

# FIFTY YEARS



Winston Churchill, Former British Chancellor of the Exchequer

THE great mass of human beings absorbed in the toils, cares and activities of life, are only dimly conscious of the pace at which mankind has begun to travel. We look back one hundred years and see that great changes have taken place. We look back fifty years and see that the speed is constantly quickening. This present century has witnessed an enormous revolution in material things, in scientific appliances, in political institutions, in manners and customs.

The greatest change of all is the least

perceptible by individuals; it is the far greater numbers which in every civilized country participate in the fuller life of man. "In those days," said Disraeli, writing at the beginning of the nineteenth century, "England was for the few and for the very few." "The twice two thousand for whom," wrote Byron, "the world is made," have given place to many millions for whom existence has become larger, safer, more varied, more full of hope and choice. In the United States, scores of millions have lifted themselves above primary necessities and comforts, and aspire to culture—at least for their children. Europe, though stunned and lacerated by Armageddon, presents a similar, if less general, advance. We all take the modern conveniences and facilities as they are offered to us, without being grateful or consciously happier. But we simply could not live if they were taken away. We assume that progress will be constant.

"This 'ere progress," Mr. Wells makes one of his characters remark, "keeps going on. It's wonderful 'ow it keeps going on." It is also very fortunate; for if it stopped, or were reversed, there would be a catastrophe of unimaginable horror. Mankind has gone too far to go back, and is moving too fast to stop. There are too many people not merely whose comfort, but whose very existence is maintained by processes unknown a century ago, for us to afford even a temporary check, still less

# HENCE

by WINSTON CHURCHILL

*Former British Chancellor of the Exchequer*



a general setback, without experiencing calamity in its most frightful forms. When we look back beyond one hundred years over the long trails of history, we see immediately why the age we live in differs from all other ages in human annals. Mankind has sometimes traveled forward and sometimes backward, or has stood still for hundreds of years. It remained stationary in India and in China for thousands of years. But now it is moving very fast.

What is it that has produced this new prodigious speed of man? Science is the cause. Her feeble groping fingers lit here and there, often trampled underfoot, often frozen in isolation, have now become a vast organized, united, class-conscious army marching forward upon all the fronts toward objectives none may measure or define. It is a proud, ambitious army which cares nothing for all the laws that men have made; nothing for their most time-honored customs, or most dearly cherished beliefs, or deepest instincts. It is this power called science which has bid hold of us, conscripted us into its regiments and batteries, set us to work upon its highways and in its arsenals; rewarded us for our services, healed us when we were wounded, trained us when we were young, pensioned us when

we were worn out. None of the generations of men before the last two or three were ever gripped, for good or ill, and handled like this.

Man in the earliest stages lived alone and avoided his neighbors with as much anxiety, and probably as much reason, as he avoided the fierce flesh-eating beasts that shared his forests. With the introduction of domestic animals the advantages of co-operation and division of labor became manifest. In neolithic times, when cereals were produced and agriculture developed, the bleak hungry period, whilst the seeds were germinating beneath the soil, involved some form of capitalism and the recognition of those special rights of landed proprietors the traces of which are still visible in our legislation. Each stage involved new problems, legal, socio-logical and moral. But progress only



crawled, and often rested for a thousand years or so.

The two ribbon states in the valleys of the Nile and the Euphrates produced civilizations as full of pomp and circumstance, and more stable than, any the world has ever known. Their autocracies and hierarchies were founded upon the control and distribution of water. The rulers held the people in an efficiency of despotism never equaled till Soviet Russia was born. They had only to cut off or stint the water in the canals to starve or subjugate rebellious provinces. This gave them powers at once as irresistible and capable of intimate regulation as the control of all food supplies gives to the Bolshevik commissars. Safe from internal trouble, they were vulnerable only to external attack.

