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## An Interpretation of the Virtue of Scientists' Dedication

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### Abstract

This study starts from the interpretation of the connotation of the virtue of dedication of scientists, and combines the personal experiences of some outstanding scientists at home and abroad in real life, as well as their sense of social responsibility and mission-taking spirit that are higher than reality, to explore the formation of virtues that affect their hearts deep connotation. In addition, this study also puts forward some targeted suggestions, which provide targeted suggestions and countermeasures for later related research.

**Keywords:** Virtue; Scientist Spirit; Dedication; Scientific ethics

### 1. Introduction

Scientific research is an activity for human beings to pursue true knowledge. In the vast knowledge system, not only the virtues of dedication of scientists to science, knowledge, society, country, and mankind are condensed, but also the virtues of dedication of scientists to the spirit of science are gathered. On November 23, 1935, at the memorial meeting for Madame Curie held at the Roerich Museum in New York, USA, Einstein said with great respect: "When Madame Curie ends her life as a noble person, we don't want it only content to recall what the fruits of her work have done to mankind. The significance of a first-rate man to the epoch and the course of history is perhaps greater in moral character than in mere intellectual achievement. If only a small part of Marie Curie's moral strength and enthusiasm existed among the European intellectuals, then Europe would usher in a brighter future." The virtue of dedication of scientists should include two connotations of dedication spirit and spiritual dedication.

Marx said: "Science is by no means a selfish enjoyment. Those who are fortunate enough to devote themselves to scientific research should first use their knowledge to serve mankind." Einstein has a famous saying that is widely circulated. He said: "Only by dedicating oneself to society can a man find out the meaning of his short and dedicated life." In his essay "My World View" published in 1930, he said: "A hundred times a day I remind myself that my spiritual and material life depends on the labors of others, living and dead, and that I must try to give back in equal measure what I have received and am still receiving. I have a strong desire for simplicity of life, and am often overwhelmed with finding myself taking too much of the labor of my fellow man." [1] This is the level and feelings that scientists and intellectuals should have.

### 2. Not being obsessed with fame

Scientific research needs the support of materials, funds and basic conditions. Scientists also need not to be burdened by life, and scientific research needs the spiritual support of scientists to dedicate their virtues. In 1903, the Wright brothers invented the airplane, and they became famous all over the world. When the reporter wanted to take pictures of them, his younger brother Orville Wright declined the kindness of remembering. He said: "Why do so many people know our faces? When the reporter asked his elder brother Wilbur Wright to give a speech, he said: "Sir, do you know?"

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The parrot can croak, but it can't soar in the blue sky." The two brothers don't write autobiography, don't participate in meaningless banquets, Even less fond of showing themselves. [2]The Wright brothers' indifferent fame and fortune exemplify the adage that "fame eludes him who seeks it, but pursues him who eludes it."

Marie Curie once said: "Human beings need people with dreams, who are obsessed with a career and pursue selfless goals, while completely putting their own material interests aside. Obviously, these idealists and dreamers do not enjoy the happiness of wealth because they do not pursue it." [3]When some technicians in the radium industry wanted Mrs. Curie to apply for a patent for the invention, Mrs. Curie publicly stated: "We don't want to gain material benefits from this discovery, because we will not apply for a patent and will unreservedly publish our results, including techniques for making radium." She regards her scientific research results as the common wealth of all mankind, and almost all of her various bonuses are used to support the poor, so as to help other scientists, especially young scientists, to improve scientific research conditions. After the outbreak of the First World War, Marie Curie, in her 50s, traveled all over the country and abroad, guiding those field medical personnel to use X-ray diagnosis and treatment to treat the wounded and save a large number of dying lives. In response to the long-awaited honor, Marie Curie has repeatedly said: "In science, what matters is what is discovered, not the researcher himself." Einstein once made this evaluation of Madame Curie: "Among all the famous people I know, Madame Curie is the only one who is not corrupted by honor." In the history of science, [4] Madame Curie's dedication to scientists Virtue leaves a monument.

