Historical View of the Progress of the Human Mind (1794)
by Condorcet

Condorcet organized his ***Esquisse*** in ten chapters. The first nine follow
the development of human civilization from its earliest time to1the French Revolution..

Reproduced here is the "Tenth Chapter"from the
English translations by Judith Barraclough (1955)

THE TENTH STAGE

The future progress of the human mind

If man can, with almost complete assurance, predict phenomena when he knows their laws, and if, even when he does not, he can still, with great expectation of success, forecast the future on the basis of his experience of the past, why, then, should it be regarded as a fantastic undertaking to sketch, with some pretense to truth, the future destiny of man on the basis of his history? The sole foundation for belief in the natural sciences is this idea, that the general laws directing the phenomena of the universe, known or unknown, are necessary and constant. Why should this principle be any less true for the development of the intellectual and moral faculties of man than for the other operations of nature? Since beliefs founded on past experience of like conditions provide the only rule of conduct for the wisest of men, why should the philosopher be forbidden to base his conjectures on these same foundations, so long as he does not attribute to them a certainty superior to that warranted by the number, the constancy, and the accuracy of his observations?

Our hopes for the future condition of the human race can be subsumed under three important heads: the abolition of inequality between nations, the progress of equality within each nation, and the true perfection of mankind. Will all nations one day attain that state of civilization which the most enlightened, the freest and the least burdened by prejudices, such as the French and the Anglo-Americans, have attained already? Will the vast gulf that separates these peoples from the slavery of nations under the rule of monarchs, from the barbarism of African tribes, from the ignorance of savages, little by little disappear?

Is there on the face of the earth a nation whose inhabitants have been debarred by nature herself from the enjoyment of freedom and the exercise of reason?

Are those differences which have hitherto been seen in every civilized country in respect of the enlightenment, the resources, and the wealth enjoyed by the different classes into which it is divided, is that inequality between men which was aggravated or perhaps produced by the earliest progress of society, are these part of civilization itself, or are they due to the present imperfections of the social art? Will they necessarily decrease and ultimately make way for a real equality, the final end of the social art, in which even the effects of the natural differences between men will be mitigated and the only kind of inequality to persist will be that which is in the interests of all and which favors the progress of civilization, of education, and of industry, without entailing either poverty, humiliation, or dependence? In other words, will men approach a condition in which everyone will have the knowledge necessary to conduct himself in the ordinary affairs of life, according to the light of his own reason, to preserve his mind free from prejudice, to understand his rights and to exercise them in accordance with his conscience and his creed; in which everyone will become able, through the development of

his faculties, to find the means of providing for his needs; and in which at last misery and folly will be the exception, and no longer the habitual lot of a section of society?

Is the human race to better itself, either by discoveries in the sciences and the arts, and so in the means to individual welfare and general prosperity; or by progress in the principles of conduct or practical morality; or by a true perfection of the intellectual, moral, or physical faculties of man, an improvement which may result from a perfection either of the instruments used to heighten the intensity of these faculties and to direct their use or of the natural constitution of man?

In answering these three questions we shall find in the experience of the past, in the observation of the progress that the sciences and civilization have already made, in the analysis of the progress of the human mind and of the development of its faculties, the strongest reasons for believing that nature has set no limit to the realization of our hopes.

If we glance at the state of the world today we see first of all that in Europe the principles of the French constitution are already those of all enlightened men. We see them too widely propagated, too seriously professed, for priests and despots to prevent their gradual penetration even into the hovels of their slaves; there they will soon awaken in these slaves the remnants of their common sense and inspire them with that smoldering indignation which not even constant humiliation and fear can smother in the soul of the oppressed.

As we move from nation to nation, we can see in each what special obstacles impede this revolution and what attitudes of mind favor it. We can distinguish the nations where we may expect it to be introduced gently by the perhaps belated wisdom of their governments, and those nations where its violence intensified by their resistance must involve all alike in a swift and terrible convulsion.

Can we doubt that either common sense or the senseless discords of European nations will add to the effects of the slow but inexorable progress of their colonies, and will soon bring about the independence of the New World? And then will not the European population in these colonies, spreading rapidly over that enormous land, either civilize or peacefully remove the savage nations who still inhabit vast tracts of its land?

Survey the history of our settlements and commercial undertakings in Africa or in Asia, and you will see how our trade monopolies, our treachery, our murderous contempt for men of another color or creed, the insolence of our usurpations, the intrigues or the exaggerated proselytic zeal of our priests, have destroyed the respect and goodwill that the superiority of our knowledge and the benefits of our commerce at first won for us in the eyes of the inhabitants. But doubtless the moment approaches when, no longer presenting ourselves as always either tyrants or corrupters, we shall become for them the beneficent instruments of their freedom.

The sugar industry, establishing itself throughout the immense continent of Africa, will destroy the shameful exploitation which has corrupted and depopulated that continent for the last two centuries.

Already in Great Britain, friends of humanity have set us an example; and if the Machiavellian government of that country has been restrained by public opinion from offering any opposition, what may we not expect of this same spirit, once the reform of a servile and venal constitution has led to a government worthy of a humane and generous nation? Will not France hasten to imitate such undertakings dictated by philanthropy and the true self-interest of Europe alike? Trading stations have been set up in the French islands, in Guiana and in some English possessions, and soon we shall see the downfall of the monopoly that the Dutch have sustained with so much treachery, persecution and crime. The nations of Europe will finally learn that monopolistic companies are nothing more than a tax imposed upon them in order to provide their governments with a new instrument of tyranny.

