

On the scientific conscience of scientist: Einstein's Enlightening

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Abstract: On the Basis of the definition of the scientific conscience, this paper discusses the scientific conscience of scientist, its moral implication and realistic meaning from seven aspects, including the motives of scientific exploration, the aim of scientific pursuit, safeguarding the autonomy of science, defending the academic freedom, the behaviors in scientific activities, the consciousness with regard to researchable consequences, and the attitude towards scientific honors. The paper takes Albert Einstein for typical case study.

Key words: The scientific conscience, A. Einstein, scientist, ethics and morals.

The ethos of science (universalism, , disinterestedness, organized skepticism) or the nature of science (the truth (true) of science: objectivity, autonomy, inheritance, skepticism; the behoof of science: communism, humanitarianism, fairness, tolerance; the beautiful of science: originality, unity, harmony, simplicity) openly reminds and exerts a subtle influence on scientists at a great deal of any moment, that would make them to understand what they ought or oughtn't to do. The scientists, working in scientific communities, gradually form a set of the standards of external behaviors, which conform to moral norm and not all exist writings, through passing on from generation to generation, their own practices, self-reflection, and intuitive comprehension. These standards are keeping in with the existing morals, the their internalization in scientist's mental world is the scientific conscience of scientist, that is, correct belief in right and wrong, good and evil inside scientist's heart of hearts regarding values and ethics in science and its related realm, as well as the consciousness, self-examination and even self-reproach towards morals duty they should bear. For the scientist as an individual, the scientific conscience can consciously or unconsciously norm his statements and actions: he would delight for the good results, and also would feel remorseful and uneasy for the bad consequences. To community of scientists, scientific conscience usually becomes a kind of "collective unconsciousness", thus insures science can more successfully move in the normal orbit. The scientific conscience is moral character that every scientist should have, and is also the essential factor in scientific research and scientific progress as well.

Albert Einstein is the commanding general of the physics revolution, greatest scientist, thinker and man, is also and spokesperson of science and the incarnation of the scientific conscience in the 20th century. He embodies focally the ethos of modern science, the scientific conscience and the good sense of the scientist. Taking Albert Einstein for typical case study, this paper more deeply inquires into discussed topic from seven aspects, i.e. the motives of scientific exploration, the aim of scientific pursuit, safeguarding the autonomy of science, defending the academic freedom, the behaviors in scientific activities, the consciousness with regard to researchable consequences, the

attitude towards scientific honors.

(1) The motives of scientific exploration: To make a picture of the world and to long for beholding a pre-established harmony.

In the year 1918 Einstein delivered an address at a celebration of Max Planck's sixtieth birthday. He said: in the temple of science are many mansions, and various indeed are they that dwell therein and the motives that have led them thither. Many take to science out of a joyful sense of superior intellectual power; science is their own special sport to which they look for vivid experience and satisfaction of ambition; many others are to be found in the temple who have offered the products of their brains on this altar for purely utilitarian purposes. Despite Einstein did not blame and deny these two types of people, but he pointed out: If the types we have just expelled were the only types there were, the temple would never have come to be, any more than a forest can grow which consist on nothing but creepers. For these people any sphere of human activity will do, if it comes to a point; whether they become engineers, officers, tradesmen, or scientist depends on circumstances.

Einstein held that, in the temple of science, most of those people who have found favor with the angel are somewhat odd, uncommunicative and solitary fellows. The strongest motives that lead them to science are two ones. One of the motives is a negative one that comes from Schopenhauer's opinion: in order to escape from everyday life with its painful crudity and hopeless dreariness, from the fetters of one's own ever shifting desires. The other motive is a positive one. That is, man tries to make for himself in the fashion that suits him best a simplified and intelligible picture of the world, and longs to behold the pre-established harmony that was happily described by Leibnitz. Each makes this cosmos and its construction the pivot of his emotional life, in order to find in this way the peace and security, which he cannot find in the narrow whirlpool of personal experience.

Einstein felt that these the two motives were both noble-minded, but he more or less appreciated the positive one. He considered that to make a picture of the world and to long for beholding a pre-established harmony are the source of the inexhaustible patience and perseverance with which Planck has devoted himself to the most general problems of our science, refusing to let himself be diverted to more grateful and more easily attained ends. Here Einstein made mention of a interesting metaphor: this attitude cannot be attributed to extraordinary will-power and discipline, the state of mind is akin to that of the religious worshiper or the lover; the daily effort comes from no deliberate intention or program, but straight from the heart. By "the heart" Einstein meant "the cosmic religious feeling" in which he believed. He explained why "the cosmic religious feeling is the strongest and noble motive for scientific research."

