

## **The Well-Read Biochemist**

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### Introduction

The artist and the scientist are exploring the same world. My goal in **The Well-Read Biochemist** is to connect biochemistry to literature, to our broader culture, and to other disciplines that appear to be remote from science.

**The Well-Read Biochemist** is a collection of literary works or excerpts that provide digressions from the usual path of a biochemistry course. Each work in this collection is connected in some way to matters commonly studied in biochemistry. In some of the works, the connections to biochemistry, or to science in general, are very obvious, and I hope that they speak for themselves. In others, where the connections are less direct or perhaps obscure, I add brief comments in which I raise questions about the work, or explore some of the connections I find between the reading and biochemistry. The comments reflect my personal opinions and interests, and in some cases, are little more than inconclusive musings.

But of course the works themselves are all far richer than I can suggest in a few paragraphs. You may find in the works reasons to challenge my opinions, or means to finish some of my incomplete thoughts. You may also find other connections that I have missed entirely. Please challenge me and share your thoughts with me.

The following poem may help you see why I want to juxtapose these literary works with the seemingly unrelated technical subjects in a course like biochemistry:

**in time of daffodils( who know  
the goal of living is to grow )  
forgetting why,remember how**

**in time of lilacs who proclaim  
the aim of waking is to dream,  
remember so( forgetting seem )**

**in time of roses( who amaze  
our now and here with paradise )  
forgetting if,remember yes**

**in time of all sweet things beyond  
whatever mind may comprehend,  
remember seek( forgetting find )**

**and in a mystery to be  
( when time from time shall set us free )  
forgetting me,remember me**

e. e. cummings

(#16 from *95 poems by e. e. cummings*, New York: Harcourt, Brace, and World, 1958)

First, forget about why I want you to read this poem right now, just as you start your study of biochemistry. Instead, think about the poem itself a little bit. Read it again, and try to imagine who is speaking it, and to whom. What is the apparent relationship between the one speaking and the one spoken to? Can you come up with an *interpretation* of the poem, in which you put the thoughts of the poem into your own words. In other words, what do you think the speaker is saying? Finally, look at the structure of the poem. What does each stanza (group of three lines) accomplish? What is the effect on you, the reader, of division of the words into short lines, division of lines into stanza, lack of capital letters, strange spacing, and missing or unusual punctuation? Why do you think the writer arranges the word in this way, instead of in grammatical sentences that are as unambiguous as possible? Do not come back here until you have tried to answer these questions.

Now, what is my take on the connections between studying biochemistry and reading this poem? First, how do I interpret this poem? This is a love poem, emphasizing pursuit, not capture; how, not why; seeking, not finding; actuals, not appearances; deliberation, not decision. The narrator says to her or his lover, consider me, the spirit, not me, the body; consider me, the sought, not me, the found; me, the actual, not me, the apparent; me, the inner, not me, the outer.

Why would I suggest this poem to you, a science student who is just now opening up a new textbook in introductory biochemistry? You are about to enter an exciting, fast-moving field that will show you science at its best. And the oppositions in this poem remind me of the best elements of science. The most exciting science focuses not on what we know, but on how we know it; not on the undeniable facts, but on the pursuit of knowledge. In the best science, we seek the spirit of nature, not the body; the essence of nature, not the appearance; and especially in the molecular sciences, we seek inner, not outer, nature.

So you see that these oppositions are as pertinent to science as to love. And after all, *isn't science a form of loving nature?* The scientists who have impressed me most throughout my career are those who seemed to love nature, and to adore their chosen area of research. They exhibited that love by being less excited about what they discovered than about the process of discovery, and less impressed with their analytical abilities than with the intricacy and beauty of the nature they sought to understand.

Facing page 1, Chapter 1 in the my book, *Crystallography Made Crystal Clear* (Academic Press, 2006), you will find the poem "Phase" by A. R. Ammons. A reviewer of an early manuscript suggested strongly that I begin Chapter 1 by explaining what the poem has to do with the book. I did not consider his suggestion for even a moment, for the obvious and primary reason that I want my readers to enter the book wondering just what connections they will find. But there was a less obvious reason. Although my decision to use the poem was immediate upon first reading it, and although the poem tells me in several ways that it belongs there, I was not sure I could articulate the connections myself.

I have often studied works from outside the sciences and said to myself, "I wish my students could read (or see, or hear) this piece while we are studying this or that topic." For me, the initial decision that a work belongs on the same plate as a scientific topic is purely intuitive, perhaps like a scientist's first inkling of an entirely new way of looking at a problem. Sometimes when I try to articulate the connections, they seem to vaporize. But usually, I like the juxtaposition anyway, and I sense that connections are there, and will emerge in time. In **The Well-Read Biochemist**, I make many such juxtapositions. My exploration of the connections is ongoing, and there is great variation in the extent to which I have been able to find and articulate them. This work is a snapshot of a search in progress -- my personal efforts to see things whole, not fragmented into academic divisions, and to help others, particularly my biochemistry students, to start finding the many connections that really do exist between science and realms of thought.

I hope you take time during your biochemistry course to read these entries and to join me in this search.

To learn more about these readings and my use of them in my biochemistry teaching, see *Journal of Chemical Education*, **73**, 732-4 (August, 1996).