
Youth, Mathematics, and a Poem Made Famous by a Famous General

by Lizhen Ji*

The Pursuit of Youth

The first emperor of China started many things. One of them was his pursuit of ways to the eternal youth, and many Chinese emperors followed suit and had also tried to find the secret of youth. Though no one has succeeded, many people are still trying to find the magic which can keep them young.

The search for the eternal youth and vitality is not only an oriental thing. In the West, there is also a long history of search for the fountain of youth. Supposedly, the Fountain of Youth is a spring will restore the youth of anyone who drinks or bathes in its waters. Such tales have existed for thousands of years. For example, it appeared in writings by Herodotus from the 5th century BC.

For more ordinary people, there are more practical searches for the life of youth. Besides making themselves young, they also try to feel young or to be immersed in the world of young. For example, some famous and rich people have married very young spouses. Such examples abound both in the East and the West, in the communities of artists and scientists, besides the rich and powerful people. Even among famous mathematicians and physicists, many people can name several candidates easily.

What is so attractive about being young? This is a difficult or easy question, depending on how you view it. It is probably related to a more basic question: what is so attractive about life?

Beauty and life radiate from the youthful people. The history across all cultures has repeatedly told us that it is very difficult, or almost impossible, for the mortals to resist the temptation of the attractiveness of youth. This is the dream of every person to feel

and enjoy all things related to youth: the appearance, freshness, vigor, spirit, etc., characteristic of one who is young.

Youth vs. Mathematics

Besides the above attractiveness of the youth, there is also a wide spread myth about the creativity in mathematics and science resulting from the youth. A google search will turn up many such discussions and comments. Many famous mathematicians have such thoughts and some have even expressed publicly in print. Probably the most famous one who wrote explicitly about it is G.H. Hardy (1877-1947). He wrote in his famous book *A Mathematician's Apology*:

No mathematician should ever allow himself to forget that mathematics, more than any other art or science, is a young man's game. To take a simple illustration at a comparatively humble level, the average age of election to the Royal Society is lowest in mathematics. We can naturally find much more striking illustrations. We may consider, for example, the career of a man who was certainly one of the world's three greatest mathematicians. Newton gave up mathematics at fifty, and had lost his enthusiasm long before; he had recognized no doubt by the time he was forty that his greatest creative days were over. His greatest idea of all, fluxions and the law of gravitation, came to him about 1666, when he was twenty four - "in those days I was in the prime of my age for invention, and minded mathematics and philosophy more than at any time since". He made big discoveries until he was nearly forty (the "elliptic orbit" at thirty-seven), but after that he did little but polish and perfect.

Galois died at twenty-one, Abel at twenty-seven, Ramanujan at thirty-three, Riemann at forty. There have been men who have done great work later; [but] I do not know of a single instance of a major mathematical advance initiated by a man past fifty. A mathematician may still be competent enough at sixty, but it is useless to expect him to have original ideas.

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Many people did not agree with this and have thought of various counterexamples to such a view. In an interview of Serre in 2004 by M. Raussen, C. Skau, *Interview with Jean-Pierre Serre*, published in *Notices Amer. Math. Soc.* 51 (2004), no. 2, 210–214, after he was awarded the Abel prize, the interviewers raised such a question to Serre on page 212:

Question: You have been active on the mathematical frontline for more than fifty years. Hardy made the often-quoted remark that “Mathematics is a young man’s game.” Isn’t that wrong – aren’t you a perfect counterexample?

Serre’s answer: Not a perfect one: have you noticed that most of the quotations of the Abel Prize are relative to things I had done before I was thirty? What is true is that people of my generation (such as Atiyah, Borel, Bott, Shimura, ...) keep working longer than our predecessors did (with a few remarkable exceptions such as Élie Cartan, Siegel, Zariski). I hope we shall continue.

Many people used Weierstrass as a counterexample to the view of Hardy, since Weierstrass became a professor at the University of Berlin at a relatively old age. But people seem to forget that the best part of his mathematics essentially depends on what he did while he was still a high school teacher.

Maybe there is some truth in the statement of Hardy. This might be supported by a well-known fact to mathematicians that there is an unwritten rule that the Fields medals are only awarded to people under the age of 40.

There are also comments attributed to the great Russian mathematician Gelfand (and probably also Kolmogorov) that in every mathematician, there is a mathematic child age. The curiosity of children decreases with the age. The younger the mathematical age, the better or more original the mathematician is. I do not remember what ages Gelfand gave to various great mathematicians, in particular his own mathematics child age (probably around 10).

The great Russian physicist L.D. Landau liked to compare and classify people. He wrote a famous series of books “Course of Theoretical Physics” with Lifschitz. In the introduction to the first volume of on *Mechanics*, on page xvi, Lifschitz wrote:

The striving for simplicity and order was an inherent part of the structure of Landau’s mind. It manifested itself not only in serious matters but also in semi-serious things as well as in his characteristic personal sense of humors. Thus, he liked to classify everyone, from women according to the degree of their beauty, to theoretical physicists according to the significance of their contribution to science. This last classification was based on a logarithmic scale of five: thus, a second-class physicist supposedly accomplished 10 times as much as a third-class physicist (“pathological types” were ranked in the fifth class). On this scale Einstein occupied the

position $\frac{1}{2}$, while Bohr, Heisenberg, Schrödinger, Dirac and certain others were ranked in the first class. Landau modestly ranked himself for a long time in class $2\frac{1}{2}$ and it was only comparatively later in his life that he promoted himself to the second class.

The creative life of Landau was cut short by an unfortunate car accident at the age of 54. Though he survived, his research was almost over. It seems that Landau was interested in and had definite opinions on every question, and one natural question is how he would view the importance of youth in research. If he had thought about this, one wonders if he might emphasize the importance of youth.

