

# Condorcet

## *Sketch for a Historical Picture of the Progress of the Human Mind: Tenth Epoch*

Translated by Keith Michael Baker

*Translator's Note:* There is still no definitive or critical edition of Condorcet's "Esquisse d'un tableau historique des progrès de l'esprit humain," or of the other parts of the work for which it was intended as an introduction. The text published posthumously in 1795 contains additions to the extant manuscript that were presumably made by the author before his death. The standard edition of Condorcet's collected works, "Oeuvres de Condorcet" (edited by A. Condorcet O'Connor and M. F. Arago, 12 vols. [Paris: Firmin Didot frères, 1847–1849]), reprints the text of 1795 with many minor changes; it also includes substantial fragments from the larger work. I have followed the edition of the "Esquisse" by O. H. Prior (Paris: Boivin, 1933; republished with an introduction by Yvon Belavel [Paris: J. Vrin, 1970]), which uses the text as published by Arago and O'Connor, placing in square brackets passages from the 1795 edition that do not appear in the extant manuscript.

Several of the choices I have made as translator should be mentioned. In current English, the term 'perfectibility' and its close cognates seem to carry a stronger implication of absolute perfection than they do in eighteenth-century French. In most cases, I have found terms like 'ameliorability,' 'amelioration,' and 'betterment' closer to Condorcet's intended meaning. The French term 'facultés' also presents a question: it can refer, as in English, to capacities with which an individual is physically endowed (e.g., sight or operations of the

mind) or to powers arising from their exercise. I have used 'faculties' for the former, 'capacities' for the latter. Finally, like most eighteenth-century writers, Condorcet generally uses the singular and plural forms of 'homme' to refer generically to human beings. Where possible without contortion, I have used gender-free language in translating these terms. Please also note that the section breaks that appear in this translation are my own.

I wish to express thanks to Emma Rothschild for helpful comments on a draft of this translation.

If we can predict phenomena with almost complete confidence when we know their laws, and if, even when we are ignorant of these laws, past experience allows us to anticipate future events with a great degree of probability, why should it seem an impossible undertaking to project the future destiny of the human species with some plausibility from the results of its history? The only basis for belief in the natural sciences is the idea that, whether we know them or not, the general laws governing the phenomena of the universe are necessary and constant. Why should this same principle be less true for the development of the intellectual and moral capacities of humankind than for other natural processes? In short, since judg-

ments grounded on past experience of like events are the sole rule of conduct for the wisest individuals, why shouldn't a philosopher be permitted to base his conjectures on this same foundation, provided he attributes to them a certainty no greater than can be sustained by the number, consistency, and precision of his observations?

Our hopes for the future condition of the human species can be reduced to three important points: the destruction of inequality among nations; the progress of equality within each people; and the real betterment of humankind. Will all nations necessarily approach one day the state of civilization achieved by those peoples who are most enlightened, freest, and most emancipated from prejudice, such as the French and the Anglo-Americans? Will we necessarily see the gradual disappearance of that vast distance now separating these peoples from the servitude of nations subjected to kings, the barbarism of African tribes, the ignorance of savages?

Are there regions of the globe where the inhabitants have been condemned by their environment never to enjoy liberty, never to exercise their reason?

Do the differences in enlightenment, resources, or wealth so far observed between the different classes within civilized peoples – the inequality that the initial advances of society augmented and may even have produced – derive from the very nature of civilization or from the current imperfections of the social art? Must these differences continually diminish, giving way to the real equality that is the ultimate goal of the social art, that of reducing the very effects of natural differences in individual capacities while allowing for the continuation only of an inequality useful to the common interest because it will foster the progress of civilization, education,

and industry without entailing dependence, humiliation, or impoverishment? In other words, will human beings advance toward a situation in which all will have the knowledge necessary to act according to their own reason in the common affairs of life, to remain free of prejudices, and to comprehend their rights and exercise them according to their judgment and their conscience? Will they approach that state in which all will be able to secure the means of providing for their needs, and in which stupidity and misery will at last be only accidental rather than the habitual condition of part of society?

Might it also be the case that the human species will necessarily better itself through new discoveries in the sciences and the arts and, as an inevitable consequence, in the means of individual well-being and common prosperity; through progress in the principles of conduct and the practice of morality; or through optimization of the intellectual, moral, and physical capacities that may result from improving the instruments that intensify these capacities and guide their use, or even the natural constitution of humankind?

In answering these three questions, we will find that past experience, observation of the progress made so far by the sciences and by civilization, and analysis of the advance of the human mind and the development of its capacities yield the strongest grounds for believing that nature has set no limit to our hopes.

A glance at the present state of the globe reveals, in the first place, that the principles of the French Constitution are accepted already by every enlightened person. We see these principles now too widespread and too firmly professed for the efforts of tyrants and priests to prevent their gradually penetrating the huts

of the enslaved, where they will soon reawaken the vestiges of good sense and the silent indignation that constant humiliation and terror fail to stifle in the soul of the oppressed.

In considering different nations, we shall see in each one the particular obstacles opposing this revolution or the conditions favoring it. We shall identify those nations in which it will be brought about peacefully by the perhaps belated wisdom of their governments, and those in which it will be rendered more violent by the resistance of governments that will inevitably be swept up in its terrible and rapid upheavals.

