A TREATISE

ON

POLITICAL ECONOMY, &c.

SUPPLEMENT

TO THE

First Section of the Elements of Ideology.

In proportion as I advance in the digestion of these elements, I am incessantly obliged to return to objects, of which I have already treated. At the commencement of the grammar it was necessary to recall the attention of the reader to the analysis of the judgment, to render still more precise the idea of that intellectual operation, and of its results, and to repeat several of the effects already recognized in the signs, and several of their relations, with the nature of the ideas which they represent.

At the commencement of the volume which treats more especially of logic, I of necessity looked back on the ancient history of the science, to show, that true logic is absolutely the same science with that of the formation, the expression, and combination of our ideas; that is to say, that which has been since called Ideology, general grammar, or analysis of the understanding; and to show that my two first volumes are but the restoration, more or less fortunate, of the two first parts of the ancient logics, and the supplement of that which has always been wanting to these very important preliminaries. I have moreover been under the necessity of insisting also on the explication of the idea of existence, and on that of the reality of our perceptions, and of their necessary concordance with the reality of the beings which cause them, when they are all legitimately deduced from the first and direct impressions, which these beings make on us.

At present I find myself, in like manner, constrained to speak again of the conclusions of this logic, before advancing further, and not to apply my theory of the causes of certitude and error, to the study of the will and its effects, without having given it some new developements. The reader ought to pardon these frequent retrospects; for they arise almost necessarily from the nature of the subject, from the manner in which it has been treated hitherto, and from the necessity we are under, of anticipating a crowd of objections, when we wish to render a new opinion acceptable.

Let me be permitted then to mention here again, that I have reduced the whole science of logic to the observation of two facts, which result manifestly from the scrupulous examination of our intellectual operations. The first is, that our perceptions being every thing for us, we are perfectly, completely, and necessarily sure of all that we actually feel. The second, which is but a consequence of that, is that none of our judgments, taken separately, can be erroneous, since, for the very reason that we see one idea in another, it must be actually there; but that their falsity, when it takes place, is purely relative to all the anterior judgments, which we permit to subsist, and consists in this, that we believe the idea, in which we see a new element, to be the same we have always had under the same sign, while it is really different, since the new element we actually see there is incompatible with some of those which we have previously seen there. So that, to avoid contradiction, it would be necessary either to take away the former, or not to admit the latter.

After having established these two principles, or rather these two facts, I have given some elucidations, I have met in advance some objections, I have shown that these two objections are equally true, whatever be the nature of our ideas, and whatever the use we make of them; and hence I have concluded, that all the rules whatsoever which have been prescribed for the form of our reasonings, to assure us of their justice, are absolutely useless and illusory; and that our sole and only means of preserving ourselves from error, is to assure ourselves well that we comprehend the idea of which we judge, and if it be doubtful, to make the most complete enumeration possible of the elements which compose it, and principally of those which may either implicitly contain or exclude that whose admission or exclusion is in question. It is here that, without more details, I have terminated my treatise on logic, which consequently finishes almost at the point at which all the

others commence. This ought so to be, as I meant to speak only of the science; while other logicians, neglecting the science almost entirely, have occupied themselves only with the art. I confess my belief, that my labour is more useful than theirs; because, in every matter, it is always very difficult, from premature consequences, to remount to the principles which ought to have served as their foundation. Whereas, when we have well established the first truths, it is easy to deduce the consequences which flow from them. Yet this second operation is important also, and as a subject is not completely treated of, but when it is executed, I will present, before proceeding further, summarily, but methodically, the series of practical maxims, which result from my method of considering our means of knowledge. The use I shall afterwards make of these same means, in the study of the will and its effects, will be an example of the manner in which these rules are applied in all our researches.

APHORISM FIRST.[*]

We know our existence only by the impressions we experience, and that of beings other than ourselves, but by the impressions which they cause on us.

Observation.

In like manner, as all our propositions may be reduced to the form of enunciative propositions, because at bottom they all express a judgment, so all our enunciative propositions may afterwards be always reduced to some one of these: *I think, I feel,* or *I perceive, that such a thing is in such a manner, or that such a being produces such an effect*; propositions of which we are ourselves the subject, because in fact we are always the subject of all our judgments, since they never express but the impression which we experience.