"Tao Te Ching: Chapter Thirty-one" says: "Tranquility is the most important thing, and victory is not beautiful." The Chinese also often say that "fame is the shackles of restriction, and interests are the fire that burns one's body" (from Bai Juyi's "Sitting and Reading Books, Yizhu Youth"). Zhuge Liang's "No ambition can be achieved without indifference, and no distance can be achieved without tranquility" has become the standard for intellectuals of later generations. During the development of the "two bombs and one satellite", a large number of scientists were unable to write books academically, and could only live a life of "living incognito and dying in obscurity". In 1961, the Soviet Union withdrew high-tech experts outside my country, and my country's enriched uranium production was in trouble. Qian Sanqiang finally chose to let Wang Chengshu take on this important task. Since then, Wang Chengshu has disappeared from the international and domestic physics academic arena. Since then, the founder of China's uranium isotope separation business has never published a paper in all academic journals at home and abroad. Not only publicly, but even in internal publications and work reports, she seldom signs her name. [5]In their minds, those fame, fortune, and power are all things outside of them. Only by creating nuclear weapons to revitalize the army and the country is everything in life. "Don't give up silence to build a strong armor, and give your years to chase purple smoke", these two lines of poems written by Chen Nengkuan in 1984 on the occasion of the 20th anniversary of the explosion of my country's first atomic bomb are the common portrayal of his and his colleagues' devotion to the cause of national defense. [6]After the death of Deng Jiaxian, Yang Zhenning wrote in a telegram to his wife Xu Luxi that his selfless spirit and great contribution are the eternal pride of you and me. The "two bombs and one satellite" spirit created by the older generation of scientists has become the banner and benchmark of Chinese scientists' dedication to virtue, and is deeply integrated into the great founding spirit of the Communist Party of China and the spiritual pedigree of the Chinese Communists.

The hybrid rice business that contemporary scientist Yuan Longping has been striving for all his life is known as the "Second Green Revolution". An authoritative evaluation agency once evaluated that if Yuan Longping applied for a patent, he might be the richest person in China now, but he After giving this patent to China, he said: "Take fame and fortune a little more lightly, be more tolerant, and stop fighting for fame and fortune, and you will feel better. Life is not about chasing fame and fortune, but should be more noble. Let the ideological realm be higher, and the mentality be more tolerant, so that you will achieve more achievements." "The most enjoyable thing for me is to produce new achievements. Whether or not this achievement gives me honor is another matter. It doesn't matter. If you can get comfort and sustenance in your soul, you must produce new achievements." [7]This simple language expresses the dialectical relationship between fame, fortune and achievement, and also reflects the inheritance and development of the virtue of dedication by contemporary scientists.

In 1986, Academician Hou Xianglin won the Italian Mattei International Award. He donated all the prize money of 25,000 US dollars to the country, and then donated 500,000 yuan to set up the "Hou Xianglin Fund" to reward young talents, and even his family real estate, he also donated to start a school. From the day Wang Chengshu became a party member, most of her salary was used to pay party dues, and part of the rest was used to support academic activities and people with difficulties in life. After her death in 1994, according to her will, her body was donated to the medical research unit, and all her books and materials were donated to the research institute. Even the deposits of more than 100,000 yuan accumulated daily were also donated to the Hope Project. In 1994, Academician Yu Min won the award of "Seeking Reality Science and Technology Foundation". He immediately set up the Yu Min Mathematical Sciences Fund to support and reward outstanding young scientific and technological personnel. In 2017, Academician Lu Yonggen and his wife donated all their savings of more than 8.8 million yuan to South China Agricultural University to set up an education

fund. [8]In the case that scientists in our country are not yet considered a wealthy class, can't the virtues of these scientists be called "selfless"?

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### 3. Being obsessed with academic research

There are no shortcuts in science. Scientific discoveries are not accomplished in an instant. Scientific research is a very arduous spiritual labor. Scientists do not become famous overnight. Every scientific achievement is the result of long-term or even life-long hard work by scientists. Marx once warned us: the road of science is full of thorns, and only those who are brave enough to climb can reach the culmination of glory; the gate of science is like the gate of hell, where all cowardice, fear, any hesitation must be wiped out. Lord Kelvins, an English physicist and mathematician, wrote: "For fifty-five years I have persevered in the advancement of science. My hardest work can be characterized by one word, and that word is failure." According to Faraday It is said that even the most successful scientist can realize less than one out of ten promising and preliminary results. Kepler's method of solving planetary motions was completely different from that of anyone before him. His analysis process was long and extremely painstaking. He worked tirelessly for more than 20 years and never gave up his goal. It would not be an exaggeration to describe his hard work as painstaking. Kepler himself once wrote: "We should listen to Tycho ourselves. He has devoted thirty-five years to his observations... I trust him completely, and only he can explain to me the order of the orbits of the planets. " Czech writer Max Brod commented on Kepler: "Kepler filled Tycho with awe. Kepler's total devotion to experimental work, complete disregard for the chatter and flattery, seemed to Tycho an almost superhuman quality. There is something unreasonable here, that is, there seems to be a lack of emotion, like the breath in the arctic cold..."[9]L.A.E. Carleson, the winner of the Wolf Mathematics Prize, spent 20 years studying Fourier series problems. Andrew Wiles, who finally proved Fermat's last theorem, stayed in his study for 10 years without publishing any research papers. Groundbreaking discoveries require persistent research and hard work!

