

The Western Intellectual Tradition

From Leonardo to Hegel

J. Bronowski & B. Mazlish

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The book comes with a punched hole in the upper right-hand corner, and this is an indication that I bought it on sale, probably on the side-walk outside a book-store, sometime in the 70's, either back at Harvard, or along Broadway up by Columbia. I often bought paper-back books on half-price for quick sale, and in those neighborhoods there always were very many books on sale and I took advantage of it, being in the habit of regular browsing and building up my library slowly but surely. Many of those books remain unread in my shelves, others are picked up by accident forty years later. This one I actually started to read I recall, back during what must have been the spring of 1979, my last term at Columbia, and the term following the death of my father. At that time I must have read, maybe even seen some rerun, of Bronowski's 'Ascent of Man' and been rather impressed by him. I recall that while reading the book I set myself the goal of also reading books referred to in the book, thus, somewhat touchingly, embarking on a project of intellectual self-education, true to my auto-didactical temperament. I only got so far as to read More's 'Utopia', and in the book I now discovered a bookmark in the form of a Godiva label, the fancy chocolatier, on page 160 during the beginning of the so called Puritan Revolution, which seems not to have caught my fancy. Further on in the book, two more bookmarks turned up, one involving a receipt of a 1000 dollar transfer, almost a monthly salary at the time. Now I decide, after two books by Bronowski to have a final go, maybe partly motivated by the questionable maxim of never leaving a book, which you have at some time started, unfinished. Before beginning the review let me just note one peculiarity. On the spine of the book there is only the name of one of the authors, namely that of Bronowski himself, while on the cover both names occur, that of Mazlish, for some reason not in black but in red. Could it be that he was the junior author (born in 1923 as opposed to Bronowski 1908) and not likely to sell? Who was he? He turns out to have been a historian working at M.I.T. and could very well have contributed most of the hard and tedious writing, which is inevitably involved in a thick book. Closer inspection of the spine reveals though that traces of his name remains. No doubt having been printed in red, as on the front cover, it has faded drastically during forty years of exposure to light, as red prints usually did, at least in the past.

The book is meant to be a survey of the intellectual awakening and maturing of the West, starting from the late Renaissance with Leonardo, and climaxing, somewhat surprisingly with Kant and Hegel in the early 19th century. It is a survey which highlights the individual men of genius, which may be seen as somewhat controversial, after all is not history the result of impersonal forces, and to maintain that individuals make a difference is but sentimentalism? The individual is at most a representative for the spirit of the times, moved but not a mover. This is a fashionable view, and as with most

abstract pronouncement nearly impossible to falsify. True or not, the approach to focus on individuals has many advantages, for one thing, this is a history of ideas, and ideas are expressed by individuals and exert their influence by being carried from one mind to another and in the process being subtly modified. Eventually the idea disseminates to society at large and make up a common world-view and a 'Zeitgeist', although one should be careful with what one really means by the statement than an idea becomes common property; maybe not the idea itself but its consequences, such as in technological applications of scientific principles which deeply affect the ordinary quotidian life. When it comes to science itself most people have very dim ideas of what it is really all about, and the educated public, which constitutes the general audience, necessarily is for much of history a very thin slice of the population, which until recently, to a large extent was illiterate anyway. How many actually read Galileo's dialogues at the time? Or those penned by ? Certainly not millions, but maybe tens of thousands. The printed book really made a difference, but apart from the Bible, there were few books if any, who found their ways into general households. The Bible, and related books, thus being sure bestsellers and hence attractive to publishers, who are torn between the demand to make public worthy books and the necessity to pay their bills. Thus bestsellers make serious books possible (nowadays the ambition of contributing intellectually takes second place, or maybe no place at all).

