CONTENTS

PRELUDE

THE SUN SNARERS

Section 1

THE history of mankind is the history of the attainment of external power. Man is the tool-using, fire-making animal. From the outset of his terrestrial career we find him supplementing the natural strength and bodily weapons of a beast by the heat of burning and the rough implement of stone. So he passed beyond the ape. From that he expands. Presently he added to himself the power of the horse and the ox, he borrowed the carrying strength of water and the driving force of the wind, he quickened his fire by blowing, and his simple tools, pointed first with copper and then with iron, increased and varied and became more elaborate and efficient. He sheltered his heat in houses and made his way easier by paths and roads. He complicated his social relationships and increased his efficiency by the division of labour. He began to store up knowledge. Contrivance followed contrivance, each making it possible for a man to do more. Always down the lengthening record, save for a set-back ever and again, he is doing more.... A quarter of a million years ago the utmost man was a savage, a being scarcely articulate, sheltering in holes in the rocks, armed with a rough-hewn flint or a fire-pointed stick, naked, living in small family groups, killed by some younger man so soon as his first virile activity declined. Over most of the great wildernesses of earth you would have

sought him in vain; only in a few temperate and sub-tropical river valleys would you have found the squatting lairs of his little herds, a male, a few females, a child or so.

He knew no future then, no kind of life except the life he led. He fled the cave-bear over the rocks full of iron ore and the promise of sword and spear; he froze to death upon a ledge of coal; he drank water muddy with the clay that would one day make cups of porcelain; he chewed the ear of wild wheat he had plucked and gazed with a dim speculation in his eyes at the birds that soared beyond his reach. Or suddenly he became aware of the scent of another male and rose up roaring, his roars the formless precursors of moral admonitions. For he was a great individualist, that original, he suffered none other than himself.

So through the long generations, this heavy precursor, this ancestor of all of us, fought and bred and perished, changing almost imperceptibly.

Yet he changed. That keen chisel of necessity which sharpened the tiger's claw age by age and fined down the clumsy Orchippus to the swift grace of the horse, was at work upon him--is at work upon him still. The clumsier and more stupidly fierce among him were killed soonest and oftenest; the finer hand, the quicker eye, the bigger brain, the better balanced body prevailed; age by age, the implements were a little better made, the man a little more delicately adjusted to his possibilities. He became more social; his herd grew larger; no longer did each man kill or drive out his growing sons; a system of taboos made them tolerable

to him, and they revered him alive and soon even after he was dead, and were his allies against the beasts and the rest of mankind. (But they were forbidden to touch the women of the tribe, they had to go out and capture women for themselves, and each son fled from his stepmother and hid from her lest the anger of the Old Man should be roused. All the world over, even to this day, these ancient inevitable taboos can be traced.) And now instead of caves came huts and hovels, and the fire was better tended and there were wrappings and garments; and so aided, the creature spread into colder climates, carrying food with him, storing food--until sometimes the neglected grass-seed sprouted again and gave a first hint of agriculture.

And already there were the beginnings of leisure and thought.

Man began to think. There were times when he was fed, when his lusts and his fears were all appeased, when the sun shone upon the squatting-place and dim stirrings of speculation lit his eyes. He scratched upon a bone and found resemblance and pursued it and began pictorial art, moulded the soft, warm clay of the river brink between his fingers, and found a pleasure in its patternings and repetitions, shaped it into the form of vessels, and found that it would hold water. He watched the streaming river, and wondered from what bountiful breast this incessant water came; he blinked at the sun and dreamt that perhaps he might snare it and spear it as it went down to its resting-place amidst the distant hills. Then he was roused to convey to his brother that once indeed he had done so--at least that some one had done so--he mixed that perhaps

with another dream almost as daring, that one day a mammoth had been beset; and therewith began fiction--pointing a way to achievement--and the august prophetic procession of tales.