So the peoples of Europe, confining themselves to free trade, understanding their own rights too well to show contempt for those of other peoples, will respect this independence, which until now they have so insolently violated. Their settlements, no longer filled with government hirelings hastening, under the cloak of place or

privilege, to amass treasure by brigandry and deceit, so as to be able to return to Europe and purchase titles and honor, will now be peopled with men of industrious habit, seeking in these propitious climates the wealth that eluded them at home. The love of freedom, will retain them there, ambition will no longer recall them, and what have been no better than the counting-houses of brigands will become colonies of citizens propagating throughout Africa and Asia the principles and the practice of liberty, knowledge and reason, that they have brought from Europe. We shall see the monks who brought only shameful superstition to these peoples and aroused their antagonism by the threat of yet another tyranny, replaced by men occupied in propagating amongst them the truths that will promote their happiness and in teaching them about their interests and their rights. Zeal for the truth is also one of the passions, and it will turn its efforts to distant lands, once there are no longer at home any crass prejudices to combat, any shameful errors to dissipate.

These vast lands are inhabited partly by large tribes who need only assistance from us to become civilized, who wait only to find brothers amongst the European nations to become their friends and pupils; partly by races oppressed by sacred despots or dull-witted conquerors, and who for so many centuries have cried out to be liberated; partly by tribes living in a condition of almost total savagery in a climate whose harshness repels the sweet blessings of civilization and deters those who would teach them its benefits; and finally, by conquering hordes who know no other law but force, no other profession but piracy. The progress of these two last classes of people will be shower and stormier; and perhaps it will even be that, reduced in number as they are driven back by civilized nations, they will finally disappear imperceptibly before them or merge into them.

We shall point out how these events will be the inevitable result not merely of the progress of Europe but also of the freedom that the French and the North American Republics can, and in their own real interest should, grant to the trade of Africa and Asia; and how they must of necessity be born either of a new-found wisdom on the part of the European nations, or of their obstinate attachment to mercantilist prejudices.

We shall show that there is only one event, a new invasion of Asia by the Tartars, that could prevent this revolution, and that this event is now impossible. Meanwhile everything forecasts the imminent decadence of the great religions of the East, which in most countries have been made over to the people, and, not uncontaminated by the corruption of their ministers, are in some already regarded by the ruling classes as mere political inventions; in consequence of which they are now powerless to retain human reason in hopeless bondage, in eternal infancy.

The progress of these peoples is likely to be more rapid and certain than our own because they can receive from us everything that we have had to find out for ourselves, and in order to understand those simple truths and infallible methods which we have acquired only after long error, all that they need to do is to follow the expositions and proofs that appear in our speeches and writings. If the progress of the Greeks was lost to later nations, this was because of the absence of any form of communication between the different peoples, and for this we must blame the tyrannical domination of the Romans. But when mutual needs have brought all men together, and the great powers have established equality between societies as well as between individuals and have raised respect for the independence of weak states and sympathy for ignorance and misery to the rank of political principles, when maxims that favor action and energy have ousted those which would compress the province of human faculties, will it then be possible to fear that there are still places in the world inaccessible to enlightenment, or that despotism in its pride can raise harriers against truth that are insurmountable for long?

The time will therefore come when the sun will shine only on free men who know no other master but their reason; when tyrants and slaves, priests and their stupid or hypocritical instruments will exist only in works of history and on the stage; and when we shall think of them only to pity their victims and their dupes; to maintain ourselves in a state of vigilance by thinking on their excesses; and to learn how to recognize and so to destroy, by force of reason, the first seeds of tyranny and superstition, should they ever dare to reappear amongst us.

In looking at the history of societies we shall have had occasion to observe that there is often a great difference between the rights that the law allows its citizens and the rights that they actually enjoy, and, again, between the equality established by political codes and that which in fact exists amongst individuals: and we shall have

noticed that these differences were one of the principal causes of the destruction of freedom in the ancient republics, of the storms that troubled them, and of the weakness that delivered them over to foreign tyrants.

These differences have three main causes: inequality in wealth; inequality in status between the man whose means of subsistence are hereditary and the man whose means are dependent on the length of his life, or, rather, on that part of his life in which he is capable of work; and, finally inequality in education.

We therefore need to show that these three sorts of real inequality must constantly diminish without however disappearing altogether: for they are the result of natural and necessary causes which it would be foolish and dangerous to wish to eradicate; and one could not even attempt to bring about the entire disappearance of their effects without introducing even more fecund sources of inequality, without striking more direct and more fatal blows at the rights of man.

