

This is a new development in the field of technology and science in the United States.

Figure 11 concerns itself with manpower considerations. It is interesting to note the percentage of the labor force that science and technology now represents. Note also the rapid percentage growth. Now, 4.7 percent is not big in terms of 100 percent, but it is a very significant increase from 1.5 percent in this brief period since 1940. It has meant educating people, developing educators who can do so, and expanding our universities, which can be very difficult to expand, particularly since so many of the best of them are privately supported.

At the bottom of the chart you will notice something that is left out of so many discussions of this subject--namely, the technicians. What are technicians? They are the expert highly trained craftsmen who first carry out the work of the scientists and the engineers. The electronics industries utilized them more wisely and more fully than most of the engineering industries. These are men who do not have, for the most part, university degrees, but who have technical aptitudes. These are people who can do things with their hands, who have good three-dimensional imagination and sufficient academic aptitude to deal with the mathematical and scientific concepts, even though they cannot originate them or even in all cases understand them. But they can communicate with the engineers, and they speak the engineers' language. They are an important element which Russia has utilized to the full in that vast education system of theirs, where there are as many institutions training technicians, called Technicums, as they have in all their universities. This is believed to be a major factor in how Russia made her great stride from serfdom to a modern industrial complex in a few decades.

Figure 12 is a worrywart chart. Here we analyze the trend in supply and demand for the scientists and engineers for 1960-1970, by the NSF. What do we see? We find that the ratio of scientists to engineers has been greatly changed with the result that we are staring ahead into a vast shortage of trained engineers and a surplus of scientists.

If the children now in school knew it, it indicates that the field is more open for the future to the skilled engineer than it is currently to the skilled scientist, but, because the press calls nearly everything that occurs nowadays a scientific achievement, even when it