For scores and hundreds of centuries, for myriads of generations that life of our fathers went on. From the beginning to the ripening of that phase of human life, from the first clumsy eolith of rudely chipped flint to the first implements of polished stone, was two or three thousand centuries, ten or fifteen thousand generations. So slowly, by human standards, did humanity gather itself together out of the dim intimations of the beast. And that first glimmering of speculation, that first story of achievement, that story-teller bright-eyed and flushed under his matted hair, gesticulating to his gaping, incredulous listener, gripping his wrist to keep him attentive, was the most marvellous beginning this world has ever seen. It doomed the mammoths, and it began the setting of that snare that shall catch the sun.

Section 2

That dream was but a moment in a man's life, whose proper business it seemed was to get food and kill his fellows and beget after the manner of all that belongs to the fellowship of the beasts. About him, hidden from him by the thinnest of veils, were the untouched sources of Power, whose magnitude we scarcely do more than suspect even to-day, Power that could make his every conceivable dream come real. But the feet of the race were in the way of it, though he died blindly unknowing.

At last, in the generous levels of warm river valleys, where food is abundant and life very easy, the emerging human overcoming his earlier jealousies, becoming, as necessity persecuted him less urgently, more social and tolerant and amenable, achieved a larger community. There began a division of labour, certain of the older men specialised in knowledge and direction, a strong man took the fatherly leadership in war, and priest and king began to develop their roles in the opening drama of man's history. The priest's solicitude was seed-time and harvest and fertility, and the king ruled peace and war. In a hundred river valleys about the warm, temperate zone of the earth there were already towns and temples, a score of thousand years ago. They flourished unrecorded, ignoring the past and unsuspicious of the future, for as yet writing had still to begin.

Very slowly did man increase his demand upon the illimitable wealth of Power that offered itself on every hand to him. He tamed certain animals, he developed his primordially haphazard agriculture into a ritual, he added first one metal to his resources and then another, until he had copper and tin and iron and lead and gold and silver to supplement his stone, he hewed and carved wood, made pottery, paddled down his river until he came to the sea, discovered the wheel and made the first roads. But his chief activity for a hundred centuries and more, was the subjugation of himself and others to larger and larger societies. The history of man is not simply the conquest of external power; it is first the conquest of those distrusts and fiercenesses,

that self-concentration and intensity of animalism, that tie his hands from taking his inheritance. The ape in us still resents association. From the dawn of the age of polished stone to the achievement of the Peace of the World, man's dealings were chiefly with himself and his fellow man, trading, bargaining, law-making, propitiating, enslaving, conquering, exterminating, and every little increment in Power, he turned at once and always turns to the purposes of this confused elaborate struggle to socialise. To incorporate and comprehend his fellow men into a community of purpose became the last and greatest of his instincts. Already before the last polished phase of the stone age was over he had become a political animal. He made astonishingly far-reaching discoveries within himself, first of counting and then of writing and making records, and with that his town communities began to stretch out to dominion; in the valleys of the Nile, the Euphrates, and the great Chinese rivers, the first empires and the first written laws had their beginnings. Men specialised for fighting and rule as soldiers and knights. Later, as ships grew seaworthy, the Mediterranean which had been a barrier became a highway, and at last out of a tangle of pirate polities came the great struggle of Carthage and Rome. The history of Europe is the history of the victory and breaking up of the Roman Empire. Every ascendant monarch in Europe up to the last, aped Caesar and called himself Kaiser or Tsar or Imperator or Kasir-i-Hind. Measured by the duration of human life it is a vast space of time between that first dynasty in Egypt and the coming of the aeroplane, but by the scale that looks back to the makers of the eoliths, it is all of it a story of yesterday.

Now during this period of two hundred centuries or more, this period of the warring states, while men's minds were chiefly preoccupied by politics and mutual aggression, their progress in the acquirement of external Power was slow--rapid in comparison with the progress of the old stone age, but slow in comparison with this new age of systematic discovery in which we live. They did not very greatly alter the weapons and tactics of warfare, the methods of agriculture, seamanship, their knowledge of the habitable globe, or the devices and utensils of domestic life between the days of the early Egyptians and the days when Christopher Columbus was a child. Of course, there were inventions and changes, but there were also retrogressions; things were found out and then forgotten again; it was, on the whole, a progress, but it contained no steps; the peasant life was the same, there were already priests and lawyers and town craftsmen and territorial lords and rulers doctors, wise women, soldiers and sailors in Egypt and China and Assyria and south-eastern Europe at the beginning of that period, and they were doing much the same things and living much the same life as they were in Europe in A.D. 1500. The English excavators of the year A.D. 1900 could delve into the remains of Babylon and Egypt and disinter legal documents, domestic accounts, and family correspondence that they could read with the completest sympathy. There were great religious and moral changes throughout the period, empires and republics replaced one another, Italy tried a vast experiment in slavery, and indeed slavery was tried again and again and failed and failed and was still to be tested again and rejected again in the New World; Christianity and