It is easy to prove that wealth has a natural tendency to equality, and that any excessive disproportion could not exist or at least would rapidly disappear if civil laws did not provide artificial ways of perpetuating and uniting fortunes; if free trade and industry were allowed to remove the advantages that accrued wealth derives from any restrictive law or fiscal privilege; if taxes on covenants, the restrictions placed on their free employment, their subjection to tiresome formalities and the uncertainty and inevitable expense involved in implementing them did not hamper the activity of the poor man and swallow up his meager capital; if the administration of the country did not afford some men ways of making their fortune that were closed to other citizens; if prejudice and avarice, so common in old age, did not preside over the making of marriages; and if, in a society enjoying simpler manners and more sensible institutions, wealth ceased to be a means of satisfying vanity and ambition, and if the equally misguided notions of austerity, which condemn spending money in the cultivation of the more delicate pleasures, no longer insisted on the hoarding of all one's earnings.

Let us turn to the enlightened nations of Europe, and observe the size of their present populations in relation to the size of their territories. Let us consider, in agriculture and industry the proportion that holds between labor and the means of subsistence, and we shall see that it would be impossible for those means to be kept at their present level and consequently for the population to be kept at its present size if a great number of individuals were not almost entirely dependent for the maintenance of themselves and their family either on their own labor or on the interest from capital invested so as to make their labor more productive. Now both these sources of income depend on the life and even on the health of the head of the family. They provide what is rather like a life annuity, save that it is more dependent on chance; and in consequence there is a very real difference between people living like this and those whose resources are not at all subject to the same risks, who live either on revenue from land, or on the interest on capital which is almost independent of their own labor.

Here then is a necessary cause of inequality, of dependence and even of misery, which ceaselessly threatens the most numerous and most active class in our society.

We shall point out how it can be in great part eradicated by guaranteeing people in old age a means of livelihood produced partly by their own savings and partly by the savings of others who make the same outlay, but who die before they need to reap the reward; or, again, on the same principle of compensation, by securing for widows and orphans an income which is the same and costs the same for those families which suffer an early loss and for those which suffer it later; or again by providing all children with the capital necessary for the full use of their labor, available at the age when they start work and found a family, a capital which increases at the expense of those whom premature death prevents from reaching this age. It is to the application of the calculus to the probabilities of life and the investment of money that we owe the idea of these methods which have already been successful, although they have not been applied in a sufficiently comprehensive and exhaustive fashion to render them really useful, not merely to a few individuals, but to society as a whole by making it possible to prevent those periodic disasters which strike at so many families and which are such a recurrent source of misery and suffering.

We shall point out that schemes of this nature, which can be organized in the name of the social authority and

become one of its greatest benefits, can also be the work of private associations, which will be formed without any real risk, once the principles for the proper working of these schemes have been widely diffused and the mistakes which have been the undoing of a large number of these associations no longer hold terrors for us.

[We shall reveal other methods of ensuring this equality, either by seeing that credit is no longer the exclusive privilege of great wealth, but that it has another and no less sound foundation; or by making industrial progress and commercial activity more independent of the existence of the great capitalists. And once again, it is to the application of the calculus that we shall be indebted for such methods.]

The degree of equality in education that we can reasonably hope to attain, but that should be adequate, is that which excludes all dependence, either forced or voluntary. We shall show how this condition can be easily attained in the present state of human knowledge even by those who can study only for a small number of years in childhood, and then during the rest of their life in their few hours of leisure We shall prove that, by a suitable choice of syllabus and of methods of education, we can teach the citizen everything that he needs to know in order to be able to manage his household, administer his affairs and employ his labor and his faculties in freedom; to know his rights and to be able to exercise them to be acquainted with his duties and fulfill them satisfactorily; to judge his own and other men's actions according to his own lights and to be a stranger to none of the high and delicate feelings which honor human nature; not to be in a state of blind dependence upon those to whom he must entrust his affairs or the exercise of his rights; to be in a proper condition to choose and supervise them; to be no longer the dupe of those popular errors which torment man with superstitious fears and chimerical hopes; to defend himself against prejudice by the strength of his reason alone; and, finally, to escape the deceits of charlatans who would lay snares for his fortune, his health, his freedom of thought and his conscience under the pretext of granting him health, wealth and salvation.

From such time onwards the inhabitants of a single country will no longer be distinguished by their use of a crude or refined language; they will be able to govern themselves according to their own knowledge; they will no longer be limited to a mechanical knowledge of the procedures of the arts or of professional routine; they will no longer depend for every trivial piece of business, every insignificant matter of instruction on clever men who rule over them in virtue of their necessary superiority; and so they will attain a real equality, since differences in enlightenment or talent can no longer raise a barrier between men who understand each other's feelings, ideas and language, some of whom may wish to be taught by others but, to do so, will have no need to be controlled by them, or who may wish to confide the care of government to the ablest of their number but will not be compelled to yield them absolute power in a spirit of blind confidence.

This kind of supervision has advantages even for those who do not exercise it, since it is employed for them and not against them. Natural differences of ability between men whose understanding has not been cultivated give rise, even in savage tribes, to charlatans and dupes, to clever men and men readily deceived. These same differences are truly universal, but now they are differences only between men of learning and upright men who know the value of learning without being dazzled by it; or between talent or genius and the common sense which can appreciate and benefit from them; so that even if these natural differences were greater, and more extensive than they are, they would be only the more influential in improving the relations between men and promoting what is advantageous for their independence and happiness.

