

Address,
to the 76th Convocation of the
University of Waterloo, Canada,
for the
Conferment of Degrees in Mathematics
Saturday morning 30 May 1998,

by William M. Kahan
on his admission to the degree of
Doctor of Mathematics *honoris causa*

I do appreciate the honour you have conferred upon me, and even more the warm welcome extended by everyone here at the University of Waterloo. This welcome reinforces the pleasure I always take in the company of my countrymen during visits to my native land. Canada was good to my family when we needed someone to be good to us, and I shall not forget it.

Now, what can I tell you important enough to be worth the time you are lending me here to tell it?

A passage at the end of Matthew xiii in the King James Version comes to mind:

"A prophet is not without honour, save in his own country and in his own house."

The meaning of this passage is clear now: I am no prophet. I can't forecast the future but must estimate it the way you would, aided by mathematics. I can't foresee what will be important but must review the past for hints at what may be important now.

The most important choices throughout my career have been the choices of people with whom to work. People to work for, to work under, to direct;-- people to work with.

(It's important too to be lucky in the choice of one's parents, but I don't know what I did to deserve that good luck.)

Among the coworkers I have chosen, the most influential by far has been the partner with whom I have had, for four and a half decades, a contract to grow old together for better and for worse. Most of my associates would agree that this choice of partner is the choice that matters most.

Perhaps you can leave this choice to chance, hoping that some kind of Brownian motion will bring together you and your partner-to-be if you wait long enough. I was unwilling to wait. This choice seemed too important to leave to chance. This problem deserves the same kind of searching inquiry and analysis that works when brought to bear upon any technical or mathematical problem. Now I have no doubt:

The choice of spouse is far too important a choice to leave to chance.

Also important is a good way to estimate the importance of objects and tasks that compete for our attention. Elwyn Berlekamp, famous for his contributions to coding theory and mathematical games, tried to teach me his way when we had neighbouring offices. He continues to dispatch most tasks first and quickly, and then think carefully about the rest. How does he decide which tasks to dispatch quickly? He says these are the tasks which, if bungled, would merely have to be redone later. The tasks he considers carefully are the few tasks which, if bungled, could not be retrieved. But he hasn't told me yet how he knows which tasks are which. I'm no prophet, so I'm obliged to think carefully sometimes about tasks that turn out to be unimportant.

I'd like to think that all the tasks we mathematicians undertake are important. Actually, though, some of the vastly many mathematical papers published nowadays seem to fill long-needed gaps. My reluctance to fill such a gap could explain why my list of publications is so short, but the real explanation is simpler than that:

Much of my work -- my attempts to get computers to perform approximate arithmetic properly -- can best be compared with sewer repair.

Now, "sewer repair" may sound like an excessively modest assessment, but it's not. Think of what would happen to us all if sewers were in bad repair. It's not a thought we enjoy; aren't you glad someone else has thought about it? That's why it's like the work I and my students do:

Our work is the kind of work most mathematicians and computer scientists are glad someone else is thinking about, the kind of work which, if done right, everybody else can safely ignore.

In this respect we are just like millions of people whose work contributes something unseen but essential to our society. This contribution is the essence of human civilization:

that we benefit from the experience of others without having to relive it.

When we work that way, working so well that what we have done remains mostly out of sight and out of mind though fully in service every day, we are paying down the debt we owe to unsung forebears for the civilization we enjoy now. It's a strange kind of debt:

We all owe it.

It is our duty to repay it.

And repaying it is the way we pass the debt on to our descendants.

The occasional accolade encourages us to do our duty. For that accolade I thank you.