From *Logic or the Art of Thinking*
this section attributed to Antoine Arnauld

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CHAPTER 16

The judgments we ought to make concerning future accidents

These rules, which are helpful for judging about past events, can easily be applied to future events. For as we ought to believe it probable that an event has happened whenever certain circumstances [352] we know about are ordinarily connected with that event, we also ought to believe that it is likely to happen whenever present circumstances are such that they are usually followed by such an effect. This is how doctors can decide the good or bad outcome of diseases, how military leaders judge the future course of a war, and how we in the world judge most contingent matters.

But with respect to accidents in which we play a part, and that we can bring about or prevent in some sense by our care in exposing ourselves to them or avoiding them, many people happen to fall into an illusion that is all the more deceptive as it appears more reasonable to them. This is that they consider only the greatness and importance of the benefit they desire or the disadvantage they fear, without considering in any way the likelihood or probability that this benefit or disadvantage will or will not come about.

So whenever they are apprehensive about some great harm, such as loss of life or all their wealth, they think it prudent not to neglect any precaution to safeguard themselves against it. And if it is some great good, such as gaining a hundred thousand crowns, they think they are acting wisely by trying to obtain it if the risks are slight, however unlikely they are to succeed.

It was reasoning of this kind that led a princess, who heard that some persons were crushed by a falling ceiling, not to enter a house ever afterwards without having it inspected first. She was so convinced she was right that it seemed to her that everyone who acted otherwise was imprudent.

This is also the form of reasoning that leads various people into troublesome and excessive precautions for protecting their health. This is what makes others overly distrustful in the smallest matters because, having been mistaken on a few occasions, they assume they will also be wrong about everything. This is what attracts so many people to lotteries: Is it not highly advantageous, they say, to win twenty thousand crowns for one crown? Each person thinks he will be the happy person who will win the jackpot. No one reflects that if it is, for example, twenty thousand crowns, it may be thirty thousand times more probable for each individual [353] to lose rather than to win it.

The flaw in this reasoning is that in order to decide what we ought to do to obtain some good or avoid some harm, it is necessary to consider not only the good

or harm in itself, but also the probability that it will or will not occur, and to view geometrically the proportion all these things have when taken together. This can be clarified by the following example.

There are games in which, if ten persons each put in a crown, only one wins the whole pot and all the others lose. Thus each person risks losing only a crown and may win nine. If we consider only the gain and loss in themselves, it would appear that each person has the advantage. But we must consider in addition that if each could win nine crowns and risks losing only one, it is also nine times more probable for each person to lose one crown and not win the nine. Hence each has nine crowns to hope for himself, one crown to lose, nine degrees of probability of losing a crown, and only one of winning the nine crowns. This puts the matter at perfect equality.

All games of this sort are fair, as much as games can be, and those that are otherwise are manifestly unfair. This is how we can show that there is an obvious injustice in the type of games called lotteries because, with the operator of the lottery usually taking a tenth for his share in advance, the whole group of players is duped in the same way as if someone made an equal wager, that is, where the likelihood of winning is as great as that of losing, of ten pistoles against nine. Now if this is disadvantageous to the whole group, it is also disadvantageous to each person in it, since from this it follows that the probability of loss exceeds the probability of winning by more than the advantage desired exceeds the disadvantage to which one is exposed, namely of losing what he has put in.

Sometimes the success of something is so unlikely that however advantageous it may be, and however little risk there is in obtaining it, it is preferable not to chance it. Thus it would be foolish to play twenty sous against ten million pounds, or against a kingdom, on the condition that one could win only in case a child arranging the letters in a printer's shop at random immediately composed the first twenty verses of Virgil's *Aeneid*. So without thinking about it, there is no moment in life in which we [354] would risk life any more than a prince would risk his kingdom in wagering on this condition.[1]

These reflections appear trivial, and in effect they are if we go no further. But we can make them useful for more important things. The main use we ought to derive from them is to make us more reasonable in our hopes and fears. Many people, for example, are exceedingly frightened when they hear thunder. If thunder makes them think of God and death and happiness, we could not think about it too much. But if it is only the danger of dying by lightning that causes them this unusual apprehension, it is easy to show that this is unreasonable. For out of two million people, at most there is one who dies this way. We could even say that there is hardly a violent death that is less common. So, then, our fear of some harm ought to be proportional not only to the magnitude of the harm, but also to the probability

[1] Here Arnauld borrows from Pascal the premises of his famous argument, "Pascal's wager," concerning the existence of God. See the *Pensées*, "Infini rien," No. 233, *Pensées and the Provincial Letters*, pp. 79–84.

of the event. Just as there is hardly any kind of death more rare than being struck by lightning, there is also hardly any that ought to cause us less fear, especially given that this fear is no help in avoiding it.

Not only is this how we should set straight these people who take extraordinary and bothersome precautions to safeguard their life and health, by showing them that these precautions are a greater harm than is the danger of such a remote accident as the one they fear. But it is also necessary to disabuse other people who reason almost the same way in their undertakings – there is danger in this affair, therefore it is bad; there is an advantage in that one, therefore it is good – since it is neither by the danger nor the advantages, but by the proportion between them that we should judge them.

It is the nature of finite things, however great they are, to be able to be surpassed by the smallest things if they are multiplied often, whether the little things surpass the largest in the likelihood of their occurring more than they are surpassed in magnitude. Thus the smallest gain can surpass the largest that could be imagined if the lesser one is often duplicated, or if the greater good is so difficult to obtain [355] that it surpasses the small one in size by less than the small one surpasses it in ease of acquisition. The same is true of the harms we dread, that is, that the smallest harm can be more important than the greatest harm that is not infinite, if it surpasses it by this proportion.

Only infinite things such as eternity and salvation cannot be equalled by any temporal benefit. Thus we ought never balance them off against anything worldly. This is why the slightest bit of help for acquiring salvation is worth more than all the goods of the world taken together. And the least peril of being lost is more important than all temporal harms considered merely as harms.

This is enough to make all reasonable people draw this conclusion, with which we will end this *Logic*: that the greatest of all follies is to use one's time and life for something other than what may be useful for acquiring a life that will never end, since all the goods and harms of this life are nothing in comparison to those of the other life, and the danger of falling into those harms, as well as the difficulty of acquiring these goods, is very great.

Those who draw this conclusion and who follow it in the way they lead their lives are prudent and wise, however inexact they are in reasoning about scientific matters. Those who do not draw it, however exact they are in everything else, are treated in Scripture as foolish and senseless persons, and they misuse logic, reason, and life.

The end.