Can there be any doubt that good sense or the absurd divisions among the European nations will further the slow but inevitable effects of the progress of their colonies, resulting soon in the independence of the New World? Or that the European population, rapidly increasing over this immense territory, will civilize or cause the disappearance, even without conquest, of the savage nations that still occupy vast regions of it?

Review the history of our enterprises and settlements in Africa and Asia and you will see our commercial monopolies, our betrayals, our bloodthirsty contempt for people of another color or creed, the insolence of our usurpations, and the extravagant proselytizing or the intrigues of our priests destroying the sentiment of respect and goodwill initially inspired by the superiority of our knowledge and the benefits of our commerce.

But the moment is surely approaching when we shall stop appearing to them only as corruptors and tyrants and become their useful instruments or generous liberators.

Sugar cultivation, as it is established in the immense African continent, will de-

stroy the shameful exploitation that has corrupted and depopulated that continent for two centuries.

Already, in Great Britain, friends of humanity have set an example; and if the Machiavellian government of this country, forced to respect public reason, has not dared oppose it, what can we not expect from this same spirit once a servile and corrupt constitution has been reformed and rendered worthy of a humane and generous nation? Will France not hasten to imitate these undertakings dictated in equal measure by philanthropy and European interests properly understood? Spice production has been introduced in the French islands, in Guiana, and in some English possessions, and one will soon see the collapse of the monopoly in this trade the Dutch have maintained by so many betrayals, aggressions, and crimes. These European nations will finally learn that exclusive trading companies are only a form of tax imposed on them to give their governments a new instrument of tyranny.

Then the European peoples, limiting themselves to free commerce, and too enlightened regarding their own rights to disregard those of other peoples, will respect the independence they have hitherto violated so arrogantly. Their settlements will no longer be filled with government favorites profiting from a place or a privilege as they rush to accumulate a treasure through brigandage or treachery in order to get back to Europe to buy titles and honors. Instead, they will be populated by industrious persons traveling to these beneficent climates in search of the prosperity that has eluded them in their own country. Liberty will hold these individuals there and ambition will no longer draw them home. As a result, these outposts for bandits will become colonies of citizens spreading to Africa and Asia the principles and prac-

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tices of European liberty, knowledge, and reason. In place of the monks who brought these peoples nothing but shameful superstition, filling them with revulsion against the threat of a new domination, we shall see individuals disseminating among these nations the truths useful to their happiness and enlightening them as to their interests and their rights. Zeal for truth is also a passion, and it will extend its efforts to distant regions when it no longer sees itself surrounded at shorter range by gross prejudices to combat and shameful errors to dissipate.

In these vast regions there are numerous peoples who seem to be waiting only to receive from us the means to become civilized, only to find brothers among Europeans and to become their friends and disciples. There are nations under the yoke of sacred despots or benighted conquerors who have been crying out for liberators for so many centuries. There are still almost savage tribes held back from the enjoyments of civilization by the harshness of their climate, which in turn deters those who would like to acquaint them with these benefits. There are conquering hordes that know no law but force, nor occupation but brigandage. The progress of the latter two groups will be slower and stormier; it is even possible that their numbers will diminish as they find themselves pushed back by the civilized nations, and that they will end up gradually disappearing, or being lost in the midst of these nations.

We shall show how these developments will be an ineluctable result, not only of European progress but also of the liberty that the French and North American republics have both the real interest and the power to bring to African and Asian commerce, and how they must necessarily spring either from

the newly acquired good sense of the European nations or from their obstinate attachment to their commercial prejudices.

We shall demonstrate that a new Tartar invasion from Asia is the only circumstance that could prevent this revolution, and that such an event is no longer possible. In the meantime, everything is leading to the prompt collapse of the great religions of the East. Abandoned almost everywhere to the people, infected by the degradation of their ministers, and already viewed by powerful men in some countries as mere political inventions, these religions no longer threaten to keep human reason hopelessly enslaved and in eternal infancy.

The advance of these peoples should be more rapid and assured than ours because they should receive from us what we have had to discover, and because they should only need to be able to follow the explanations and proofs we offer orally and in books to grasp the simple truths and certain methods we have attained only after long error. If the progress accomplished by the Greeks was lost to other nations, we must blame a lack of communication among peoples and the tyrannical domination of the Romans. But once mutual needs have brought all humanity together; once the most powerful nations have included among their political principles a commitment to equality among societies as among individuals, respect for the independence of weaker states, and a humane concern for ignorance and misery; and once maxims fostering the action and energies of human faculties replace those tending to inhibit them, will it then still be possible to fear that parts of the globe remain inaccessible to enlightenment, or that the pride of despotism can oppose to the truth barriers that will remain insurmountable for very long?

The time will therefore come when the sun shines only on free human beings who recognize no other master but their reason; when tyrants and slaves, priests and their benighted or hypocritical minions exist only in the history books and the theater, and our only concern with them is to pity their victims and their dupes, maintain a useful vigilance motivated by horror at their excesses, and know how to recognize and stifle, by the weight of reason, the first seeds of superstition and tyranny that ever dare to reappear.

In reviewing the history of societies, we will have occasion to show that there is often a great gap between the rights the law recognizes as belonging to citizens and the rights they actually enjoy, between the equality established by political institutions and that existing among individuals. We shall point out that this was one of the principal causes of the destruction of liberty in the ancient republics, the upheavals that disrupted them, and the weakness that delivered them over to foreign tyrants.

