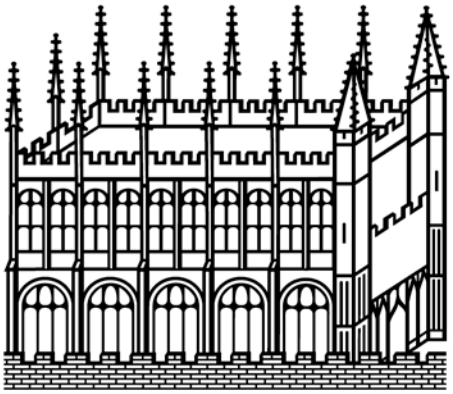

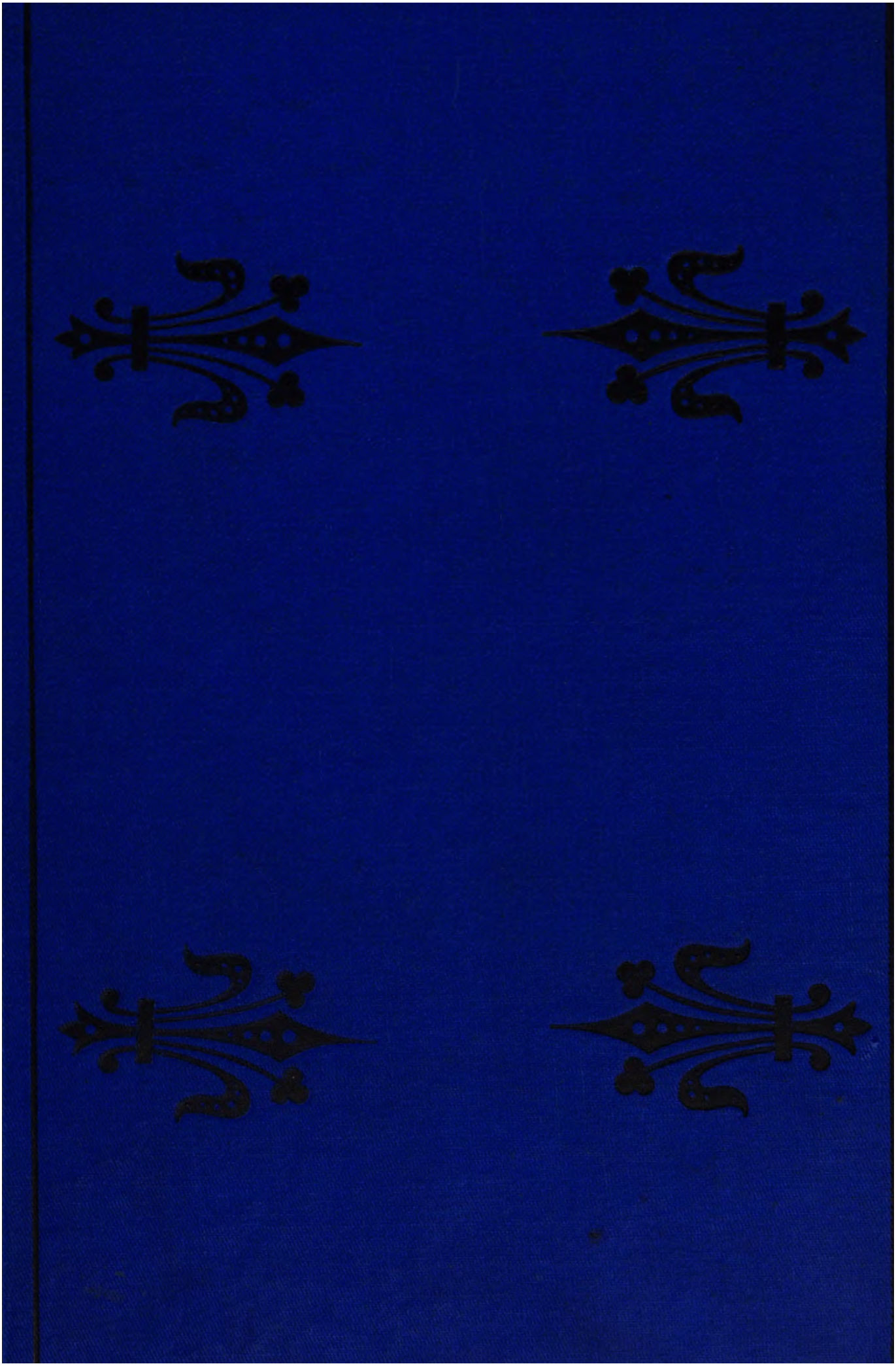

—RADIOGRAPHY—
FORETOLD IN FICTION.

(Copy of letter)

To the Editor of the Dundee Advertiser.

SIR,

In connection with the recent startling advance in photography a paragraph, has appeared in a newspaper, stating that "a young medical man in Wurtemberg, Dr. Hopf, foretold the discovery some little time ago in a small volume of medical fairy tales (Medicinische Marchen)." One of the stories, entitled "Electra" it is said, "tells of a young doctor coming into possession of a mysterious box, the contents of which made organisms of every kind transparent." The date of Dr. Hopf's book is not mentioned, but as it is said to be "some little time ago," it may be presumed to be recent.

