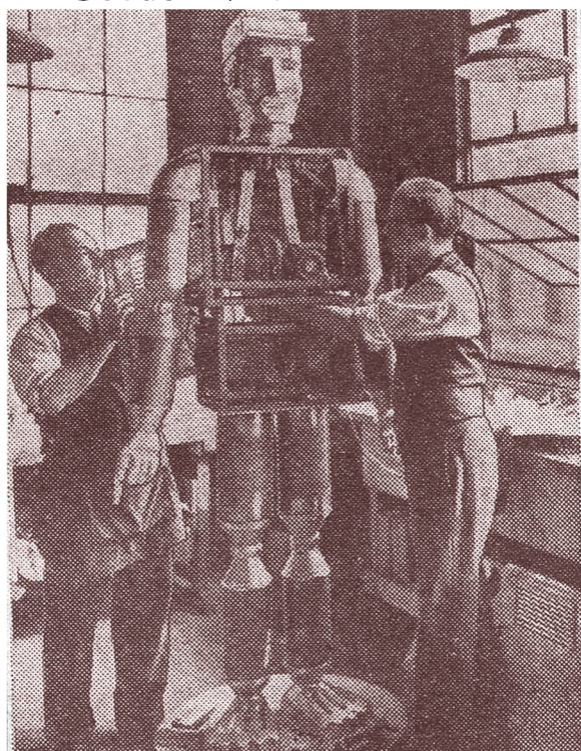


AUGUST 7, 1937: p. 3

## TECHNOLOGY -

### Machines, Man, and Great New Problems



#### *Will Robots Wreak Havoc on Man?*

**I**S MAN too clever? Or is he not clever enough? In the United States, will labor-saving inventions become Frankenstein monsters, destroying the economic and social system of their creators? Or will they be blessings in a bright new world?

President Roosevelt posed these questions two years ago when he appointed a National Resources Committee to investigate factors which might influence the man-power and raw materials of the nation.

Last week, he had an answer from the organization's Subcommittee on Technology. It was a gigantic, 450,000-word report entitled *Technological Trends and National Policy, Including the Social Implications of New Inventions* (PATHFINDER, July 31).

The body had studied man-made machines—robots of iron, steel, glass, gasoline, wire and electricity which threw flesh-and-blood men out of work. It had studied synthetic materials which were tending to disemploy humans who cut natural timber, worked iron mines, cultivated silk-worms.

Because "inventions create jobs as well as take them away," the subcommittee would term invention neither an unmixed bane nor an unmixed blessing. But inventive science influences labor, natural resources, human minds and social institutions. Thus the investigators of technology did not hesitate to declare that "the greatest cause of change in our modern civilization is invention."



*Ogburn Looked Back and Ahead*

**PAST:** To prove this point, William F. Ogburn, 51-year-old sociology professor of Chicago University and head of the subcommittee, looked back 35 years in the past.

He found a national population of 76,000,000, nearly half of which lived on farms. Transportation was limited and expensive. Travel was infrequent and farm communities were isolated. Residential centers huddled closely about places of work. With natives of different regions largely ignorant of each other, the United States was the scene of hundreds of different provincialisms.

Life's tempo was leisurely, but long hours of work left little time for actual leisure. Recreations were few. Business transactions were slowly conducted and small in volume. The father was not only the head but in many cases the employer of the family.

**PRESENT:** Today, the scene is far different. Whirling machines of iron and steel have offered so many jobs that the agricultural population of the United States has dwindled to half its former proportion. Inventions have had other inestimable influences on American society.

Machines have done away with industry in the home and much of small private business. Women are workers and voters. Family ties have been weakened and patriarchal authority lessened.

Tightly knit cities have exploded into metropolitan areas. In a day of cheap and rapid transportation, well-to-do workers no longer need live near office or factory.

Provincialism, that state of mind which once limited the mental horizons of people, no longer can be said to exist. Horse and buggy have given way to the automobile and the airplane. The nation has been marked with broad highways which blur state and county lines. Farm isolation has been destroyed.

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Citizens on the eastern seaboard and the central plains see the same moving pictures and hear the same radio programs as Californians. The telegraph tickers of press services send to newspapers throughout the country stories which are the same, word for word. In the space of a few minutes, photographs by wire bring the same visual impression of a *Hindenburg* disaster or a Hollywood marriage to readers living in places as far apart as San Francisco and Boston.