These disparities have three principal causes: inequality of wealth; inequality of condition between the individual who has assured means of subsistence transmissible to his family and the individual for whom these means depend on his lifespan or, rather, on the length of time during which he is able to work; and finally, inequality of instruction.

It will therefore be necessary to show that these three kinds of real inequality must diminish continuously – without, however, being completely eliminated. For they have natural and necessary causes which it would be absurd and dangerous to try to destroy; and one could not even attempt to eliminate their effects without opening up more potent sources of inequality and com-

mitting more direct and disastrous violations of human rights.

It is easy to prove that there is a natural tendency toward equality of wealth, and that an excessive disproportion among fortunes cannot exist, or must quickly come to an end, unless civil laws establish artificial means of perpetuating and combining them. Inequality will diminish if liberty of commerce and industry destroys the advantage that any restrictive law or fiscal privilege confers on accumulated wealth; if taxes on contracts and agreements, restrictions on their freedom, their subjection to cumbersome formalities, and, finally, the uncertainty and obligatory cost of securing their execution do not impede the activity of the poor and swallow up their skimpy capital. It will diminish provided public administration does not open to some citizens abundant sources of opulence that are closed to others; provided prejudices and the spirit of avarice we associate with old age do not govern marriage arrangements. And it will diminish if simplicity of manners and wise institutions make wealth no longer the means of satisfying vanity or ambition – without, however, issuing in a misguided austerity that prevents its use in the search for life's enjoyments and as a resource for preserving them once they have been obtained.

Turn to the enlightened European nations and compare the current size of their populations with the extent of their territories. Note the distribution of work and of the means of subsistence obtaining in their agriculture and industry. We shall see that it would be impossible to keep subsistence at this same level – and hence, necessarily, impossible to maintain the same population size – if a great number of individuals ceased to rely almost entirely for their needs, and those of their family, on their industry and the

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yield from any capital invested in acquiring it or making it more productive. Yet preservation of either of these resources depends on the life and even the health of the head of each family; it becomes an income subject to his life chances, or even more contingent than that. It follows that there is a very real difference between the class of people in this situation and the class of those whose resources are not subject to the same risks because their needs are supplied either by revenue from land or by interest on capital almost independent of their industry.

There is therefore a necessary cause of inequality, dependence, even misery, which ceaselessly threatens the most numerous and most active class in our societies.

We shall show that this cause can be destroyed in large part by opposing chance to chance itself: by guaranteeing to someone who reaches old age assistance that is produced by his own savings, augmented by those of individuals who contributed in the same way but died before needing to harvest the benefits; by using the same principle of compensation to provide women and children who lose a husband or father with a similar income acquired at the same cost, whether it be for families afflicted by a premature death or for those whose head survives longer; or even by building up for children who attain the age to work for themselves, and to start a new family, the benefit of a capital necessary to the development of their industry, a sum that will have increased at the expense of those prevented by premature death from reaching this point. We owe the idea of these methods to the application of mathematical calculation to the probabilities of life and to financial investment, and they have already been employed successfully, though not

yet to the extent and in the variety of forms that would make them really useful, not simply to a few individuals but to the entire mass of the society they would free from that periodic ruin of a great number of families which is an ever-recurring source of corruption and misery.

We shall explain that institutional arrangements of this kind can be formed by the social power and become one of its greatest benefits, but can also be created by private associations which will be formed safely once the principles governing the organization of such institutions have become more widely known and the errors that have destroyed a great number of them are no longer to be feared.

[We shall set forth other means of securing equality, whether by ensuring that credit ceases to be a privilege so exclusively reserved for great wealth but retains a no less solid foundation, or by making industrial progress and commercial activity less dependent on the existence of great capitalists. We will owe these means, too, to the application of mathematical methods.]

The equality of instruction one can hope to attain, and which should be sufficient, would exclude all dependence, whether forced or voluntary. We shall demonstrate that the present state of human knowledge allows easy means of arriving at this goal, even for those individuals able to study only for a small number of their early years, and for a few leisure hours during the rest of their life. We shall show that a good choice of the knowledge to be taught, and of the methods for teaching it, will make possible the instruction of an entire people in everything one needs to know to manage a household, administer one's affairs, and freely develop one's industry and one's capacities; to know, defend, and

exercise one's rights; to learn one's duties, in order to fulfill them well; to judge one's actions and those of others according to one's own lights and be denied none of the higher and more refined sentiments that honor human nature; to avoid blind dependence on those to whom one is obliged to entrust one's affairs or the exercise of one's rights, and to have the capacity to choose them and supervise them; to be no longer the dupe of those popular errors that torment one's life with superstitious fears and chimerical hopes; to defend oneself from prejudices by the force of reason alone; and finally, to escape the seductions of charlatanism that would ensnare one's wealth, health, and freedom of opinion and conscience, under the pretext of promising enrichment, healing, or salvation.

From that point on, the inhabitants of a single country will no longer be differentiated by their use of cruder or more refined language. They will be able to govern themselves according to their own lights. They will no longer be limited to unthinking acquaintance with the procedures of an art or the routine of a profession. They will no longer depend, for the simplest matters or the most elementary instruction, on skillful men who dominate them by virtue of their necessary superiority. Real equality must be the result, since differences in knowledge and talents will no longer raise a barrier between individuals whose sentiments, ideas, and language will permit them to understand one another, who may wish to be instructed by others but will not need to be directed by them, and who will be able to entrust responsibility for government to the more enlightened among them without being forced to abandon it to them in blind confidence.

