

It is only fair to point out here that statisticians are dealing with a precise mathematical form in an absolutely unprecise area. Anyone who thinks that he can gather such statistics precisely is indeed very naive. The study and the report on the NSF shows the problems they had in trying to define these areas. There is, indeed, much food for thought in this attempt to portray, graphically and consisely, the complexities represented by the R. & D. effort in the United States which is said to be more in volume than all of the rest of the world put together.

Figure 6 shows by a logarythmic curve, the historic rate of increase for Federal funded R. & D. Notice at the top the rate is starting to flatten out. This is because of the pressures reflected by Congress, which has become more concerned against further large increments in the R. & D. funds.

In Figure 7 we have a different view of the historic use of R. & D. expenditures from Federal funds. We saw on that last slide the effect of World War II and the Korean war, and the effect they caused. Here you have research and development expenses as a percent of the Federal budget. This means that political forces took cognizance of the role of research and development and responded to it, which they had not done prior to the World War II period, or prior to World War I. Note that they now represent nearly 16 percent of the Federal budget.

Figure 8, here are Federal obligations for R. & D. by performer. This one is an interesting one because it shows the division amongst the principal Federal agencies. This 71 percent represents defense in 1963. If we had such a graph up-to-date, say in 1965, what do you think we would see? We would see that defense was much less than 50 percent and that NASA would be 20 percent bigger than defense.

This shift in emphasis will all occur in a 2-year period.

One development that brought on the Congressional irritation was the Health, Education, and Welfare, even though it does not show to be more than 11 percent on the chart. However, it grew so fast that it has been reported to have brought in considerable inefficiency in the effort. Seemingly the availability of trained researchers and existing facilities could not be found to match the available funds.

Figure 9 shows the trends in Federal obligations for basic and applied R. & D. This may not be too obvious but it can be readily