Corollary.

From hence it follows: 1st. That our perceptions are all of them always such as we feel them, and are not susceptible of any error, taken each separately, and in itself.

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[*]I have employed the form of aphorisms, observations and corollaries, in order to say the most in the fewest words.

2dly. That if in the different combinations, we make of them, we add to them nothing which is not primitively comprised in them, implicitly or explicitly, they are always conformable to the existence of the beings which cause them, since that existence is not known to us but by them, and consists for us only in those perceptions.

3dly. That we know nothing but relatively to ourselves, and to our means of receiving perceptions.

4thly. That these perceptions are every thing for us; that we know nothing ever but our perceptions; that they are the only things truly real for us, and that the reality which we recognize in the beings that cause them is only secondary, and consists only in the permanent power of always causing the same impressions under the same circumstances, whether on ourselves, or on other sensible beings, who give us an account of them (also by the impressions which they cause in us) when we have become able to hold communication with them by signs.

APHORISM SECOND.

Since our perceptions are all of them always such as we feel them, when we perceive one idea in another, it is actually and really there, from the very circumstance of our perceiving it there: hence no one of our judgments taken separately and detached, is false. It has always and necessarily the certitude which belongs inevitably to each of our actual perceptions.

Corollary.

None of our judgments then can be false, but relatively to anterior judgments, and that suffices to render them false relatively to the existence of beings, the causes of our impressions, if these anterior judgments were just, relatively to that existence.

APHORISM THIRD.

When we see in an idea, or a perception, an element incompatible with those which it included before, this idea is different from what it was, for, such as it was, it excluded this new element which we see there; and, such as it is, it excludes those which are incompatible with it.

Corollary.

That it may then be the same idea which it was before, we must exclude from it the element which we see there at present, or if those which are repugnant to it, are misplaced in this idea, they must themselves be excluded from it; that is to say, it must be rendered such as it was, when they were erroneously admitted into it, which is to restore it again to the same state in which it was, before it was changed by a false judgment, without our perceiving it.

APHORISM FOURTH.

When we form a judgment of an idea, when we see in it a new element, one of these four things must necessarily happen: Either the judgment which we now form is consequent to a just idea, in which case it is just; and the idea without changing its nature has only developed and extended itself.

Or it is inconsequent to a just idea, in which case it is false; and the idea is changed, and is become false.

Or it is consequent to an idea already false, then it is false, but the idea is not changed; it is when it has become false previously, that it has changed in relation to what it was primitively.

Or it is inconsequent to a false idea, then it may be just or false; but never certain, for the idea is changed. But it may have become just, such as it was originally, or false, in a manner different from the preceding.

Observation.

Remark always, that an idea infected with false elements, and consequently meriting the name of false, taken in mass, may also contain many true elements. We may form then, in consequence of these true elements, just judgments, and then they will be completely true; as we may also form from them false judgments, which shall be completely false; but these judgments will not be formed from that idea, inasmuch as it is false, and in consequence of that which it has of falsity; they ought therefore to be considered as formed from a true idea, and enter into what we have said of these.

This is what most frequently happens to us, so few compound ideas have we which are perfectly pure, and without mixture of imperfection. Perhaps we have none. Perhaps it would suffice for us to have one alone,

to render all our others the same, by the sole force of their relations and combinations, proximate or remote.

APHORISM FIFTH.

Thus all our perceptions are originally just and true, and error is only introduced to them at the moment when we admit an element which is opposed to them. That is to say, which denaturalises and changes them, without our perceiving it.

APHORISM SIXTH.

This would never happen to us, if we had always present to the mind, that which the idea comports, of which we judge. Thus all our errors really come from this: that we represent the idea imperfectly to ourselves.

APHORISM SEVENTH.

What precedes not appertaining to any circumstance peculiar to any one of our perceptions rather than to another, agrees generally with all.

Corollary.

Hence it follows, 1st. That our manner of proceeding is the same for our ideas of every kind.