Europe throughout the Middle Ages was a static society if any, dominated by the Catholic church spiritually and also to some extent politically. The idea of progress, that the past was essentially different from the present, and thus that the future would involve radical changes of improvement engineered by men, did not exist in their minds. And in fact this was not particular about Europe, but was the normal state of mind in most of the world for most of the time. The expansion of the Roman empire may have provided time with an arrow for the political elite, but for the common man it did not mean very much. The daily life of people in general probably did not really change until the 19th century in the West, and as far as the world at large, only in the last thirty years, when modern technology such as mobile phone, became generally accessible. The natural point to start is of course the renaissance, which involved the rediscovery of the classical world in more than a formal sense. True, Aristotle was a guiding component of scholastic thought, and of course Latin was the lingua franca of theology in particular and intellectual thought in general. The Renaissance meant that the human being could take pride in himself and his powers, thus appropriating Pagan elements in the Classical culture. Of course such an exalted view of themselves as individuals only became the prerogative of a very few, known as Renaissance men for the lack of limits to their interests and curiosities and concomitant ambitions. Most of them were mere 'Condottiere', seeking distinction for their war-like prowess, ideally along with an interest and appreciation of artistic culture; and in this context one should not forget the Popes, who were anything but spiritual exemplars at the time, but more often than not greedy and unscrupulous power-hungry war-lords engaged in regional warfare, making latter-day Popes, for all their faults and pretensions of infallibility, into saints. The notion of a Renaissance man that has survived into our days, is admirably represented by Leonardo, and thus a fitting starting point for the narrative presented by the authors. Leonardo was a masterful painter and mainly known as such to

his contemporaries, but to him this was just a sideline useful for procuring sponsors. His real interests were indeed wide and far-ranging, but exactly how wide and far-ranging only became known long after his death when his voluminous *Nachlaß* of notes was discovered and deciphered. He was, what is often called a man ahead of his time, and although he fancied himself as a scientist he had basically no influence as such, because as the senior author remarks in another book¹ he had no peers and hence his endeavors were solitary and asocial making no impact. In the history of mankind he remains a curiosity, if a glorious one, showing both the potential of the individual and his limits. Your thoughts can be as brilliant as anything, but amount to nothing unless shared².

The Catholic church was at a crisis about five hundred years ago. An intellectual and spiritual crisis. In history there is never one specific cause, but almost always a combination of many fortuitously brought about³. One particular and thus contributing cause was the printing press enabling the quick communication with the masses, which, as noted above, should be thought of the literate ones⁴. One individual who benefited from the printing press was Erasmus of Rotterdam who would become one of the leading lights of the Reformation although he did distance himself from more radical proponents such as Luther, being of a more thoughtful and hence of a meeker temperament. Due to the printed book a reading public arose and with that a division between an elite of authors and their readers⁵. It was also a secular phenomena in the sense of not being controlled by the church. There formed networks of intellectuals, formed by readers and sustained by letters, so when the authors became known to their public, they also became known to themselves (although of course there might very well have been more channels to get to know each other, but how would Erasmus and Luther have learned of each other otherwise?), Thus in that charmed circle Thomas More, with his above-mentioned 'Utopia' enters. His book being important for presenting an alternative society to the one present. It was not entirely original, no doubt being much influenced by Plato's 'The State', access to which had been made possible by the spread of original Greek manuscripts during the late Renaissance.

¹ reviewed in this volume

² Leonardo, as all men of substantial talent was interested in mathematics, as was his almost contemporary Dürer, but all he did was mathematical doodles (as retold by Coolidge in his book on mathematical amateurs, incidentally also reviewed in these volumes) receiving no inspiration nor impetus.

³ Just as physical traits, i.e. properties of the phenotype, seldom are the effects of specific genes

⁴ Who were literate and who were not? Universal primary education is of course a late invention and implementation. Those of the nobility and the wealthy middle-classes could of course afford to have their progeny educated, but if you were poor avenues were not closed. Most people seem to need explicit instruction to learn to read, while a few pick up reading on their own unbidden. Such gifted children, maybe making up 5 percent of the population, would through their manifested literacy catch the attention of the establishment. Anyway literacy in an illiterate society is a great asset. Thus the prospects of a gifted child back then may have been comparatively better than it would be now.