Another famous mathematician who supported Hardy’s point of view by his choice of life is probably Grothendieck. At the relatively young age of 42, he abandoned his distinguished academic position at IHES and his revolutionary work in algebraic geometry. People are still guessing about his motivation for such a sudden change. The ending of youthful life has not been emphasized. Or maybe this could be the explanation?¹

What Is Youth Really?

In the previous section, the youth in the commonly understood sense was shown, to a certain extent, to be crucial to research. We started this article with the never ending pursuit of the youth by all kinds of people. But it seems that one basic question has not been addressed: *What is youth after all?*

It is probably not surprising that there can be many different answers. The following is one *simple* yet *profound* description:

Youth

Youth is not a time of life; it is a state of mind; it is not a matter of rosy cheeks, red lips and supple knees; it is a matter of the will, a quality of the imag-

¹ Here are some reasonings for the assertion. Grothendieck worked very hard and he was also very optimistic before he left IHES. But he despaired after working on his huge project for a while. As Serre said, Grothendieck wanted to build a cathedral but could only build a base after all these years. Grothendieck realized that he could not do it. Later he blamed it on his students. He was also very tired. In a conversation with the current author in Strasbourg a few years ago, Cartier described it well and said Grothendieck worked 25 hours a day and burned out. So Grothendieck stopped working on his ambitious project and found some excuses. His later work on anabelian geometry, Grothendieck-Teichmüller theory and the long march through Galois theory is more like a dream, even though he claimed later in his life that this is one of his best works. The importance of these new ideas may not be so clear. On the other hand, it is probably hard to judge his claim now, and the time is the best test. To some people, his later judgement was probably not sound anymore, though he may not realize it.

ination, a vigor of the emotions; it is the freshness of the deep springs of life.

Youth means a temperamental predominance of courage over timidity of the appetite, for adventure over the love of ease. This often exists in a man of sixty more than a boy of twenty. Nobody grows old merely by a number of years. We grow old by deserting our ideals.

Years may wrinkle the skin, but to give up enthusiasm wrinkles the soul. Worry, fear, self-distrust bows the heart and turns the spirit back to dust.

Whether sixty or sixteen, there is in every human being's heart the lure of wonder, the unfailing child-like appetite of what's next, and the joy of the game of living. In the center of your heart and my heart there is a wireless station; so long as it receives messages of beauty, hope, cheer, courage and power from men and from the infinite, so long are you young.

When the aerials are down, and your spirit is covered with snows of cynicism and the ice of pessimism, then you are grown old, even at twenty, but as long as your aerials are up, to catch the waves of optimism, there is hope you may die young at eighty.

Who wrote this poetic essay? Its author is Samuel Ullman, a relatively unknown person who became famous because of this poem. Indeed, there is a museum in honor of him now at the University of Alabama. According to the description of on the website of the museum,

<https://www.uab.edu/ullmanmuseum/>

Here is what happened:

Samuel Ullman was born in Germany in 1840. At the age of eleven, he and his family moved to the United States and settled in Port Gibson, Mississippi. After briefly serving in the Confederate Army, he became a resident of Natchez, Mississippi. There, Ullman married, started a business, served as a city alderman, and was a member of the local board of education.

In 1884, Ullman moved to the young city of Birmingham, Alabama, and was immediately placed on the city's first board of education.

During his eighteen years of service, he advocated educational benefits for black children similar to those provided for whites. In addition to his numerous community activities, Ullman also served as president and then lay rabbi of the city's reform congregation at Temple Emanu-El. Often controversial but always respected, Ullman left his mark on the religious, educational, and community life of Natchez and Birmingham.

In his retirement, Ullman found more time for one of his favorite passions – writing letters, essays and poetry. His poems and poetic essays cover subjects as varied as love, nature, religion, family, the hurried lifestyle of a friend, and living “young.” It was General Douglas MacArthur who facilitated Ullman's popularity as a poet – he hung a framed copy of a version of Ullman's poem “Youth” on the wall of his office in Tokyo and often quoted from the poem in his speeches. Through MacArthur's influence, the people of Japan discovered “Youth” and became curious about the poem's author...

For years, Samuel Ullman (1840-1924) and his prose poem “Youth” have been known and admired by the Japanese. However, both the man and his work are largely unknown in the United States, even in Birmingham where he spent the last forty years of his life in service to the community...

Through General MacArthur's influence, the poem became familiar throughout Japan and served to inspire a generation of Japanese citizens and business leaders faced with rebuilding their war-ravaged country.

Reflecting the admiration of the Japanese people for Mr. Ullman and his inspiring poetry, a Japanese business executive working in Alabama visited Birmingham in 1992 and expressed the desire to see the erstwhile Ullman residence where the poet had spent the last 17 years of his life and where he had penned his most significant work. Mr. Kenji (Ken) Awakura, then First Vice President of The Japan-America Society of Alabama (JASA), finding that the house had fallen into disrepair, was inspired with a vision of what the house could become if restored and operated as a museum.

Mr. Awakura spearheaded a JASA-led fund raising effort in Japan and the United States, resulting in corporate and personal contributions which were used to purchase and restore the property. The property was presented to The UAB Educational Foundation by JASA in 1993, and the Ullman Museum, displaying materials, artifacts, and furniture donated by members of the Ullman family, officially opened on March 21, 1994.

Therefore, the poem and its author were made famous by the famous (or infamous) American General during the WWII.

Acknowledgment

This article was written upon a strong request of Prof. Yau. Among all the mathematicians I know, he is the most youthful according to the definition by Samuel Ullman above: *Youth means a temperamental predominance of courage over timidity of the appetite, for adventure over the love of ease. This often exists in a man of sixty more than a boy of twenty. Nobody grows old merely by a number of years. We grow old by deserting our ideals.*