Obsolete Men

An examination of Technological Unemployment in the light of the machine that makes 500,000 needles a day, the machine that turns out 40,000 bricks an hour, and the machine that switches 1,000,000 freight cars in a year.

FOR some two or three millions of years the world's work was done by a patent, automatic, self-cooling mechanism of levers, joints, and complicated controls with a maximum life of about three score years and ten, an average efficient working day of eight to twelve hours, an intermittent power production of one-tenth of one horsepower, and certain vernal vagaries for which there was no adequate explanation in the laws of physics. This mechanism sowed and cultivated and harvested the world's corn, milled and baked its bread, wove its cloth, shaped its bricks, heeled its shoes, and generally did what was necessary to be done. It was still doing the world's work 200 years ago. It was still doing the great bulk of the world's work 100 years ago. But within the last ten decades, and preponderantly within the last five, and largely within the last decade and a half, it has been supplanted. In certain departments of its ancient labors, and particularly in its honorable function as a producer of primary motive power, it is not only outmoded but actually obsolete. In others it has been thrown aside and junked. And throughout the whole field of its primitive supremacy it meets, with increasing frequency and increasing insistence, the challenge of newer, harder, noisier, more powerful engines capable in certain cases of producing one whole horsepower of work for two pounds of weight and capable of running day and night without rest and without interruption. The beginning of this process of obsolescence was called in the books the Industrial Revolution. And because it had a name, and because it occurred a century or so ago, people very generally believe that they know all about it, that its effects have been observed, and that the primitive machine of levers, having survived competition thus long, will go on surviving it forever. But the truth is that the Industrial Revolution of a century ago and the Industrial Revolution of the contemporary world have no more in common than the springs of the Yellowstone River and that river's falls. And that the phenomenon clumsily referred to as technological unemployment is a phenomenon as obscure today as it may be ominous.

TECHNOLOGICAL-Unemployment is a long word. It is also a bugaboo. It is also a whip to beat the bankers. It is also conceivably the most important issue of our time. But it is most familiarly a column of statistics.

As for example the following figures compiled by such engineers and economists as Leon Pratt Alford, Michael B. Scheler, F. Alexander Magoun, Eric Hodgins, Benjamin C. Marsh, and most recently and most strikingly by Howard Scott which show:

. . . that machinery developed in the single decade between 1914 and 1925 enabled one man employed in industry in 1925 to take the place of three men employed in industry in 1914

. . . that if the S. S. *Europa* obtained her motive power the way the Spartan admiral Eurybiades obtained his at the battle of Salamis she would have to carry sweep-pullers to the number of 3,000,000 men — or about the total male population of Washington, Kansas, and Minnesota put together — instead of the engine crew of 180 she now employs

. . . that whereas Mr. P. J. McCarthy, the famous strong man of the '90's, supported 6,370 pounds of stone to the amazement of the world, no one would so much as turn his head today to see a dinky hoisting engine lift 6,370 pounds of stone sixty feet a minute

. . . that six or eight men can today control and operate a turbine capable of producing as much energy in twenty-four hours as 9,000,000 men working on eight-hour shifts

. . . that if 10,000 men had set out to dig the Panama Canal the year the Pilgrims landed, they would not yet have finished the digging of the earth and rock

. . . that the production of a motor car required in 1929 less than one-third as many man hours as in 1919 and less than one-twelfth as many as in 1904

. . . that one man operating a modern brick-making machine sends 710 brick makers into other jobs or out to the breadline . . . that one man operating a modern glass-tube-making machine deprives 600 skilled hand workmen of their places . . . that one man operating a new electric-light-bulb machine replaces 10,000 human electric-light-bulb makers . . . that one man in 1930 could make as many needles in a day as 17,000 men in 1830 . . . that a modern Minneapolis flour mill under the control of one man turns out as much flour in a day as 8,000 of Themistocles' millers . . . that modern shoe machinery installed in the shoe industry of Revolutionary days would have driven thirty-nine out of forty shoe makers out of the industry

. . . that although Caecilius, a freeman under Augustus, was famous among slave-owners of antiquity for his stable of 4,116 head, an equivalent total horsepower (411.6) is owned during the course of his life by almost any small car owner of the present day who trades in his old Ford every two or three years for a new one

. . . that if the 1929 U. S. wheat crop had been grown in 1829, 6,000,000 men using the best 1829 equipment would have been required to prepare the ground for it and sow it . . . whereas 4,000 men using the best 1929 equipment could have done the whole job

. . . that in one decade (1920-30) one manufacturer (General Electric) created new machinery capable of producing four times as much man power (160,000,000) as the total wage-earning population of the U. S.

Figures of all kinds.

Figures showing, in brief, that in manufactures, in transportation, in mining, in agriculture, in the whole spectrum of industry from one end to the other, fewer men are required to do a given unit of work, more, and more automatic, machines are continually being developed and installed, and the basic relation of human labor to industrial production in America is apparently undergoing a change as profound as that which, in the early days of the Industrial Revolution, threatened the security and even the food and the shelter of British labor.

They are amazing figures. They were italicized with dismay or admiration in book after book written in that happy era when The Machine Age was a best-selling title. Frenchmen visiting the States in the '20's relayed them home with stupefaction to their publishers in Paris. Russian politicos recorded them in notebooks and hired American engineers to bring them to pass in the Ukraine. English novelists cited them with solemn warning in lectures on Craftsmanship and The Modern Soul. Drawing-room conversations were punctuated with teletypes, magnetic cranes, and automatic tractors. The Dynamo became the god-devil of a nervous play. The word "robot" was imported from Czechoslovakia to express

the mechanization of man. And one way or another a very comfortably exhilarating hysteria was worked up. We were obviously the actors in a most significant drama. We were the subjects of universal speculation. And it was pleasant to be alive.