⁵ The potential power of an author is measured by the extent of his readership. Not everyone can become a best-selling author, if everyone would be an author with a readership of ten thousand say, necessarily composed of other authors, everyone would have to read ten thousand books and hardly have time for writing.

What was the real impact of the Reformation? It started out as an attempt at reforming the Catholic church, focusing on one of its abuses, namely the selling of indulgences. But this abuse was clearly just one aspect of a deeper malaise of the spiritual health of the church, as indicated above. One thing led to another and Luther was carried away and became more and more radical, buttressed by the support given by him by the German princes, putting him into confrontations with the Catholic authorities, thereby painting himself into a corner. Luther was not the first vocal opponent of the mighty Catholic Church, but those who had preceded him had come to grief. Without the political support, referred to above, he too would have been done for. Thus the times were more conducive to rebellion, the ground having been already prepared. Luther was an intellectual, and the core of his creed was that the relation between God and the Individual would be direct and unmediated unlike the case of the Catholic church. Furthermore an individual was not able to achieve salvation on his own merits through good deeds, salvation was always a matter of grace⁶. Crucial to the whole enterprise was that Individuals should be able to read the Bible on their own, thus calling for translations into the vernacular, and it is as a translator of the Bible that Luther made his lasting impression upon posterity. A movement which started as a rebellion actually ended up as authoritative. Luther turned a cold eye to the peasant rebellions that arose, ostensibly reluctant to jeopardize his political support. And when it came to emerging science, the Protestant church was at least as bigoted as the Catholic Church, no doubt much more, because in addition to political opposition there came religious fervor, the kind of which was not to be found in the power elite of the established church. The authors dismiss Luther as a nationalist, that his church was national in character, and thus had no appeal outside Germany. This bespeaks a certain ignorance, or at least nonchalance. While Germany remained a mosaic with Catholic pockets in Protestant areas, and Protestant pockets in the Catholic areas, reflecting also the political division of the lands, Lutheranism got a stronghold in Scandinavia, which is actually of some historical importance. Of course the spread of Protestantism in Scandinavia was not a case of a grassroots bottom-up approach but very much a top-down affair imposed by powerful rulers, as eager as Henry VIII to appropriate its riches. As a result Lutheranism became a state religion in Scandinavia, and Catholicism was outlawed until the 20th century, sharing with England a strong anti-papist attitude.

The Puritan Revolution was notable in the respect that for the first time the people cut off the head of a King, breaking a deep taboo, one surmises which did more for freedom for the common people than all the beautiful words and sentiments ever did. In the end the Puritan Revolution may have failed, but, the authors claim that out of its ashes something was reclaimed, namely the belief of religious, political and economic individualism.

The book then continues predictably with the Scientific revolution to be followed by the Industrial, the connection between the two being both tenuous and inevitable. The scientific one centers on the Royal Society, with special chapters on Hobbes and Locke

⁶ This crucial theological point was lost on most Protestants, touchingly evoked by Th.Fontane in his novella Grete Minde. I recall how I as a pupil at school was admonished to do good deeds with the implicit assumption that those earned you entrance to heaven, although of course at the Last Judgment you are damned not for sinning but for sins of omission, i.e omitting to do good when the opportunity presented itself. This of course is a license for judgmental whims on the part of the judges, known as divine grace.

as well as Pascal and Bayle, but surprisingly not on Newton, while Descartes gets his own chapter, as do the classical philosophers of the Enlightenment, as we were introduced to them at school - Voltaire, Montesquieu and Rousseau. There is an emphasis on the American Revolution, with names such as Franklin and Jefferson. The French Revolution can of course not be ignored, and chapters are given to Adam Smith, Edmund Burke, Robert Owen and Jeremy Bentham, reflecting perhaps the idiosyncratic taste of the authors. Somewhat surprisingly the book ends with Kant and Hegel, two philosophers who would hardly have been comfortable together.