Mohammedanism swept away a thousand more specialised cults, but essentially these were progressive adaptations of mankind to material conditions that must have seemed fixed for ever. The idea of revolutionary changes in the material conditions of life would have been entirely strange to human thought through all that time.

Yet the dreamer, the story-teller, was there still, waiting for his opportunity amidst the busy preoccupations, the comings and goings, the wars and processions, the castle building and cathedral building, the arts and loves, the small diplomacies and incurable feuds, the crusades and trading journeys of the middle ages. He no longer speculated with the untrammelled freedom of the stone-age savage; authoritative explanations of everything barred his path; but he speculated with a better brain, sat idle and gazed at circling stars in the sky and mused upon the coin and crystal in his hand. Whenever there was a certain leisure for thought throughout these times, then men were to be found dissatisfied with the appearances of things, dissatisfied with the assurances of orthodox belief, uneasy with a sense of unread symbols in the world about them, questioning the finality of scholastic wisdom. Through all the ages of history there were men to whom this whisper had come of hidden things about them. They could no longer lead ordinary lives nor content themselves with the common things of this world once they had heard this voice. And mostly they believed not only that all this world was as it were a painted curtain before things unguessed at, but that these secrets were Power. Hitherto Power had come to men by chance, but now there were these seekers seeking, seeking among rare and

curious and perplexing objects, sometimes finding some odd utilisable thing, sometimes deceiving themselves with fancied discovery, sometimes pretending to find. The world of every day laughed at these eccentric beings, or found them annoying and ill-treated them, or was seized with fear and made saints and sorcerers and warlocks of them, or with covetousness and entertained them hopefully; but for the greater part heeded them not at all. Yet they were of the blood of him who had first dreamt of attacking the mammoth; every one of them was of his blood and descent; and the thing they sought, all unwittingly, was the snare that will some day catch the sun.

Section 3

Such a man was that Leonardo da Vinci, who went about the court of Sforza in Milan in a state of dignified abstraction. His common-place books are full of prophetic subtlety and ingenious anticipations of the methods of the early aviators. Durer was his parallel and Roger Bacon--whom the Franciscans silenced--of his kindred. Such a man again in an earlier city was Hero of Alexandria, who knew of the power of steam nineteen hundred years before it was first brought into use. And earlier still was Archimedes of Syracuse, and still earlier the legendary Daedalus of Cnossos. All up and down the record of history whenever there was a little leisure from war and brutality the seekers appeared. And half the alchemists were of their tribe.

When Roger Bacon blew up his first batch of gunpowder one might have

supposed that men would have gone at once to the explosive engine. But they could see nothing of the sort. They were not yet beginning to think of seeing things; their metallurgy was all too poor to make such engines even had they thought of them. For a time they could not make instruments sound enough to stand this new force even for so rough a purpose as hurling a missile. Their first guns had barrels of coopered timber, and the world waited for more than five hundred years before the explosive engine came.

Even when the seekers found, it was at first a long journey before the world could use their findings for any but the roughest, most obvious purposes. If man in general was not still as absolutely blind to the unconquered energies about him as his paleolithic precursor, he was at best purblind.

Section 4

The latent energy of coal and the power of steam waited long on the verge of discovery, before they began to influence human lives.