In this way, superiority becomes advantageous even to those who do not

share it, existing for them and not against them. The natural difference in capacities among individuals whose understanding has not been developed produces charlatans and dupes, the clever and the gullible, even among the savages. This same difference doubtless exists in societies where instruction has become truly general, but in this case it entails no more than the differentiation between enlightened individuals and those right-minded ones who recognize the value of knowledge without being dazzled by it, between talent or genius and the good sense that knows how to appreciate and benefit from them. And even if this difference were to become greater in terms of the relative strength and extent of individual capacities, it would not have a more marked effect on the relations among individuals and on factors affecting their independence and their happiness.

These various causes of equality do not operate in isolation. They combine, interact, and reinforce one another, jointly producing a stronger, surer, and more constant action. More equal instruction fosters greater equality in industry and hence in wealth; economic equality necessarily promotes equality of instruction; and there is a mutual relationship between equality among peoples and that among individuals.

In short, well-organized instruction corrects the natural inequality in human capacities rather than strengthening it, just as good laws remedy natural inequality in the means of subsistence, and just as liberty will be more extensive and more entire in societies where institutions have led to such equality than it was in the state of independence enjoyed by the savages, even though it will be subject to a regular constitution. The social art will thus have fulfilled its purpose, that of assuring and extending for

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all the enjoyment of the common rights to which nature calls them.

The real advantages to result from the progress we may hope for with virtual certainty, as we have now seen, can have no other limit than the very perfecting of the human species. This must be so because, as the various causes of equality extend their effect to vaster means of providing for our needs, to a broader range of instruction, and to a more complete liberty, the resulting equality will be more substantial and closer to embracing everything truly affecting human happiness.

It follows that we can only know the extent or limit of our hopes in examining the advance and laws of this amelioration.

No one has ever thought that the mind could exhaust all the facts of nature or reach the ultimate means of precision in measuring and analyzing these facts, the relationships of objects one to another, and all the possible combinations of ideas. The relations of magnitude alone – quantity and extension, the permutations of this single idea – form a system that is already too immense for the human mind ever to be able to grasp in its entirety, or for the part of this system our intelligence will have penetrated ever to be greater than that remaining unknown to it. The conclusion has therefore been drawn that, since humankind will only ever be able to know a fraction of the objects its intelligence is capable of grasping, it is bound to reach a point at which the number and complication of the facts already known will have absorbed all its forces and any further progress will become really impossible.

But as facts multiply, the human mind learns to classify them and reduce them to more general facts, and the instru-

ments and methods used to observe and measure them acquire a new precision. As more relations become known among a greater number of objects, it becomes possible to subsume them under more general relationships and express them in simpler terms, presenting them in ways that make it possible to grasp a greater number with the same brain-power and no greater force of attention. As the mind reaches more complicated combinations, simpler formulae make them easier to grasp. In consequence, truths first discovered by the greatest effort, and initially understood only by individuals capable of profound reflection, are soon developed and proved by methods that are no longer beyond persons of average intelligence. If the methods that lead to new combinations are exhausted, or if their application to questions still unresolved demands effort exceeding the time or powers of researchers, soon more general methods and more simple means appear to open a new field to genius. The power and range of human minds will have remained the same, but the instruments they can employ will have been multiplied and improved, and the language that fixes and determines their ideas will have been able to acquire more precision and generality. And in contrast to mechanics, where force may be increased only by diminishing velocity, the methods directing genius in the discovery of new truths will have added both to its force and to the rapidity of its operations.

Since these changes are the necessary consequence of progress in the knowledge of detailed truths, and since the need for new resources simultaneously produces the means of obtaining them, it follows that the real accumulation of truths forming the system of the empirical, experimental, and mathematical sci-



ences can grow constantly, and all the parts of this same system will be enhanced even assuming only the same strength, activity, and extent of human faculties.

In applying these general considerations to the different sciences, we shall find examples of successive advances in each that leave no doubt regarding the certainty of those we must expect. In the case of those sciences regarded by prejudice as closest to being exhausted, we shall make a particular point of identifying the advances that promise to be most probable and most imminent. We shall elucidate everything that a more general and philosophical application of the mathematical sciences to all human knowledge will necessarily add to the extent, precision, and unity of the entire system of this knowledge. We shall explain how more universal instruction in each country must expand our hopes by giving a greater number of individuals the elementary knowledge that can inspire their taste for a particular subject of study and foster their ability to make progress in it. In the most enlightened countries, scarcely a fiftieth of those to whom nature has given talents receive the instruction necessary to develop them. We shall show that our hopes of progress will increase even further as more widespread prosperity allows more individuals to devote themselves to these occupations, and as the number of individuals destined to push back the limits of the sciences by their discoveries necessarily grows in the same proportion.

It will be seen how much this equality of instruction, and the equality that must be established among the various nations, would accelerate the progress of those sciences in which advances depend on observations repeated in greater number and extended over a larger area;

how much mineralogy, botany, zoology, and meteorology would benefit as a result; and what a great disparity there is in these sciences between the weakness of the methods that have nevertheless led us to so many useful and important truths, and the power of those that could then be employed.

We shall explain how the advantage of being cultivated by a large number of individuals extends even to those sciences in which discoveries are achieved by meditation alone, since progress in these sciences can be made through those improvements in detail that do not require an inventor's brainpower and become evident upon simple reflection.