In 1993, Nan Rendong, then deputy director of the Beijing Astronomical Observatory, proposed to build an international large radio telescope in China. At that time, the largest radio telescope in my country had an aperture of only 25 meters. Since 1994, Nan Rendong and his colleagues have carried out pre-research work for more than 10 years. He integrated the measurement scale, electromagnetic wave environment, ecological environment, engineering geological environment and other factors, and finally selected more than 390 depressions. Dawodang, which has the most suitable conditions, was selected here. In 2007, the 500-meter Aperture Spherical Radio Telescope (FAST) was officially approved as a project, and construction began in 2011. In the 22 years from the idea to the completion of the project, Nan Rendong led three generations of scientific and technological workers, old, middle-aged and young, to overcome unimaginable difficulties. The "Wisdom Eye" was finally opened, and the "Eye of Heaven" was opened for Chinese scientists to explore the unknown universe and the origin of life. Xinhua News Agency commented: "From his prime to his twilight years, he turned a simple idea into a national important weapon, and achieved a unique project in China in the world." [10]Since the 1960s, Song Wencong has participated in the development of fighter jets and served as the chief designer of the J-7C aircraft in 1981. From 1986 when he was appointed as the chief designer of the J-10 aircraft, known as Mount Everest in the field of Chinese fighter development, to the first flight of the J-10 in 1998, and then to the finalization of the design of the J-10 in 2004. In 18 years, he has carried out tens of thousands of wind tunnel tests, breaking the international convention that the new machine development technology does not exceed 30%, and with the use of more than 60% of new technologies, a complete set of third-generation fighter design technologies with independent intellectual property rights has been formed. [11]In the 50 years, 20 years have been dedicated to casting swords. Academician Song Wencong has devoted himself to hard work and created the glory of China's aviation industry. In the early 1980s, there was a "Double-Ten Law" in the field of biomedicine, that is, "one billion dollars, ten years" was the most basic investment in research and development of new drugs. During the 25 years of fighting against Crohn's disease (30-year-old disease), Wang Yiping, a cardiovascular pharmacologist, led the team to develop a modern Chinese medicine salvianolate powder injection for the treatment of cardiovascular diseases after 13 years of unremitting efforts. In 21 years, he completed the clinical trial of the new anti-arrhythmic drug, Suxindine Sulfate, and obtained multi-national patent authorization. The supplementary plan for the clinical trial of Suxindine Sulfate was still in his notebook before he died. [12]It can be said that Wang Yiping's whole life is for new and good medicines.

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### 4. Challenging scientific risks

Scientific research is full of risks. According to statistics, the success rate of modern basic research is only 2%, and most basic research projects cannot achieve satisfactory results. A large number of scientists engaged in basic research have worked hard all their lives to explore, but in the end they are only unknown, becoming the paving stones on the road of unknown and unprofitable scientific development. The most essential feature of science is exploration. Exploration means innovation, innovation means challenge, and challenge means risk. It can be said that innovation is realized in