As to the section on science the authors make some questionable claims, such as that Galileo is supposed to have proven that a force that gets moving continues to move until some force acts to stop it. How do you actually prove such a claim? It is an assumption of course an attempt to explain and make sense and is as such somewhat of a metaphysical statement, which however has proved to be very fruitful. Or that the English mathematicians stuck, out of patriotism and reverence, to Newton's cumbersome notation, and thus allowed Newton's legacy to develop on the continent and leaving England in the backwater. This is a commonly expressed opinion handed down from one generation to another, but one wonders how much is actually true. They also claim that Pascal laid the foundation for projective geometry. In some sense it goes all the way back to Pappus in the Hellenistic period, and a more modern pioneer would be Desargues. And finally in connection with Descartes claim that the existence of God was as self-evident as that the sum of the three angles of a triangle make up two right ones once you have figured out the essence of a triangle. That is of course not clear and the authors refer to non-Euclidean geometry. An additional axiom is needed, but their claim that this was not provided by Euclid is patently false, how would people have been trying to prove it otherwise? They confuse the issue with Playfair's reformulation of Euclid's axiom. They go on to comment that a similar confusion holds for physics, namely that self-evident assumptions need to be re-examined, one example being that nature in the small is similar to and simpler than at scale we are familiar with. Quantum mechanics belies it.

On the nature of science and scientific awakening they have some interesting things to say. The authors remark correctly that Bacon's insistence that observation and experiments will give results by himself is as ill-founded as Descartes notion that the universe can be constructed by thinking alone, although personally I find much which is both fascinating and attractive with this. Obviously it is a matter of temperament. The authors conclude that the empirical and the rational method need to go hand in hand in order to achieve a science which is both realistic and orderly.

There was a deep personal animosity between Newton and Hook. Hook was really doing science in a Baconian spirit, his fertile mind overflowing with ideas and suggestions. Newton was ahead of his time and had a much more systematic approach to science. He broke up experiments into smaller steps, each of which was designed to settle between a limited set of alternatives. Most clearly this was done in his researches on optics. And then of course his command of mathematics had no equal. More fundamentally so he used to experimental approach to formulate new basic concepts, a paradigm if you so want. Aristotle had done that too, based on self-evident principles, something the Baconian school had rejected, but gone one step further by going beyond the self-evident. As the

authors emphasize, this is the basic inductive principle on which modern science is founded.

On Descartes they are critical as already noted above. As an example he countered the Church dogma that the Earth does not move with that it was the vortex in which it was situated which moves around the vortex of the sun. A kind of scholastic argumentation splitting hairs. Pascal comes out better. In a way he carried on the Cartesian principle of doubt which became a mainstay of French thinking ever since, the authors claim. It certainly has vitalized it, on the other hand it has caused much trouble in practical political life, they continue, as far as forming stable governments, founding acceptable taxation schemes and other mundane concerns of ordinary lives. More interestingly though is that Pascal anticipated the burning question of the latter part of the 20th century. In connection with designing a first calculating machine, he asked in what sense a machine made up of cogwheels can reason logically, differs in that respect from a human. His conclusion was that it is not reason that distinguishes us, but will and self-consciousness, a conclusion shared by modern philosophers. But he also recognized that this shows that reason has limitations in the end we have to rely on faith. Hence this became the end of doubt. Pascal saw deeper than Descartes, who, as pointed out, labored under the illusion that he had shown that the existence of God was logically necessary.