There were no doubt many such devices as Hero's toys devised and forgotten, time after time, in courts and palaces, but it needed that coal should be mined and burning with plenty of iron at hand before it dawned upon men that here was something more than a curiosity. And it is to be remarked that the first recorded suggestion for the use of steam was in war; there is an Elizabethan pamphlet in which it is proposed to

fire shot out of corked iron bottles full of heated water. The mining of coal for fuel, the smelting of iron upon a larger scale than men had ever done before, the steam pumping engine, the steam-engine and the steam-boat, followed one another in an order that had a kind of logical necessity. It is the most interesting and instructive chapter in the history of the human intelligence, the history of steam from its beginning as a fact in human consciousness to the perfection of the great turbine engines that preceded the utilisation of intra-molecular power. Nearly every human being must have seen steam, seen it incuriously for many thousands of years; the women in particular were always heating water, boiling it, seeing it boil away, seeing the lids of vessels dance with its fury; millions of people at different times must have watched steam pitching rocks out of volcanoes like cricket balls and blowing pumice into foam, and yet you may search the whole human record through, letters, books, inscriptions, pictures, for any glimmer of a realisation that here was force, here was strength to borrow and use.... Then suddenly man woke up to it, the railways spread like a network over the globe, the ever enlarging iron steamships began their staggering fight against wind and wave.

Steam was the first-comer in the new powers, it was the beginning of the Age of Energy that was to close the long history of the Warring States.

But for a long time men did not realise the importance of this novelty. They would not recognise, they were not able to recognise that anything fundamental had happened to their immemorial necessities. They called

the steam-engine the 'iron horse' and pretended that they had made the most partial of substitutions. Steam machinery and factory production were visibly revolutionising the conditions of industrial production, population was streaming steadily in from the country-side and concentrating in hitherto unthought-of masses about a few city centres, food was coming to them over enormous distances upon a scale that made the one sole precedent, the corn ships of imperial Rome, a petty incident; and a huge migration of peoples between Europe and Western Asia and America was in Progress, and--nobody seems to have realised that something new had come into human life, a strange swirl different altogether from any previous circling and mutation, a swirl like the swirl when at last the lock gates begin to open after a long phase of accumulating water and eddying inactivity....

The sober Englishman at the close of the nineteenth century could sit at his breakfast-table, decide between tea from Ceylon or coffee from Brazil, devour an egg from France with some Danish ham, or eat a New Zealand chop, wind up his breakfast with a West Indian banana, glance at the latest telegrams from all the world, scrutinise the prices current of his geographically distributed investments in South Africa, Japan, and Egypt, and tell the two children he had begotten (in the place of his father's eight) that he thought the world changed very little. They must play cricket, keep their hair cut, go to the old school he had gone to, shirk the lessons he had shirked, learn a few scraps of Horace and Virgil and Homer for the confusion of cads, and all would be well with them....

Section 5

Electricity, though it was perhaps the earlier of the two to be studied, invaded the common life of men a few decades after the exploitation of steam. To electricity also, in spite of its provocative nearness all about him, mankind had been utterly blind for incalculable ages. Could anything be more emphatic than the appeal of electricity for attention? It thundered at man's ears, it signalled to him in blinding flashes, occasionally it killed him, and he could not see it as a thing that concerned him enough to merit study. It came into the house with the cat on any dry day and crackled insinuatingly whenever he stroked her fur. It rotted his metals when he put them together.... There is no single record that any one questioned why the cat's fur crackles or why hair is so unruly to brush on a frosty day, before the sixteenth century. For endless years man seems to have done his very successful best not to think about it at all; until this new spirit of the Seeker turned itself to these things.

How often things must have been seen and dismissed as unimportant, before the speculative eye and the moment of vision came! It was Gilbert, Queen Elizabeth's court physician, who first puzzled his brains with rubbed amber and bits of glass and silk and shellac, and so began the quickening of the human mind to the existence of this universal presence. And even then the science of electricity remained a mere little group of curious facts for nearly two hundred years, connected

perhaps with magnetism--a mere guess that--perhaps with the lightning. Frogs' legs must have hung by copper hooks from iron railings and twitched upon countless occasions before Galvani saw them. Except for the lightning conductor, it was 250 years after Gilbert before electricity stepped out of the cabinet of scientific curiosities into the life of the common man.... Then suddenly, in the half-century between 1880 and 1930, it ousted the steam-engine and took over traction, it ousted every other form of household heating, abolished distance with the perfected wireless telephone and the telephotograph....

