

been presented are a baker's dozen of 13 topics that concern themselves with what is the structure of American science and technology. It would take several more lectures to describe how differently they may do it in certain countries in Europe and why the differences exist, and so forth. That would be immaterial for your study today.

Let us merely say that the 13th consideration to be presented-- others could be added, but these 13 in my analysis are the principal ones-- is that of the universal use of so-called computer mathematics, computer operation, and computer application, leading partly to true automation, as apart from the more common industrial automation, where it is integrated into improved tooling and improved machinery. It is becoming quite common that many machines and industrial systems are directed by computers.

This phenomena has become an economic playground, and the economists have drawn many different conclusions with respect to it. Some say it displaces labor and it therefore should be limited. This sounds like the myth of poor old King Canute, who was wheeled in his chair down to the sea where he tried without success to prevent the tides from coming in. Well, the tides came in, and there is not any economic force in sight, or a socially-oriented economist, who is going to stop this tide, no matter what his theories are. But the interesting thing is, history has not supported these views. Automation has not displaced total labor, although labor unions will give you some very fine arguments on how it does in specific instances.

All of you are no doubt familiar with that type of logic which tries to reason from the specific to the general; and let us be on guard for this can be a booby trap. Some ancient philosopher also said, "All generalities are false, including this one." Be on your guard. Be on your guard.

I leave this thought with you, that the mathematics behind the computers, the micro-circuits that are inherent to computers, the utilization of currents of electricity that travel 186,000 miles a second but which have only a few feet to go make it possible to do computations in millionths of a second that would require many man-hours of labor and which otherwise never would get done. This concludes our baker's dozen of the major elements of the structure of science and technology in the United States today!

Now I think the seventh inning has truly arrived!