One should not forget some rather remarkable insights during the 17th century as resulting from some rather pressing practical problems, such as the determination of longitude that called for a universal clock. The positions of the Moons of Jupiter would in fact provide such a one despite the difficulties of observation on the sea, especially on a tumultuous one. It was while engaged in determining such tables that the Danish astronomer Rømer discovered that they did not follow a regular pattern (after all they move in almost circular orbits) but appeared to speed up and slow down. Rømer attributed this to the finite speed of light, and thus a Doppler effect, and was able to estimate the speed of light surprisingly accurately in view of the primitive assessment of the astronomical unit ⁷

They spend a fair amount of time, not surprisingly on the Enlightenment, and with an emphasis on the three classical Enlightenment philosophers as noted above. First of all the age was conducive to satire, the first pioneering effort having been the hugely successful 'In praise of Folly' by Erasmus. Satire presumes the existence of a civilized victim who believes in reasons, without this common ground satire falls flat. This also may explain Voltaire's dismissal of the 'rubble' which seems to go against his egalitarian ideology. The only public available to him was the elite of the salons, which he sought to cultivate, hence laying himself open to being called a snob. But the Enlightenment was after all restricted to an elite and beyond it Voltaire's satirical attempts would indeed fall on infertile grounds.

Another example was Montesquieu who initially was hailed as a brilliant satirist through his 'Persian Letters' was later viewed as a traitor to the cause by his enlightened contemporaries, but gained renewed appreciation during subsequent centuries. He believed in the constancy of human nature, hence he believed that the past could give good and relevant advice to the present as the problems facing institutions were the same

⁷ When the Earth approaches Jupiter most rapidly, the apparent orbital revolution for Callisto (the most distant of the Galilean Moons) is shortened with about two minutes, and during a quarter of a year it is about eight minutes ahead of schedule. This is still rather marginal so Rømer must have been involved in rather delicate observations.

than as now. He believed that there were essentially only three kinds of governments - republican, monarchical and despotic. Where one man governs according to fixed laws we have a monarchy, if there are no laws we get despotism. Republicanism means that the public participates in governing. But what is the public? It can be restricted to the aristocracy, and hence be classified as republican. He certainly was not a democrat in the modern, mostly egalitarian sense. His celebrated balance of powers was an opposition to democracy. The authors clarify him as either a liberal conservative or a conservative liberal. He was like Burke for moderate changes and opposed like him to disruptive revolutions. He believed that enlightened people would realize that faults and virtues are inevitably tied together, so reform has always to proceed with caution.

Rousseau is traditionally counted among the Enlightenment philosophers, but concomitant with championing a more egalitarian society he also glorified the instinctive, the irrational and the emotional, virtues seemingly anathema to Enlightenment itself.

The crucial point of departure for Rousseau, as well as the source of his most important influence, was his *Discourse on the moral effects of the Arts and Sciences* which the authors see as the most important challenge to science since the Inquisition. It was a hastily written work with no logic and order, as he himself admitted, but no man is born with the ability to learn the art of writing immediately he excused himself and later rewrote it, but that turned out to be unnecessary, it had had its effect. His main point was to free the theodicy problem from theology, just as Galileo had done for science and Machiavelli for politics, by blaming evil not on original sin as had Pascal or on God, but on society itself. With this comes the possibility to change society as such and thereby also the perceived necessity to do so, preferably in a rational way. The laws of society were not given by God, nor imposed by a tyrant (pace Hobbes), and not even natural ones to discover, but laws exist only by the consent of the public. And more importantly, the authors claim, the insight that man's true nature is not what it happens to be, but what it potentially can be, a prerequisite for a science of man, and a complement to Montesquieu's assertion of the constancy of human nature. Now the notion of a consent of the public, presupposes a public will, and how to determine it. On this Rousseau was vague. If it is through the counting of votes we have a democratic interpretation, or if it would exist as a platonic idea, it needs something equivalent to a philosopher King. Nowadays we scoff at the latter and dismiss it as totalitarian not to say fascist, but in fact democratic voting presupposes that the public knows its own mind, which is far from being evident⁸. Rousseau was not unaware of the pitfalls of democracy and took a somewhat skeptical view of revolutions fearing that those would merely make the public susceptible to seducers, exchanging their condition to something worse. Apprehensions confirmed by history over and over again. Rousseau could not really dissolve the dilemma, and instead took refuge in statements to the effect that the state should be all powerful as it embodies in itself the general will, and inalienable rights belong not to individuals but to the society as a whole, thus, I think, falling in the trap of going all the way returning to the point of departure. Thus, the authors conclude, Rousseau illustrates how close the reign of pure virtue is to despotism, something Montesquieu had warned about.

