

Figure 4 is interesting, because now we are viewing the enormous growth of R. & D. It shows the preponderance of Federal funds expended for research, as well as the importance of funds from industrial sources, and lastly it shows the funds from universities and nonprofit sources.

You know from your studies, that probably the most important sector can be that little share at the top of the graph. It is the part where creativity and discovery is high, and which often develops the basis for the applied research and developments of the next 10 years. That is what we were so terribly weak on back in the World War I period. It was the product of education and research in the foreign universities that fed us with much of our then new knowledge and ideas. (Slide 5)

This shows the sources of R. & D. funds and where the work is done. Of course the colleges cannot put much money into research, and the nonprofit institutions cannot, either. But they generally put part of their earned fees back in, because they are not allowed to make a profit.

Again we see what industry puts in as well as our government. Now let us review where and by whom the work is done. Industry performs three-quarters of the R. & D. This is where the limitations placed on procurement policy comes into play. A lecture could be given on how certain regulations make it hard for industry and even universities because of the sometimes severe inhibitions placed over government procurement procedures. It is indeed a tribute to all concerned that it works as well as it does. When shortly after World War II ONR went out and supported basic research in our colleges it then received a severe setback from Congress and others for daring to put money into our universities without having in advance a commitment to deliver. This set back some of our greatest developments, one of which has since led to supersonic aerodynamic knowledge. This apparently occurred because ONR could not prove, by scientists doing some advanced research that they were going to solve the problem.

We find that the universities do play quite a key role. On the chart this is indicated in the righthand figure when one realizes that the amount of basic research as pictured there, is performed largely by our institutions of higher learning.