The only trouble was that we had no more idea than the property swan in *Lohengrin* what the significance of the drama actually *was*.

MODERN industrialism is the undiscovered continent of our time. We are sure it exists for its woods are thick around us. But of its geography we are at least as ignorant as were the Teton Sioux of the geography of the Missouri in the year 1804. They saw the river running. But whether it emptied at last into buffalo grass, fat elk, and the cook smokes of plenty, or whether on the contrary it lost itself in the sand they had no means of knowing. Their fathers had mentioned buffalo grass.

And we were in much the same situation when the decade of mechanical marvels ended in the depression of 1929. We had been informed that the mechanization of industry and the resultant increase of production led necessarily to lasting plenty. And when we stumbled over the bluff of November, 1929, we could hardly believe our senses. We blamed the government. We blamed the expansive manufacturers. We blamed our own speculations. We blamed—we are still blaming—the bankers. But it never occurred to us to ask whether the blame might not more properly be attached to fundamental changes in industrialism itself.

As a matter of fact it has hardly occurred to us even yet to ask that question. There have been a few searchings of the evidence. The machines themselves have been collected for the forthcoming Chicago Exposition in Mr. Paul Cret's polychrome Hall of Science shown in the frontispiece. But by and large the possibility that the present depression may be the effect of a revolutionary and far-reaching change in industrialism rather than a cyclical dislocation of the credit machinery has never seriously been entertained. In the recent presidential campaign, a campaign fought on economic issues in the midst of an economic disaster, neither candidate nor either party so much as raised the question, though Mr. Hoover did on one occasion state that there were *also* men unemployed for technological cause. It is true that political parties evade fundamental issues. But the omission of the basic industrial problem from a campaign heatedly debated in economic terms is striking nevertheless. For if the question exists at all it is a question of infinitely greater importance than any other issue which could conceivably be discussed. For it goes to the roots of our civilization. If that increasing process of mechanization which is the characteristic feature of modern industry means an increasing displacement of human labor and the rapid industrial obsolescence of a great part of the country's population, then it is worse than idle to discuss farmers' loans and the reform of the Anti-Trust Laws as a remedy.

It is worth while, therefore, to gather such facts on technological unemployment as are known. They are not numerous.

IT HAD been learned by 1929 that there was in truth as well as in theory a serious decline in the number of wage earners in basic industries. There were at least 500,000 and perhaps 1,000,000 fewer men in manufacture than there had been in 1919; at least 240,000 and perhaps 300,000 fewer in railways; at least 65,000 and perhaps 200,000 fewer in mines; and a loss of about 1,500,000 persons eligible for employment from agriculture. It is true that employment figures for 1919 were high due to War-time conditions. But 1929 was also a boom year and the drop was in any case considerable. The total decline in these categories has been taken by Professor Paul H. Douglas at 2,500,000. And since this decline occurred in the face of an increase in population which should have increased the wage-earning population by 2,000,000, the real loss was about 4,500,000.

But it cannot be concluded with certainty from that fact that the process of mechanization actually caused the displacement. For one thing, there is no means of knowing how many of these displaced workers have actually been displaced by technological advances (though the Director of the International Management Institute has estimated that the total displaced for this cause was 1,485,000). And for another, the current economic beliefs of the period prior to the depression and such statistics as had then been collected pointed in a different direction.