But in these states man had not learnt to catalyze the forces of nature. The maximum power available was the sum of the mus-

cular efforts of all the inhabitants. Later empires, scarcely less imposing but far less stable, rose and fell. In the methods of production and communication, in the modes of getting food and exchanging goods, there was less change between the time of Sargon and the time of Louis XIV, than there has been between the accession of Queen Victoria and the present day. Darius could probably send a message from Susa to Sardis faster than Philip II could transmit an order from Madrid to Brussels. Sir Robert Peel, summoned in 1834 from Rome to form a government in London, took the same time as the Emperor



Television May Be Expected to Open Oceans and Continents to Conquer Distances as Radio Has Already Done

Vespasian when he had to hasten to his province of Britain. The bathrooms of the palaces of Minos were superior to those of Versailles. A priest from Thebes would probably have felt more at home at the council of Trent, two thousand years after Thebes had vanished, than Sir Isaac Newton at a modern undergraduate physical society, or George Stephenson in the Institute of Electrical Engineers. The changes have been so sudden and so gigantic, that no period in history can be compared with the last century. The past no longer enables us even dimly to measure the future.

There are two processes which we adopt consciously or unconsciously when we try to prophesy. We can seek a period in the past whose conditions resemble as closely as possible those of our day, and presume that the sequel to that period will, save for some minor alterations, be similar. Secondly, we can survey the general course of development in our immediate past, and endeavor to prolong it into the near future. The first is the method of the historian; the second that of the scientist. Only the second is open to us now, and this only in a partial sphere. By observing all that science has achieved in modern times, and the knowledge and power now in her possession, we can predict with some assurance the inventions and discoveries which will govern our future. We can but guess, peering through a glass darkly, what reactions these discoveries and their applications will produce upon the habits, the outlook and the spirit of men.

The most wonderful of all modern prophecies is found in Tennyson's "Locksley Hall":

For I dipt into the future, far as  
human eye could see,



Steamlining Is Being Extended to Locomotives, so It Is Not Difficult to Visualize the "Iron Horse" of the Future Like This

Saw the Vision of the World, and all  
the wonder that would be;  
Saw the heavens fill with commerce,  
angosies of magic sail,  
Pilots of the purple twilight, drop-  
ping down with costly bales;  
Heard the heavens fill with shouting,  
and there rain'd a ghastly dew  
From the nation's airy navies grap-  
pling in the central blue;  
Far along the world-wide whisper  
of the south wind rushing warm,  
With the standards of the peoples  
plunging thro' the thunderstorm;  
Till the war-drum throb'd no longer,  
and the battle-flags were fur'd  
In the Parliament of man, the  
federation of the world.  
Slowly comes a hungry people, as a  
lion, creeping higher,  
Glares at one that nods and winks  
behind a slowly-dying fire.



**Hidden Cities and Towns a Lost Civilization May Be Discovered When Exploration of the Ocean Floor Is Made Easy.**

These six stanzas of prediction, written eighty years ago, have already been fulfilled. The conquest of the air for commerce and war, the world struggle of Armageddon, the League of Nations, the Bolshevik revolution—all divined in their true sequence by the great Victorian, all now already in the history books and stirring the world around us today. We may search the Scriptures in vain for such precise and swiftly vindicated forecasts of the future. Jeremiah and Isaiah dealt in dark and cryptic parables, pointing to remote events and capable of many varied interpretations from time to time. A Judge, a Prophet, a Redeemer would rise to save his chosen people; and from age to age the Jews asked disputing, "Art thou he that should come? or look we for another?" But "Locksley Hall" contains

an exact foretelling in their sequence of stupendous events, which many of those who knew the writer lived to see and endure! The dawn of the Victorian era opened the new period of man, and the genius of the poet cast back the curtains which veiled it.

Whereas, formerly, the utmost power that man could guide and control was a team of horses, or a galley full of slaves, or, possibly, if they could be sufficiently drilled and harnessed, a gang of laborers like the Israelites in Egypt, it is today already possible to control accurately from the bridge of a battle cruiser all the power of hundreds of thousands of men. Or to set off with one finger a mine capable in an instant of destroying the work of thousands of man-years. These changes are due to the substitution of molecular energy for muscular energy, and its direction and control