These various causes of equality do not act in isolation; they unite, combine and support each other and so their cumulative effects are stronger, surer and more constant. With greater equality of education there will be greater equality in industry and so in wealth; equality in wealth necessarily leads to equality in education: and equality between the nations and equality within a single nation are mutually dependent.

So we might say that a well directed system of education rectifies natural inequality in ability instead of strengthening it, just as good laws remedy natural inequality in the means of subsistence, and just as in societies where laws have brought about this same equality, liberty, though subject to a regular constitution, will be more widespread, more complete than in the total independence of savage life. Then the social art will have fulfilled its aim, that of assuring and extending to all men enjoyment of the common rights to which they are called by

nature.

The real advantages that should result from this progress, of which we can entertain a hope that is almost a certainty, can have no other term than that of the absolute perfection of the human race; since, as the various kinds of equality come to work in its favor by producing ampler sources of supply, more extensive education, more complete liberty, so equality will be more real and will embrace everything which is really of importance for the happiness of human beings.

It is therefore only by examining the progress and the laws of this perfection that we shall be able to understand the extent or the limits of our hopes.

No one has ever believed that the mind can gain knowledge of all the facts of nature or attain the ultimate means of precision in the measurement, or in the analysis of the facts of nature, the relations between objects and all the possible combinations of ideas. Even the relations between magnitudes, the mere notion of quantity or extension, taken in its fullest comprehension, gives rise to a system so vast that it will never be mastered by the human mind in its entirety, that there will always be a part of it, always indeed the larger part of it that will remain forever unknown. People have believed that man can never know more than a part of the objects that the nature of his intelligence allows him to understand, and that he must in the end arrive at a point where the number and complexity of the objects that he already knows have absorbed all his strength so that any further progress must be completely impossible.

But since, as the number of known facts increases, the human mind learns how to classify them and to subsume them under more general facts, and, at the same time, the instruments and methods employed in their observation and their exact measurement acquire a new precision: since, as more relations between various objects become known, man is able to reduce them to more general relations, to express them more simply, and to present them in such a way that it is possible to grasp a greater number of them with the same degree of intellectual ability and the same amount of application; since as the mind learns to understand more complicated combinations of ideas, simpler formulae soon reduce their complexity; so truths that were discovered only by great effort, that could at first only be understood by men capable of profound thought, are soon developed and proved by methods that are not beyond the reach of common intelligence. If the methods which have led to these new combinations of ideas are ever exhausted, if their application to hitherto unsolved questions should demand exertions greater than either the time or the capacity of the learned would permit, some method of a greater generality or simplicity will be found so that genius can continue undisturbed on its path. The strength and the limits of man's intelligence may remain unaltered; and yet the instruments that he uses will increase and improve, the language that fixes and determines his ideas will acquire greater breadth and precision and, unlike mechanics where an increase of force means a decrease of speed, the methods that lead genius to the discovery of truth increase at once the force and the speed of its operations.

Therefore, since these developments are themselves the necessary consequences of progress in detailed knowledge, and since the need for new methods in fact only arises in circumstances that give rise to new methods, it is evident that, within the body of the sciences of observation, calculation and experiment, the actual number of truths may always increase, and that every part of this body may develop, and yet man's faculties be of the same strength, activity and extent.

If we apply these general reflections to the various sciences, we can find in each of them examples of progressive improvement that will remove any doubts about what we may expect for the future. We shall point out in particular the progress that is both likely and imminent in those sciences which prejudice regards as all but exhausted. We shall give examples of the manner and extent of the precision and unity which could accrue to the whole system of human knowledge as the result of a more general and philosophical application of the sciences of calculation to the various branches of knowledge. We shall show how favorable to our hopes would be a more universal system of education by giving a greater number of people the elementary knowledge which could awaken their interest in a particular branch of study, and by providing conditions favorable to their progress in it; and how these hopes would be further raised, if more men possessed the means to devote

themselves to these studies, for at present even in the most enlightened countries scarcely one in fifty of the people who have natural talents, receives the necessary education to develop them; and how, if this were done there would be a proportionate increase in the number of men destined by their discoveries to extend the boundaries of science.

We shall show how this equality in education and the equality which will come about between the different nations would accelerate the advance of these sciences whose progress depends on repeated observations over a large area; what benefits would thereby accrue to mineralogy, botany zoology amid meteorology; and what a vast disproportion holds in all these sciences between the poverty of existing methods which have nevertheless led to useful and important new truths, and the wealth of those methods which man would then be able to employ.

We shall show how even the sciences in which discovery is the fruit of solitary meditation would benefit from being studied by a greater number of people, in the matter of those improvements in detail which do not demand the intellectual energy of an inventor but suggest themselves to mere reflection.

If we turn now to the arts, whose theory depends on these same sciences, we shall find that their progress depending as it does on that of theory, can have no other limits; that the procedures of the different arts can be perfected and simplified in the same way as the methods of the sciences; new instruments, machines and looms can add to man's strength and can improve at once the quality and the accuracy of his productions, and can diminish the time and labor that has to be expended on them. The obstacles still in the way of this progress will disappear, accidents will be foreseen and prevented, the insanitary conditions that are due either to the work itself or to the climate will be eliminated.

