The second in a series.

The purpose of education.

We begin our education believing that the facts we learn and the technologies we master are the foundation for our careers. But changes in careers are common and technologies become obsolete quickly. In fact, alumni records show that it is likely for many of us to work in multiple fields or to change fields entirely. We may also move from engineering and science into non-technical areas such as marketing or general management.

The ability to do excellent work in a range of fields and to meet diverse challenges with clear bold thinking and creative solutions is the hallmark of a good education. However, to work effectively in fields that are new to us we cannot rely on facts and technologies that may have become obsolete or are not applicable; we must depend on fundamental thinking and problem solving skills that are effective in any discipline and in working on virtually any type of problem.

These skills are analogous to the basic skills, strength and coordination that a superb athlete will learn in preparation for a lifetime of competition, skills that will serve him in a variety of different sports.

For the scientist or engineer the heart of the learning process is finding and solving interesting problems. This is as true if the subject is quantum physics as it is in managing a company. With proper mentoring, the mental struggle of dealing with a difficult and important problem results in the development of mental skills that cannot be learned in any other way and that are applicable to a wide range of new situations.

The skills we learn are an acute ability to observe all aspects of a problem, to integrate a wide range of knowledge, to analyze in depth, to obtain insight, to find creative solutions, and to rigorously test the solutions. These problem solving skills are taught by a fine teacher no matter what the subject. For maximum benefit the student must realize the importance of these skills to his or her education and must consciously focus on developing them not only in every course in college but over a lifetime of learning.