2dly. That all our errors originate from the basis of our ideas, and not from the form of our reasonings.

3dly. That all the rules which can be prescribed for the forms of these reasonings, can contribute nothing to avoid error; or at least can contribute to it but accidentally.

APHORISM EIGHTH.

We have then no other effectual means of avoiding error, but to assure ourselves well of the comprehension of the idea of which we judge, that is to say, of the elements of which it is composed.

Observation.

That is not possible, unless we commence by well determining the extension of this idea, for it contains many elements in certain degrees of its extension, which it does not in others, that is to say, it is

not exactly similar to itself, it is not rigorously the same idea in their different degrees of extension.

This general and only method embraces several others, and first that of studying with care the object, or objects, from which the idea in question emanates, and afterwards that of guarding ourselves with the same care from the affections, passions, prejudices, dispositions, habits and manners of being, by which the idea could be altered.

Observation.

These two precautions are necessary, the first to assemble, as far as possible, all the elements which really appertain to the idea in question, the second to separate from it in like manner all those which are foreign to it, and which might mingle themselves with it, and alter it, without our perceiving it.

After these two necessary preliminaries, if we are still in doubt as to the judgment we are to form, the most useful expedient of which we can avail ourselves, is to make an enumeration the most complete possible of the elements composing the idea, which is the subject of the judgment, and principally of those which have relation to the idea which we propose to attribute to it, that is to say, to the attribute of the contemplated judgment.

Observation.

The effect of this operation is to recall to ourselves, or to those whom we wish to convince of the truth or falsity of a proposition, the elements of the subject which implicitly comprehend the proposed attribute, or which on the contrary may exclude it.

It is the object which the logicians propose to attain by what they call *definitions*; but in my opinion they fall into several errors relatively to definitions, and they greatly mistake their effects and properties.

1st. They believe that there are definitions of words, and definitions of things, while in truth there are none but definitions of ideas. When I explain the sense of a word, I do nothing but explain the idea which I have when I pronounce that word, and when I explain what a being is,

I still do nothing but explain the idea I have of that being, and which I express when I pronounce its name.

2d. They aver that definitions are principles, and that we cannot dispute about definitions. These two assertions are contraries, and yet both of them false.

In the first place they are contradictory, for if definitions are principles, we can and we ought frequently to question their truth, as we ought never to recognise any principle as true without a previous examination, and if we cannot contest definitions, they cannot be principles, since every principle should be proved before it is admitted.

Again, these two assertions are both false. Definitions are not principles: for facts are the only true principles; and definitions are not facts, but simple explanations founded on facts, as all our other propositions whatsoever. Now we may contest a definition, as every other proposition; for when I explain the idea that I have of a being, I do not pretend to say merely that I have this idea; I pretend also to affirm that this idea agrees with that being, and that we may so conceive it without error; now this is what may be false, and what may be contested. So also when I explain the idea which I have of the sense of a word, I do not solely pretend that I have this idea, I pretend further that it does not affect the real relations of this word with an infinity of others, that we may employ it in this sense without inconvenience and without inconsequence; now this is what again may be contested with reason. In fine, if I should pretend by a definition only to explain the complex and compound idea that I have actually in my head, yet it should always be allowed to show me that this idea is badly formed, that it is composed of judgments inconsequent the one to the other, and that it includes contradictory elements. Then definitions never are principles, and yet they always are contestible.

3dly. The logicians have believed that the definition is good, and that the idea defined is perfectly explained when they have determined it, *per genus proximum et differentiam specificam*, as they say; that is to say, when they have expressed that one of its elements which constitutes it of such a genus, and the one which in this genus distinguishes it from the ideas of the neighbouring species. Now this is still false, and is only founded on the fantastical doctrine, in virtue of which they believed they v were able to distribute all our ideas into different arbitrary classes called categories.

That is false, first, because these arbitrary classifications never rep-

resent nature. Our ideas are connected the one to the other by a thousand different relations. Seen under one aspect they are of one genus, and under another they are of another genus; subsequently each of them depends on an innumerable multitude of proximate ideas, by an infinity of relations, of natures so different that we cannot compare them together, to decide which is the least remote. Thus we can never, or almost never find really *the proximate genus or specific difference* which deserves exclusively to characterise an idea.