meeting challenges and overcoming risks. In 1900, the German physicist Max Planck tried to apply all the theories and methods of classical physics to propose a new formula to replace the "Wien formula" and "Rayleigh formula", but he finally has not been successful within the classical physics system. The failure made Planck soberly realize that there is no way out without revolutionizing classical physics. So he put forward his own formula completely different from classical physics in 1900, which is later known as "Planck's formula", and in 1900 he proposed the theoretical basis of "Planck's formula" "quantum hypothesis of energy". By resolutely rejecting the notion of absolute continuity in the motion of matter in classical physics, he advanced physical science into a new era. [13]It can be said that without challenges, there will be no new scientific discoveries, and without risks, there will be no revolutionary scientific theories. Norbert Wiener, the founder of modern cybernetics, once said: "It is the duty of scientists to promote some heresy and taboo opinions with an experimental attitude... If heresy has the risk of causing punishment, it must be honest and honest. Be brave enough to take that risk." [14]In 1864, an explosion occurred in the explosives factory run by the old Nobel. Nobel's brother and five people were killed, and they were "destroyed" by the bombing. But the failure and sorrow did not shake his determination. In order not to harm others due to the explosion accident in the research, he even built the laboratory on a flat boat in the middle of the lake. In 1867, he used mercury fulminate as the detonating agent. With a loud noise, his laboratory was sent to the sky. When he ran out of the thick smoke covered in blood, it meant that the metal tube contained a mine. The mercury-acid detonator was invented. Belgian doctor Vesalius (Andreas Vesalius) risked being beheaded, stole autopsies many times, studied the structure of the human body, and wrote "The Structure of the Human Body", becoming the first person in the world to correctly describe the structure of the human body expert.

In the 1950s, the incidence of polio in Shanghai, Jinan, Qingdao, Nanning and other epidemic areas in my country was as high as 36-53 per 100,000 people (the incidence in Berlin in 1947 was as high as 78.1 per 100,000 people). Regarding the safety of the vaccine, Gu Fangzhou, a Chinese medical scientist and virology expert, took the vaccine himself at the risk of being paralyzed, and then gave the vaccine to his one-month-old son. Inspired by Gu Fangzhou, colleagues vaccinated their children one after another. He said, if your own children dare not eat it, how can you let other children eat it! [15]He expressed his dedication to the country, the people, and science with an almost cruel persistence. Leprosy is a chronic infectious disease with a history of 3,000 years. For a long time, leprosy patients have struggled to survive the disease and being discriminated against. For face-to-face contact with leprosy patients, Li Huanying, a leprosy prevention expert, has never been afraid. She said: "Doctors should not be afraid! This is like soldiers who know that bullets are powerful, so why don't they rush forward when they go to the battlefield?" "If doctors are afraid, then The cadres must be afraid; if the cadres are afraid of leprosy in their hearts, how can the common people discriminate against leprosy patients?" When someone wondered that she was not afraid of being infected, she joked: "I can't wait to be a model to prove that leprosy is 'preventable, curable, and not terrible'." [16]Academician Wang Zhongcheng of neurosurgery, in the case of poor protection conditions in the early days of the founding of New China, was repeatedly exposed to super-large doses of radiation for a long time, and his white blood cells dropped below 4000/mm<sup>3</sup>, which was far below the normal value, and he did not recover throughout his life. Due to impaired immune function, he suffered from pneumonia 8 times and pleural effusion twice, almost losing his life. But he said: "Go all out! Foreigners can do it, and we must find a way to research it." [17]When COVID-19 hit, scientists represented by Zhong Nanshan, Chen Wei, Li Lanjuan, and Zhang Boli fought the virus "zero distance", guarded the health and lives of the people, and forged a great anti-epidemic spirit together with the people. Military science and technology is accompanied by risks and extreme challenges, and is regarded as the riskiest cutting-edge science and technology undertaking. The deep-diving test of nuclear submarines is very risky and faces the test of life and death. In 1963, the US' "Thresher" nuclear submarine encountered problems and sank before diving to the limit depth. More than 160 officers, soldiers and experimenters on the ship died in line of duty. When the country decided to carry out the "091" deep-diving test, the test participants were unprecedentedly nervous. The chief designer Huang Xuhua decided to dive in person. All the leaders tried to dissuade him, but Huang Xuhua firmly believed that this decision was his responsibility. On April 28, 1988, with the successful test, he also became the first chief designer in the history of nuclear submarine development in the world to personally follow a nuclear submarine to complete the extreme deep dive. [18]Luo Yang, commander-in-chief of my country's first-generation carrier-based aircraft J-15 aircraft development site, heard the deafening roar of the carrier-based aircraft engine, "It seems that the eardrum is about to be torn, and the entire chest is under tremendous pressure, and the heart seems to be pulled out." In such an extreme environment, he still chose to observe the landing of carrier-based aircraft at close range. The measurement of nuclear tests is always accompanied by danger. In order to get the first-hand test data as soon as possible and master the most accurate test data, Lin Junde tries to get as close as possible to the explosion site or even the center of the explosion every time, so that he can recover after the nuclear explosion to grab the data quickly. [19]"Only risk leads to the peak", scientists have created an indelible spirit of exploration with the responsibility and ability to challenge and overcome risks without hesitation.