A very small amount of ground will be able to produce a great quantity of supplies of greater utility or higher quality; more goods will be obtained for a smaller outlay; the manufacture of articles will be achieved with less wastage in raw materials and will make better use of them. Every type of soil will produce those things which satisfy the greatest number of needs; of several alternative ways of satisfying needs of the same order, that will be chosen which satisfies the greatest number of people and which requires least labor and least expenditure. So, without the need for sacrifice, methods of preservation and economy in expenditure will improve in the wake of progress in the arts of producing and preparing supplies and making articles from them.

So not only will the same amount of ground support more people, but everyone will have less work to do, will produce more, and satisfy his wants more fully.

With all this progress in industry and welfare which establishes a happier proportion between men's talents and their needs, each successive generation will have larger possessions, either as a result of this progress or through the preservation of the products of industry; and so, as a consequence of the physical constitution of the human race, the number of people will increase. Might there not then come a moment when these necessary laws begin to work in a contrary direction; when, the number of people in the world finally exceeding the means of subsistence, there will in consequence ensue a continual diminution of happiness and population, a true retrogression, or at best an oscillation between good and bad? In societies that have reached this stage will not this oscillation be a perennial source of more or less periodic disaster? Will it not show that a point has been attained beyond which all further improvement is impossible, that the perfectibility of the human race has after long years arrived at a term beyond which it may never go?

There is doubtless no one who does not think that such a time is still very far from us; but will it ever arrive? It is impossible to pronounce about the likelihood of an event that will occur only when the human species will have necessarily acquired a degree of knowledge of which we can have no inkling. And who would take it upon himself to predict the condition to which the art of converting the elements to the use of man may in time be brought?

But even if we agree that the limit will one day arrive, nothing follows from it that is in the least alarming as far

as either the happiness of the human race or its indefinite perfectibility is concerned; if we consider that, before all this comes to pass, the progress of reason will have kept pace with that of the sciences, and that the absurd prejudices of superstition will have ceased to corrupt and degrade the moral code by its harsh doctrines instead of purifying and elevating it, we can assume that by then men will know that, if they have a duty towards those who are not yet born, that duty is not to give them existence but to give them happiness; their aim should be to promote the general welfare of the human race or of the society in which they live or of the family to which they belong, rather than foolishly to encumber the world with useless and wretched beings. It is, then, possible that there should be a limit to the amount of food that can be produced, and, consequently, to the size of the population of the world, without this involving that untimely destruction of some of those creatures who have been given life, which is so contrary to nature and to social prosperity.

Since the discovery, or rather the exact analysis of the first principles of metaphysics, morals and politics is still recent and was preceded by the knowledge of a large number of detailed truths, the false notion that they have thereby attained their destination, has gained ready acceptance; men imagine that, because there are no more crude errors to refute, no more fundamental truths to establish, nothing remains to he done.

But it is easy to see how imperfect is the present analysis of man's moral and intellectual faculties; how much further the knowledge of his duties which presumes a knowledge of the influence of his actions upon the welfare of his fellow men and upon the society to which he belongs, can still be increased through a more profound, more accurate, more considered observation of that influence; how many questions have to be solved, how many social relations to be examined, before we can have precise knowledge of the individual rights of man and the rights that the state confers upon each in regard to all. Have we yet ascertained at all accurately the limits of the rights that exist between different societies in times of war, or that are enjoyed by society over its members in times of trouble and schism, or that belong to individuals, or spontaneous associations at the moment of their original, free formation or of their necessary disintegration?

If we pass on to the theory which ought to direct the application of particular principles and serve as the foundation for the social art, do we not see the necessity of acquiring a precision that these elementary truths cannot possess so long as they are absolutely general? Have we yet reached the point when we can reckon as the only foundation of law either justice or a proved and acknowledged utility instead of the vague, uncertain, arbitrary views of alleged political expediency? Are we yet in possession of any precise rules for selecting out of the almost infinite variety of possible systems in which the general principles of equality and natural rights are respected, those which will best secure the preservation of these rights, which will afford the freest scope for their exercise and their enjoyment, and which will moreover insure the leisure and welfare of individuals and the strength, prosperity and peace of nations?

The application of the calculus of combinations and probabilities to these sciences promises even greater improvement, since it is the only way of achieving results of an almost mathematical exactitude and of assessing the degree of their probability or likelihood. Sometimes, it is true, the evidence upon which these results are based may lead us, without any calculation, at the first glance, to some general truth and teach us whether the effect produced by such-and-such a cause was or was not favorable, but if this evidence cannot be weighed and measured, and if these effects cannot be subjected to precise measurement, then we cannot know exactly how much good or evil they contain; or, again, if the good and evil nearly balance each other, if the difference between them is slight, we cannot pronounce with any certainty to which side the balance really inclines. Without the application of the calculus it would be almost impossible to choose with any certainty between two combinations that have the same purpose and between which there is no apparent difference in merit. Without the calculus these sciences would always remain crude and limited for want of instruments delicate enough to catch the fleeting truth, of machines precise enough to plumb the depths where so much that is of value to science lies hidden.

However, such an application, notwithstanding the happy efforts of certain geometers, is still in its earliest stages: and it will be left to the generations to come to use this source of knowledge which is as inexhaustible as the calculus itself, or as the number of combinations, relations and facts that may be included in its sphere of

operation.

