

TECHNOLOGY

What's Ahead in Automation

Nationwide survey points up the future for automation in industry. American Society of Tool Engineers finds that 16% of present production methods are automatable.

By HOWARD SIMONS

► AUTOMATION, a word still missing in most dictionaries, has become, nevertheless, a factoryhold word almost overnight.

"What's ahead in automation?"

This question was put to industry by the American Society of Tool Engineers to find out just how much of an impact on manufacture will be made by this scientific and technological dimension that has been added to the American production line.

Generally, automation will not make over American factories immediately. Nor will it do so for a long time to come.

The Society states that "as far as industry can see today, automation eventually can be applied to about 16% of all manufacturing operations in the metal-working industries."

Even this small percentage will have an "enormous" effect on American industry. It will open up many potential markets for all kinds of equipment. A plant wanting to convert to automation for one of its operations will often find that it must replace not only equipment, but processes too.

Automation will influence also the future design of products. According to ASTE officials, "the survey shows that there will be a greater tendency toward standardization of components, even though there may be less standardization of assemblies."

Foresee Differing Exteriors

This will mean that products will become more and more like human beings in the sense that although they may all look different on the outside, they are all pretty much alike on the inside.

Automation can also mean an end to the "big-plant" concept of production, the report states. It is best suited to the medium-sized plants for the simple reason that it is easier to automate the manufacture of an engine, a transmission or an axle, than it is to automate the production of an entire car.

These are some results of the survey that had American industry take a long look at itself and automation.

The Society's study was made on three broad levels: geographical regions, the metalworking industries and plant sizes.

Geographically, interest in automation stacks up this way:

Highest interest is registered in the Middle Atlantic, east North Central and southern states. Industry in these states estimates that between 15% and 20% of all its operations are potentially automatable.

Industry in New England, on the other hand, appears to be less interested in automation at the present time than in any other region. Its estimate of total potential is ten percent.

The west North Central states, unlike their neighboring states to the east, do not show as much interest in automation, indicating that from 10% to 15% of their production can be automated.

The West at the moment appears to be sitting on the fence in regard to automation.

By 1958, 20% to 25% of the pots and pans, toys, pipe fittings and sporting goods you will be buying will have come off automated production lines. This is because interest in automation appears to be highest to producers of "fabricated metal products."

Automobile makers, however, are "still way out in front" among those manufacturers buying automation equipment for their plants. Over one-quarter of this year's equipment orders and an estimated one-

third of next year's will be for automated automobile machinery.

Only a little behind the auto makers are the airplane makers, who will be buying 20% of their equipment from the automation stocks.

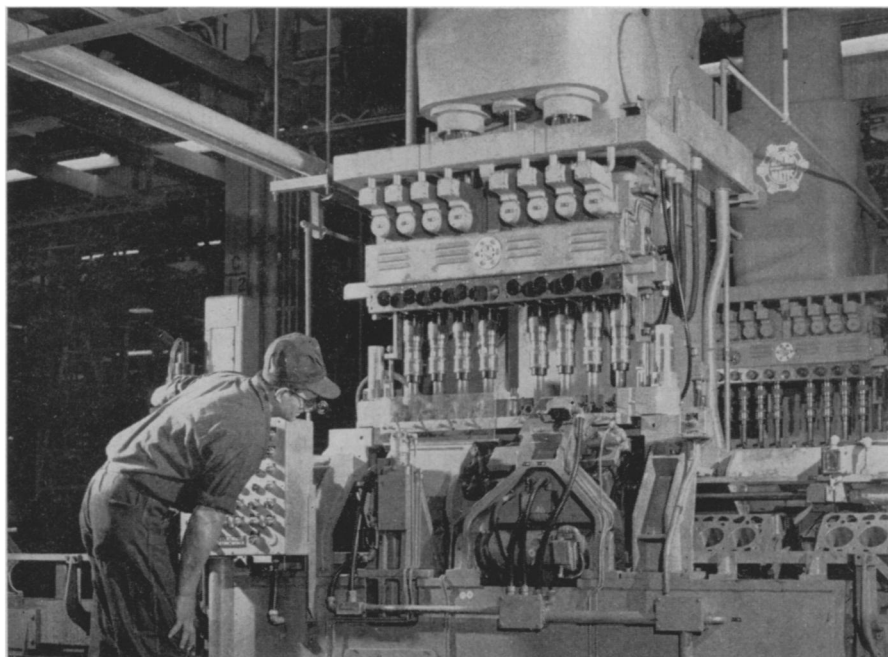
Oddly enough, the machinery makers who would conceivably make the machines that are automatable estimate that only about 15% of their industry can eventually be automated.

It is clear from the study that, although toasters, air conditioners, machines and trucks are all being considered as automatable equipment, it is not practical to automate the entire product.

Manufacturers seem to agree that specific operations of production, differing with each product, can be automated. But nowhere in the study is it indicated that a manufacturer contemplates making a whole product by automation.

The ASTE survey shows that only 16% of current manufacturing operations in the United States can be automated profitably.

To do this, however, industry would have to replace over 200,000 machine tools, 55,000 grinders and finishers, 50,000 metal forming machines and 25,000 production welders, in addition to other types of equipment for production.



AUTOMATED PRODUCTION—Giant honing machines on the automated assembly line of Ford Motor Company's engine plant at Cleveland, Ohio, put the finishing touches on cylinder bores in the Ford V-8 engine blocks. One-quarter of the new machines bought by the automobile makers this year will be automated equipment such as that shown here. Next year one-third of the total will be automatic.