⁸ One may think of the recent debacle of Brexit in which the public ostensibly spoke its will, but somehow seems very dissatisfied with the outcome

In the eighteenth century universities started to lose their prestige and concomitant influence and were more and more seen as outmoded institutions, especially, I suspect, in England. The industrial revolution was not driven by scientific discoveries originating in the universities but by independent inventors and in academies which also provided education to which the emerging manufacturing classes sent their sons in pursuit of a more realistic education. Academies originating as training schools for on-conformist ministers but soon also opening up to laymen offering instruction in modern languages and science. A notable representative was the distinguished chemist Priestley. The Royal Society also encountered competition in the much more informal Lunar Society, drawing its members from the professional classes, meaning mostly doctors and ministers.

Adam Smith, however, was a professor at a university, and is nowadays seen as the advocate of self-interest. This idea was not new with him, but had been championed before by de Mandeville, claiming that *Private Vices made Public Benefits* and it was *en courrant* among intellectuals of the 18th century. But what he did was to give it respectability by buttressing it with rational and convincing arguments. However, the view of him as a cynic is misleading, and the legitimacy manufacturers and business men find in its doctrine spurious. A closer reading of his works reveal a highly moralistic author, for ever inveighing against the excesses of businessmen. What he sought to accomplish with his similes was the intellectually interesting observation, that the effects of acts are not necessarily to be found in their causes, that the world is full of surprises and that things are not what they appear to be. By stating some simple principles to explain complicated phenomena he pioneered a scientific approach to social investigations retrospectively reminiscent of Darwin's explanation of evolution doing away with design.

Following the theme on political thought, a chapter is devoted to Burke, who anticipating modern historians mistrusted principles in politics. Politics are conducted through expediency, and only retroactively do historians infer a pattern of principle on a series of acts of the past. Principles do not exist at the time, they are only imposed after the facts. He often criticized the expediencies, in particular in the handling by George III of the cessation by the American colonies. Political policy should not be conducted on principles but by good sense as people can be trusted with that, but not with principles as they usually do not understand them. To him political problems had little to do with truth and falsehood but what was good and what was evil. Politics was a question of morality. But how to pursue it? The drafting of a constitution with its distribution of power is a most delicate matter. Furthermore, governments may very well be considered to have divine authority but one should never forget that they all in form and execution originate from the people.

Burke was an orator and his delivery was often vulgar at least in taste, making his colleagues uncomfortable. But to Burke this wildness of his was a mark of the sublime, and one should not forget that in his youth he wrote a book on that notion, which nowadays has gone out of fashion. But such excesses were dismissed as a manifestation of enthusiasm, a word which at the time was one of disapproval, smacking of hysteria. Eventually people stopped paying attention to his oratory and left, so effective indeed was that he got to be nicknamed 'the dinner bell'. But this was not the only thing about Burke which met with disapproval, his financial dealings had a bad smell.

In the same vein, a lot of attention is paid to Bentham, who was independently wealthy and could without distractions devote himself fully to his chosen work. He lived simply, never married, never saw anyone except for a specific purpose, and never took wine. Poetry he had no taste for, and I recall with some fondness a saying I came across as a teenager and which I now now to be attributed to Bentham, namely his definition of Prose, in which all the lines, except the last, go the end of the margin, but Poetry is what when they sometimes fail to do so.

