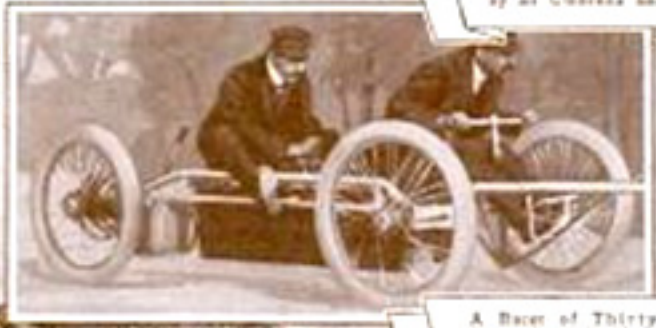
DO YOU REMEMBER WAY BACK WHEN-

Land Boat Propelled by Sails Described in Popular Mechanics in 1902

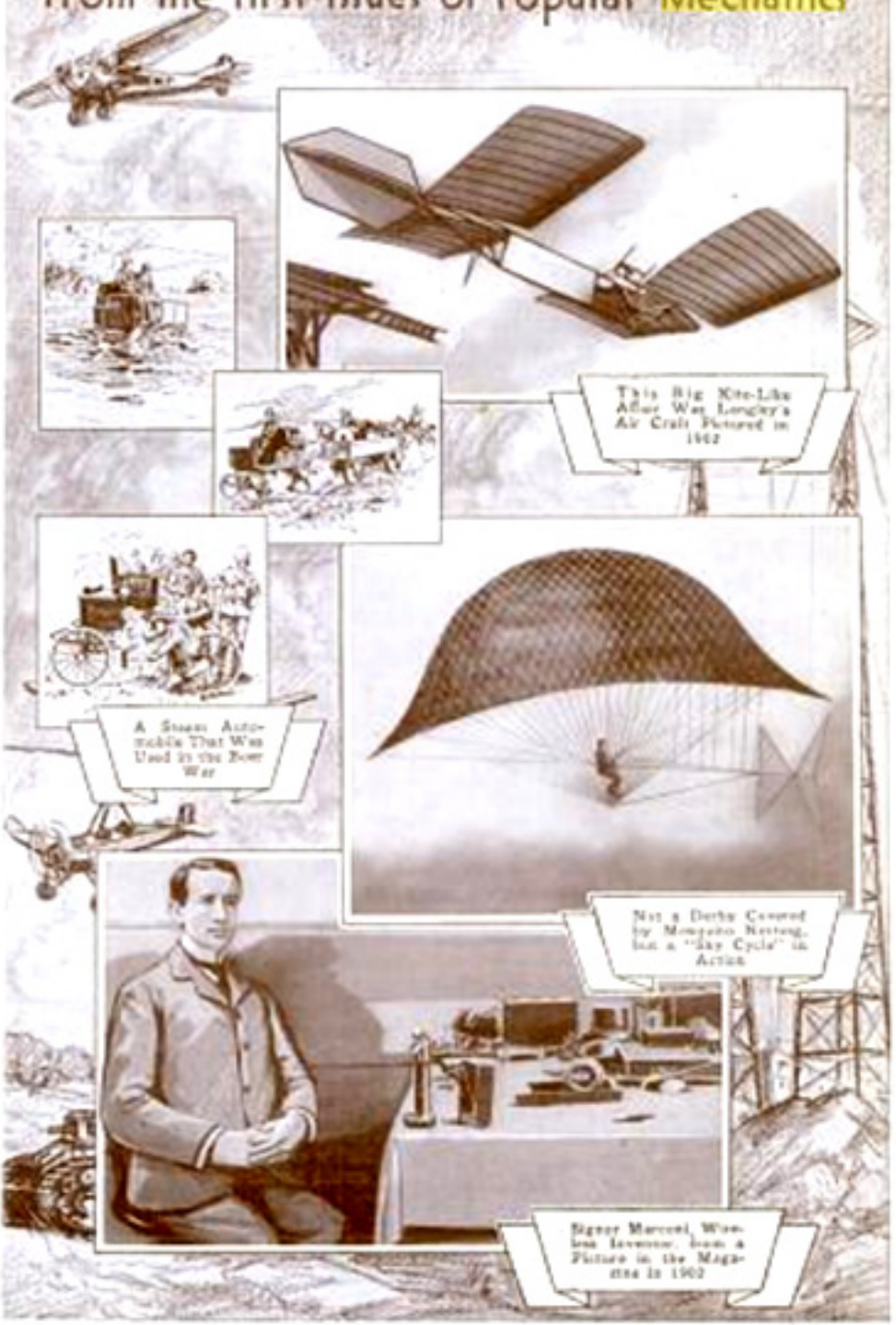
The Joys of Motoring Back in 1902: the First Electric Chair