There is another kind of progress within the sciences that is no less important; and that is the perfection of scientific language which is at present so vague and obscure. This improvement could be responsible for making the sciences genuinely popular, even in their first rudiments. Genius can triumph over the inexactitude of language as over other obstacles and can recognize the truth through the strange mask that hides or disguises it. But how can someone with only a limited amount of leisure to devote to his education master and retain even the simplest truths if they are distorted by an imprecise language? The fewer the ideas that he is able to acquire and combine, the more necessary is it that they should be precise and exact. He has no fund of knowledge stored up in his mind which he can draw upon to protect himself from error, and his understanding, not being strengthened and refined by long practice, cannot catch such feeble rays of light as manage to penetrate the obscurities, the ambiguities of an imperfect and perverted language.

Until men progress in the practice as well as in the science of morality, it will be impossible for them to attain any insight into either the nature and development of the moral sentiments, the principles of morality, the natural motives that prompt their actions, or their own true interests either as individuals or as members of society. Is not a mistaken sense of interest the most common cause of actions contrary to the general welfare? Is not the violence of our passions often the result either of habits that we have adopted through miscalculation, or of our ignorance how to restrain them, tame them, deflect them, rule them?

Is not the habit of reflection upon conduct, of listening to the deliverances of reason and conscience upon it, of exercising those gentle feelings which identify our happiness with that of others, the necessary consequence of a well-planned study of morality and of a greater equality in the conditions of the social pact? Will not the free man's sense of his own dignity and a system of education built upon a deeper knowledge of our moral constitution, render common to almost every man those principles of strict and unsullied justice, those habits of an active and enlightened benevolence, of a fine and generous sensibility which nature has implanted in the hearts of all and whose flowering waits only upon the favorable influences of enlightenment and freedom? Just as the mathematical and physical sciences tend to improve the arts that we use to satisfy our simplest needs, is it not also part of the necessary order of nature that the moral and political sciences should exercise a similar influence upon the motives that direct our feelings and our actions?

What are we to expect from the perfection of laws and public institutions, consequent upon the progress of those sciences, but the reconciliation, the identification of the interests of each with the interests of all? Has the social art any other aim save that of destroying their apparent opposition? Will not a country's constitution and laws accord best with the rights of reason and nature when the path of virtue is no longer arduous and when the temptations that lead men from it are few and feeble?

Is there any vicious habit, any practice contrary to good faith, any crime, whose origin and first cause cannot be traced back to the legislation, the institutions, the prejudices of the country wherein this habit, this practice, this crime can be observed? In short will not the general welfare that results from the progress of the useful arts once they are grounded on solid theory, or from the progress of legislation once it is rooted in the truths of political science, incline mankind to humanity, benevolence and justice? In other words, do not all these observations which I propose to develop further in my book, show that the moral goodness of man, the necessary consequence of his constitution, is capable of indefinite perfection like all his other faculties, and that nature has linked together in an unbreakable chain truth, happiness and virtue?

Among the causes of the progress of the human mind that are of the utmost importance to the general happiness, we must number the complete annihilation of the prejudices that have brought about an inequality of rights between the sexes, an inequality fatal even to the party in whose favor it works. It is vain for us to look for a justification of this principle in any differences of physical organization, intellect or moral sensibility between men and women. This inequality has its origin solely in an abuse of strength, and all the later sophistical attempts that have been made to excuse it are vain.

We shall show how the abolition of customs authorized, laws dictated by this prejudice, would add to the happiness of family life, would encourage the practice of the domestic virtues on which all other virtues are based, how it would favor the progress of education, and how, above all, it would bring about its wider diffusion; for not only would education be extended to women as well as to men, but it can only really be taken proper advantage of when it has the support and encouragement of the mothers of the family. Would not this belated tribute to equity and good sense, put an end to a principle only too fecund of injustice, cruelty and crime, by removing the dangerous conflict between the strongest and most irrepressible of all natural inclinations and man's duty or the interests of society? Would it not produce what has until now been no more than a dream, national manners of a mildness and purity, formed not by proud asceticism, not by hypocrisy, not by the fear of shame or religious terrors but by freely contracted habits that are inspired by nature and acknowledged by reason?

Once people are enlightened they will know that they have the right to dispose of their own life and wealth as they choose; they will gradually learn to regard war as the most dreadful of scourges, the most terrible of crimes. The first wars to disappear will be those into which usurpers have forced their subjects in defense of their pretended hereditary rights.

Nations will learn that they cannot conquer other nations without losing their own liberty; that permanent confederations are their only means of preserving their independence; and that they should seek not power but security. Gradually mercantile prejudices will fade away: and a false sense of commercial interest will lose the fearful power it once had of drenching the earth in blood and of ruining nations under pretext of enriching them. When at last the nations come to agree on the principles of politics and morality, when in their own better interests they invite foreigners to share equally in all the benefits men enjoy either through the bounty of nature or by their own industry, then all the causes that produce and perpetuate national animosities and poison national relations will disappear one by one; and nothing will remain to encourage or even to arouse the fury of war.

Organizations more intelligently conceived than those projects of eternal peace which have filled the leisure and consoled the hearts of certain philosophers, will hasten the progress of the brotherhood of nations, and wars between countries will rank with assassinations as freakish atrocities, humiliating and vile in the eyes of nature and staining with indelible opprobrium the country or the age whose annals record them.