Turning to the useful arts, we shall see that their progress is bound to follow that of the sciences upon which they depend for their theory, and to have no other limits; that their techniques are susceptible of the same improvements and simplifications as scientific methods; that instruments, machines, and specializations steadily increase human strength and skill, augmenting both the perfection and precision of products while diminishing the time and labor needed to achieve them. The obstacles still opposing the progress of these arts will disappear, along with the accidents one will learn to anticipate and prevent, and the dangers to health arising from the work itself, from habitual practices, or from climate.

Then an ever-smaller tract of land will yield a quantity of more useful and valuable commodities; greater enjoyments will be obtained with less consumption of resources; the same industrial products will require less destruction of raw materials, or become more durable. It will be possible to select, for each kind of soil, the crop satisfying the greatest needs, and to choose, among crops serv-

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ing similar needs, those satisfying a greater number of people with less work and less real consumption. Thus, without any sacrifice, the means of conservation and of economy in consumption will follow the progress of the art of reproducing various substances, processing them, and producing goods from them.

Not only will the same plot of land thus be able to feed more individuals, but they will each be engaged in less arduous but more productive occupations, and better able to satisfy their needs.

As the progress of industry and welfare leads to a more advantageous ratio between human capacities and needs, each generation will be brought to greater enjoyments, as a result either of this progress or of the conservation of goods produced earlier. Given the constitution of the human species, however, it follows that there will be an increase in the number of individuals. Will there not inevitably come a point, therefore, at which these two equally necessary laws will clash and the growth in the number of people will exceed the increase in their resources? Is this not bound to lead to a kind of oscillation between good and evil, if not to the constant diminution of well-being and population that would constitute a real retrogression? Will this oscillation not become an enduring cause of periodic misery in societies that have reached this point? Will it not indicate the end point beyond which further improvement would become impossible, the limit to its betterment the human species would finally reach after an immensity of centuries and never be able to go beyond?

There is no one, surely, who fails to see how distant this time is from us, but are we not bound to reach it one day? It is equally impossible to pronounce for or against the future reality of an event that would occur only in an age when the hu-

man species would necessarily have acquired knowledge we can scarcely imagine. And who would dare guess what the art of converting the elements into substances fit for our use must one day bring?

But supposing this limit must one day be reached, there is nothing we need fear as a result, either for the happiness of the human species, or for its indefinite improvement. If we assume that up to this point the progress of reason will have matched that of the sciences and the arts, that the ridiculous prejudices of superstition will have ceased to infuse morality with a severity that corrupts and degrades it rather than purifying and elevating it, then humanity will know that the obligations it has toward those not yet born consist in giving them not life but happiness. These obligations pertain to the general welfare of the human species, of the society in which one lives, of the family to which one is attached, not to the childish idea of filling the earth with useless and miserable beings. Thus there could be a limit to the possible quantity of foodstuffs, and hence to the maximum population, without this resulting in a premature destruction of some of those beings already living, which would be contrary to nature and to social prosperity.

Discovery of the first principles of metaphysics, ethics, and politics, or rather their exact analysis, is still recent. Because knowledge of these principles was preceded by a great number of particular truths, the prejudice that it has reached its ultimate limit easily took root. Because there were no more gross errors to destroy or fundamental truths to establish, it was assumed that there was nothing left to do.

But it is easy to see how imperfect the analysis of the intellectual and moral faculties of humankind remains. Since

knowledge of one's individual duties depends on understanding the effects of one's actions on the well-being of one's fellows and on the society to which one belongs, it can therefore still be extended by more consistent, more probing, and more precise observation of these effects. Many questions remain to be answered, many social relations to be examined, before we will know precisely the extent of the individual's rights, and of the rights the social state gives to all in relation to each. Have we yet established with any precision the limits on rights, either those of different societies in wartime, those of societies over their members in times of division and disorder, or those of individuals or spontaneous associations at the point of their free and original formation or when their dissolution becomes necessary?

Turning to the theory that must direct the application of these principles and serve as the basis for the social art, is it not still clearly necessary to reach a precision to which these first truths cannot be susceptible when stated in absolutely general form? Have we reached the point at which we can base all the provisions of our laws on justice or a proven and recognized utility, and not on vague, uncertain, and arbitrary opinions or alleged political advantages? Have we determined the precise rules for choosing with assurance, among the almost infinite number of possible arrangements under which the general principles of equality and natural rights would be respected, those which would more fully guarantee the preservation of these rights, allow great leeway for their exercise and enjoyment, and ensure most effectively the peace and well-being of individuals and the strength, tranquility, and prosperity of nations?

The application of combinatorial theory and the calculus of probabilities to these sciences promises even more sub-

stantial progress because it offers the sole means of giving their results an almost mathematical precision and of evaluating their degree of certainty or likelihood. In the absence of calculation, admittedly, the facts upon which these results rest may sometimes lead us to general truths on the basis of observation alone, and they may on occasion teach us whether the effect produced by a given cause has been positive or not. But unless it has been possible to count or weigh the facts, or to subject the effects to precise measurement, one will not be able to gauge the extent of the good or evil arising from this cause. The good and evil might almost balance out, or the difference between them might not be very great, in which case one would be unable even to determine with any certainty which way the scale might tip. Without the application of mathematical calculation, it would often be impossible to choose with any confidence between two arrangements for attaining the same goal, because their relative advantages might not be obviously disproportionate. Lacking such a resource, these sciences would remain crude and limited for want of methods sophisticated enough to grasp the elusive truth, or of techniques reliable enough to mine the depths at which part of their wealth lies hidden.