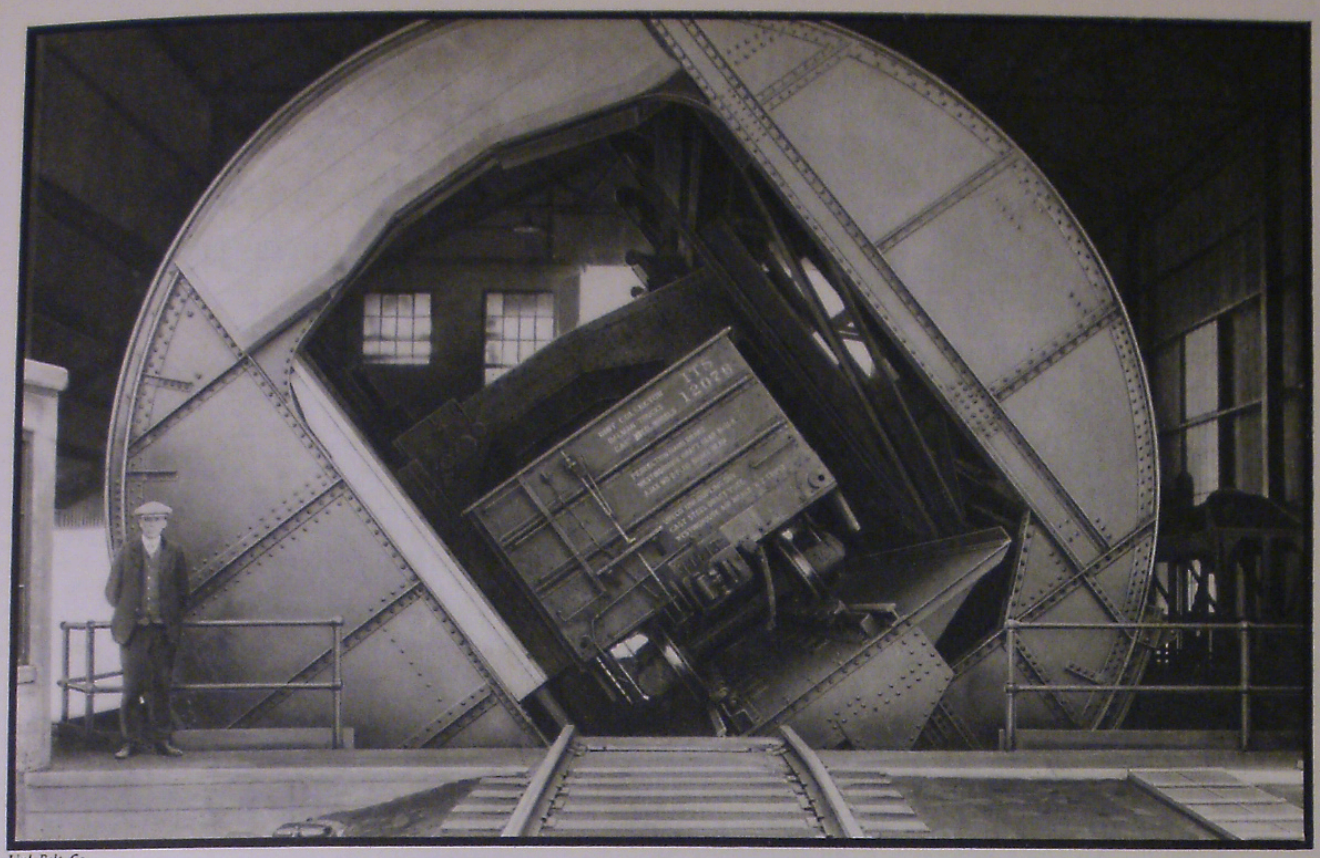
As to the statistics, it appeared, if the figures given by the U. S. Bureau of Foreign and Domestic Commerce in 1928 were valid, that the demand for automobiles, radios, telephones, moving pictures, etc. had so increased during the same period that 1,280,000 men had found employment since 1920 as chauffeurs and the like, 100,000 had been taken in in the servicing of electric refrigerators, oil burners, etc., 185,000 had been hired as teachers, and 100,000 had become life-insurance agents. There was also between 1920 and 1928 an increase in the school population of 3,500,000. But part of this was due to the rise in population. The actual increase in percentage of the school-age population attending schools was 2.7 per cent. Other surveys found an enormous increase (407,000) in the medical and allied professions, and in hotels, restaurants, moving pictures, and banking, with the result that 1,907,000 new positions were created as against the 1,485,000 eliminated. These latter figures, however, omit from consideration the population increase during the period, which supplied 2,000,000 additional wage earners to be taken up.

As to the economic theory, Professor Douglas's statement may be taken as standard and typical. It was Professor Douglas's belief that although new mechanical devices did unarguably have the effect of displacing wage earners and of displacing them in large numbers, nevertheless new mechanical devices did not and could not cause permanent unemployment because the effect of the installation of such devices is to cut down labor costs (which, beginning with the processing of raw materials, are about three-quarters of the cost of production) and thus produce a cheaper product; that the effect of the production of a cheaper product is to cause either an increase in production if the demand is elastic or a saving to the purchaser if the demand is inelastic; that in the former case few if any workers need be displaced, while in the latter case the savings of purchasers will either be spent on luxuries and the like or be saved and invested as capital; and that in either event new jobs will be created to take up the men displaced in the original industry.

THE effect both of theories and statistics therefore was to eliminate the mechanization of industry as a possible cause of hard times. It was generally believed by the end of the decade of the '20's that the machine would inevitably create as many jobs as it destroyed, and that even an automatic bulb maker which threw 10,000 men out of work would merely, in the long run, produce 10,000 surgeons or 10,000 insurance agents or 10,000 filling-station operatives or 10,000 poets. And when the depression did actually intervene, this same persuasion was carried over into the valley. Plus the comforting recollection that mechanization was as old as the turret lathe, the automatic screw machine, and even the steam engine. We had had technological unemployment in '77 and '84 and '93 and '07 and before, and we had survived the turns of fate. What reason to think of technological unemployment now?

Historically no reason. But there had begun to appear in various parts of the industrial world during the period following the War industrial geographers, engineers like Steinmetz, economists like Veblen, who were curious to know something more about this dark continent—who were curious to find out which way the waters run and how the divides are placed. And the curiosity of these explorers had raised the question of the rate of change. Granted that mechanization was an old story and that technological unemployment was not a new phenomenon, was it nevertheless true that we had nothing more to expect from either? Was it not possible that the process of technological advance which had hitherto proceeded by arithmetical rates of progression might not now be proceeding by geometric rates? Was it inconceivable that the oscillations of the pendulum should become wider and more rapid until the clock case cracked?

[*Continued on page 91*]



Link-Belt Co.

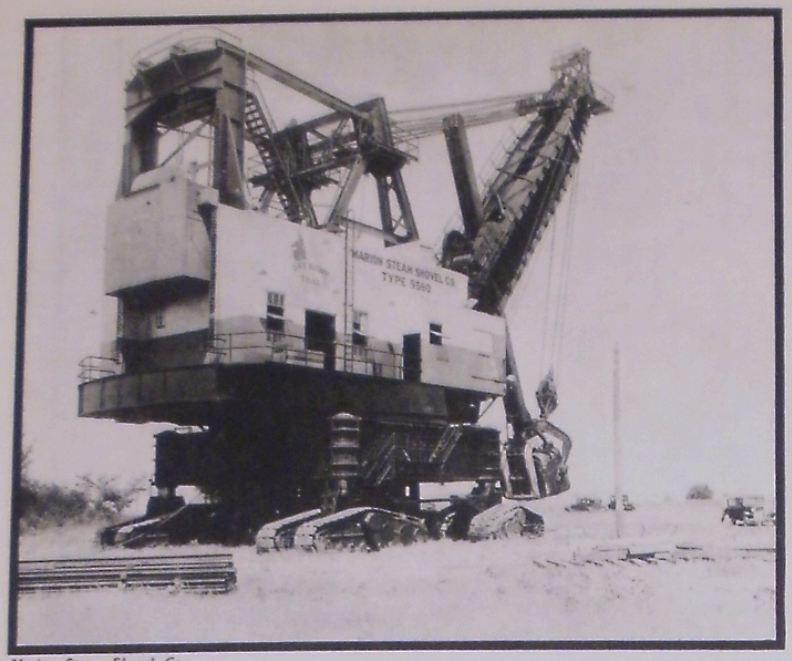
Keystone

Six hunkies: one carload: three days.