When we spoke of the fine arts in Greece, Italy and France, we observed that it was necessary to distinguish in artistic productions between what belonged properly to the progress of the art itself and what was due only to the talent of the individual artist. We shall here indicate what progress may still be expected in the arts as a result of the progress in philosophy and the sciences, of the increasing number of observations made about the aim, effects and methods of the arts, of the destruction of those prejudices which have formerly narrowed their sphere and even now hold them within the shackles of authority, shackles that science and philosophy have broken. We shall ask, whether, as some have thought, these means are exhausted, and the arts condemned to an eternal, monotonous imitation of their first models since the most sublime and moving beauty has already been apprehended, the happiest subjects treated, the simplest and most arresting ideas used, the most marked or most generous characters delineated, the liveliest intrinsic passions and their truest or most natural manifestations, the most striking truths and the most brilliant images already exploited.

We shall see that this opinion is a mere prejudice, born of the habit, which is prevalent among artists and men of letters, of judging men, instead of enjoying their works. If the more reflective pleasure of comparing the products of different ages and countries and admiring the success and energy of the efforts of genius will probably be lost, the pleasure to be derived from the actual contemplation of works of art as such will be just as vivid as ever, even though the author may no longer deserve the same credit for having achieved such perfection. As works of art genuinely worthy of preservation increase in number, and become more perfect, each successive generation will devote its attention and admiration to those which really deserve preference, and the rest will unobtrusively fall into oblivion; the pleasure to be derived from the simpler, more striking, more accessible aspects of beauty will exist no less for posterity although they will be found only in the latest

works.

The progress of the sciences ensures the progress of the art of education which in turn advances that of the sciences. This reciprocal influence, whose activity is ceaselessly renewed, deserves to be seen as one of the most powerful and active causes working for the perfection of mankind. At the present time a young man on leaving school may know more of the principles of mathematics than Newton ever learned in years of study or discovered by dint of genius, and he may use the calculus with a facility then unknown. The same observation, with certain reservations, applies to all the sciences. As each advances, the methods of expressing a large number of proofs in a more economical fashion and so of making their comprehension an easier matter, advance with it. So, in spite of the progress of science, not only do men of the same ability find themselves at the same age on a level with the existing state of science, but with every generation, that which can be acquired in a certain time with a certain degree of intelligence and a certain amount of concentration will be permanently on the increase, and, as the elementary part of each science to which all men may attain grows and grows, it will more and more include all the knowledge necessary for each man to know for the conduct of the ordinary events of his life, and will support him in the free and independent exercise of his reason.

In the political sciences there are some truths that, with free people (that is to say, with certain generations in all countries) can be of use only if they are widely known and acknowledged. So the influence of these sciences upon the freedom and prosperity of nations must in some degree be measured by the number of truths that, as a result of elementary instruction, are common knowledge; the swelling progress of elementary instruction, connected with the necessary progress of these sciences promises us an improvement in the destiny of the human race, which may be regarded as indefinite, since it can have no other limits than that of this same progress.

We have still to consider two other general methods which will influence both the perfection of education and that of the sciences. One is the more extensive and less imperfect use of what we might call technical methods; the other is the setting up of a universal language.

I mean by technical methods the art of arranging a large number of subjects in a system so that we may straightway grasp their relations, quickly perceive their combinations, and readily form new combinations out of them.

We shall develop the principles and examine the utility of this art, which is still in its infancy, and which, as it improves, will enable us, within the compass of a small chart, to set out what could possibly not be expressed so well in a whole book, or, what is still more valuable, to present isolated facts in such a way as to allow us to deduce their general consequences. We shall see how by means of a small number of these charts, whose use can easily be learned, men who have not been sufficiently educated to be able to absorb details useful to them in ordinary life, may now be able to master them when the need arises; and how these methods may likewise be of benefit to elementary education itself in all those branches where it is concerned either with a regular system of truths or with a series of observations and facts.

A universal language is that which expresses by signs either real objects themselves, or well-defined collections composed of simple and general ideas, which are found to be the same or may arise in a similar form in the minds of all men, or the general relations holding between these ideas, the operations of the human mind, or the operations peculiar to the individual sciences, or the procedures of the arts. So people who become acquainted with these signs, the ways to combine them and the rules for forming them will understand what is written in this language and will be able to read it as easily as their own language.

It is obvious that this language might be used to set out the theory of a science or the rules of an art, to describe a new observation or experiment, the invention of a procedure, the discovery of a truth or a method; and that, as in algebra, when one has to make use of a new sign, those already known provide the means of explaining its import.

Such a language has not the disadvantages of a scientific idiom different from the vernacular. We have already observed that the use of such an idiom would necessarily divide society into two unequal classes, the one composed of men who, understanding this language, would possess the key to all the sciences, the other of men who, unable to acquire it, would therefore find themselves almost completely unable to acquire enlightenment. In contrast to this, a universal language would be learned, like that of algebra, along with the science itself; the sign would be learned at the same time as the object, idea or operation that it designates. He who, having mastered the elements of a science, would like to know more of it, would find in books not only truths he could understand by means of the signs whose import he has learned, but also the explanation of such further signs as he needs in order to go on to other truths.