(2) The aim of scientific pursuit: Discovering truth, science for its own sake.

The aim of scientific pursuit is closely relating to the motives of scientific exploration. Einstein said: "The aim of science is, on the one hand, a comprehension, as complete as possible, of the connection between the sense experience in their totality, and, on the other hand, the accomplishment of this aim by the use of a minimum of primary concepts and relations." Speak for itself he positioned science in seeking the systematic experience knowledge here. He spoke more clear and definite in another place: the aim of science, tangibly say, is to discover the truth, despite he thought scientific theories only are "some approximate truth", "the trueness of a natural law is infinite".

Exactly according to the above views, Einstein initiated "science for its own sake", as Henri Poincaré did. In his opinion, Science itself carries its purpose, and yet need not aim at other intention so that to deviate its own path. Therefore he time and again emphasized: "science exists for its own sake, just as art does for its own sake."

"Scientific research can flourish only if it is pursued for its own sake, without regard to its practical application."

He deeply realized: "Thought for its own sake is as wonderful as music! "

Einstein still treated the pursuit of truth from a vast field of vision of ethics and morals. Followed Spinoza, he connected the pursuit of truth with the pursuit of good and of perfect morals, because the ultimate good in human mind can be included in the truth. For this reason, scientists implement their own social responsibility and moral duty in dedicating themselves to the pursuing of the truth. The truth's impersonality and transcultural quality make this kind of pursuing possible. No wonder Einstein thought: The principle that the desire for truth must take precedence of all other desires is a supreme good ; The search and striving for truth and knowledge are one of the highest of man's qualities .

Later generations respond to Einstein's above-mentioned views. Professor Mohr said just right: Not only the pursuit of knowledge for its own sake is the noble ideal for scientists, but also is the essence of the scientific approach, simultaneously is a product of a cultural evolution.

(3) Safeguarding the autonomy of science: positive resistance, keeping relative independence.

The literal meaning of "autonomy" is self-rule. The autonomy of science contains the both connotations: it is something of scientist individual as well as of scientific community. Of the former, just as I. Kant ever said in *Groundwork for Metaphysics of Morals*: "Autonomy is the ground of the dignity of human nature and of every rational nature."(Sect.2.) Of the latter, the autonomy of science means the tension between two factors, i.e. the factor that science relies on its social milieu and the factor that the independent core of science can self-decide and self- develop. That is to say, scientific community wants to make every effort to bring the exterior influence on science into intrinsic logic of science self-moving, and to keep relative independence of science.

Einstein's inner world and external actions were all autonomic. From cradle to grave, he spared no effort for safeguarding the autonomy of science. His independent personality was a clear marking of his own autonomy. This manifested fully itself in his solitary personality (Einspänner) as well as extraordinary and free from vulgarity character. Actuality made Einstein to feel bitterly disappointing, because a handful of men, that those control power in economy and politics, made the scientists depending on others for their living, at the same time threatened their spiritual independence, in order to force them to keep silence as a cicada in cold weather, to resign oneself to adversity, and even to help a villain do evil. In the face of this situation Einstein's attitude was very resolute: better be a bird's beak than a cow's anus, rather be a broken piece of jade than a whole tile.

On August 1924, a handful German fascists and anti-Semites with their gathered together members of a clique, whom Einstein slightly named "the company against theory of relativity", insanely opposed theory of relativity, viciously attacked Einstein himself, and with ulterior motives fabricated a myth of "the German physics" antagonism to "the Jewish physics". At once Einstein gave them tit for tat, and pierced to the truth with one pertinent remark: "The motive that instigates their business enterprise is not a wishes to pursue the truth." 。 In the year 1933, for protest about Hitler seizing power by a fascist coup détas Einstein angrily resigned his position as academician of academy of sciences, and abandoned the Prussia civic rights. Because he did not wish to live in a country where civil liberty, tolerance and equality of all citizens before the law does not prevail, and where freedom of speech and teaching can be not enjoyed. He positively refused to request him from speaking a good word for the German people. He said:"To give such 'testimony' would be a denial of all the principles of justice and liberty for which I have Stood all my life. Such testimony would not have been a demonstration in behalf of the German people; rather, it would only have furthered the cause of those who seek to destroy the very ideas and principles that have earned the German people a place of honor in the civilized world. Had I issued such testimony in the present circumstances, I would have contributed, if only indirectly, to moral corruption and the destruction of all existing cultural values." During 1950's, McCarthyism indulged in atrocities the United States and wantonly persecuted intellectual, with the result that the scientific community was disturbed. For this, Einstein many times declared, conversed, and vigorously took a

stand against it. His scientific conscience has a sense of liabilities, bounden duty, and historical mission. He so said: "At long intervals I have publicly expressed opinions on such conditions in society which I considered to be so bad and unfortunate that silence would have made me feel guilty of complicity."