Section 6

And there was an extraordinary mental resistance to discovery and invention for at least a hundred years after the scientific revolution had begun. Each new thing made its way into practice against a scepticism that amounted at times to hostility. One writer upon these subjects gives a funny little domestic conversation that happened, he says, in the year 1898, within ten years, that is to say, of the time when the first aviators were fairly on the wing. He tells us how he sat at his desk in his study and conversed with his little boy.

His little boy was in profound trouble. He felt he had to speak very seriously to his father, and as he was a kindly little boy he did not want to do it too harshly.

This is what happened.

'I wish, Daddy,' he said, coming to his point, 'that you wouldn't write all this stuff about flying. The chaps rot me.'

'Yes!' said his father.

'And old Broomie, the Head I mean, he rots me. Everybody rots me.'

'But there is going to be flying--quite soon.'

The little boy was too well bred to say what he thought of that.
'Anyhow,' he said, 'I wish you wouldn't write about it.'

'You'll fly--lots of times--before you die,' the father assured him.

The little boy looked unhappy.

The father hesitated. Then he opened a drawer and took out a blurred and under-developed photograph. 'Come and look at this,' he said.

The little boy came round to him. The photograph showed a stream and a meadow beyond, and some trees, and in the air a black, pencil-like object with flat wings on either side of it. It was the first record of the first apparatus heavier than air that ever maintained itself in the air by mechanical force. Across the margin was written: 'Here we go up,

up, up--from S. P. Langley, Smithsonian Institution, Washington.'

The father watched the effect of this reassuring document upon his son. 'Well?' he said.

'That,' said the schoolboy, after reflection, 'is only a model.'

'Model to-day, man to-morrow.'

The boy seemed divided in his allegiance. Then he decided for what he believed quite firmly to be omniscience. 'But old Broomie,' he said, 'he told all the boys in his class only yesterday, "no man will ever fly." No one, he says, who has ever shot grouse or pheasants on the wing would ever believe anything of the sort....'

Yet that boy lived to fly across the Atlantic and edit his father's reminiscences.

Section 7

At the close of the nineteenth century as a multitude of passages in the literature of that time witness, it was thought that the fact that man had at last had successful and profitable dealings with the steam that scalded him and the electricity that flashed and banged about the sky at him, was an amazing and perhaps a culminating exercise of his intelligence and his intellectual courage. The air of 'Nunc Dimittis'

sounds in same of these writings. 'The great things are discovered,' wrote Gerald Brown in his summary of the nineteenth century. 'For us there remains little but the working out of detail.' The spirit of the seeker was still rare in the world; education was unskilled, unstimulating, scholarly, and but little valued, and few people even then could have realised that Science was still but the flimsiest of trial sketches and discovery scarcely beginning. No one seems to have been afraid of science and its possibilities. Yet now where there had been but a score or so of seekers, there were many thousands, and for one needle of speculation that had been probing the curtain of appearances in 1800, there were now hundreds. And already Chemistry, which had been content with her atoms and molecules for the better part of a century, was preparing herself for that vast next stride that was to revolutionise the whole life of man from top to bottom.

One realises how crude was the science of that time when one considers the case of the composition of air. This was determined by that strange genius and recluse, that man of mystery, that disembowelled intelligence, Henry Cavendish, towards the end of the eighteenth century. So far as he was concerned the work was admirably done. He separated all the known ingredients of the air with a precision altogether remarkable; he even put it upon record that he had some doubt about the purity of the nitrogen. For more than a hundred years his determination was repeated by chemists all the world over, his apparatus was treasured in London, he became, as they used to say, 'classic,' and always, at every one of the innumerable repetitions of his experiment,

that sly element argon was hiding among the nitrogen (and with a little helium and traces of other substances, and indeed all the hints that might have led to the new departures of the twentieth-century chemistry), and every time it slipped unobserved through the professorial fingers that repeated his procedure.

Is it any wonder then with this margin of inaccuracy, that up to the very dawn of the twentieth-century scientific discovery was still rather a procession of happy accidents than an orderly conquest of nature?