These applications of mathematics remain still elementary, one might say, despite the happy efforts of some mathematicians. They will open up to succeeding generations a source of knowledge as inexhaustible as the science of calculation itself, as vast as the number of combinations, relationships, and facts that can be made subject to it.

There is another advance to be made in these sciences that is no less important: perfecting their language, which is still so vague and obscure. This can give them the advantage of becoming truly

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popular, even in their elementary form. Genius can overcome the imprecision of scientific languages along with other obstacles; it recognizes the truth despite the strange mask that conceals or disguises it. But will the individual who can only devote a few moments to his instruction be able to acquire and retain the simplest notions if they are disguised by an imprecise language? The less able he is to assemble and combine ideas, the more he needs them to be exact and precise; his own intelligence cannot supply him with a system of truths that will protect him against error; and his mind, lacking the strength and refinement that comes from long exercise, is unable to seize the feeble rays that slip through the obscurities and ambiguities of an imperfect and perverted language.

Human beings cannot enlighten themselves regarding the nature and development of their moral sentiments, the principles of ethics and the natural motivations that bring their actions into accordance with them, their interests as individuals or as members of a society, without also making progress in the practice of morality as real as that in the science itself. Is not interest badly understood the most frequent cause of actions contrary to the common good? Is the violence of the passions not frequently the effect of habits embraced only as the result of miscalculation, or of ignorance of the means of resisting their first impulses, calming them, and redirecting and controlling their action?

Consider the habit of reflecting upon one's own conduct and listening to one's reason and one's conscience as one does so, the experience of those gentle sentiments that blend our happiness with that of others: are these not the neces-

sary result of a well-conceived study of morality, a greater equality in the conditions of the social pact? The sense of one's dignity that belongs to the free person, an upbringing based on a developed knowledge of the constitution of our moral being: must these not render common among almost all of us those principles of a strict and pure justice, those habitual movements of an active and enlightened benevolence, of a delicate and generous sensibility? Their seeds have been placed by nature in all our hearts, and they await only the sweet influence of enlightenment and liberty to develop within us. Just as the mathematical and physical sciences serve to improve the arts employed to provide for our simplest needs, is it not equally within the necessary order of nature that the progress of the moral and political sciences exercise a similar effect on the motives that direct our sentiments and our actions?

Is it not the case that improvement in the laws and public institutions resulting from the progress of the moral and political sciences will have the effect of harmonizing and identifying the common interest of each individual with the common interest of all? Is it not the goal of the social art to destroy this apparent opposition? Will not the society whose constitution and laws conform most exactly to the voice of reason and nature be the place where virtue will be easiest, the temptations to stray from it weakest and most rare?

What vicious habit is there, what practice contrary to good faith, what crime even, that cannot be shown to derive its origin and first cause from the legislation, institutions, and prejudices according to which it is observed?

In short, will the well-being that follows from the advances of the useful arts when they are based on sound theory, or

from the progress of a just legislation based on the truths of the moral and political sciences, not dispose individuals toward a sense of humanity, benevolence, and justice?

These observations will be developed more fully in the work to follow. Do they not prove that moral goodness – the necessary result of the human constitution – is susceptible like all the faculties to indefinite improvement, and that nature has linked truth, happiness, and virtue together by an indissoluble chain?

The advances of the human mind most important for the general happiness must include the complete elimination of the prejudices that have established an inequality of rights between the two sexes that is fatal even to the one it is presumed to favor. We would look in vain for grounds to justify this inequality in terms of differences in the physical organization of the sexes, or of a putative disparity in powers of intelligence or in moral sensibility. Its only origin is abuse of force; subsequent attempts to excuse it have been empty sophistries.

We shall show how much the destruction of the practices authorized by this prejudice, and of the laws it has dictated, can contribute to the enhancement of family happiness, and to making common and habitual the domestic virtues that are the first foundation of all the others; how much this change can foster the progress of instruction, and especially render it truly general, either because it will be extended to the two sexes more equally, or by virtue of the fact that it cannot become general, even for men, without the support of mothers of families. Would this belated tribute to equity and good sense not stifle a fertile source of injustices, cruelties, and crimes by eliminating so dangerous an opposition between the liveliest and most irrepressible natural inclination and our duties

as humans, or the interests of society? Would it not realize what has so far been only a fantasy: national manners that are sweet and pure, formed not by privations arising from pride, by hypocritical appearances, by restrictions imposed by the fear of shame or religious terrors, but by habits that are freely acquired, inspired by nature, and declared by reason?

The most enlightened peoples, reclaiming the right to expend their blood and their wealth, will gradually learn to see war as the deadliest scourge and the greatest of crimes. The first conflicts to disappear will be those into which peoples are dragged by the usurpers of national sovereignty in support of alleged hereditary rights.

Peoples will know that they cannot become conquerors without losing their own liberty; that permanent confederations are the sole means of maintaining their independence; that they must seek security, not power. Commercial prejudices will gradually dissipate; false mercantile interests will lose their dreadful power to cover the earth with blood, ruining nations under the pretext of enriching them. As peoples finally come to closer agreement on the principles of politics and ethics, as each finds that its own advantage consists in offering foreigners a more equal share of the goods it owes to nature and its industry, all the causes producing, envenoming, and perpetuating national hatreds will gradually vanish, no longer to serve as fuel or pretext for the fury of war.