(4) Defending the academic freedom: Fight for the external freedom, forever maintaining freedom of heart.

Einstein thought, it was in science only a free individual can make a discovery or invention. One can organize the application of a discovery or invention already made, but one cannot organize the discovery itself. Therefore, to make a guarantee of the academic freedom in the scientific community and to respect scientist's free pioneering spirit is a reasonable matter. Just as Einstein said: "I feel there cannot be any doubt that the pursuit of truth and scientific knowledge ought to be treated as sacred by every government, and that it serves the highest interest of society as a whole to respect the freedom of those who sincerely seek truth and scientific knowledge."

Einstein clear-headedly noticed: "By freedom I understand social condition of such a kind that the expression of opinions and assertions about general and particular matters of knowledge will not involve dangers or serious disadvantages for him who expresses them." In the first instance it must guarantee by law. Then there must be a spirit of tolerance in the entire population. For the scientific advancement this is outward freedom. "The development of science and the creative activities of the spirit in general requires still another kind of freedom, which may be characterized as inward freedom. It is this freedom of the spirit, which consists in the independence of thought from the restrictions of authoritarian and social prejudices as well as from unphilosophical routinizing and habit in general. This inward freedom is an infrequent gift of nature and a worthy objective for the individual."

Einstein was a man having freest mind, and also a fighter for defending the academic freedom and the researchable freedom. For the sake of fighting against the wicked force in an invasion of freedom of thought, he issued statements, expressed opinions, and gave it merciless exposing and attacking times by times. At the same time, he appealed to intellectuals for strengthening their sense of morals and responsibility, for implementing their special mission (because they can enormously influence public opinion), and for struggling with it by the every kind of way. Aiming at the political persecution and at breaking scientific freedom that the United States government carried out in 1950's, Einstein publicly unmasked that these mean and petty actions is a mental uneasy disease. Further he indicates: " If I were a young man again and had to decide how to make a living, I would not try to become a scientist or scholar or teacher. I would choose to be a plumber or peddler, in hope of finding that modest degree of independence still available under present circumstances."

(5) the behavior of scientific activity: Morals higher than the intellect, virtue is necessary.

So far as the individual success of a scientist or the smooth movement of a scientific community is concerned, the scientific activity to conform morals cannot do without even for a moment. Einstein knew all of it, and he made this thesis clear from the higher level: "I do not need emphasize my respect and appreciation for every possible effort in the direction of truth and knowledge. But I do not believe that the lack of moral and aesthetic values can be counterbalance by purely intellectual effort." It is the moral qualities of its leading personalities that are perhaps of even greater significance for a generation and for the course of history than purely intellectual accomplishments. Even these latter are, to a far greater degree than is commonly credited, dependent on the stature of character." Not only Einstein had independent personality, but also he had kindhearted humanity and unsullied character. Go without saying, his behavior in the scientific activities was and is a model of each scientific researcher. He pressed forward despite difficulties, always picked not out the thin board to bore, and always wanted not himself to become a hen that every day lay egg. He was persistent, hard to struggle 18 years for the theory of relativity and 40 years for the unified field theory, till his life ended. He always corrected an error when he became aware of it, even didn't hesitate to abandon his beloved equation or the hard winning result in many years. He took delight in helping others,

never refused a request. He treated others as equals, and equally without discrimination. He was strict with himself and lenient toward other. But he was very unhappy and disgustful towards the pressure to require producing achievements in scientific research, towards the behavior to beat a retreat in the face of difficulties, and towards fiercely contending for rising in rank.

(6) The consciousness with regard to researchable consequences: to stop the alienation of science, to eradicate completely the abuse of technology.