Three men and a hoist: one carload: three hours.

Machines for HANDLING

LIKE most fundamental innovations in industry modern handling equipment had a non-industrial origin. Freight-car unloaders like the Link-Belt Rotary Railroad Car Dumper illustrated above date from the War. But it was the immigration quota rather than the progressiveness of manufacturers which gave them their real start in life. When hunkies thinned out of the employment offices, engineers came into the plants. With unskilled wages rising, it was worth while to substitute for twenty-eight men shoveling 1,700 tons of coal in three eight-hour shifts a single machine which, with eight attendants, sluiced out 1,700 tons in a single working day. And with longshoremen few and exigent it was an economy to replace 100 ship loaders with automatic conveyors and a spiral chute operated by four. The result was the greatest single technical improvement in industrial operation since the War. Handling equipment has been widely installed. Magnetic cranes like that here shown are in common and efficient use for the moving of bulks of metal which no number of men could transport with ease. Belt conveyors in foundries move the 150 to 200 tons of material which must be handled and rehandled to produce one ton of castings and raise the daily output of molds from 125 to 550. Electric hoists enable two men to handle in five hours as many tons of preserves as eighteen men in twelve, and three men to unload in an hour a car of lumber which five men could unload by hand in half a day. Oil-burning ships are fired by a crew of nine instead of the usual stoking complement of 120. And labor is displaced. The American Sugar Refining Co. estimates that its automatic packing and handling equipment saves half its labor bill.



Marion Steam Shovel Co.

Machines for DIGGING

The Irishman with the pick and shovel dug the ditches and emptied the dinner pails of Mr. Dooley's America.

In Mr. Hoover's America and in St. Louis 70 men with ditch-digging machines did the work of 7,000 picks and shovels—but still ate only 70 of the dinners.

WHEN Adam dug, one man with a primitive shovel was probably able to move better than a cubic yard of earth in a ten-hour day. When the boys in blue were swinging their Ames shovels before Vicksburg, one man with a shovel could dig and move only a little more—perhaps two cubic yards. When Marion electric type No. 5560 (left) shoves into the Kansas dirt overlying the Kansas coal deposits she throws eighteen cubic yards per heave, cleans out 30,000 cubic yards in a twenty-four-hour day, and between one sun-up and the next accomplishes as much back-breaking, knuckle-bruising labor as 15,000 men working straight through a ten-hour day. She could also perform certain services impossible to the 15,000, such as picking up four or five truck loads of dirt and rock and depositing them upon the top of a seven-story building a couple of hundred yards away. But though her capacity is eighteen times that of the ordinary contractor's steam shovel and considerably larger than those pictured below and to the left, the smaller shovel is still a formidable implement in contrast with the traditional tool of ditch-digging. And the combination of truck, tractor, and shovel (below) spells the end of the heavy common labor of the ditches, the foundations, and the streets. One Link-Belt Trench Hoe can run a twenty foot deep, eight foot wide ditch at the rate of 1,000 cubic yards per ten-hour day. And the typical gang of seventy-four men which, prior to 1919, laid 350 feet of pavement a day was, by 1928, cut almost in half by improved road-building equipment while the amount of paving laid was increased to 800 feet.

Bucyrus-Erie Co.

Caterpillar Tractor Co.

Machines for METAL

THERE is another side to technological advance. A new machine or a new process will not only displace men but will displace machines as well. And manufacturers with a heavy investment in plant are often as inhospitable to inventiveness as are the unions. The result is that the rate of technological change may be very slow in heavy industry. There have been rumors from time to time of impending revolutions in steel. For the most part the rumors have not materialized. But even so productivity in the industry more than doubled in the years from 1911 to 1927 and man-hours per gross ton of pig iron fell in the same years by half (from 7.119 to 3.329). But the most significant modern development in that direction is the Aston process for wrought iron now in use in the Ambridge plant of the A. M. Byers Co., which does away with hand puddling (the mixing in the oven of the furnace of slag and iron) and permits the processing of an 8,000-pound wrought-iron sponge ball every five minutes as against the former 600-pound wrought-iron sponge ball produced by a puddler and his helper every hour and a half. Thus in the Byers plant eighty men in a single turn can produce four times as much wrought iron as 225 men could produce in a single turn in the hand-puddling process. The gigantic bucket to the right and the primitive Malayan tin smelter below are, for all their similarity, centuries apart.