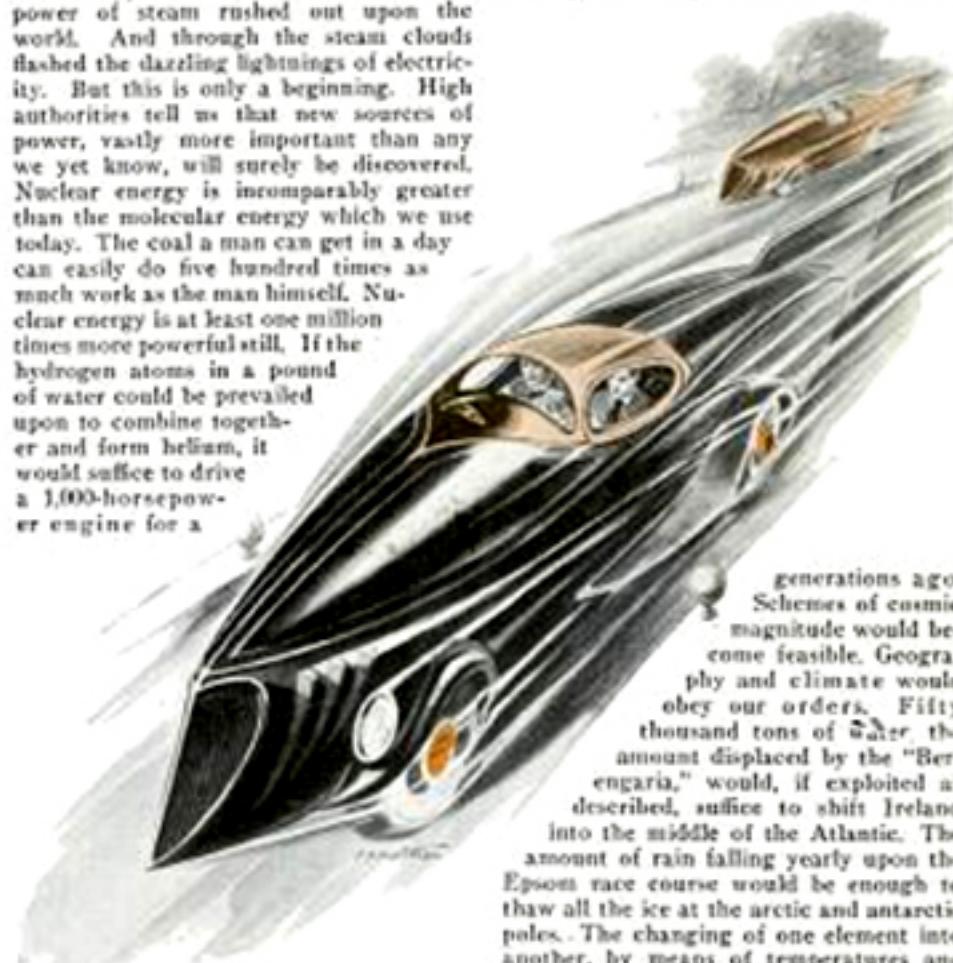
by an elaborate, beautifully perfected apparatus. These immense new sources of power, and the fact that they can be wielded by a single individual, have made possible novel methods of mining and metallurgy, new modes of transport and undreamed-of machinery. These, in their turn, enable the molecular sources of power to be extended and used more efficiently. They facilitate also the improvement of ancient methods. They substitute the 100,000-kilowatt turbo-generators at Niagara for the mill wheel of our forefathers. Each invention acted and reacted on other inventions, and with ever-growing rapidity that vast structure of technical achievement was raised which separated the civilization of today from all that the past has known.

There is no doubt that this evolution will continue at an increasing rate. We

know enough to be sure that the scientific achievements of the next fifty years will be far greater, more rapid, and more surprising, than those we have already experienced. The slide lathe enabled machines of precision to be made, and the power of steam rushed out upon the world. And through the steam clouds flashed the dazzling lightnings of electricity. But this is only a beginning. High authorities tell us that new sources of power, vastly more important than any we yet know, will surely be discovered. Nuclear energy is incomparably greater than the molecular energy which we use today. The coal a man can get in a day can easily do five hundred times as much work as the man himself. Nuclear energy is at least one million times more powerful still. If the hydrogen atoms in a pound of water could be prevailed upon to combine together and form helium, it would suffice to drive a 1,000-horsepower engine for a

tonator to cause the dynamite to explode. The scientists are looking for this.