Institutions better devised than the projects for perpetual peace that have occupied the leisure and consoled the spirit of some philosophers will accelerate the progress of this brotherhood among nations. Wars between peoples, like assassinations, will be numbered among those monstrous atrocities that

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humiliate and revolt nature, and bring enduring disgrace to the country and the century whose annals they have stained.

We have already observed, when we discussed the fine arts in Greece, Italy, and France, that it is necessary to distinguish what in an artistic work really belongs to the progress of the art and what is owing to the talent of the particular artist. We shall point out here the progress still to be expected in the arts, whether as a result of progress in philosophy and the sciences, of more numerous and thorough observations of the object, effects, and techniques of the arts, or of the destruction of the prejudices that have restricted their sphere and kept them still under the yoke of authority, which the sciences and philosophy have already cast off. We shall consider whether the arts must reach the point of exhaustion, as some have believed, once the most sublime and moving beauty has been caught, the most felicitous subjects have been treated, the simplest and most striking arrangements employed, the most vivid and most generous characters portrayed, the strongest passions and their truest and most natural expressions represented, along with the most imposing truths and the most brilliant images. Are the arts condemned, in short, whatever fertility one attributes to their techniques, to the eternal monotony of imitating the first models?

We shall make clear that this view is no more than a prejudice born of the tendency of writers and artists to judge individuals instead of appreciating works. If there must be a loss of the reflective pleasure produced by comparing works of art from different centuries or different countries, or by admiring the efforts or the successes of genius, the enjoyment to be derived from these works

considered in themselves must nevertheless be as intense even when the artist can claim less merit to bringing them to perfection. As artistic works truly worthy of preservation multiply and become more perfect, each generation will exercise its curiosity and capacity for admiration on those deserving preference; others will gradually be forgotten; and the enjoyment to be derived from the simplest and most striking manifestations of beauty, those that were caught the first, will not exist less for the new generations who must find them among more modern creations.

The progress of the sciences guarantees that of the art of instruction, which in turn accelerates scientific advance. The constant action of this reciprocal influence must be counted among the most dynamic and powerful causes of the amelioration of the human species. A young man leaving school today knows more mathematics than Newton acquired by profound study or discovered through his genius; he is able to utilize the instrument of the calculus with a facility then unknown. The same observation is applicable to all the sciences, though in unequal measure. As each develops, so do the means of expressing more concisely the proofs of a greater number of its truths, and of making them easier to understand. In consequence, new advances in the sciences notwithstanding, not only do individuals of equal genius still reach the level of the current state of knowledge at a similar age, but what each generation can learn in the same length of time, with the same brainpower and the same attention, necessarily increases. Similarly, the elementary part of each science, that which all can master, becomes more and more extensive, thus comprising more fully the knowledge each individual

must have to conduct his everyday life, or exercise his reason with complete independence.

In the political sciences there is an order of truths that can only be useful, especially among free peoples (which, within a few generations, will mean all peoples), when they are generally known and acknowledged. The influence of the progress of these sciences on the liberty and prosperity of nations must therefore be measured, to some degree, by the number of these truths that become common to all minds as a result of elementary instruction. Thus the constant expansion of elementary instruction in these sciences, linked as it is to their necessary progress, offers us an improvement in the destinies of the human species that can be regarded as indefinite, since its only limits are those of this same progress.

We still have to discuss two general means that must influence the improvement of the art of instruction as well as the advance of the sciences. One is the more extensive and less imperfect use of what might be called technical methods; the other, the establishment of a universal language.

By technical methods, I understand the art of bringing together a large quantity of data in a systematic arrangement making it possible to see their relationships immediately, grasp combinations among them rapidly, and form new permutations easily.

We shall set forth the principles and show the utility of this art still in its infancy. As it is developed, it will offer the advantage of bringing together within a small table what would often be difficult to show as readily, or as well, in a very lengthy book. Alternatively, it will provide the even more precious means of presenting isolated facts in the order most suitable to derive general results

from them. We shall explain how, with the aid of a small number of these tables, whose use will be easily learned, individuals who have not been able to go far enough beyond the most elementary instruction to master detailed knowledge useful in common life will find it possible to locate this knowledge at will whenever the need arises. We shall also show how use of these same methods can facilitate elementary instruction in any field where it is based on a systematic order of truths or on a sequence of observations or facts.

A universal language is one that uses signs to represent either real objects, or those well-defined aggregates of simple and general ideas that are found to be the same (or can take form equally) in the understanding of all individuals, or the general relations between these ideas, the operations of the human mind, the procedures particular to each science, or the techniques of the arts. People who knew these signs, the methods of combining them, and the principles underlying them would understand what is written in this language and be able to express it with equal facility in the language of their own country.

Clearly, this language could be used to set out the theory of a science or the rules of an art, to report an experiment or new observation, the invention of a procedure, or the discovery of a truth or method. As in algebra, signs already known would supply the means of explaining the precise meaning of new ones when they are needed.

A language of this kind would not share the disadvantages of a scientific idiom different from common usage. We have already observed that use of such an idiom would necessarily have the effect of dividing society into two unequal classes of people: those who know the scientific language and thus

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possess the key to all the sciences, and those who have been unable to learn it and consequently find themselves utterly unable to acquire knowledge. The universal language, in contrast, would be learned with a science itself, as in algebra; the sign would be understood at the same time as the object, the idea, or the procedure it represents. An individual who had acquired the elements of a science and wanted to study it further would find in books not only truths he could understand with the help of the signs whose precise meaning he already knew, but also the explanation of new signs necessary to reach other truths.