Experienced the two world wars, Einstein keenly felt pain at the abuse of science and technology. In the year 1939, out of the consideration to enhance the military force of the democratic nation against fascism and the concern to be rushed ahead owning the atomic weapon by Germany, Einstein submitted a statement to the president Roosevelt, and suggested the United States government to watch the new trend of Germany uranium research and adopts a necessary and decisive step. Who would have thought the development of events entirely ran counter to Einstein's kind wishes. When he knew that the United States had thrown atomic bombs in Japan, he grievously cried out in alarm. When he was misunderstood and criticized because of discovering mass-energy relation and sending in the suggestion, he many times and calmly explained that he functioned very indirectly. More important, as a firm pacifist he dedicated his own whole life to an objection against the atomic weapons and the criminal wars. In Einstein's heart of hearts it is very clear that science is a product of human intellect and that science is in itself rational. "And certainly we should take care not to make the intellect our god; it has, of course, powerful muscles, but no personality. It cannot lead, it can only serve." The intellect has a sharp eye for method and tools, but is blind to ends and values." He also understood very clearly, that science itself is not a liberator and the deepest source of happiness. It creates means, not goals. It is up to men to utilize of those means to achieve reasonable goals. When science is abused, the tools of science become as dangerous as a razor in the hands of a child. At the same time, Einstein wasn't alike to others infatuated with the victory advance of science, and he at that time gained an insight into the alienation of science and its danger. According to his views, the alienation of science seems to manifest itself in two aspects: One is the negative influence of this "double blade knife" of technology as by-product of science, other is specialization and technicalization of science making the two culture split and the human spirit distortional. Then this inevitably causes people's life to mechanization, atomization, and inhumanity.

For sober cognition mentioned above and in the face of the present situation, while the means became increasingly powerful and goals increasingly confusional, Einstein formally warned scientists: The conscienceless science looks like phantom, the conscienceless scientist is decay of morals and a crime against humanity. Scientists must bravely and consciously undertake the holy and heavy social duty with the greatest moral soul and sense of responsibility, so as to try hard for arresting the alienation of science and the abuse of technology. He appealed to scientists to refuse determinedly all unjust requirements, and at necessary moment even to adopt the ultimate weapon: non-co-operation the strike . He placed great hopes on futuristic scientists and engineers: "If you want life's work to be useful to mankind, it is not enough that you understand applied science as such. Concern for man himself must always constitute the chief objective of all technological effort, concern for the big unsolved problems of how to organize human work and the distribution of commodities in such a manner as to assure that the result of our scientific thinking may be a blessing to mankind, and not a curse. Never forget this when you are pondering over your diagrams and equations."

(7) The attitude towards scientific honor: Practical and realistic, generous humbleness.

All (though) the years Einstein led a simple life without worldly desires, and saw the fame and wealth as floating cloud and worn-out shoes. On Vanity Fair that everyone hankered after pursuing he never was a hunter. While filled his résumé, he usually forgot writing the Nobel prize that he had won. He would often receive the myriad certificates

of honor and medals, but he didn't put them on the attractive place or hanged in the wall: they were hidden in "the braggly corner" that he humorously called it. He made every effort to evade the honor and avoided to show himself. Sometimes the reporter gathered news or the adorer came to worship, he would rather egress and concealed himself for hours. It is different from the contemporaries and the moderns that he never craved titular title, arbitrary signing and autograph. He strongly opposed the personality cults, and expressed the blindness to worship the authority is a performance of low intelligence quotient. He always felt his own success in science is in itself biggest recompense, and usually examined himself, controlled himself and blamed himself for gaining excessive honor. Sometimes under utterly helpless circumstances he had to laugh at himself to be apparently become a bedlamite, a swindler, a magician, a hypnotist, a clown of a circus troupe. He wouldn't deliver a speech in the innumerable conferences, so to let people look at him as a prize bull. He didn't want to turn into a symbolic leading sheep on which head there is aureole, and only a common sheep in a flock of clean and pure sheep. During his lifetime he even brought up the following requests: After his death not to perform any religious and official ceremony of funeral and interment, not to put a wreath, not to play a funeral music, not set up a grave, not to erect a monument, secretly to deposit his bon ashes, to close his former home for the sake of preventing posterity from a visit, looking at with reverence and making a pilgrimage to a sacred place.