An Invention of 1904: It Is a Boat Propelled by an Umbrella Sail



A Racer of Thirty Years Ago: It Made a Mile in Forty-three Seconds

From the First Issues of Popular Mechanics



This Big Kite-Like Affair Was Langley's Air Craft Pictured in 1902

A Steam Automobile That Was Used in the Boer War

Not a Derby Covered by Marconi Nesting, but a "Sky Cycle" in Action

Signor Marconi, Wireless Inventor, from a Picture in the Magazine in 1902

MACHINES TO RAISE WAGES

By H. W. BUCK

Vice, Blackwell & Buck, Engineers

MUCH abuse has been heard lately of this mechanical world in which we live and of its alleged displacement of human labor. If, however, some of the critics of our present civilization could bring back conditions of one hundred years ago, which they appear to admire so much, it would be interesting to see how they would provide jobs for those engaged at present in work which is the result of mechanical invention. A few of such groups given for the year 1930 might be cited:

Chemical Industries	-	621,000	Employees
Woodworking "	-	1,827,200	"
Textile "	-	1,187,300	"
Electrical "	-	378,500	"
Railway "	-	1,583,300	"
Telegraph and Telephone	-	578,300	"
Automobile Industries	-	1,827,200	"
Steel and Metal "	-	2,716,795	"

All of the above industries have been developed from mechanical inventions and labor saving devices and yet the very saving of labor has allowed an economic expansion of industry to take place sufficient to provide far more employment as a whole than the labor displaced by the individual labor saving machines.

A few years ago, for instance, ditches were dug by manual labor with pick and shovel. Today the steam shovel and the trench digging machine have displaced a large amount of such labor. However, the resulting inexpensive ditch has enabled more ditches to be dug and the old ditch digger has been promoted to the building of the labor saving machines used and to making the pipe, electrical cables, conduits, cement, etc., to be laid in the ditch and is receiving much higher wages therefor. The economic world could not possibly afford to pay him as much for mere manual labor.

Two of the greatest labor saving machines of all time have been the stone crusher and the air driven rock drill. Hundreds of men who had formerly done the work by hand were apparently thrown out of work by those inventions. But today we have the enormous road building industry employing thousands of men all made possible by the air drill and rock crusher.

In the long run wages will be proportional not to the amount of labor expended in a day's work but to the amount a man can actually accomplish. Wages are higher today than fifty years ago because men produce more. The two primary elements that make this result possible are machinery invention and mechanical power. It would greatly clarify economic thought if the term "labor saving machinery" could be abolished and

some expression such as "production increasing machinery" substituted.

Mechanical invention has not reached its limit. The country will continue to grow in the future with its aid as it has in the past if governmental throttling does not prevent. Many inventions will be of a nature to create entirely new occupations without displacing any labor, such as the radio.

At times there will undoubtedly be temporary displacements of labor and derangements due to new inventions during the interval required for re-employment of such labor in new and higher paid employment. Such problems can, however, be successfully handled by intelligent leadership.

OIL INDUSTRY MOVES FORWARD

By W. C. TEAGLE

President, Standard Oil Company of New Jersey

FEW industries have aided, and at the same time been helped by, the progress of science as has the oil business. Were it not for science, petroleum would not be available in the hundreds of different forms in which it is sold today. Were it not for petroleum, numerous scientific discoveries—particularly in the mechanical field—would have died in the laboratory.

A modern oil refinery is a monument to the progress of science. Metallurgy, welding and riveting have combined with improved thermodynamics and the genius of the mechanical engineer to give the refiner of today great cracking towers, capable of withstanding working pressures up to 750 and 1,000 pounds, and temperatures as high as 900 to 1,100 degrees F.

Rotary drilling has extended the search for oil to a depth of nearly two miles in some fields. Powerful valves and fittings choke off pressures as high as a ton or more per square inch suddenly released at the bottom of the hole. Diesel engines and improved high pressure steam give the oil man more efficient tankers to transport his product on the seas. High carbon steel, seamless pipe and improved welding methods, not to mention powerful gas compressors, enable us to send invisible fuel from Texas to Chicago—nearly 1,000 miles.