We shall demonstrate that there is nothing chimerical about the idea of forming such a language, provided it is limited to the expression of simple and precise propositions of the kind that form the system of a science or the practice of an art. Its creation would already be easy for a large number of objects, and the strongest obstacle against extending it to others would be the somewhat humiliating necessity of accepting how few precise ideas and well-defined notions we have yet to agree on.

We shall show how this language, constantly improving and daily extending its range, would bring to bear on all the objects embraced by human intelligence a rigor and precision that would make knowledge of the truth easy and error almost impossible. Then each science would advance as surely as mathematics, and the propositions forming its system would acquire all the geometric certainty permitted by the nature of its subject and method.

All these causes of the amelioration of the human species, all these means assuring it, must by their very nature exercise a continuous action and constantly extend their range.

We have outlined the proofs of this here, and they will be developed more fully and forcefully in the work to come. We could therefore already conclude that humankind is indefinitely ameliorable. But so far we have assumed that it will have the same faculties and the same physical constitution. What then would be the extent and certainty of our hopes if we could believe that these natural faculties and this physical constitution themselves could also be improved? This is the last question remaining for us to consider.

Organic amelioration or deterioration of vegetable and animal species may be regarded as one of the general laws of nature. This law extends to the human species and surely no one will doubt that progress in medical care, healthier nutrition and accommodation, a mode of life developing strength through exercise without destroying it through excess, and, finally, destruction of the two most potent causes of degradation – misery and excessive wealth – will inevitably extend the average lifespan and assure human beings more consistent health and a more robust constitution. It seems clear that advances in preventive medicine, rendered more efficacious by the progress of reason and of the social order, will in the long run extinguish transmissible and contagious illnesses, as well as the common illnesses caused by climate, foodstuffs, and working conditions. Nor will it be difficult to prove that this same expectation must apply to almost all other illnesses, whose distant causes will one day probably be discovered. Would it be absurd at this point to imagine that this amelioration of the human species must be regarded as susceptible of indefinite progress, that a time will come when death will be only a result of unusual accidents or the slower and slower deterioration of vital forces,

and even that the average interval between birth and this deterioration will have no assignable limit? Human beings will certainly not become immortal, but can there not be an indefinite increase in the interval between the beginning of life and the average point at which existence becomes difficult for them naturally, without illness or accident? Since we are speaking here of a progress that can be represented with precision numerically or diagrammatically, this is the appropriate point at which to explicate the two possible meanings of the term *indefinite*.

It might be that this average lifespan, constantly increasing the further we advance in time, expands by virtue of a law according to which it continually approaches a point of unlimited duration without ever reaching it. Or it might be that it expands by virtue of a law according to which, over the immensity of centuries, it reaches a duration greater than any determinate limit we might have assigned to it. In this latter case, the increase is truly indefinite in the most absolute sense, because there exists no endpoint before which it must stop. In the former case, the increase is also indefinite in relationship to us if we cannot fix the point it must always approach and can never reach, and especially if, knowing only that it can never stop, we do not even know which of the two senses of the term 'indefinite' should be applied to it. This is precisely the limit of our present knowledge as to the potential ameliorability of the human species, and hence the sense in which we can call it indefinite.

Thus, in the example considered here, we have to believe that the average human lifespan must increase constantly unless this is prevented by physical revolutions, but we do not know the limit beyond which it cannot extend, or even

whether the laws of nature have fixed such a point.

As for physical faculties, the force, adaptability, and delicacy of the senses, are these not among the qualities whose improvement in the individual can be transmitted? Observation of the different species of domestic animals leads us to believe so, and we will be able to confirm this by direct study of human beings.

Finally, can these same hopes be extended to intellectual and moral faculties? Our parents pass on to us the advantages and defects of their physical constitution, from which we derive distinctive bodily characteristics and dispositions to particular physical states. Can they not also pass on to us that part of physical organization governing intelligence, strength of mind, emotional energy, and moral sensibility? Is it not plausible that in improving these qualities education could affect this same physical organization, modifying and improving it? Analogy, analysis of the development of human faculties, and even some observed facts seem to prove the reality of these conjectures, which would extend even further the limits of our hopes.

These are the questions to be examined in concluding the discussion of this Tenth Epoch. And how welcome to the philosopher is this picture of the human race freed from all its chains, released from the domination of chance and of the enemies of its progress, advancing with a firm and sure step in the path of truth, virtue, and happiness! How this spectacle consoles him for the errors, crimes, and injustices that still defile the earth, of which he is often the victim! In contemplation of this picture, he finds the reward for his efforts on behalf of the progress of reason and the defense

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of liberty. He dares thus to link these efforts to the eternal chain of human destinies, finding there the true reward of virtue, the pleasure of having done some lasting good which fate will no longer destroy, bringing back prejudices and slavery in a deadly swing of the pendulum. This contemplation affords him an asylum where the memory of his persecutors cannot pursue him, where he forgets humanity tormented and corrupted by greed, fear, or envy, to live in the mind with humanity restored to the rights and dignity of its nature. There he truly lives in communion with his fellows, in a paradise that his reason has been able to create and his love of humankind enhances with the purest of pleasures.