The following quotation, however, will show that the discovery was foreshadowed more than twenty years ago by the late Dr. Andrew Blair, a medical man, who was a native of Dunfermline, latterly resident in Tayport, and well known in Dundee, in a work issued anonymously, and published in three volumes in 1874, by Samuel Tinsley, London. The work is entitled "Annals of the Twenty Ninth Century; or the Autobiography of the Tenth President of the World Republic." The realisation in less than a quarter of a century, of a scientific achievement deemed sufficiently wonderful to warrent in the forecast, its postponement for ten centuries, is a remarkable tribute to the inventive ingenuity of the age in which we live. The passage referred to will be found at page 105 of Vol. III, and is as follows:—

"I perceived the Secundines could not only make glass and stones and all inorganic substances malleable, but possessed a power undreamed of by man of making them transparent . . .

When I expressed my surprise at the power of robbing minerals of their opacity, they at once took steps to reinforce my amazedness by telling me that all things in nature could be transparentised, and that the world itself could be rendered crystaline. Confirmatory of these truths, I was taken to experimental gardens, where I was wonderstruck to behold trees and plants, some transparent in part, others in whole, according as it was deemed necessary to disclose to students the several parts of their economy. I was next shown animals, upon which the youths were taught zoology and comparative anatomy, in some of which the skin was like a glass case, showing beneath the working of the muscles; in others the skin and muscles were pellucid, showing the circulatory system; in others all was perspicuous, save the bones, with the view of their being subservient to the study of osteology; while in others still, the whole body was vitreous."

Dr. Blair was a man of original genius, constantly making experiments in chemistry, and the allied sciences, and it is not improbable he may in some of his experiments have stumbled on some results suggestive of his forecast.

I am, &c,

(Signed) ALEXANDER HUTCHESON.

Herschel House, Broughty Ferry. 8th Feb., 1896.

This Letter refers to this Book, of which there are three volumes.

ANNALS OF THE
TWENTY-NINTH CENTURY.

Give me leave
To speak my mind, and I will through and through
Cleanse the foul body of the infected world,
If they will patiently receive my medicine.

MERCHANT OF VENICE.

If the contents please thee, and be for thy use, suppose the man of the moon or whom thou wilt to be the author.

BARTON.

ANNALS OF THE

TWENTY-NINTH CENTURY;

OR,

The Autobiography of the Tenth President of the World-Republic.

IN THREE VOLUMES.

VOL. I.

London:
SAMUEL TINSLEY,
10, SOUTHAMPTON STREET, STRAND.
1874.

LONDON: PRINTED BY
EDWARD J. FRANCIS, TOOK'S COURT,
CHANCERY LANE, E.C.

CONTENTS OF VOL. I.

ANNALS OF THE TWENTY-NINTH CENTURY.

CHAPTER I.

INFANCY.

In resolving to tread such a slippery and snare-fraught path as autobiography, my inclination surrenders to duty. Providence having made me president of this small star in His boundless domains,—an office so insignificant in *His* eyes, but yet so important to the shortsighted retina of little man,—it is meet I should bequeath the great constituency of posterity my autobiographic testament.

I, Diogenes Milton, was born in the year of Our Lord, July 4th, 2776. Of my lineage, it is enough that it can be traced to our common parentless parents, in the year of the world one. Of the hundreds of links between them and me, and of the millions of the opposing sexes

whose lots were interwoven ere my thread of vitality was spun, it is well that their names are shrouded in oblivion, for there is not a man but, by tracing his pedigree into the dark, pre-millennial ages, would find, in the history of his forefathers, the stains of every enormity and criminality; and that, for one of whom he would have cause to rejoice, there would be a hundred for whom he would have reason to weep. Of my father himself, I can well say that his humility was his greatness. A naturalist, moulded by the truest genius and the soundest education, his works alone betray his worth. My mother, whose wisdom first directed my steps towards good, was the daughter of Parry Franklin, the ex-Governor of Greenland.

My early years were spent without any record-worthy incident. My growth in body and mind, and my physical and mental education, were unchequered by any peculiarity. Plato rejoiced that he lived in the same age as Socrates. I have had equal cause to be grateful I belong to the present age. My feeble ambition would have pined under that unpalatable educational system of the past,

by which the book of nature was eschewed in favour of a barren desert of idioms, syntax, languages, and a stunted philosophy, and by which pupils were rendered importers of lore and not exporters of wisdom. The eye of progress must view with glowing delight the many brilliant leaves over which history has since turned, and the sight of education from a shallow, turbid ditch, broadening and deepening into such a wide and majestic river. Learning now forms its own appetite. Boys now enjoy the school more than in days of yore they enjoyed the vacation. Where dry rules were dispensed we have experiments. There are diagrams and illustrations in place of dull type. Instead of imprisoning pupils within stone walls, binding their bodies to benches, and enthralling their eyes to books, knowledge is now acquired by travel,—by studying nature at its own shrines, history at historical scenes, art in studios and workshops, science at its head-quarters, politics in Parliament, and common-sense everywhere.