The mutual interdependence of science and petroleum along many lines promises interesting developments for the future. Hydrogenation and improved refining processes not only have assured us of an adequate supply of motor fuel but point the way to gasolines of better anti-knock quality. This in turn is matched by the automotive engineers' promise of more powerful engines and cars of greater flexibility in operation.

In the industrial field, the oil industry is compounding and otherwise improving its lubricants to meet the challenge of greater friction, larger, heavier and more powerful machinery and high gear and bearing pressures in the modern factory.

Popular Mechanics

LUXURIES FOR EVERYONE

By CHARLES DAVIS

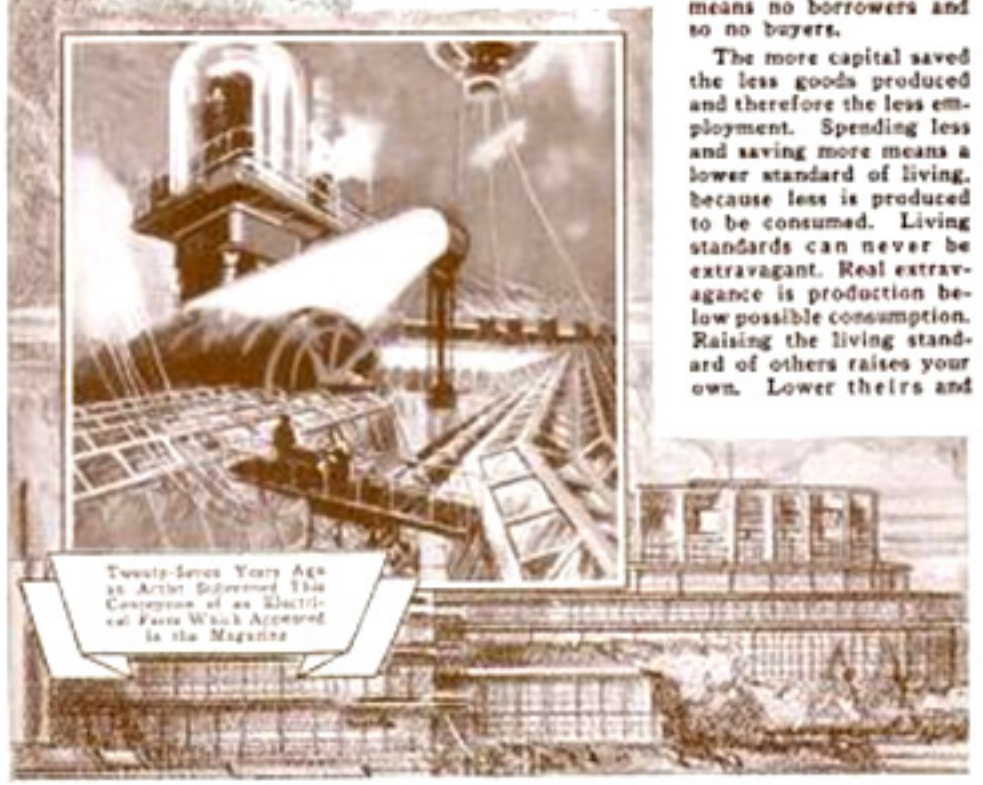
President, National Highways Association

SINCE Popular Mechanics Magazine was established science has given us air navigation, wireless and radio communication, moving pictures, television and the countless mechanical devices making labor easier and life richer.

The productive activities of mankind are divided between two great classes, (a) necessities—food, water, clothing, heat, habitations and all things needed to maintain and care for life; and (b) luxuries—meaning everything else. The volume of goods that are necessary varies little save by increase in population. But the capacity of man to produce and consume luxuries appears to have no limit save the means to buy. Why not give him all the means he wants? For then he will prosper and continue to prosper.

More roads, more inventions, more luxuries, more new industries, more wages, more credit, means more buying power, thus using our savings and not wasting them in idleness. We now have much over twenty billion such idle savings. Debts do not impoverish; idle capital does, for it means no borrowers and so no buyers.

The more capital saved the less goods produced and therefore the less employment. Spending less and saving more means a lower standard of living, because less is produced to be consumed. Living standards can never be extravagant. Real extravagance is production below possible consumption. Raising the living standard of others raises your own. Lower theirs and



Twenty-Seven Years Ago an Artist Discovered This Conception of an Electrical Farm Which Appeared in the Magazine

you lower yours. So bring those of others up to ours and not ours down to theirs.