© Aikler

J. B. Newsom

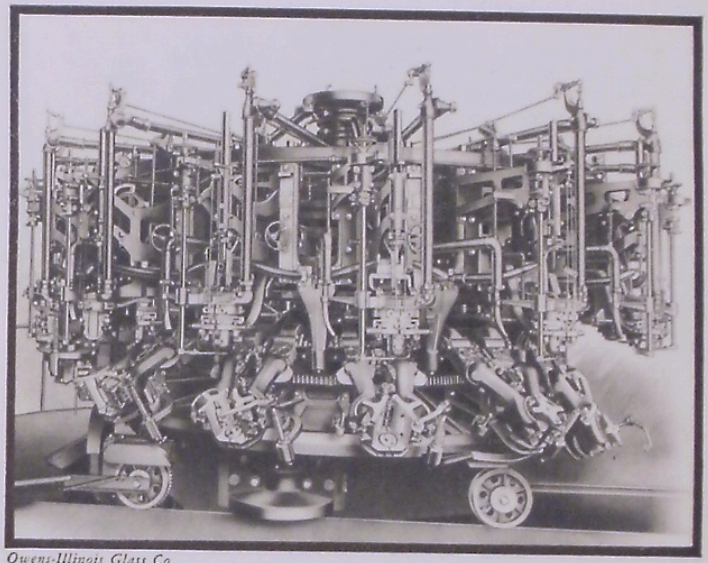
The American steel industry can now produce with the same number of men three times as much pig iron as it produced in 1904.

Machines for MACHINES

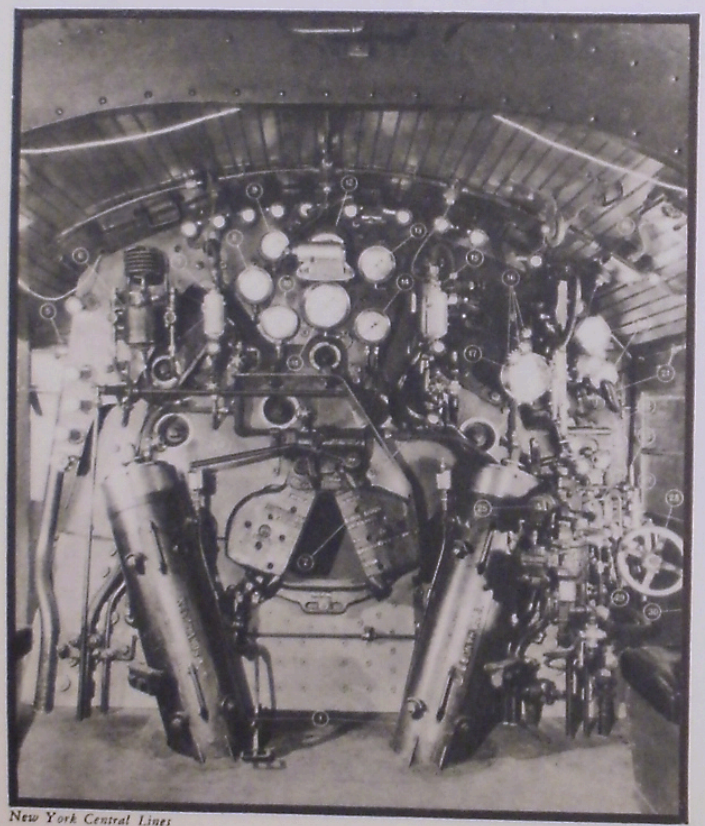
Wide World

THE machine on the left looks like a man and does (but without equal efficiency) some of the things a man can do. The machine below bears no resemblance to a man and does only one of the things a man can do. But does it with an efficiency no man has ever attained. It sucks molten glass up into a blank mold as a glass blower sucks molten glass into the end of his pipe, and blows it out into the desired shape as a glass blower also blows it out. But it is capable of producing 288,000 one-dram bottles in the time (twenty-four hours) required for 17,280 bottles by handicraft method.

Below and to the left appear a few of the labor-saving devices in a modern engine cab. Most of these devices do not displace men on the particular engine but permit the engine to do work which displaces other crews. Automatic stokers are necessary when the engine consumes more than 4,000 pounds of coal an hour. Automatic fire doors and bell ringers are general equipment. Power grate shakers must be installed on large engines. Automatic water scoops are used on express lines. Automatic signals are universal. Hump yard switches in which three men switch and sort cars formerly requiring fifty exist in the larger yards. And an automatic device for discovering and marking internally defective rails is in process of development by Westinghouse.



Owens-Illinois Glass Co



New York Central Lines

There were 2,100,000 railroad employees in the U. S. in 1920.

In July, 1932, there were 1,020,000.

