if we suppose that quantity is composed of indivisible points. Two lines are equal when the numbers of the points that compose them are equal, and when there is a point in one corresponding to a point in the other. But though this standard be exact, it is useless; since we can never compute the number of points in any line. It is besides founded on the supposition of finite divisibility, and therefore can never afford any conclusion against it. If we reject this standard of equality, we have none that has any pretensions to exactness. I find two that are commonly made use of. Two lines above a yard, for instance, are said to be equal when they contain any inferior quantity, as an inch, an equal number of times. But this runs in a circle. For the quantity we call an inch in the one is supposed to be *equal* to what we call an inch in the other: and the question still is, by what standard we proceed when we judge them to be equal; or, in other words, what we mean when we say they are equal. If we take still inferior quantities, we go on *in infinitum*. This therefore is no standard of equality. The greatest part of philosophers, when asked what they mean by equality, say that the word admits of no definition, and that it is sufficient to place before us two equal bodies, such as two diameters of a circle, to make us understand that term. Now this is taking the *general appearance* of the objects for the standard of that proportion, and renders our imagination and senses the ultimate judges of it. But such a standard admits of no exactness, and can never afford any conclusion contrary to the imagination and senses. Whether this question be just or not must be left to the learned world to judge. It were certainly to be wished that some expedient were fallen upon to reconcile philosophy and common sense, which, with regard to the question of infinite divisibility, have waged most cruel wars with each other.

We must now proceed to give some account of the second volume of this work, which treats of the passions. It is of more easy comprehension than the first, but contains opinions that are together as new and extraordinary. The author begins with *pride* and *humility*. He observes that the objects which excite these passions are very numerous, and seem-

ingly very different from each other. Pride or self-esteem may arise from the qualities of the mind - wit, good-sense, learning, courage, integrity; from those of the body - beauty, strength, agility, good mien, address in dancing, riding, fencing; from external advantages - country, family, children, relations, riches, houses, gardens, horses, dogs, clothes. He afterwards proceeds to find out that common circumstance in which all these objects agree, and which causes them to operate on the passions. His theory likewise extends to love and hatred, and other affections. As these questions, though curious, could not be rendered intelligible without a long discourse, we shall here omit them.

It may perhaps be more acceptable to the reader to be informed of what our author says concerning *free-will*. He has laid the foundation of his doctrine in what he said concerning cause and effect, as above explained. 'it is universally acknowledged, that the operations of external bodies are necessary, and that in the communication of their motion, in their attraction and mutual cohesion, there are not the least traces of indifference or liberty.' . . . 'Whatever, therefore, is in this respect on the same footing with matter, must be acknowledged to be necessary. That we may know whether this be the case with the actions of the mind, we may examine matter, and consider on what the idea of a necessity in its operations are founded, and why we conclude one body or action to be the infallible cause of another.

'It has been observed already, that in no single instance the ultimate connexion of any object is discoverable either by our senses or reason, and that we can never penetrate so far into the essence and construction of bodies, as to perceive the principle on which their mutual influence is founded. It is their constant union alone with which we are acquainted; and it is from the constant union the necessity arises, when the mind is determined to pass from one object to its usual attendant, and infer the existence of one from that of the other. Here then are two particulars, which we are to regard as essential to *necessity*, viz. the constant union and the *inference* of the mind, and wherever we discover these we must acknowledge a necessity.' Now nothing is more evident than the constant union of particular actions with particular motives. If all actions be not constantly united with their proper motives, this uncertainty is no more than what may be observed every day in the actions of matter, where, by reason of the mixture and uncertainty of causes, the effect is often variable and uncertain. Thirty grains of opium will kill any man that is not accustomed to it, though thirty grains of rhubarb will not always purge him. In like manner, the fear of death will always make a man go twenty paces out of his road, though it will not always make him do a bad action.

And as there is often a constant conjunction of the actions of the will with their motives, so the inference from the one to the other is often as certain as any reasoning concerning bodies; and there is always an inference proportioned to the constancy of the conjunction. On this is founded our belief in witnesses, our credit in history, and indeed all kinds of moral evidence, and almost the whole conduct of life.

Our author pretends that this reasoning puts the whole controversy in a new light, by giving a new definition of necessity. And indeed the most zealous advocates for free will must

allow this union and inference with regard to human actions. They will only deny that this makes the whole of necessity. But then they must show that we have an idea of something else in the actions of matter; which, according to the foregoing reasoning, is impossible.

Through this whole book there are great pretensions to new discoveries in philosophy; but if anything can entitle the author to so glorious a name as that of an *inventor*, it is the use he makes of the principle of the association of ideas, which enters into most of his philosophy. Our imagination has a great authority over our ideas; and there are no ideas that are different from each other which it cannot separate, and join, and compose into all the varieties of fiction. But notwithstanding the empire of the imagination, there is a secret tie or union among particular ideas, which causes the mind to conjoin them more frequently together, and makes the one, upon its appearance, introduce the other. Hence arises what we call the *apropos* of discourse; hence the connexion of writing; and hence that thread, or chain of thought, which a man naturally supports even in the loosest reverie. These principles of association are reduced to three, viz. *Resemblance* - a picture naturally makes us think of the man it was drawn for: *contiguity* - when St. Denis is mentioned, the idea of Paris naturally occurs: *causation* - when we think of the son, we are apt to carry our attention to the father. It will be easy to conceive of what vast consequence these principles must be in the science of human nature, if we consider that, so far as regards the mind, these are the only links that bind the parts of the universe together, or connect us with any person or object exterior to ourselves. For as it is by means of thought only that anything operates upon our passions, and as these are the only ties of our thoughts, they are really to us the cement of the universe, and all the operations of the mind must, in a great measure, depend on them.

FINIS

** This e-text of the *Abstract* and its footnotes were created by Carl Mickelsen. Permission is granted for electronic copying, distribution in print form for educational purposes and personal use. No permission is granted for commercial use of this material. Carl Mickelsen - carlmick@moscow.com

(1) Books I and II of [A Treatise of Human Nature](#) were published anonymously in 1739. Hume published the *Abstract*, also anonymously, in 1740.

(2) [An Essay on Human Understanding](#) by John Locke (1690), *Le Recherche de la Verité* [[The Search After Truth](#)] by [Nicolas Malebranche](#) (1674), and *Art de Penser* [[The Art of Thinking](#), a.k.a. *Port-Royal Logic*] by [Antoine Arnauld](#) and Pierre Nicole (1662).