The discovery and control of such sources of power would cause changes in human affairs incomparably greater than those produced by the steam engine four



**High-Speed Lanes as Highways Will Possibly Come with Further Evolution of Streamlined Cars**

whole year. If the electrons—those tiny planets of the atomic systems—were induced to combine with the nuclei in the hydrogen, the horsepower liberated would be one hundred and twenty times greater still. There is no question among scientists that this gigantic source of energy exists. What is lacking is the match to set the bonfire alight, or it may be the de-

generations ago. Schemes of cosmic magnitude would become feasible. Geography and climate would obey our orders. Fifty thousand tons of water, the amount displaced by the "Berengaria," would, if exploited as described, suffice to shift Ireland into the middle of the Atlantic. The amount of rain falling yearly upon the Epsom race course would be enough to thaw all the ice at the arctic and antarctic poles. The changing of one element into another, by means of temperatures and pressures far beyond our present reach, would transform beyond all description our standards of values. Materials thirty times stronger than the best steel would create engines fit to bridle the new forms of power. Communications and transport by land, water and air would take unimaginable forms if, as is in principle possible, we could make an engine of six hundred horsepower weighing twenty pounds and carrying fuel for a thousand hours in a tank the size of a fountain pen. Wireless



The Metropolis of the Future May Contain Sun-Buck Structures  
a-Like These and Elevated Streets

telephones and television, following naturally upon their present path of development, would enable their owner to connect up to any room similarly equipped and here and take part in the conversation as well as if he put his head in through the window. The congregation of men in cities would become superfluous. It would rarely be necessary to call in person on any but the most intimate friends; but if so, excessively rapid means of communication would be at hand. There would be no more object in living in the same city with one's neighbor than there is today in living with him in the same house. The cities and the countryside would become indistinguishable. Every home would have its garden and its glade.

Up till recent times, the production of food has been the prime struggle of man. That war is won. There is no doubt that the civilized races can produce or procure all the food they require. Indeed, some of the problems which vex us today are due to the production of wheat by white men having exceeded their own needs, before yellow men, brown men and black men have learned to demand and become able to purchase a diet superior to rice. But food is at present obtained almost entirely from the energy of the sunlight. The radiation from the sun produces from the carbonic acid in the air more or less complicated carbon compounds which serve us in plants and vegetables. We use the latent chemical energy of these to keep our bodies warm, we convert it into muscular effort. We employ it in the complicated processes of digestion to repair and replace the wasted cells of our bodies. Many people, of course, prefer food in what the vegetarians call "the secondhand form," i.e., after it has been digested and converted into meat for us by domestic animals

## POPULAR MECHANICS

kept for this purpose. In all these processes, however, ninety-nine parts of the solar energy are wasted for every part used.

Even without the new sources of power great improvements are probable here. Microbes, which at present convert the nitrogen of the air into the proteins by which animals live, will be fostered and made to work under controlled conditions, just as yeast is now. New strains of microbes will be developed and made to do a great deal of our chemistry for us. With a greater knowledge of what are called hormones, i.e., the chemical messengers in our blood, it will be possible to control growth. We shall escape the absurdity of growing a whole chicken in order to eat the breast or wing, by growing these parts separately under a suitable medium. Synthetic food will, of course, also be used in the future. Nor need the pleasures of the table be banished. That gloomy Utopia of tabloid meals need never be invaded. The new foods will be practically indistinguishable from the natural products from the outset, and any changes will be so gradual as to escape observation.

If the gigantic sources of power become available, food would be produced without recourse to sunlight. Vast cellars, in which artificial radiation is generated, may replace the cornfields and potato patches of the world. Parks and gardens will cover our pastures and plowed fields. When the time comes, there will be plenty of room for the cities to spread themselves.

But equally startling developments lie already just beyond our fingertips in the breeding of human beings and the shaping of human nature. It used to be said of



Ultraviolet Light May Result in Many Changes in Life Processes Just as It Already Aids in the Treatment of Disease

scientific progress: "You have taught the dog more tricks; but you cannot alter the breed of the dog." But this is no longer true. A few years ago London was surprised by a play called "Ressum's Universal Robots." The production of such beings may well be possible within fifty years. They will not be made, but grown under glass. There seems little doubt that it will be possible to carry out the entire cycle which now leads to the birth of a child, in artificial surroundings. Interference with the mental development of such beings, expert suggestion and treatment in the earlier years, would produce beings specialized to thought or toil.