Moreover, if we should have found in this idea the elements which in fact determine the genus and species in which it is reasonably permitted to class it, the idea would still be far from sufficiently explained, to be well known.

These two elements might even be absolutely foreign to the decision of the question which may have given place to the definition. Assuredly when I say that gold is a metal, and the heaviest of metals except platina, I have correctly ranged gold in the genus of beings to which it belongs, and I have distinguished it by a characteristic difference from those nearest to it in that genus. Yet this does not help me to know whether the use of gold, as money, is useful to commerce, or pernicious to morality, nor even whether it is the most ductile of metals. The two first questions depend on ideas too foreign to those which fix gold in a certain place amongst metals; and though the latter may be less distant, yet we do not know the direct and necessary relation between weight and ductility.

Logicians have been mistaken respecting the nature, the effects and properties of definitions. They are incapable of answering the end which they propose to attain by their means, that of presenting the idea of which we are to judge in such a manner that we cannot avoid forming a just judgment. The only mean of attaining this is to make the best description possible of the idea, and with the precautions which we have indicated.

Remark.

It is necessary to observe that all that we have advised in the 8th, 9th and 10th aphorisms, and also what we shall advise hereafter to be done, to know well the idea, the subject of the judgment in question is equally applicable to the idea which is the attribute of the same judgment, a knowledge of which is equally essential, and can only be acquired by the same mean.

The means indicated above of knowing well the idea of which we are to judge, are the only really efficacious ones in bringing us to the formation of just judgments; but they may very possibly be insufficient to give us a certitude of having succeeded. We must therefore add subsidiary means.

APHORISM TWELFTH.

The best and most useful of our secondary means is to see, on the one hand, if the judgment we are to form is not in opposition to anterior judgments, of the certitude of which we are assured; and on the other if it does not necessarily lead to consequences manifestly false.

Remark.

The first point is that which has so strongly accredited the usage of general propositions; for, as we can confront them with a number of particular propositions, we have frequently had recourse thereto, and we have habituated ourselves to remount no further, and to believe that they are the primitive source of truth. The second is the motive of all those reasonings which consist in a reduction to what is absurd.

Observation.

The process recommended in this aphorism is a species of proof to which we submit the projected operation. It is very useful to avoid error, for if the judgment we examine is found in opposition to anterior ones which are just, or necessarily connected with false consequences, it is evidently necessary to reject it; but this same process does not lead us directly and necessarily to truth, for it may be that no determining motive for the affirmative may result from the research.

APHORISM THIRTEENTH.

In a case in which we want decisive reasons to determine us, no other resource is left us but to endeavour to obtain new lights, that is to say, to introduce new elements into the idea which is the subject of the judgment we are to form. This can be done in two ways only, either by seeking to collect new facts, or by endeavouring to make of those already known combinations which had not previously occurred to us, and thence to draw consequences which we had not before remarked.

The advice contained in this aphorism, is only the developement of the first part of aphorism 9th, and it can be nothing else; for when we are assured that we are not sufficiently acquainted with a subject to judge of it, there is no other resource but to study it more.

APHORISM FOURTEENTH.

Finally, when the motives of determination fail us invincibly, we should know how to remain in complete doubt, and to suspend absolutely our judgment, rather than rest it on vain and confused appearances, since in these we can never be sure that there are not some false elements.

Remark and conclusion.

This is the last and most essential of logical principles; for in following it we may possibly remain in ignorance, but we can never fall into error; all our errors arising always from admitting into that which we know elements which are not really there, and which lead us to consequences which ought not to follow from those that are there effectively.

In effect, if from our first impressions the most simple to our most general ideas, and their most complicated combinations, we have never recognized in our successive perceptions but what is there, our last combinations would be as irreproachable as the first act of our sensibility. Thus, in logical rigour, it is very certain that we ought never to form a judgment but when we see clearly that the subject includes the attributes: that is to say, that the judgment is just.