## 5. Being dedicated to science

In 79 AD, Mount Vesuvius in Italy erupted, and people fled for their lives, but the naturalist Pliny the Elder (23-79) ran to the place where people fled for scientific records, until he was swallowed by magma. The Inquisition in Medieval Europe can be said to be a slaughterhouse for killing science and scientists to some extent. In 391, the Pope decreed to ban the study of mathematics and astronomy. In 451, Alexandria mathematician Pacia (Hypatia, 370) -415) was brutally murdered by believers, Italy's Bruprini... The vast majority of scientists who were killed by the inquisition did not even leave their names. Japanese biologist Hideyo Noguchi (Noguchi Hideyo, 1876-1928) went to Africa many times to study yellow fever, unfortunately contracted the virus, and died in Accra on the Gold Coast. His tombstone reads: "Born in Japan, died in Africa, lived for science, died for science." [20]Madame Curie is respected not only because of her scientific discoveries, but also because of her dedication to science. She has worked in a strong radiation environment for a long time and is often attacked by radioactive elements, which gradually damaged her blood. She died of leukemia. Austrian physicist Ludwig Edward Boltzmann (Ludwig Edward Boltzmann, 1844-1906) insisted on and demonstrated the existence of atoms all his life, and used atomic theory to gain insight into the nature of the universe. The sustained onslaught of positivists such as Friedrich Wilhelm Ostwald (1853–1932) and the Austrian physicist Ernst Mach (1838–1916) put him under enormous mental stress and Psychological torture, the resulting depression actually claimed his life. [21]However, shortly after his death, Einstein presented clear experimental evidence confirming the existence of atoms, and Ostwald publicly admitted his error, praising Boltzmann's achievement.

On December 5, 1968, the plane Guo Yonghuai was on crashed. When people found him from the wreckage of the fuselage, they found his body tightly hugged by the guard Mou Fangdong. Between the two burnt bodies, a briefcase was intact. It is non-destructive, and it contains a document about the data of thermonuclear missile experiments! Together with the guards, he used his life to protect this extremely precious material for scientific research. [22]Biochemist Peng Jiamu voluntarily devoted himself to the development and scientific research in Xinjiang, and conducted scientific investigations in Xinjiang 15 times. In May 1980, Peng Jiamu led a comprehensive expedition team into Lop Nur. On June 17, the water carried by the expedition team was seriously insufficient. In the desert of Kumkuduk, where the temperature was as high as 50 degrees Celsius and the wind speed was greater than 10 m/s, he resolutely decided to go out to find water, but the violent Gobi quicksand swallowed his life. However, Peng Jiamu exchanged his life for the first time in contemporary Chinese history to uncover the mystery of Lop Nur. In 1983, Hua Luogeng wrote his will on the sickbed: "I am exhausted, but my fighting spirit is not weakened. It is a good thing for a soldier to die on the battlefield. But I hope that the corpse can be useful to the revolution. Leaning against the wall can be used as a ladder for people, and crossing a ditch can be used as a bridge for people." On June 12, 1985, he fell on the podium of the University of Tokyo, realizing what he said before his death that "the greatest hope is to work until the last moment of life." [23]During the laying of "Tianhe No. 1" optical fiber, in order to avoid friction between the surface of the optical fiber and the cement floor, the construction commander Zou Gexin took the lead in laying a smooth human flesh conveyor belt in the fiber optic trench, and the wiring was carried out in the hot and narrow trench. , He exchanged all bruises for 15,000 optical fibers unscathed. The leader of Tianjin Binhai New Area said with emotion: "In wartime, soldiers used flesh and blood to block gun holes and blow up bunkers.

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## 6. Conclusion

Today, I saw the scientific research personnel of the army defend the honor of the country with flesh and blood. "[24] Scientific research not only does not advocate unnecessary sacrifices, but also avoids or even eliminates unnecessary sacrifices, however the spirit of scientists' devotion to science will never fade.

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## Compliance with ethical standards

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