

#### 4. Research is a State of Mind A Radio Talk by Charles F. Kettering

Every time I have the good fortune of being in the studio audience at Radio City I am impressed with the fact that it takes much less energy to listen to music than to direct or play it. So, while the Maestro and the orchestra rest for a moment, I will tell you of a simple comparison between Music and Research that we have used many times.



This afternoon we are listening to the compositions of Mozart. He was one of those rare and talented individuals who had the natural gifts of both composition and execution. He was a child prodigy. This type of individual is rare but each generation may produce one or more - they occur not only in the musical field but also in art, medicine and science, and their contributions are of great importance. Most of our work, however, must be done by people with just ordinary abilities in the beginning who reach positions of skill or responsibility by practice, study and plain persistence.

Now, I don't know the individual histories of the men in this orchestra but I suspect the majority of them are here as the result of arduous practice and much hard work and, in many cases, sacrifices of many kinds. This Symphony Orchestra is a body of men, who, in order to perform superbly as a group, must first be able to perform equally well as individuals. Just organizing a group of poor musicians doesn't make a good orchestra.

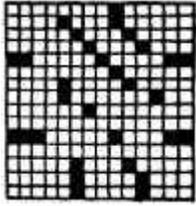
Research is done in much the same way. Our work can either be the effort of a group or of individual specialists. In fact, just like a good orchestra, each man must be a skilled and talented individual. There is one outstanding difference, when we compare Orchestras with Research - Research has no Mozart score to follow - we are working with unwritten



scores. The procedure must be different in nearly every case. It is more like composition and performance at the same time.

For many years there has been much misunderstanding as to just what Research is. The popular conception seems to be that there is something mysterious about it, and before any Research can be done it is necessary to have expensive scientific apparatus and large, elaborately equipped buildings. Actually, this is not so. Research isn't a physical thing at all but just a state of mind. It is a simple organized way of trying to accomplish something you wish to do - so simple that anyone can do Research anywhere at any time.

First, you select the problem you would like to solve, then you list at least ten reasons why this has not been solved. But in picking that problem be sure to analyze it carefully to see that it is worth the effort. It takes just as much effort to solve a useless problem as a useful one. Make sure the game is worth the candle.



After *carefully* - and I want to emphasize that word "carefully" - selecting the problem and the ten things between you and the solution, you then use the same procedure as in solving a crossword puzzle. You take the easy obstacles first and by a process of elimination you arrive at last at the one or two major ones. In the solution of the remaining obstacles you may need some simple apparatus, but the things you will probably need most are infinite patience and persistence. Few people realize the difficulties of doing any new thing.

Maybe one of the reasons people are so easily discouraged is because of their education. During all of our years at school we were examined two or three times a year. If we failed once we were out. In contrast, all Research work is 99.9 per cent failure and if you succeed once you are *in*. If we are going to progress in any line we must learn to fail intelligently so we won't become discouraged at the 99.9 per cent failure.

As we approach the end of the War and make plans to go back to our normal ways of living we are going to be faced with unlimited problems. I am talking about Research, today, because it is just a method of intelligent planning. As you probably know, some four or five hundred postwar planning groups have been organized to take care of some of these problems for us.

That is a step in the right direction, but I don't believe that is enough - we ought to have 135,000,000 planners. Each individual in this country should be doing his or her own planing - should be forming a one man or woman research project. We should not be looking outside for this help. We should be doing it for ourselves - as individuals.



But as we face tomorrow let us pick our problems very carefully and separate clearly in our minds the great difference between constructive postwar planning and very unproductive postwar wishing. ●