Of the priority of scientific discovery, Einstein was an example for scientists. In the year 1908, Einstein sent a postcard to J. Stark angrily: "It astonishes me that you deny my discovery about mass-energy relation." After he received Stark's a long letter with goodwill and admiration, he felt extremely conscience-stricken, and openly acknowledged his own errors. He so wrote in reply: " Those people who contribute luckily to scientific development shouldn't let this kind of affair break their felt joys for the result that we all have acquired by concerted efforts. In the year 1952, under a widespreading hearsay that Michelson experiment directly causes the theory of relativity, Einstein honestly expressed that the influence of the experiment for him was only indirect, at the same time he praised Michelson as "artist in science", and appreciated the experiment for its own beauty and consummation of its method. In the year 1953, E. Whittaker's book, that title of its chapter2 is "Poincaré's and Lorenz's theory of relativity", took Einstein's work for an insignificant enlargement of Poincaré's and Lorenz's result. After seeing Whittaker's the manuscript Max Born felt very astonishing, and suggested Einstein should enter a protest against Whittaker. Einstein thought that way of doing thing is not sensible. As an old miser protected a few copper cashes that he hard saved up, so Einstein wouldn't look on his work as his own private property. Einstein's attitude to priority was practical, realistic and tolerant: "To avoid individual intriguing against each other is right, but it also is important that a individual argues in favor of his own thought."

Generally speaking, as a knowledge system science could be neutral or value-free. But as a research activity and a social institution, science is value-loaded and ethical. The scientists pursue the true theories, and feel the beautiful poetic charm in sciences. They should also undertake directly or indirectly duty out of the goodness, particularly with regard to the consciousness of the foreground of science and the application of science. Otherwise, even they are not a crime, and also thumb one's nose at the world. Einstein, as the incarnation of the scientific conscience in the 20th century, not only has eternal and idealistic meaning, but also has realistic meaning for the German intellectuals (Einstein replied on January 28, 1949: "The crime of the Germans is truly the most abominable ever to be recorded in the history of the so-called civilized nations. The conduct of the German intellectuals—seen as a group—was no better than that of the mob.") and for the Chinese intellectuals (Up to now they still not enjoy the real academic freedom). If scientists can follow the example of Einstein so to do according to the scientific conscience, then they can bring the function of praising good and denouncing evil of science into full play. It will make our world a more

brilliant future.

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Li Xingmin's Biographical Note

Li Xingmin. Li was born in Huxian, the city of Xi'an, China, on October 1945. In the year 1969 Li graduated from the department of physics, Northwest University in Xi'an. In 1978 Li admitted to Graduate School, Chinese Academy of sciences (after an examination), and in 1981 got Master of Science. In 1990 Chinese Academy of sciences broke a rule to promote and to appoint Li as Research Professor in Institute of Policy and Management, Chinese Academy of Sciences. Li's incumbency is Professor of Graduate School, Chinese Academy of sciences, and Editor-in-Chief of Association for the Journal of Dialectics of Nature, Chinese Academy of sciences. Li published *The Excited Age: Physical revolution at the Turn of the Century*, *On the Tension in Two Extremes*, *Revolution in Science*, *Rational Ponder*, *Rational Splendor: Philosopher-Scientist W. Ostwald*, *Poincaré*, *On Creation of Special theory of Relativity*, *Mach*, *Roaming of a Great Mind: Philosopher-Scientist E. Mach*, *A mountain Peak of human Spirit*, *Duhem*, *Einstein*, *Pearson*, *Scientific Spirits and Values*, etc. Li Translated (English, Japanese, and Russian books) *Lenin and Scientific Revolution*, *Values of Science*, *History of Physics*, *Lectures on Scientific Method*, *Einstein On Peace*, *Mathematics and Science: Last essays*, *The Wisdom of Science*, *The grammar of Science*, *The Aim and structure of Physical Theory*, *Knowledge and Error*, *Natural Philosophy*, *Science and Method*, *Science and Hypothesis*, etc. Li Edited *The Tallest Music Poetic Charm in the Realm of Thought*, *Science and Society*, *Three Primary Colors Series*, *Philosopher-Scientist Series*, *Series of Books on Scientific Ideas*, *Series of Giant Stars in Science*, *Chinese Series in the Philosophy of Science*, *Series of Scientific method*, *Series of Middle School students in Scientific accomplishments*, *Series of Essays in Culture of Science*, etc. Moreover Li published more than 200 papers on more than 50 journals and other publications in China and overseas. Li's biographical notes are included *Who's Who*, etc. of biographical research centers in England, the United States, India, Malaysia, etc., Li's achievements in research are concerned and quoted by Scholars and colleagues of the United States, Russia, etc.