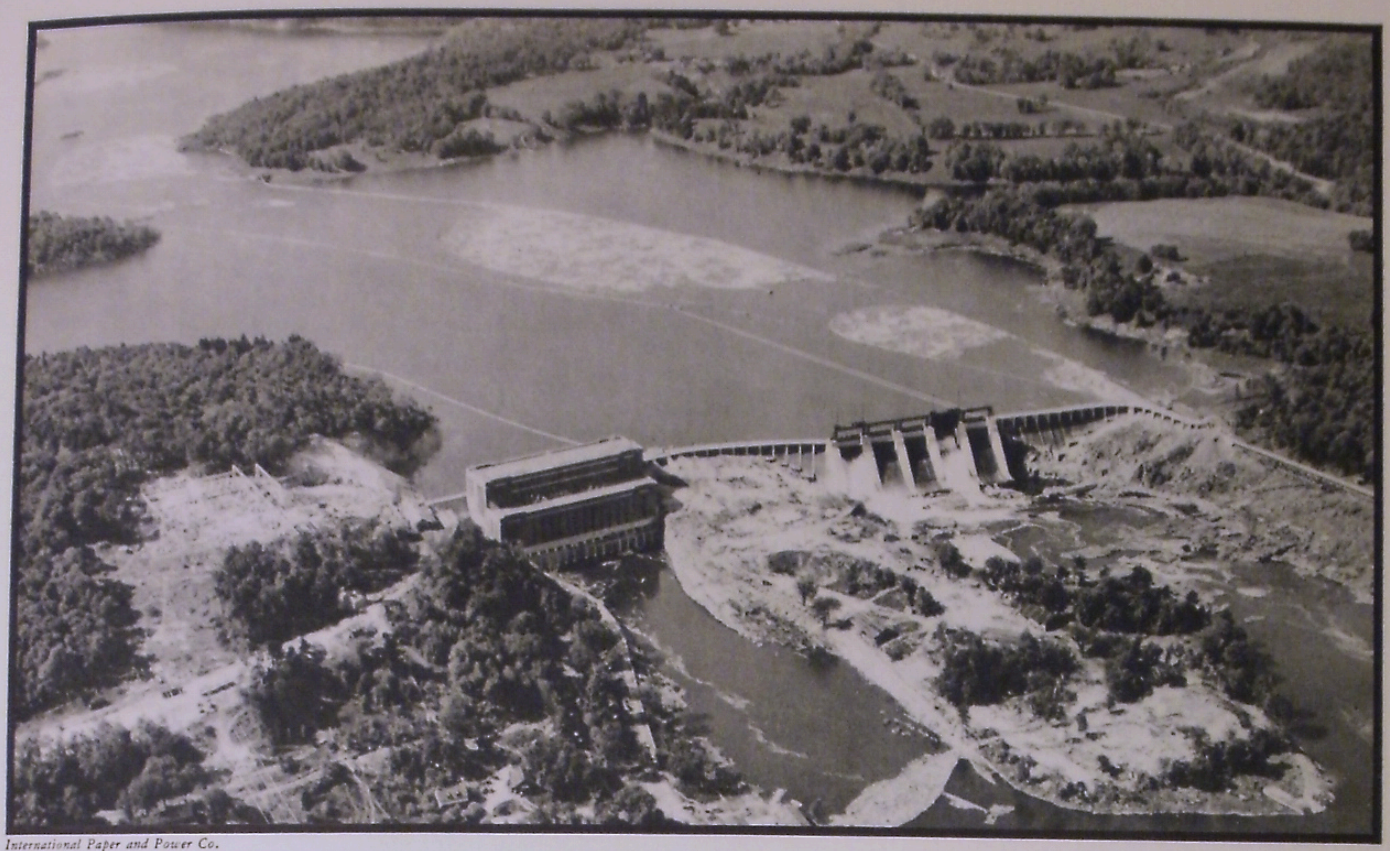
One explanation of the 50 per cent drop is the depression.

Another is the engineer.

Another is the depression *plus* the engineer.

For the mother of modern invention is not necessity but hard times.

And it is freely said that the 1,020,000 employees of the depression will still be 1,020,000 employees when peak loads and good times return.

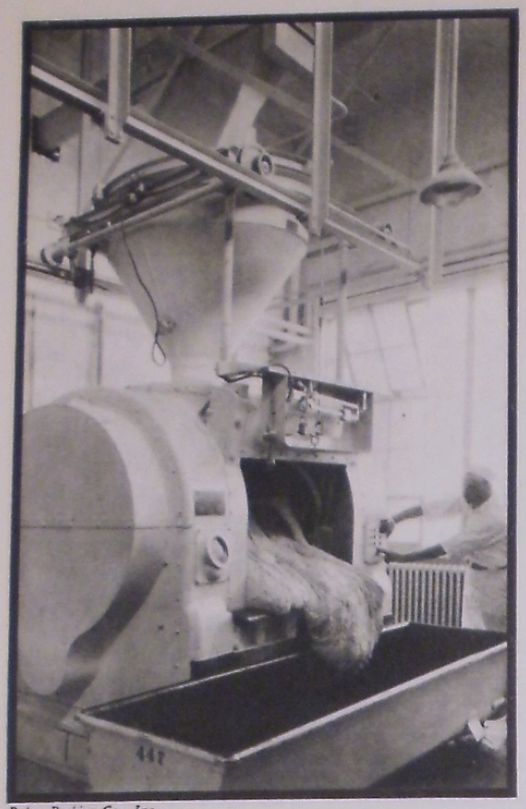


International Paper and Power Co.

Machines for POWER

THE Industrial Revolution was a revolution in two directions. It replaced the old tools of the handicraft era with the better tools of the machine era. And it replaced the crude and largely human power which had driven handicraft tools with the infinitely greater power of steam and electricity. Talk about the Machine Age obscures this second phenomenon. The development of modern power is more important, humanly speaking, than the development of modern tools. For the effect of the development of modern power is to displace human labor as the basic factor in the production of goods. In industrial communities men no longer supply the energy which produces food and transport and clothes. For the most part they tend the tools which are driven by the dynamos or turbines or gas engines which produce that energy. Consequently the key to the history of industrialism is the rate of increase of primary power. For the last sixty years primary power has increased in the U. S. at a rate thirty-five times the rate of growth of population. And the point at which the curve of power available to each workman rises while the curve of number of workmen employed declines is a significant date in the history of any modern society. That date, in the history of American industrialism, was about 1918 . . . Above is pictured the Canadian Chelsea Development of the International Paper & Power Co., one of hundreds of great stations constructed by power companies from one end of the continent to the other. American power stations are now capable of producing with a payroll of 226,000 men a total continuous horsepower of 45,000,000, or the equivalent of the labor of 1,350,000,000 men working in eight-hour shifts. And the total prime mover horsepower capacity of the country is probably well in excess of 800,000,000. . . The world's largest waterpower plant is the Queenston plant of the Hydo-Electric Power Commission of Ontario at Niagara, with nine machines having a total generating capacity of 502,000 horsepower. The largest unit turbine generator is that in the State Line plant of the Chicago District Electric Generating Corp., with a generating power of 278,000 horsepower . . . Engineers are concerned for future sources of energy. Energy consumption is estimated by Mr. Howard Scott at twenty-seven trillion British thermal units and is steadily rising. This quantity of energy cannot be indefinitely secured from available supplies of oil, gas, or coal, and Steinmetz was of the opinion that if the entire waterpower of the country were developed and every raindrop used, the energy demands of the country would not be supplied. (Actually less than 20 per cent of the electric power generated in the U. S. comes from falling water.) New sources of energy now undergoing investigation are the use of the tides, as in the race of the Bay of Fundy, the use of temperature differentials in the sea (experiments of Dr. Claude off the Cuban coast), and the use of high temperatures underground. The break-up of the atom for energy purposes lies still in the world of theory with Professor Millikan holding that the necessary heat and pressure are not available, and Dr. Tesla denying that recapturable energy would be forthcoming in any event. In the meantime experiments in fuel reduction have been made with the mercury turbine which uses mercury vapor in place of steam and develops 52 per cent more power for every pound of coal. Such a turbine is used by the Hartford Electric Light Co., Hartford, Connecticut. The obstacles in the way of wide acceptance are the high cost of mercury and the danger of escaping mercury vapor, which is excessively poisonous.