But at the same time it is also very certain that in the course of life we seldom arrive at certitude, and are frequently obliged, nevertheless, to form a resolution provisionally; to form none being often to adopt one of the most decisive character, without renouncing the principle we have just laid down, or in any manner derogating from it. It is now proper to speak of the theory of probability. It is a subject I encounter with reluctance. First, because it is very difficult, and as yet very little elucidated; next, because one cannot hope to treat it profoundly when one is not perfectly familiar with the combinations of the science of quantities, and of the language proper to them. Finally, because even with these means the nature of the subject deprives us of the hope of

arriving at almost any certain result, and leaves us only that of a good calculation of chances. Let us, however, endeavour to form to ourselves an accurate and just idea of it; this will perhaps be already to contribute to its progress.

The science of probability is not a part of logic, and ought not even to be regarded as forming a supplement to it. Logic teaches us to form just judgments, and to make series of judgments: that is to say, of reasonings which are consequent. Now, properly speaking, there are no judgments or series of judgments which are probable. When we judge that an opinion or a fact is probable, we judge it positively; and this judgment is just, false, or presumptuous, according as we have perfectly or imperfectly observed the principles of the art of logic. But it will be said, that the science of probability in teaching us to estimate this probability of an opinion, teaches us to judge justly whether this opinion is or is not probable. I admit it: but it produces this effect as the science of the properties of bodies, physics, teaches us to form the judgment that such a property appertains to such a body; as the science of extension teaches us to form the judgment that such a theorem results from the properties of such a figure; as the science of quantity teaches us that such a number is the result of such a calculation; finally, as all the sciences teach us to form sound judgments of the objects, which belong to their province. Nevertheless we cannot say, and we do not say, that they are but parts of logic, nor even that they are supplements to it. They all on the contrary throw light on the subjects of which they treat only in consequence of the means and processes with which they are furnished by sound logic. This is useful to all the sciences; but none of them either aid it immediately, supply its place, make a part of it, or are supplements to it. The science of probability has in this respect no particular privileges under this aspect; it is a science similar to all the others.

But I go further; the science to which we have given the name of the science of probability, is not a science: or to explain myself more clearly, we comprehend erroneously under this collective and common name a multitude of sciences or of portions of sciences quite different among themselves, strangers to one another, and which it is impossible to unite without confounding them all. In effect, that which is called commonly the science of probability comprehends two very distinct parts, of which one is the research, and the valuation of data, the other is the calculation, or the combination of these same data.

Now the success of the research and valuation of data, if the question is on the probability of a narration, consists in a knowledge of the circumstances, proper to the fact in itself, and to all those who have spoken of it:—thus it depends on and forms a part of the science of history. If the question is on the probability of a physical event, this research of data consists in acquiring a knowledge of anterior facts and of their connection:—thus it appertains to physics. If the question is on the probable results of a social institution, or of the deliberations of an assembly of men, the anterior facts are the details of the social organization, or of the intellectual dispositions and operations of these men:—thus it depends on social and moral science, or on ideology. Finally, when it is only to foresee the chances of the play of cross and pile, the data would be the construction of the piece, the manner of resistance of the medium in which it moves, that of the bodies against which it may strike, the motion proper to the arm which casts it, and which are more or less easy to it. Thus these data would still depend on the physical constitution of animate and inanimate bodies. Then as to the research of data, and to the fixation of their importance, the pretended science of probability is composed of a multitude of different sciences, according to the subject on which it is employed; and consequently it is not a particular science.

As to the combination of the data once established, the science of probability is nothing, when we employ calculation therein, but the science of quantity or of calculation itself; for the difficulty does not consist in giving to abstract unity any concrete value whatever, and sometimes one and sometimes another, but in knowing all the resources which perfect calculation furnishes to make of this unity and of all its multiplied combinations the most complicated, and to connect them regularly without losing their clue.

We see then that neither in regard to the research and valuation of data, nor in regard to the combinations of these same data, the pretended science of probability is not a particular science distinct from every other.