Industry would also have to convert 125,000 machine tools, 25,000 grinders and finishers, 40,000 metal forming machines and 12,000 production welders now in use.

The biggest stumbling block to wide acceptance of automation appears to be lack of development of standardized units that would not have to be scrapped every time there is a model change.

Industry also seems to want "greater versatility in the control and operating equipment to handle wider ranges of sizes or more complex operations than is now possible."

Surprisingly, it was found, relative high cost of present automation equipment is not as frequently mentioned an objection as might have been expected.

Automation is best adapted to the medium-sized plants having from 250 to 1,000 employees. These medium-sized plants feel that 16% or more of their operations can be automated. Plants employing more than 1,000 persons estimate 20% of their operations can be automated.

Small plants with less than 250 employees face the biggest problem of automating their production. Automation is practical in many small plants in which production is relatively continuous on one or two products.

"As yet," the ASTE finds, "there is no major expectation that automation can be

applied profitably to job-shops or job-lot runs." Although the Society surveyed metal working industries primarily, other industries are also sure that automation will work for them. A very large producer of plumbing supplies, for example, said that 70% of the foundry operations were automatable and a small producer of garden and lawn tractors said that from 50% to 60% of final cleaning and painting could be automated.

Automation, though a new word, is not a new idea.

The word "automation" was originated by D. S. Harder, executive vice-president of the Ford Motor Company, to describe a system for the automatic handling of parts between progressive production processes.

"Technological changes have been historically characteristic of all American industries, and account for a large part of the rise in the American standard of living," the Ford engineers explain.

"The petroleum and chemical industries, food and beverage processing industries and such non-manufacturing organizations as the telephone services have mechanized or automated their operations to an extremely high degree without particular notice being taken by the public of the advancing technology. And a flour milling operation which approached complete automaticity has been reported dating from 1784-1785."

Science News Letter, March 17, 1956

PHYSICS

Weaken Nuclear Glue

► ENORMOUS ENERGIES, far in excess even of the raging nuclear fires of hydrogen bombs, would be tapped if the nuclear glue of atomic hearts were weakened, an Atomic Energy Commission scientist has reported.

Dr. George G. Manov, AEC Commissioner Willard F. Libby's technical assistant, suggested studies with very powerful atom smashers now being built may yield clues to possible methods.

Discovering the composition of the mysterious force that keeps atomic hearts from flying apart, in spite of tightly packed positive charges that usually repel each other, is "the very frontier of science," Dr. Manov told students at Phillips Academy, Andover, Mass.

This atomic glue, he said, must possess some extremely interesting properties:

"Although it must have no net charge in itself, it is able in some manner to neutralize these tremendously powerful repulsive forces (of like charges) and to give considerable stability to the nucleus."

We may be on the verge of a totally new discovery, Dr. Manov said.

Scientists have long sought to learn what binds together the contents of atomic hearts. A bewildering number of particles, more than 20, can be driven out of the nucleus, yet no satisfactory theory to account for them is known. (See SNL, May 21, 1955, p. 330.)

However, mathematicians and scientists investigating energy levels within the atomic core, Dr. Manov said, have discovered certain regularities. They relate the atomic number of various chemical elements to the force that seems to glue together the electrical charges.

One nuclear particle, not yet isolated, for which an intensive search is being made is the elusive neutrino, the tiny neutral, massless particle needed to balance the energy equations of nuclear disintegrations.

Science News Letter, March 17, 1956

MEDICINE

Two Hormones Help Some Cancer Patients

► THYROID HORMONE and the adrenal gland hormone, cortisone, have been given to 40 patients with advanced breast cancer with good effect in about a third of the patients, the American Cancer Society announced. The treatment has been given over the past three years by Dr. Henry M. Lemon of Boston University.

A third of the patients were not helped and another third improved temporarily but for no longer than six months.

The results are considered as good as those obtained by removal of the adrenal glands or of the pituitary gland.

Science News Letter, March 17, 1956

ENTOMOLOGY

Funds Asked to Fight Tree-Killing Moth

► THE FEDERAL GOVERNMENT may decide to lend a hand in the fight against the voracious, tree-killing gypsy moth.

Congressmen from seven states threatened by the moth requested from the House appropriations subcommittee a total of \$3,000,000 to fight the pest. The request is believed to mark the beginning of a more intensive Federal program for controlling the insect in infested areas.

Spearheaded by Rep. William B. Widnall (R., N.J.), representatives from Illinois, Kentucky, Minnesota, Mississippi, North Carolina and Washington asked for \$1,500,000 for this spring and a similar amount for next spring to be used chiefly for spraying gypsy moths.

Spread of the gypsy moth has been blamed on hurricanes that have struck the eastern seaboard since 1938. Gypsy moth egg masses carried by bits of debris have been blown from their original New England habitat into northeastern Pennsylvania, northern New Jersey and most of Long Island.

The two-inch, red-tufted, bristled caterpillar is advancing westward and southward at an unprecedented rate. Midwestern states not yet affected are joining in the request for funds to enable the eastern areas to control the pest more effectively.

The money would be in addition to \$545,000 already appropriated for gypsy moth control by the Federal Government and would supplement \$1,500,000 now used for moth control by state governments.

It has been estimated that one additional acre of land can be sprayed for each Federal dollar appropriated.

Science News Letter, March 17, 1956



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