The total work of the entire population of Egypt in its most populous pyramid-building days was less than half the energy output of the Brooklyn Edison Co. alone.

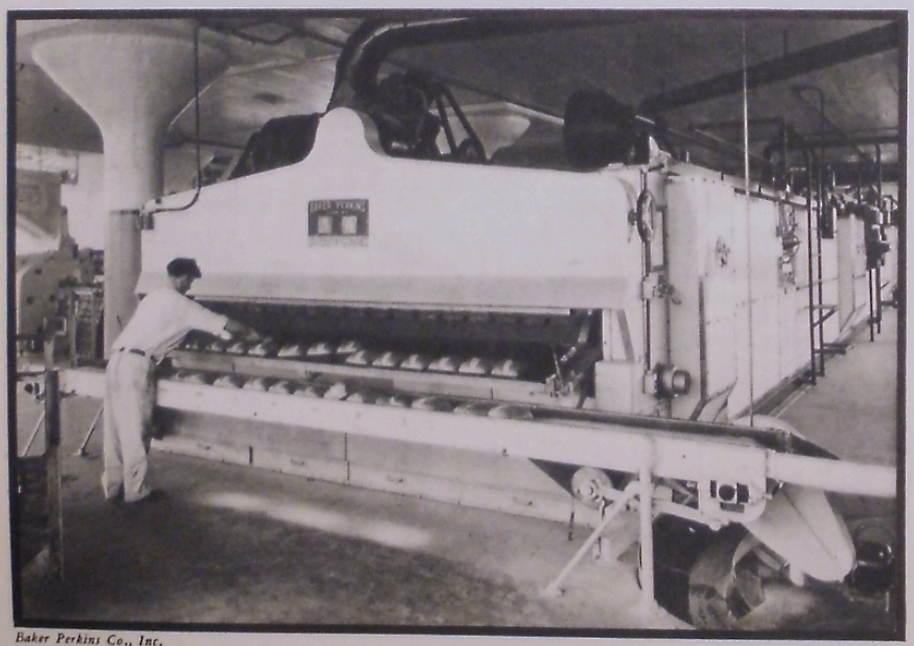


Baker Perkins Co., Inc

Machines for FOOD

MANUFACTURERS of machinery have recently become a little skittish, not to say a trifle hypocritical about their products. There is no such thing, if one believes their publicity men, as a labor-displacing device on the present market. A machine which replaces seventy-seven artisans with one is merely "labor serving," not "labor saving." There is however one partial exception. Devices for the kitchen are permitted to "save labor." The cook has no friends. And the gentleman who has invented a machine by which you and 499,999 of your friends may dial your menu selections to an automatic kitchen where and whence your dinner will be cooked and served "without the aid of human hands" may advertise his gadget by whatever epithet he pleases. To date however these devices for mechanizing the cuisine have proceeded little further than the electric stove, the electric dishwasher, and such gadgets as the automatic soda-jerker pictured to the right. The real field for technological advance in foods has been the field of baking, canning, and preserving. The dough mixer (left) very obviously takes the place of many a flour-sifting forearm. And the great baking unit below, which—with its auxiliary mixers, molders, etc.—can turn out 5,000 pounds of bread in an hour's time, equals the combined efforts of seventy French oven tenders and any number of small boys. The largest such units are in Detroit where three ovens with a staff of thirty-three men produce 15,000 loaves an hour, and in Cambridge where 6,500 pounds of bread per oven are hourly produced.

Sodamint Corp.



Baker Perkins Co., Inc.

The oyster still refuses to open by machinery.

But one dough mixer permits 800 housewives to play bridge. And the cook may vanish.