We might rather consider it either as a branch of the science of quantities, and as an employment which we make of it in certain parts of several different sciences which are susceptible of this application, or as the reunion of scattered portions of many sciences, strangers the one to the other, which have only so much in common as to give place to such questions as can only be resolved by a very learned and very

delicate employment of the admirable means of calculation furnished by the science of quantities in the state of perfection which it has at this time attained; but this is not seeing the theory of probability in its full extent, for we cannot always employ calculation in the estimation of probability. Nevertheless this manner of considering and decomposing what is called the science of probability explains to us already many of the things which concern it, and puts us in the way of forming to ourselves an accurate and complete idea of it.

We see first why it is the mathematicians who have had the idea of it, and who have, if we may so say, created and made it entirely. It is because such as they have conceived it, it consists principally in the employment of a powerful agent which was at their disposal; they have been able to push to a great length speculations which other men have been obliged to abandon in consequence of a want of means to pursue them.

We also see why these mathematicians principally and almost entirely employed themselves on subjects of which the data are very simple, such as the chances of games of hazard, and of lotteries, or the effects of the interest of money lent; it is because their principal advantage consisting in their great skill in calculation, they have with reason preferred the objects where this art is almost every thing, and where the choice and valuation of data present scarcely any difficulty; and it is in fact in cases of this kind that they have obtained a success both curious and useful.

We moreover see why it is that all the efforts of these mathematicians, even the most skilful, when they have undertaken to treat in the same manner subjects of which the data were numerous, subtile and complicated, have produced little else than witty conceits which may be called *difficiles nugae*, learned trifles. It is because the farther they have pursued the consequences resulting from the small number of data which they have been able to obtain, the farther they have departed from the consequences which these same data would have produced, united with all those often more important, which they have been obliged to neglect from inability to unravel and appreciate them. This is the cause why we have seen great calculators, after the most learned combinations, give us forms of balloting the most defective, not having taken into account a thousand circumstances, inherent in the nature of men and of things, attending only to the circumstance of the number of the one and of the other. It is the reason why Condorcet

himself, when he undertook to apply the theory of probabilities to the decisions of assemblies, and particularly to the judgments of tribunals, either has not ventured to decide any thing on actual institutions, and has confined himself to reasoning on imaginary hypothesis, or has often been led to expedients absolutely impracticable, or which would have inconveniences more serious than those he wished to avoid.

Whatever respect I bear to the great intelligence and high capacity of this truly superior and ever to be regretted man, I do not fear to pass so bold a sentence on this part of his labours, for I am in some measure authorized to do it by himself. The title of Essay which he has given to his treatise, and the motto which he has prefixed to it, prove how much he doubted of the success of such an enterprise, and what confirms it is, that in his last work, composed on the eve of an unfortunate death, in which he has traced with so firm a hand the history of the progress of the human mind, and in which he has assigned to the theory of probabilities so great a part in the future success of the moral sciences, he uses with all the candour which characterises him these expressions, page 362—"This application, notwithstanding the happy efforts of some geometricians, is still, if I may so say, but in its first elements, and it must open to following generations a source of intelligence truly inexhaustible." Yet he had then made not only the learned essay of which we are speaking, but also a work greatly superior, the elements of the calculation of probabilities and of its application to games of hazard, to lotteries and to the judgments of men, which were not published till the year 1805.

I believe, then, that I have advanced nothing rash in observing that in subjects difficult by the number, subtility, complexity and intimate connexion of the circumstances to be considered, without the omission of any of them, the great talent of well combining those, not sufficiently numerous, which have been perceived, has not been sufficient to preserve the most skilful calculators from important errors and great misreckonings. We perceive that that was to be expected. But new I must go further, and all this leads me to a last reflection, which flows from the nature of things, like those which have just been read, which confirms several important principles established in the preceding volumes, which far from annihilating the great hopes of Condorcet tends to assure and realise them, by restraining them within certain limits; but which appear to me to show manifestly, how far the calculation of probabilities is from being the same thing with the theory of proba-

bility. Observe in what this observation consists.

The principal object of the theory of probability and its great utility, is in setting out from the reunion of a certain number of given causes, to determine the degree of the probability of the effects which ought to follow; and setting out from the reunion of a certain number of known effects, to determine the degree of the probability of the causes, which have been able to produce them. We may even say that all the results of this theory are but different branches of this general result, and may be traced to be nothing more than parts of it.

