new perspective of automation – especially when he recognizes that the human energy that is replaced can be either physical or mental. Automation, then, is simply a new name for an old process: the transfer of work from people to machines in order to lighten man's burdens and to increase his output.

What Isn't Automation?

Actually, automation is blamed unjustly for effects it has not caused. It has become the public whipping post for a bigger thing called "technological change."

Technological change is change that is brought about by advances in the application of skills or methods of production or, even more importantly, change brought about by the discovery of new products that have new uses. For instance, the introduction of television dealt a tremendous blow to the movie industry.

Private companies have invested millions of dollars in research on a "new" metal called Titanium. It weighs about twice as much as aluminum but has some superior characteristics, so is preferred for some uses in aircraft and spacecraft. Cost has been a barrier to its use, but the millions of dollars invested in research have paid off by drastically lowering production costs. Soon it may compete with aluminum on a cost-weight basis. When this happens, lost aluminum sales could cause lowered employment in the aluminum industry. If so, the drop in employment would also be a direct result of technological change – not of automation. However, aluminum producers might turn to increased automation in an effort to lower production costs and thereby win back lost customers.

This distinction between technological change and automation is one that more people should understand. And that better understanding may come through study of some basic economic principles.

Basic Economics As a Benchmark

When a man buys a telescopic sight for his rifle, the first thing he does after installing it is to "sight it in." Fire control men in the Navy also "sight in" a ship's guns to make sure they aim true. To assist in doing this, they select a fixed point somewhere on the ship as a "benchmark." Measurements are made from this mark to insure an unchanging point of reference.

When talking about automation and changes in production or products, we can refer to similar benchmarks. Such reference points can be found in the following unchanging economic principles:

PRINCIPLE #1

Man's Material Welfare equals *Natural Resources* plus *Human Effort* times *Tools.*

Man determines his material welfare (standard of living) by taking natural resources and applying his human effort to develop them with the aid of tools.

This is an absurdly simple statement of fact, yet how many people forget it when thinking about automation? If we remember the simple rule that man's standard of living is directly dependent on both the amount of effort he expends as well as the number and quality of tools he uses, it's easy to see that automation (i.e., better tools) can't possibly cause unemployment. Automation (better tools) can only increase production. Therefore, the real cause of unemployment must be found elsewhere.

PRINCIPLE #2

Man's wants are unlimited.

Some people claim automation increases production so much that overproduction results. This idea sounds plausible until we remember that man's wants have never been completely satisfied. Regardless of how many products there are, consumers always seem ready for more new ones.

For example, if we could go back 100 years and list all the things people could possibly want, the people of that day couldn't begin to name the thousands of wonderful new products that have been invented during the past century. If the list were up-dated every 25 years, people's wants would grow each time by leaps and bounds: from coarse black stockings to sheer nylon hose; from molasses and sulphur to modern antibiotics; from food cellars to automatically defrosted refrigerators. Yes, there's no doubt that people's wants always exceed the possibility of satisfying them. So, overproduction isn't the cause of unemployment either.

PRINCIPLE #3

All employment comes from customers—when customers are lost, unemployment results.

Once the truth of this statement is understood, the real cause of unemployment begins to rear its ugly head, and it's not "automation" or "changes in products or production." It's simply the refusal of customers to buy what is produced. A totalitarian government might possibly force customers to buy, but in America we rely on voluntary persuasion. And the best customer persuasion is usually a reduced price tag.

This leads to the next benchmark and to what brings about