We can do all this and more by letting dollars reach markets as fast as goods, and we have yet to find how to produce more goods than we can consume if we also provide the dollars. In other words, we cannot have too many goods or too many dollars. We did this to get 25,000,000 motor cars; otherwise we could not have had them. Why not do it for everything else we can produce?

THE MARCH OF PROGRESS

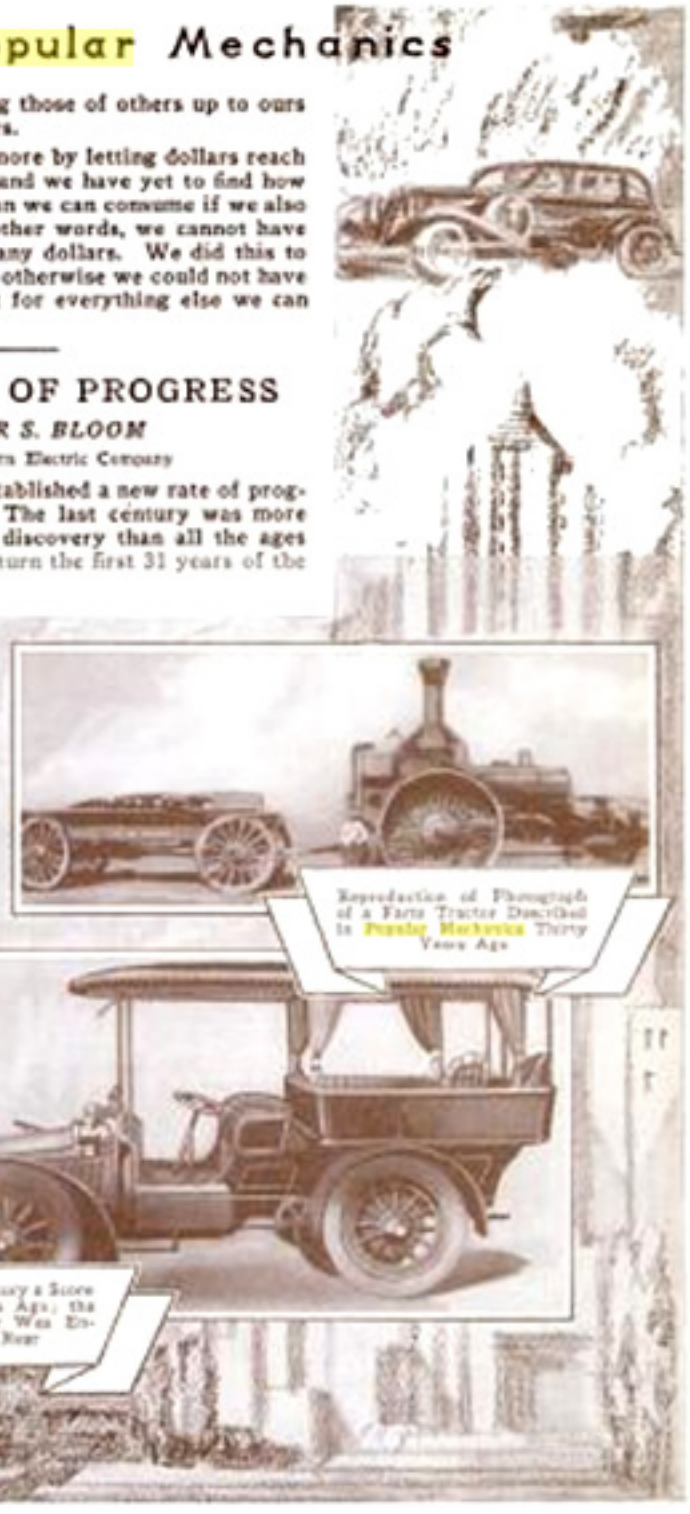
By EDGAR S. BLOOM

President, Western Electric Company

THE dawn of science established a new rate of progress for civilization. The last century was more fruitful of invention and discovery than all the ages that preceded it. And in turn the first 31 years of the present century have resulted in still greater achievement.

The comforts and conveniences which we have come to consider part of the standard of living today are, relatively speaking, of recent birth. We owe most of them to science.