More efficient transportation and communication bring the same textiles, the same clothing styles, the same types of food, the same commercial and political propaganda to consumers from one end of the country to the other. The national economic system has been altered from one that was partly local in nature to one that is almost entirely national. The gasoline engine, the radio, the telegraph, the telephone, all have had their profound effect in new Federal, state and local laws and even in the interpretation of the Constitution. The inventions of the last 35 years have had one immediately notable result—a standardization of life all over the United States.

But society had not been well prepared for the changes wrought by technological innovations. When workers flooded into the cities, then back out into metropolitan areas, they were hastily and poorly housed. Streets became too narrow. Local governments became too weak to cope with their new problems. Man had been clever but not clever enough.

**LOST JOBS:** In individual cases, possibly the most distressing effect of new inventions in the past 35 years was to throw men out of work. On the farm, the tractor not only tended to make the horse unnecessary, but lessened the number of hands needed. In industry, new machinery caused unemployment among factory workers.

Because of a number of complicating factors, there is no adequate measure of technological unemployment. A factory which adopts labor-saving machinery may not only discharge its own workers, but compete so successfully with another factory that rival workers also meet with dismissal.

New machinery not only reduces the number of employees required in manufacturing plants, but also attains a higher output quota, making the hiring of new workers unnecessary. Thus a number of eligibles who have never had jobs may be said to be technologically unemployed.

One industry may tend to supplant another, as in the case of the new, artificial rayon industry and the old, natural fiber textile plants. In each case, the amount of technological unemployment is incalculable.

But there is no doubt that such unemployment does exist, and in large

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quantity. Before the National Resources Committee was appointed, Dr. F. C. Mills of the National Bureau of Economic Research made a study of the separation of workers from industry. In the period of 1923 to 1929, he found that "every two years, one individual worker in 20 was forced to seek employment in a new industry." Because the '20s were a time during which the general employment level rose, nearly all of this constant dislocation (about 1,000,000 workers a year) was undoubtedly due to technological improvements which replaced many men by few machines.

Also, because the employment level was rising, it could be concluded that new inventions, as well as eliminating jobs, created more than enough new ones to take care of discharged workers. But the fact stood that even during boom days, many thousands of laborers, skilled and unskilled, were unemployed for periods which cost them months of pay and years of savings.

**INVENTION LAG:** Various influences kept the dislocations caused by technology from being even greater. All tended to slow up the time between practicalization of an invention and its general adoption.

First was the natural tendency of human beings to oppose change. The telegraph, the telephone, the radio, the oil-burner, were all laughed at.

Industry, with a large stake in machinery and equipment which would be rendered obsolete by adoption of new inventions, has been opposed to change. Telephone companies have clung stubbornly to the old, two-handed type of set and still charge almost prohibitive fees for the installation of the new, French type 'phone. In 1937, the Federal Communications Commission declared that the Bell Telephone System suppressed 3,400 unused patents in order to forestall competition.

Resistance to technological improvement on the grounds that it causes unemployment is an old cause for the slow adoption of inventions. In the late 16th century, the Council of the



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city of Danzig ordered strangled the inventor of a machine which would weave four to six pieces of cloth at once, lest his invention reduce many workers to beggary. Not many years ago, the United States Senate had a new dial telephone system removed, largely from a feeling that it would cause the dismissal of too many switchboard operators. When the Rust brothers announced the perfection of their cotton picker, which in a 7½-hour day can pick as much cotton as a man can gather in five weeks, they purposely limited its use to one region in Mississippi (although no limit has been placed on its export to Soviet Russia).

All these factors have tended to lessen the impact of technological improvements in American life. But Rust cotton pickers, suddenly loosed on Dixie fields, might cause catastrophe to Southern labor. Other inventions not now in use might entirely upset governmental institutions and social forms.

**FUTURE:** What can be done today to prevent dislocations tomorrow? Because of invention lag, the Subcommittee on Technology thought that present inventions neglected by industry might be sought out, and their effects predicted. So reasoning, they took a cautious peek into the next 20 years.