Bentham is known for his advocacy of utility. It took off for two reasons. One being that the French revolution had shown the inadequacy of 'natural rights', the second that he widened and deepened the notion of utility, to extend it from the merely individual sphere to society as a whole, as illustrated by his familiar phrase: the greatest happiness of the greatest number. In this way he provided a measure of social morality. In this way utilitarianism, originated in ancient doctrines of mere hedonism, could be used as a tool to analyze penal and constitutional law and guide in the creation of complete and logical laws a task to which he devoted himself. In this way he was able to lay bare the class interest that lay behind old laws, thereby putting the question, who actually benefit from the laws. Also it lead to asking for the consequences of laws, not just their precedence. This had far reaching effects on the theory of legislation. But at the time his suggestions did not meet with the enthusiasm of those in power, maybe because they did not identify their happiness with those of the greatest number. His slogan provided the rationality for each government, not so much to protect the interests of mere individuals but of society at large, so to speak pandering to its general will. Something one must admit is somewhat risky, and some people condemn utilitarianism for that very reason as being autistic. Yet of course its thinking is prevalent in modern societies. It came under criticism right away. Why should on make happiness a fundamental value, and how do you actually measure it, and balance off the happiness of one individual against that of another? ⁹ As to the criticism of the first, Bentham simply stated that you cannot give grounds for axioms, you have to start somewhere. His utilitarianism tied in with the invisible hand of Smith which made him a proponent of 'laissez-faire' and thereby, the authors claim, he made an original contribution to the doctrine of economic liberalism. His utilitarianism can also be seen as an attempt to make the language of politics as rigorous as that of mathematics. This was part of his general obsession with language¹⁰, and apparently we owe to him words such as international law, codify and codification, as well as maximize and maximization (similarly for minimize). In fact he faults an inadequate language for making the confusion about motives and consequences. Morality depends on the latter not the former. He also was a champion of universal suffrage, where he was a radical. But it would take time. The Reform Bill of 1832 went some way, but it was not until 1885 there was universal male suffrage and it would take to 1918 until the women got the vote.

⁹ The authors makes in a note a reference to Game theory as developed by von Neumann and Morgenstern. They think of this a being in the spirit of Benthamism, in spite of it authors being very critical of Bentham scornfully a no guiding principle can be found in trying to maximize to or more functions at once. Bronowski and Mazlish reject this as missing the point.

¹⁰ He learned Latin at four, and became fluent in French a few years later we learn, as well as Italian and Spanish, and then in later life studying German, Russian and even Swedish!

As a conclusion the authors claim that the guiding principle since the Renaissance has been to find laws both in nature and human societies. By laws you make nature intelligible and can use it both to exploit for human needs as well as protect you from it. You also can handle on society enabling you to develop it rationally and construct reliable and durable institutions. As far as scientific progress is concerned, it has been far more successful in the realm of nature than in the social. The major reason for that, according to the authors is that in natural science there has been achieved a fruitful fusion between the rational and the empirical approach, but not so in the social and humanistic sciences, where one aspect has been allowed to dominate and thus there has been no cross-fertilization.

Concomitant with the search for laws and hence explanations there has also been an inexorable secularization of society, to which the Reformation unwittingly contributed. Explanations are no longer to be found in traditional dogmas, dogmas are to be examined and if necessary rejected, and mankind has to assume the responsibility, which to a large extent the Enlightenment was all about. Secularization may have had the greatest impact on the daily lives of people, and profoundly transformed society, for better or for worse. With the Renaissance and subsequent developments such as the Reformation, there has been an emphasis on individualism, paradoxically hand in hand with the collectivization of man turned into the mass, in connection with the Industrial Revolution, which treated man as a machine. Another theme, intimately connected to personal development is the idea of freedom.

February 3,6, April 5-7 2019 **Ulf Persson:** *Prof.em, Chalmers U.of Tech., Göteborg Sweden* ulfp@chalmers.se ■