Speeding along a modern highway, any motorist boasts a swifter conveyance than the richest monarch of all ages. Pressing a switch, he floods his



Reproduction of Photograph of a Farm Tractor Described in Popular Mechanics Thirty Years Ago

The Height of Luxury a Score and a Half Years Ago; the Horseless Buggy Was Entered from Rear

home with light such as only an occasion of state in some kingly mansion would have justified 100 years ago. Taking the telephone in his hand, he summons a magic which, with the speed of light, outstrips the fleetest messenger and, more than that, conveys his message in his living voice.

Such instances of the forces now at the command of the humblest citizen can be multiplied endlessly. The accomplishments of science in power, in illumination, in transportation and in communication have found a host of applications in the home, in industry and in every walk of daily life. Seeing how new and better ways have always crowded out the old, we realize that in the future the course of events will lead us forward in the same manner. The candle is replaced by oil, oil by gas, gas by electricity. The foot messenger is passed by the horseman, the horseman by the signal tower, signalling by the telegraph. And now by telephone and radio our voices circle the globe and bring the farthest land within speaking distance.

These triumphs of human ingenuity go on. Often before this, the march of progress has halted. But only temporarily. Always it has set off again to climb to higher goals. While we are adjusting ourselves to present economic difficulties, the foundations are being laid for a new ascent.

In the industrial laboratories of today, men who are scientists in many fields have joined forces. While this mass attack upon the riddles of nature is relatively new, it has already proved far more productive in invention and discovery than any previous method.

Countless realms remain to be explored. The more we progress, the more opportunity we see ahead for progressing. The future will yield a harvest of technical developments which we can now scarcely vision. Science has just started the work of harnessing nature to do the bidding of man.

THE FUTURE LEADERS OF MEN

By JOHN PAUL LUCAS

President, American Engineering Council

YOU are arousing and stimulating in Popular Mechanics Magazine the desire on the part of your readers to weigh and appraise things and training them to judge men and situations with greater accuracy.

Men familiar with the mechanics of material are better able to judge the abilities and the capacities of men; and in breeding in men a desire to know something of the mechanics of things in general, something of the strength and qualities of materials, and of the strength and qualities of men, you are promoting their capacity and their ability as leaders of men. The successful executive must know the capacity and the break-

ing point of men as well as of materials. Popular Mechanics Magazine therefore, through its inspiring and stimulating articles of progress and achievement, is rendering an outstanding service to its readers and to the country in general.

THE PROGRESS OF MEDICINE

By CHARLES H. MAYO, M. D.

JUST a little more than thirty years ago, or shortly before the founding of Popular Mechanics, the world was ushered into a new era of development through the discovery of radium and X-rays. It is indeed difficult to realize that but three decades have passed since man acquired a greater control over the invisible and unlimited sources of energy which, in one form or another, fill the universe.

The little, insignificant tube which Roentgen made in 1896 was the forerunner of the modern tubes which approximate a million volts or so, and from which man will derive energy of a character similar to that of the gamma rays of radium discovered by Madame Curie. The range of man's vision has been extended in innumerable ways, but paramount has been the ability given him to weed out the flaws, defects and diseases of metals and human flesh.

No tongue can relate or pen sketch the untold service which the utilization of these very short wavelengths of energy has accomplished in medicine and surgery, for, in addition to making visible injuries and diseases of the bones, the accuracy of diagnosis of ailments of the stomach, gallbladder, lungs and other vital organs of the body has been increased manyfold and assistance rendered in the alleviation of suffering and the cure of cancer.

The discovery by Richardson and others that a metallic wire when heated emitted charged particles was the basis for the modern radio tube, and the circling of the world in a fraction of a second, so that terrestrial time and space, in the last quarter of a century, have been brought well nigh to naught. The thinkers and the builders have each contributed toward this wonderful progress. In certain types of surgery, the old scalpel is being relegated to the archives of past achievements and is being replaced by surgical diathermy or the radio knife. Portions of the body, both externally and internally, are being heated by diathermy and short electric waves.

Each year sees constant advancement in the application of man's increased ability to harness, direct and control energy. The mighty sun of the heavens is being successfully imitated in various types of electric arcs, so that man need no longer suffer from the diseases of darkness. Comfort and efficiency have been increased by the development of the incandescent lamp by that great wizard of electricity, Edison. So in three

One of the Latest Types of Towers for Power Transmission Lines; Compare It with the Picture at the Bottom of This Page

Modern Motor Coach Containing Seating and Sleeping Accommodations for Twenty-Six Passengers; Its Engine Can Be Quickly Removed

Electric Power Lines in 1891; the Photograph Shows a Repair Crew Beside the First Buffalo Transmission Line, Strung on Poles

decades we have passed from being worshippers of matter to being worshippers of energy.