In a look at various specific industries, the subcommittee saw possible trouble ahead for the farms. According to its report, poor farmers who were unable to buy machinery to keep up with the first technological advances will fall farther and farther behind, with a widening gap between the general well-being of agriculturalists who were abreast of the times and those who were not. The problem of farm tenancy will be aggravated, possibly to a point of catastrophe. But the subcommittee also pointed out that the increased use of cooperatives might enable the small farmer to compete with the big one. In regard to other industries, Dr. Ogburn's committee declared that:

¶ Mineral industries are being forced by dwindling deposits to go deeper underground to produce oil, coal and other fuels. By about 1950, a permanent rise in the prices of these commodities may be expected because producing them will be more costly.

¶ Transportation has already reached a high peak of development. Passenger traffic may increase, but freight traffic will not. The distribution and ownership of automobiles will keep on at its present phenomenal increase rate. Privately-owned trucks will challenge freight-carrying railroads with increasing success.

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Airplane services will expand.

¶ Power is a commodity which the United States has in more quantity than any other country in the world. Consumption of power, particularly of electricity, will vastly increase. The growing use of airplanes will make telegraph poles a hazard and unsightly transmission lines will be driven underground.

¶ Communications may be affected by fantastic developments already presaged by the sending of photographs by telephone and radio.

¶ Chemical industries will see miracles, too, and will expand remarkably, particularly in the manufacture of materials which counterfeit those of nature.

¶ Electrical goods manufacturers may well be bewildered by the versatility of the current which their devices utilize. But electricity definitely may be expected to provide more light and power for rural areas, to light highways in growing measure, and, by means of air-conditioning, to provide man with a steady climate, invariable from day to night and from season to season.

¶ Metallurgy will proceed with no boom in the extraction of metals in sight. New alloys, light and strong, will come into increasing use.

¶ Construction industries have suffered badly from the effects of the depression and may continue to suffer.

In this vast field of inspection, the Subcommittee on Technology saw specters as well as wonders. These it lumped into 13 inventions and developments which it recommended for further study, so that their possible implications for labor and society might be better measured. Their list included:

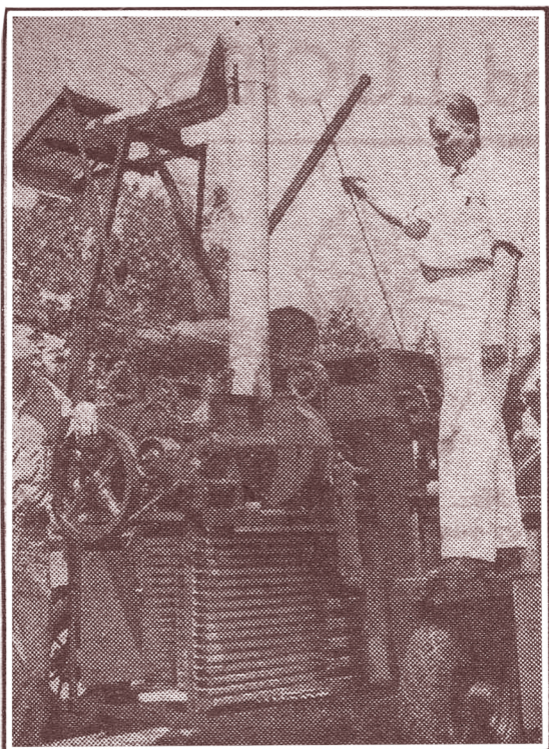
(1) Synthetic rubber, more expensive than the natural product, but sufficiently superior to it to justify prediction of increasing large-scale production.

(2) Automobile trailers, whose use for homes will not expand to nearly so great an extent as has been popularly predicted.

(3) Plastics, which have unlimited possibility for the future. In recent years they have tended to displace hard rubber and celluloid. No immediate limit is seen to their present use in competition with wood, metal and pottery products.

(4) Cheap, artificial cotton and woolen-like fibers produced from cellulose. They are regarded as both a boon and a bogey because they will seriously affect cotton and woolen markets at the same time as they cause increased production of textiles.

(5) Pre-fabricated houses, made in factories. Their immediate, wide-



*The Rust Cotton Picker Causes Worry*

spread adoption, which would disemploy architects and workmen, is not likely.

(6) Air-conditioning, an industry which is likely to expand rapidly, creating new jobs without threatening the old.

(7) Extraction of gasoline from coal instead of oil. This process has been undeservedly neglected in the United States, which seems to have plenty of oil but does not realize that the supply may be exhausted with shocking suddenness.

(8) Steep-flight airplanes such as autogiros and helicopters, which can ascend and descend almost vertically and in limited spaces. They are just coming out of the experimental stage and such "air flivvers" will probably not be made available to the public for a long time.