Yet the spirit of seeking was spreading steadily through the world. Even the schoolmaster could not check it. For the mere handful who grew up to feel wonder and curiosity about the secrets of nature in the nineteenth century, there were now, at the beginning of the twentieth, myriads escaping from the limitations of intellectual routine and the habitual life, in Europe, in America, North and South, in Japan, in China, and all about the world.

It was in 1910 that the parents of young Holsten, who was to be called by a whole generation of scientific men, 'the greatest of European chemists,' were staying in a villa near Santo Domenico, between Fiesole and Florence. He was then only fifteen, but he was already distinguished as a mathematician and possessed by a savage appetite to understand. He had been particularly attracted by the mystery of phosphorescence and its apparent unrelatedness to every other source of light. He was to tell afterwards in his reminiscences how he watched the fireflies

drifting and glowing among the dark trees in the garden of the villa under the warm blue night sky of Italy; how he caught and kept them in cages, dissected them, first studying the general anatomy of insects very elaborately, and how he began to experiment with the effect of various gases and varying temperature upon their light. Then the chance present of a little scientific toy invented by Sir William Crookes, a toy called the spinthariscope, on which radium particles impinge upon sulphide of zinc and make it luminous, induced him to associate the two sets of phenomena. It was a happy association for his inquiries. It was a rare and fortunate thing, too, that any one with the mathematical gift should have been taken by these curiosities.

Section 8

And while the boy Holsten was mooning over his fireflies at Fiesole, a certain professor of physics named Rufus was giving a course of afternoon lectures upon Radium and Radio-Activity in Edinburgh. They were lectures that had attracted a very considerable amount of attention. He gave them in a small lecture-theatre that had become more and more congested as his course proceeded. At his concluding discussion it was crowded right up to the ceiling at the back, and there people were standing, standing without any sense of fatigue, so fascinating did they find his suggestions. One youngster in particular, a chuckle-headed, scrub-haired lad from the Highlands, sat hugging his knee with great sand-red hands and drinking in every word, eyes aglow, cheeks flushed, and ears burning.

'And so,' said the professor, 'we see that this Radium, which seemed at first a fantastic exception, a mad inversion of all that was most established and fundamental in the constitution of matter, is really at one with the rest of the elements. It does noticeably and forcibly what probably all the other elements are doing with an imperceptible slowness. It is like the single voice crying aloud that betrays the silent breathing multitude in the darkness. Radium is an element that is breaking up and flying to pieces. But perhaps all elements are doing that at less perceptible rates. Uranium certainly is; thorium--the stuff of this incandescent gas mantle--certainly is; actinium. I feel that we are but beginning the list. And we know now that the atom, that once we thought hard and impenetrable, and indivisible and final and--lifeless--lifeless, is really a reservoir of immense energy. That is the most wonderful thing about all this work. A little while ago we thought of the atoms as we thought of bricks, as solid building material, as substantial matter, as unit masses of lifeless stuff, and behold! these bricks are boxes, treasure boxes, boxes full of the intensest force. This little bottle contains about a pint of uranium oxide; that is to say, about fourteen ounces of the element uranium. It is worth about a pound. And in this bottle, ladies and gentlemen, in the atoms in this bottle there slumbers at least as much energy as we could get by burning a hundred and sixty tons of coal. If at a word, in one instant I could suddenly release that energy here and now it would blow us and everything about us to fragments; if I could turn it into the machinery that lights this city, it could keep Edinburgh brightly lit

for a week. But at present no man knows, no man has an inkling of how this little lump of stuff can be made to hasten the release of its store. It does release it, as a burn trickles. Slowly the uranium changes into radium, the radium changes into a gas called the radium emanation, and that again to what we call radium A, and so the process goes on, giving out energy at every stage, until at last we reach the last stage of all, which is, so far as we can tell at present, lead. But we cannot hasten it.'

'I take ye, man,' whispered the chuckle-headed lad, with his red hands tightening like a vice upon his knee. 'I take ye, man. Go on! Oh, go on!'

The professor went on after a little pause. 'Why is the change gradual?' he asked. 'Why does only a minute fraction of the radium disintegrate in any particular second? Why does it dole itself out so slowly and so exactly? Why does not all the uranium change to radium and all the radium change to the next lowest thing at once? Why this decay by driblets; why not a decay en masse? . . . Suppose presently we find it is possible to quicken that decay?'