Now we have previously seen, and on different occasions, that for beings of any kind, to be successfully submitted to the action of calculation, it is necessary they should be susceptible of adaptation to the clear, precise and invariable divisions of the ideas of quantity, and to the series of the names of numbers and of cyphers, which express them. This is a condition necessary to the validity of every calculation from which that which has probability for its object, cannot be any more exempt, than that which conducts to absolute certainty.

Hence it rigorously follows, that there is a multitude of subjects of which it would be absolutely impossible to calculate the data, if even (which is not always the case) it should be possible to collect them all without overlooking any.

Assuredly the degrees of the capacity, of the probity of men, those of the energy and the power of their passions, prejudices and habits, cannot possibly be estimated in numbers. It is the same as to the degrees of influence of certain institutions, or of certain functions, of the degrees of importance of certain establishments, of the degrees of difficulty of certain discoveries, of the degrees of utility of certain inventions, or of certain processes. I know that of these quantities, truly inappreciable and innumerable in all the rigour of the word, we seek and even attain to a certain point, in determining the limits, by means of number, of the frequency and extent of their effects; but I also know that in these effects which we are obliged to sum and number together as things perfectly similar, in order to deduce results, it is almost always and I may say always impossible to unravel the alterations and variations of concurrent causes, of influencing circumstances, and of a thousand essential considerations, so that we are necessitated to arrange together as similar a multitude of things very different, to arrive only at those preparatory results which are afterwards to lead to others which cannot fail to become entirely fantastical.

Is an example desired, very striking, drawn from a subject which surely does not present as many difficulties of this kind as moral ideas? Here is one. Certainly none of those who have undertaken to estimate the effort of the muscles of the heart, have erred against the rules of calculation, nor, what is more, against the laws of animated mechanics, the certainty of which should still preserve them from many errors. Yet some have been led to estimate this effort at several thousands of pounds, and others only at some ounces; and nobody knows with certainty which are nearest to truth. What succour then can we derive from calculation, when even availing ourselves properly of it we are subject to such aberrations and to such prodigious incertitude?

It is then true, and I repeat it, that there is a multitude of things to which the calculation of probabilities like every other calculation is completely inapplicable. These things are much more numerous than is generally believed, and even by many very skilful men, and the first step to be taken in the science of probability is to know how to distinguish them. It is for the science of the formation of our ideas, for that of the operations of our intelligence, in a word for sound ideology, to teach us the number of these things, to enable us to know their nature, and to show us the reasons why they are so refractory. And it is a great service which it will render to the human mind, by preventing it in future from making a pernicious use of one of its most excellent instruments. It already shows us that the science of probability is a thing very distinct from the calculation of probability with which it has been confounded, since it extends to many objects to which the other cannot attain. This is what I principally proposed to elucidate.

Finally, as I have before announced, this observation does not destroy the great hopes which the piercing genius of Condorcet had made him conceive from the employment of calculation in general, and from that of probability in particular, in the advancement of the moral sciences; for if the different shades of our moral ideas cannot be expressed in numbers, and if there are many other things relative to social science, which are equally incapable of being estimated and calculated directly, these things depend on others which often render them reducible to calculable quantities, if we may use the expression. Thus for example, the degrees of the value of all things useful and agreeable, that is to say, the degrees of interest we attach to their possession cannot be noted directly by figures, but all those which can be represented by quantities of weight or extension of a particular thing, become cal-

culable and even comparable the one with the other; in like manner
the energy and durability of the secret springs which cause and pre-
serve the action of the organs constituting our life are not susceptible
of direct appreciation, but we judge of them by their effects. Time
and different kinds of resistance and waste are susceptible of very exact
divisions. This is sufficient for us, and we derive thence a great multi-
tude of results and of valuable combinations; now there is an infinity of
things in the moral sciences which offer us similar resources; but there
are also many which offer none, and once more it is of great impor-
tance to discriminate perfectly between them: For first, in respect to
these latter, every employment of calculation is abusive; and moreover
there are often species of quantities presented which appear calculable,
but which are inextricably complicated by mixture with those other
species of quantities which I permit myself to call refractory, and then
if calculation be applied thereto, the most skilful mathematicians are
inevitably led into enormous errors; against this in my opinion they
have not always been sufficiently on their guard. As to these two latter
cases we may say of calculation what has been said of the syllogistic
art as to all our reasonings whatsoever; that is, that it conducts our
mind much less correctly than the simple light of good sense aided by
sufficient attention.