Machines for CLOTHES

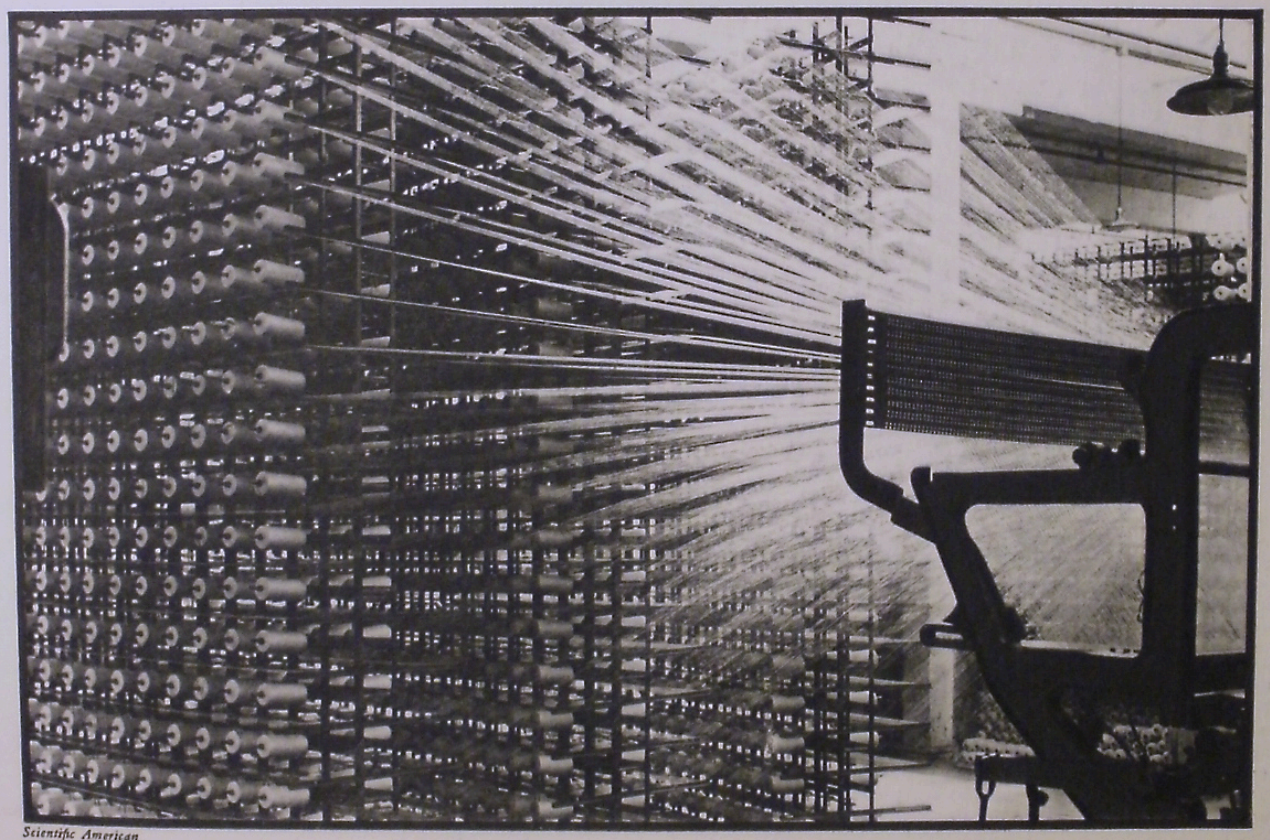
Raphael G. Wolff

THE sewing machine began bloodily. It began in Paris in 1841 with a riot which destroyed its atelier and all but murdered its inventor. And it has lived violently ever since. It invaded the shoe business, the hat business, the sack business. It took a flier in automobile upholstery and handbags. It tried its needle on parachutes and dirigible covers. It has introduced the Industrial Revolution under the Singer company's banner of a scarlet S into half the backward countries of the world. And wherever it has gone, with one exception, it has taken the place of men and women. The one exception is the sewing table under the household lamp. There it has produced true leisure because there work is merely work and not the means to livelihood. But elsewhere its record of displacement is prodigious. In the shoe industry the sewing machine and its shoe-making auxiliaries have displaced nine out of ten workers. In men's clothing, improvements in sewing and cutting machinery permitted 175,000 workers to turn out more than $1,000,000,000 worth of goods in 1925, while 190,000 workers produced only $415,000,000 in 1900. And it is estimated that in the one decade, 1919-29, 26,000 textile workers were permanently laid off for technological cause.

A woman's hand can sew fifty to seventy-five stitches a minute.

A sewing machine can sew 1,800.

And one man with textile machinery can equal the production of 45,000 men at the time of the American Revolution.



Scientific American

Caterpillar Tractor Co.

Past: In 1832 one man and two oxen plowed an acre in six hours, forty minutes.

Present: In 1932 one man and a two-plow tractor can plow an acre in an hour and ten minutes.

Future: Self-guiding tractors will permit one man to direct the plowing of an entire farm with a time expenditure of about five minutes per acre.

Machines for the FARMER

N. Y. Public Library

THE farm problem is usually expressed in terms of mortgages and wheat prices. It should be expressed in terms of machines. What has happened to the farmer is neither the politician nor the big banker nor the tariff but James Watt and Michael Faraday and Lenoir and McCormick. What has happened to the farmer may be succinctly stated in this way. Between 1850 and 1920 the man-hours necessary to seed an acre of wheat were reduced through mechanical inventiveness by 98.7 per cent. There are other statistics but this is eloquent enough to stand alone. It means explicitly that there was about one one-hundredth as much work to be done per acre in the seeding of wheat in 1920 as there had been in 1850. It explains the 3,300,000 mass migration from the farms to industry in the '20's. And it supplies a ray of logic to the stories of corn burned for fuel and wheat left in the field in a country where millions are short of food. When one man with a tractor drill such as that illustrated at the bottom of the page can sow an acre in fifteen minutes against four hours and fifteen minutes required with seed sack and hand a century ago; when one man with a tractor and a four-row corn planter can do the work of twenty-five men with 1855 machinery, and one man with tractor and four-row cultivator the work of sixty-five with horse and plow; when hay is made in one-fiftieth the time required a century ago—when all these machines exist and are in use there is little occasion to read the farm-relief programs of the two political parties.

International Harvester Co.