

The interrelationship of science, technology, and industry is taken for granted today – summed up, not altogether accurately, as "research and development.

" Yet historically this widespread faith in the economic virtues of science is a relatively recent phenomenon, dating back in the United States about 150 years, and in the Western world as a whole not over 300 years at most.

Even in this current era of large scale, intensive research and development, the interrelationships involved in this process are frequently misunderstood.

Until the coming of the Industrial Revolution, science and technology evolved for the most part independently of each other.

Then as industrialization became increasingly complicated, the craft techniques of preindustrial society gradually gave way to a technology based on the systematic application of scientific knowledge and scientific methods.

This changeover started slowly and progressed unevenly.

Until late in the nineteenth century, only a few industries could use scientific techniques or cared about using them.

The list expanded noticeably after 1870, but even then much of what passed for the application of science was "engineering science" rather than basic science.

Nevertheless, by the middle of the nineteenth century, the rapid expansion of scientific knowledge and of public awareness-if not understanding-of it had created a belief that the advance of science

would in some unspecified manner automatically generate economic benefits.

The widespread and usually uncritical acceptance of this thesis led in turn to the assumption that the application of science to industrial purposes was a linear process, starting with fundamental science, then proceeding to applied science or technology, and through them to industrial use.

This is probably the most common pattern, but it is not invariable.

New areas of science have been opened up and fundamental discoveries made as a result of attempts to solve a specific technical or economic problem.

Conversely, scientists who mainly do basic research also serve as consultants on projects that apply research in practical ways.

In sum, the science-technology-industry relationship may flow in several different ways, and the particular channel it will follow depends on the individual situation.

It may at times even be multidirectional.