

# **Some thoughts for graduation. Requested for publication in the graduation issue of the Williams newspaper, 2002**

## **Williams, work, and life** by J. Ross Macdonald, '44

### **History:**

I am grateful to Williams for strong scholarship support, and to many Williams professors for broadening my horizons and helping me become more self-aware, for aiding me to learn to think better, and for improvement in my self-confidence. These factors all helped greatly with my later work at MIT, Oxford, and in the world outside academia.

Because of WWII and a cooperative Williams-MIT program, I transferred to MIT at the end of the first semester of my junior year at Williams. Through summer work at MIT, it became possible for me to graduate from both schools in 1944. This has had the disadvantage that 25<sup>th</sup> and 50<sup>th</sup> anniversary celebrations have overlapped, leading to my absence from such gatherings at both places.

Another interesting situation is that I am claimed as a Rhodes Scholar by both schools. This is not totally accurate. When I decided to apply for the scholarship in the Fall of 1947 while I was again at MIT after serving in the Navy, I naturally asked Williams to sponsor me. For reasons that I have now forgotten, they wrote that they were unable to do so. But MIT then did, and I was lucky to be selected as a Rhodes Scholar from Massachusetts, starting at New College, Oxford in 1948.

Over the years, I have enjoyed serving on many selection committees of various kinds. A favorite question of mine for Rhodes applicants was "what do you hope to be doing in 25 years?" An appropriate answer, which I never got, was, of course, "sitting on your side of the table!"

In the year 1946-1947, I had the extraordinary opportunity to work on the MIT Whirlwind vacuum-tube digital computer, one of the first of its kind. But rather than describe other aspects of my life in science (much of which is available on my Web site: <http://www.physics.unc.edu/~macd/>), I hope that a few general precepts and conclusions derived from that life and from an abiding curiosity may be of some interest to the reader.

### **Advice:**

First and foremost, pick work that you like, preferably work that you are driven to do, and make it your play. This is perhaps easier for scientists and other artists, but it is a key key to happiness. Remember that although you are entitled to your work, its fruits should belong to the world, as you do. Further, remember the words of Goethe, surely a prodigious and creative worker, "No one can take from us the joy of the first becoming aware of something, the so-called discovery. But if we also demand the honor, it can be utterly spoiled for us, for we are usually not the first." Much of this is encapsulated in the following romantic short poem by Kenyon

Cox:

Work thou for pleasure – paint, or sing, or carve  
The thing thou lovest, though the body starve --  
Who works for glory misses oft the goal;  
Who works for money coins his very soul.  
Work for the work's sake, then, and it may be  
That these things shall be added unto thee.

Whether or not we have free will, it feels as though we do. That is sufficient. If you are not a hammer, you may be used as an anvil. Do what you can, the best you can, today; your tomorrow may not come. Don't worry about tomorrow's rain but be prepared for any storm. Be careful in using the words "all", "forever", and "never." They can lead to verbal paradoxes and often imply physical impossibilities. If you must choose between facts and faith, choose facts but remember that either or both may be wrong. An important aspect of one kind of intelligence is the ability to recognize and make fine distinctions. For example if you are religious, it seems more appropriate to say, "I am with God," than "God is with me."

Most things in life involve input and output. An input is transformed by a "black box" into an output. It is joyful when your work makes some black box more transparent. With knowledge comes control, but knowledge is only the first step to wisdom. The poet Robinson Jeffers said: "To seek the truth is better than good works, better than survival, holier than innocence, and higher than love." Yet most truth is both culturally relative and approximate, although some scientific truths, such as Newton's theory of gravity, are absolute but still approximate. The most complex thing in the universe that we are aware of is the human brain and its self-consciousness, surely the pre-eminent black box. I believe we differ from other higher mammals in not only being self aware, but in being aware that we are self aware.

We are children of the universe and of our precious world. The outside universe is apparently totally impersonal, but we can love and care. Perhaps we, and life in general, are ways the universe has evolved to see itself and contain emotion and caring. If so, surely we should care for the earth and each other more than most of us do.

Finally, remember that the ineffable is also real and important. A simple example is the emotional impact of music (classical in my case), but, in larger terms, although the universe contains intrinsically unknowable elements, the grand challenge of both science and other ways of knowing is to understand better as much of it as possible, including ourselves.

*Ross Macdonald is an electrical engineer and condensed-matter physicist, the editor of, and a major contributor to, the book "Impedance Spectroscopy," and the author of more than 225 publications in the areas of semiconduction, electrochemistry, solid-state physics, statistics, and data analysis. After work at Armour Research Foundation and Argonne National Laboratory, he joined Texas Instruments in 1953 and eventually served as Director of the Central Research Laboratory and Vice President for Research and Engineering. He has been a member of many national committees. After early retirement from TI in 1974, he was named a William Rand Kenan, Jr. Professor of Physics at the University of North Carolina, Chapel Hill. Although he became emeritus in 1989, he continues to write scientific papers and poetry.*