We shall show that the formation of such a language, if confined to the expression of those simple, precise propositions which form the system of a science or the practice of an art, is no chimerical scheme; that even at the present time it could be readily introduced to deal with a large number of objects; and that, indeed, the chief obstacle that would prevent its extension to others would be the humiliation of having to admit how very few precise ideas and accurate, unambiguous notions we actually possess.

We shall show that this language, ever improving and broadening its scope all the while, would be the means of giving to every subject embraced by the human intelligence, a precision and a rigor that would make knowledge of the truth easy and error almost impossible. Then the progress of every science would be as sure as that of mathematics, and the propositions that compose it would acquire a geometrical certainty, as far, that is, as is possible granted the nature of its aim and method.

All the causes that contribute to the perfection of the human race, all the means that ensure it must by their very nature exercise a perpetual influence and always increase their sphere of action. The proofs of this we have given and in the great work they will derive additional force from elaboration. We may conclude then that the perfectibility of man is indefinite. Meanwhile we have considered him as possessing the natural faculties and organization that he has at present. How much greater would be the certainty, how must vaster the scheme of our hopes if we could believe that these natural faculties themselves and this organization could also be improved? This is the last question that remains for us to ask ourselves.

Organic perfectibility or deterioration amongst the various strains in the vegetable and animal kingdom can he regarded as one of the general laws of nature. This law also applies to the human race. No one can doubt that, as preventive medicine improves and food and housing become healthier, as a way of life is established that develops our physical powers by exercise without ruining them by excess, as the two most virulent causes of deterioration, misery and excessive wealth, are eliminated, the average length of human life will be increased and a better health and a stronger physical constitution will be ensured. The improvement of medical practice, which will become more efficacious with the progress of reason and of the social order, will mean the end of infectious and hereditary diseases and illnesses brought on by climate, food, or working conditions. It is reasonable to hope that all other diseases may likewise disappear as their distant causes are discovered. Would it be absurd then to suppose that this perfection of the human species might be capable of indefinite progress; that the day will come when death will be due only to extraordinary accidents or to the decay of the vital forces, and that ultimately the average span between birth and decay will have no assignable value? Certainly man will not become immortal, but will not the interval between the first breath that he draws and the time when in the natural course of events, without disease or accident, he expires, increase indefinitely? Since we are now speaking of a progress that can be represented with some accuracy in figures or on a graph, we shall take this opportunity of explaining the two meanings that can be attached to the word indefinite.

In truth, this average span of life which we suppose will increase indefinitely as time passes, may grow in conformity either with a law such that it continually approaches a limitless length but without ever reaching it, or with a law such that through the centuries it reaches a length greater than any determinate quantity that we may assign to it as its limit. In the latter case such an increase is truly indefinite in the strictest sense of the word, since there is no term on this side of which it must of necessity stop. In the former case it is equally indefinite in relation to us, if we cannot fix the limit it always approaches without ever reaching, and

particularly if, knowing only that it will never stop, we are ignorant in which of the two senses the term "indefinite" can be applied to it. Such is the present condition of our knowledge as far as the perfectibility of the human race is concerned; such is the sense in which we may call it indefinite.

So, in the example under consideration, we are bound to believe that the average length of human life will for ever increase unless this is prevented by physical revolutions; we do not know what the limit is which it can never exceed. We cannot tell even whether the general laws of nature have determined such a limit or not.

But are not our physical faculties and the strength, dexterity and acuteness of our senses, to be numbered among the qualities whose perfection in the individual may be transmitted? Observation of the various breeds of domestic animals inclines us to believe that they are, and we can confirm this by direct observation of the human race.

Finally may we not extend such hopes to the intellectual and moral faculties? May not our parents, who transmit to us the benefits or disadvantages of their constitution, and from whom we receive our shape and features, as well as our tendencies to certain physical affections, hand on to us also that part of the physical organization which determines the intellect, the power of the brain, the ardor of the soul or the moral sensibility? Is it not probable that education, in perfecting these qualities, will at the same time influence, modify and perfect the organization itself? Analogy, investigation of the human faculties and the study of certain facts, all seem to give substance to such conjectures which would further push back the boundaries of our hopes.

These are the questions with which we shall conclude this final stage. How consoling for the philosopher who laments the errors, the crimes, the injustices which still pollute the earth and of which he is often the victim is this view of the human race, emancipated from its shackles, released from the empire of fate and from that of the enemies of its progress, advancing with a firm and sure step along the path of truth, virtue and happiness! It is the contemplation of this prospect that rewards him for all his efforts to assist the progress of reason and the defense of liberty. He dares to regard these strivings as part of the eternal chain of human destiny; and in this persuasion he is filled with the true delight of virtue and the pleasure of having done some lasting good which fate can never destroy by a sinister stroke of revenge, by calling back the reign of slavery and prejudice. Such contemplation is for him an asylum in which the memory of his persecutors cannot pursue him; there he lives in thought with man restored to his natural rights and dignity, forgets man tormented and corrupted by greed, fear or envy; there he lives with his peers in an Elysium created by reason and graced by the purest pleasures known to the love of mankind.