   This is all I had to observe on the science and calculation of prob-
ability, and I draw from it the following consequences: The theory of
probability is neither a part of nor a supplement to logic. This theory
moreover is not a science separate and distinct from all others. All sci-
ences have a positive and a conjectural part. In all of them the positive
part consists in distinguishing the effects which always and necessarily
follow certain causes, and the causes which always and necessarily pro-
duce certain effects. In all of them also the conjectural part consists in
proceeding from the reunion of a certain number of given causes to de-
termine the degrees of probability of the effects which ought to follow
from them, and in proceeding from the reunion of a certain number
of known effects to determine the degree of probability of the causes
which have been able to produce them. In these two parts, when the
ideas compared are not of a nature to comport with the application
of the names of numbers and of figures, we can only employ the ordi-
nary instruments of reasoning, that is to say our vulgar languages, their
forms, and the words which compose them. In these two parts equally
when the ideas compared by the clearness, constancy, and precision of

their subdivisions are susceptible of adaptation to the divisions of the series of the names of numbers, and of figures, we can employ with great advantage, instead of the ordinary instruments of reasoning, the instruments proper to the science of the ideas of quantity, that is to say, the language of calculation, its formulas, and its signs. It is this which constitutes in respect to the conjectural part the calculation of probability. It is necessary to distinguish it carefully from the science of probability; for the one is of use in all cases in which the object is a likelihood of any kind whatsoever; it is properly the conjectural part of all other sciences, whereas the other calculation has place only in those cases in which we can employ the language of calculation; it is but an instrument, of which unhappily the science of probability cannot always avail itself.

The science of probability consists in the talent and sagacity necessary to know the data, to chuse them, to perceive their degrees of importance, to arrange them in convenient order, a talent to which it is very difficult to prescribe precise rules, because it is often the product of a multitude of unperceived judgments. On the contrary, the calculation of probability, properly so called, consists only in following correctly the general rules of the language of calculation in those cases in which it can be employed.

This calculation is often extremely useful and extremely learned; but it is necessary carefully to distinguish the occasions on which we can avail ourselves of it, for however little the ideas which we attempt to calculate are mingled with those which I have named refractory, and which are truly incalculable, we are inevitably led into the most excessive misreckonings. It is what I think has happened but too frequently to skilful men, who by their knowledge, and even by their mistakes, have put us into the way of discovering their cause.

I will limit myself to this small number of results. I perceive that it is to diffuse but little direct light on a subject, which is so much the more important and the more extensive, as unfortunately certitude is for the most part far from us. But if I have contributed to the formation of a just and clear idea of it I shall not have been useless. I have much more reason than Condorcet for saying *"I have not thought that I was giving a good work, but merely a work calculated to give birth to better ones, &c."*[*]

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[*]See page 183 of the preliminary discourse to the essay on the application of

Not wishing to occupy myself longer with the conjectural part of our knowledge, and not believing it necessary to add to the small number of principles which I have established before this long digression, and which embrace in my opinion every thing of importance in the logical art, such as it proceeds from true logical science; it only remains for me to endeavour to make a happy application of this art to the study of our *will and its effects*. It is this I am going to undertake, with a hope that my instruments being better, I may better succeed than perhaps men more skilful but not so well armed.

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analysis to the probability of decisions, given by a plurality of votes, in 4to 1785, al'imprimerie royal.

This discourse, the elements of the same author which I have already cited, and the excellent lesson of M. Delaplace, which are to be found in the collection of the Normal schools, are, in my opinion, the three works in which we are best able to see the general spirit and process of the calculation of probabilities, and where we can the most easily discover the causes of its advantages and inconveniences, although they are not yet there completely developed.