The chuckle-headed lad nodded rapidly. The wonderful inevitable idea was coming. He drew his knee up towards his chin and swayed in his seat with excitement. 'Why not?' he echoed, 'why not?'

The professor lifted his forefinger.

'Given that knowledge,' he said, 'mark what we should be able to do! We should not only be able to use this uranium and thorium; not only should we have a source of power so potent that a man might carry in his hand the energy to light a city for a year, fight a fleet of battleships, or drive one of our giant liners across the Atlantic; but we should also have a clue that would enable us at last to quicken the process of disintegration in all the other elements, where decay is still so slow as to escape our finest measurements. Every scrap of solid matter in the world would become an available reservoir of concentrated force. Do you realise, ladies and gentlemen, what these things would mean for us?'

The scrub head nodded. 'Oh! go on. Go on.'

'It would mean a change in human conditions that I can only compare to the discovery of fire, that first discovery that lifted man above the brute. We stand to-day towards radio-activity as our ancestor stood towards fire before he had learnt to make it. He knew it then only as a strange thing utterly beyond his control, a flare on the crest of the volcano, a red destruction that poured through the forest. So it is that we know radio-activity to-day. This--this is the dawn of a new day in human living. At the climax of that civilisation which had its beginning in the hammered flint and the fire-stick of the savage, just when it is becoming apparent that our ever-increasing needs cannot be borne indefinitely by our present sources of energy, we discover suddenly the possibility of an entirely new civilisation. The energy we need for our

very existence, and with which Nature supplies us still so grudgingly, is in reality locked up in inconceivable quantities all about us. We cannot pick that lock at present, but----'

He paused. His voice sank so that everybody strained a little to hear him.

'----we will.'

He put up that lean finger again, his solitary gesture.

'And then,' he said. . . .

'Then that perpetual struggle for existence, that perpetual struggle to live on the bare surplus of Nature's energies will cease to be the lot of Man. Man will step from the pinnacle of this civilisation to the beginning of the next. I have no eloquence, ladies and gentlemen, to express the vision of man's material destiny that opens out before me. I see the desert continents transformed, the poles no longer wildernesses of ice, the whole world once more Eden. I see the power of man reach out among the stars....'

He stopped abruptly with a catching of the breath that many an actor or orator might have envied.

The lecture was over, the audience hung silent for a few seconds,

sighed, became audible, stirred, fluttered, prepared for dispersal. More light was turned on and what had been a dim mass of figures became a bright confusion of movement. Some of the people signalled to friends, some crowded down towards the platform to examine the lecturer's apparatus and make notes of his diagrams. But the chuckle-headed lad with the scrub hair wanted no such detailed frittering away of the thoughts that had inspired him. He wanted to be alone with them; he elbowed his way out almost fiercely, he made himself as angular and bony as a cow, fearing lest some one should speak to him, lest some one should invade his glowing sphere of enthusiasm.

He went through the streets with a rapt face, like a saint who sees visions. He had arms disproportionately long, and ridiculous big feet.

He must get alone, get somewhere high out of all this crowding of commonness, of everyday life.

He made his way to the top of Arthur's Seat, and there he sat for a long time in the golden evening sunshine, still, except that ever and again he whispered to himself some precious phrase that had stuck in his mind.

'If,' he whispered, 'if only we could pick that lock. . . .'

The sun was sinking over the distant hills. Already it was shorn of its beams, a globe of ruddy gold, hanging over the great banks of cloud that would presently engulf it.

'Eh!' said the youngster. 'Eh!'

He seemed to wake up at last out of his entrancement, and the red sun was there before his eyes. He stared at it, at first without intelligence, and then with a gathering recognition. Into his mind came a strange echo of that ancestral fancy, that fancy of a Stone Age savage, dead and scattered bones among the drift two hundred thousand years ago.

'Ye auld thing,' he said--and his eyes were shining, and he made a kind of grabbing gesture with his hand; 'ye auld red thing.... We'll have ye YET.'