And, in thirty years' time, we have learned to popularize science so that even he who runs may read and understand. We have learned that abstract mathematics and physical and chemical theory are useful, but that, after all, their deductions are, when transferred from the intangible to the tangible and made serviceable to mankind, understandable in their everyday language.

EDUCATION AND PROGRESS

By R. H. FERNALD

Dean of the Towne Scientific School, University of Pennsylvania

AS we think of the great inventions with which we are personally familiar, it is hard to believe that a Commissioner of Patents, before the Civil War, advised the Government officials that the Patent Office could soon be closed as everything had then been developed that man could possibly invent.

It takes but a glance at the latest edition of "Who's Who in America" to realize the influence of technically trained men not only upon industry, commerce, and transportation, but on the political and social life of this country. "Who's Who" reveals the fact that of 3,000 graduates in science or technology, over 1,100 are presidents of major commercial, industrial, manufacturing and transportation

organizations and companies, seventy-odd are presidents of consulting engineering and construction firms, seventy are presidents of banks and trust companies, between twenty and thirty are presidents of universities. Governors of several states and the President of the United States are among the distinguished representatives of the engineering profession who have responded to the call to render important public service. The higher executive positions throughout this country are calling for men with a scientific or technical educational background.

Ultimately, this means placing our scientific and technical courses upon a graduate basis, the Bachelor of Arts degree being required as a prerequisite.

For the time being, it means reducing our technical requirements to the strictly fundamental courses and enriching the educational program by the introduction of subjects that have a broader and more cultural significance.

We are slowly approaching the time when engineering will be truly recognized as a profession and not a trade—a profession vital to world progress.

NOSTRUMS NO CURE

By F. A. MERRICK

President, Westinghouse Electric and Manufacturing Co.

INDUSTRY must recognize this as a period of wholesome reconstruction. Those who first recognize the situation in this light will be the ones who profit most largely. They will profit in the way of better returns from the actual business of the immediate present

A 1909 Blériot Flying Machine, the First Plane to Cross the English Channel; It Was Flown Again Under Its Own Power in 1928

Giant Press That Takes a Bite of Metal and Stamps Out a Car Fender Ready for Trimming; This Big Machine Weighs 200,000 Pounds

The Owner of This Car in 1903 Probably Was No Prouder Than the Owner Today, for the Auto Is Still Running in London

and still more largely in the future when the efficiency and strength developed in making ends meet under adverse conditions can be applied to serving the enormous needs of this country and of the world when the dammed-up buying power is released.

Present lines of production are being revamped, new and useful lines are being sought out, research is busy, manufacturing processes are being refined for higher quality and reduced cost, distribution means and methods are being analyzed, markets, both present and possible for development, are under close study. Industry will come out of the depression more fundamentally organized than ever before. This is the only way out. No nostrums will serve.

The electrical industry is especially typical in this respect—possibly more than typical because of the great fields of adaptability still in view ahead. Electrical industry is fortunate in that its service is a foundation stone of every industrial structure. Electricity serves every individual of the modern community—in his home, in his travels, in the manufacture of every article which he uses, in the transport of these articles, in turning the hours of darkness into light, in furnishing heat, in aiding the searches after health—in fact, in universal service.

The position of these industries is unquestioned and their growth is to be measured only by the assuredly returning prosperity of the relatively near future.

PREPARING FOR THE FUTURE

By W. M. KINNEY

General Manager, Portland Cement Association

THIRTY years ago, when Popular Mechanics was founded, there were only 23,000 automobiles in the United States and not a single motor truck. Electric washing machines, cream separators and milking machines, the radio, reliable can openers and fire-safe homes were unknown. Comparatively few had developed a liking and appreciation for things mechanical and scientific that saved time and money.

In the years that followed, Popular Mechanics unfolded the story of the most productive period the world has ever known. The magazine, itself, played an important part in this drama of mechanization and scientific progress. It has not been long since a full century or more was required for a new idea to permeate the civilized world. This was true not only because of limited communication but also because of a fear of things new and a loathness to abandon traditional customs. Popular Mechanics, as an interpreter of science in its application to everyday life, has been a public servant of inestimable value.

The future for Popular Mechanics is none the less alluring.