(9) Tray agriculture, by which vegetables (but few grains) can be grown in chemically treated tanks of water better than they can in soil. "Hydropony," as it is called, is still experimental, but may become a serious influence on agriculture in the future.

The most fearsome bogey covered in the technology report was the mechanical cotton picker invented by brothers John D. and Mack Rust of Tennessee. Their patent from the Federal government was nearly the thousandth of its kind issued, their device perhaps the first practical one to be registered. If the Rust cotton-picker should prove to be practical, it may eventually throw as many as 6,750,000 Southern tenant farmers onto a human junk heap. In the opinion of technologists, "Further reassurance" was wanted that such a machine "will be a blessing, not a curse, to mankind."

Another bogey was found in the photo-electric cell, an innocent-look-

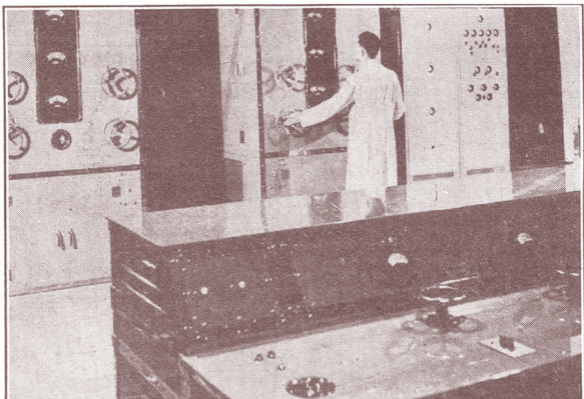
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ing apparatus, which, unlike any other industrial invention of man, can see. Listed by the committee were 142 different uses to which it might be put, including the sorting of defective manufactured articles from good ones in the factory, discarding products which have been improperly labeled, opening doors, directing traffic and guarding properties from intrusion or burglary by alarm systems. At a conservative estimate, the committee reported, the photo-electric cell could replace 250,000 and perhaps 1,000,000 workers all over the country.

Two other devices involve a problem of a different kind. Television images, transmitted through the medium of radio circuits, have been known for at least 10 years. Now, according to technologists, television only needs backers with courage and money to secure adoption by the public. Approaching a similar state is the science of facsimile transmission, which could radio-print newspapers and propaganda in subscribers' homes. With the radio and the moving picture already powerful conveyors of ideas, and with two similarly powerful agencies about to be added to the list, Dr. Ogburn's committee paused to ask a question about national policy: "What ideas, whose ideas, shall be mass-communicated? Who shall control television?"

In a larger sense, the committee had asked another, more important question: "Who shall control technology?" New inventions appearing without warning, can throw many thousands of laborers out of work. New industries can starve the old, new materials render traditional ones obsolete.

The inventions of the past 35 years in the United States have done much to turn the country's population from the country to the city, have broadened narrow thinking to a cosmopolitan view of life, have carved deep lines of transformation over the whole face of the nation. The inventions of the next 20 years may do even more. If present trends continue, Americans may conceivably find themselves in a noiseless, smokeless and climateless world. They may also find part of their number in a migrating clan with



*Who Will Control the Influence of Such Things as This Big Television Transmitter?*



**TECHNOLOGY***Ickes Could Promise No Peace Ahead*

a wandering sickness—technologically unemployed workers, sinking lower and lower in social levels because old skills are useless in industries which utilize only new ones. Whole fields of endeavor may be wiped out, great avenues to employment closed.

To foresee and forestall such disastrous effects of technology on American society, the National Resources Committee examined the report of its Subcommittee on Technology, then made several recommendations. First and most important was for the creation of a permanent National Resources Board to help streamline Federal policies to the requirements of a new and faster machine age. Second was for immediate study of the subcommittee's 13 "disturbing" inventions. Third was for the creation of a joint committee from several major Federal departments to transmit predictions of technological change to workers and industries most likely to be affected.

How further to deal with technological progress was a vastly complex problem which Harold Ickes, Chairman of the Resources Committee and Secretary of the Interior, was glad to leave for the future. But that such a problem and the compelling need for solving it would exist permanently, he left no doubt. When he turned his subcommittee's report over to the President, with it went the solemn and somewhat terrifying assurance that for workers, industries and the institutions which govern them, technology gave "no evidence whatever of a changeless peace ahead."