Theology and Biblical history forming the Atlas upon which the other branches of education should be based, I, like all the world's

youths, joined the modern crusades after religious knowledge. Hieing to Syria, we wandered through Egypt, the Wilderness, the Holy Land, and the other Biblical arenas. With Jerusalem as our head-quarters, book after book of the sacred volume was assimilated as mental and religious food, under which genial discipline the buds of my intellect gradually opened.

In studying the early and sad annals of mankind, the class of 1,500 under Herodotus Macaulay, to which I belonged, sojourned amid the theatres of ancient history. In the morning we would breakfast at Marathon, at mid-day dine at Thermopylæ, in the afternoon follow the route of the devastation expeditions of Alexander the great criminal, and finish by supping at the Ganges. Anon we would cross the Rubicon, and traverse the paths defiled by Cæsar. Now we would pursue the bloody track of Hannibal, and anon trace the gory footsteps of Moloch's great ambassadors —the blood-thirsty Xerxes, Darius, Cyrus, Pyrrhus, Philip, Scipio, and Antiochus, visiting in our course the various fields where, under their auspices, Death had celebrated its

gory festivals. Again we would tread the murder-strewn paths of Napoleon's or William's armies, and weep to think how the blood of thousands of Abels, massacred by Cains, had cried for vengeance.

In these pilgrimages I feasted my mind upon ancient history with all the zest of a knowledge-devouring epicure, and, as a dessert to this ponderous fare, I studied biography under Plutarch Johnson, and the elements of wit and humour under Cervantes Smith. How salubrious to the mental atmosphere of youth are such studies! In biography we find practical moral philosophy—the true science of living and of life. In the study of wit and humour we are taught to discern their delicately-defined boundaries, that our young feet may not cross the frontiers of the adjoining realms of buffoonery, insipidity, and pertness. Yet I did not ignore the body by pampering the mind. None entered more heartily into sports aërial, terrestrial, or aquatic. With electric wings I oft soared to the margins of the atmosphere, with submarine equipments I oft frolicked in the depths of the ocean. I could ride on eagles and sharks, condors and whales,

ostriches and sword-fish, with equal freedom. Such was my daring, that the accidents I sustained would have robbed me of twenty lives had I possessed so many, and been the victim of ancient surgery. In addition to sixteen miscellaneous fractures and dislocations, my ribs were broken eleven times, my skull twice, and my backbone once.

But pressing forward my standard in the campaign of life, I early proved myself worthy of admission to the world's stronghold of learning—the Lyceum. The aspirations which heaved my soul over this achievement I can never forget. Instinct seemed to whisper to me that my life's mission might perchance call me to a lofty and sublime sphere of usefulness.

My father's gift in testimony of my success was a beautiful multimètre, which I still use. A compendium of all the precious stones skilfully united within the compass of a cubic centimètre, it bears on its face a chronometer with the unsolved puzzle of former days — a cycloidal pendulum. Coiling around it are a barometer and thermometer, while on the other side are a magnet and sextant, an astrolabe,

and an apparatus showing the course of the sun, moon, and stars. Thus is comprised in this article the apparatus which a few years ago would have involved twenty separate instruments large enough to have filled a cart.

The etchings on the tablets of my memory of the day on which I left my home in Africa for Constantinople still possess their pristine freshness. They portray with truthful vividness the hundreds that bustled around the gigantic balloon of which I was a passenger. But this scene is short. Our aërial vessel being released and its electrical wings being in full flap, is soon ploughing on through cloudy seas. Under us the country, like a vast panorama, rolls westward, revealing cities in all directions like islands amid oceans of cultivation. The picture is a panegyric of the age. Whilome these fertile fields were uncultivated marshes. How Triptolemus would blush over his invention, mused I, if he saw, as I now do, ploughs cutting up one hundred furrows simultaneously, and doing to perfection in a few minutes what was once only done imperfectly in weeks.

I also view with interest aërial crafts crossing our wake. Here are coveys of machines

driven by the feathered creation, from sparrows to eagles. There is a youthful pair flying about with electric pinions. Little, I ween, did the inventor of artificial wings think they would be used for love-making, and that wooing in the clouds would become the most favourite of all species of courtship.

Our planet's revolution having soon thrown the sun on our leeward side and left us in darkness, nocturnal beauties now flooded our souls. Above us were the heavens glistening with their battalions of suns; below the lights of the earth formed a terrestrial firmament; while around were countless constellations of electric-lighted balloons. Agreeable reflections were elicited by the spectacle. Below us we surveyed the illuminated streets of the world, which, in consequence of our rapid motion, rolled past with such a swiftness as only made a fleeting impression on our vision. Above us we saw the stars of heaven gazing down from their heavenly places, serene and becalmed. Here, mused I, are the types of things earthly and things heavenly. Below, all is transient and shifting. Above, all is peaceful and tranquil. After my eyes had fared on the sumptuous

spectacle,—that spectacle, indeed, for which I had preferred the aërial route,—I retired to my berth. Buoyed in mid-air, rocked by the winds, with the breeze for a pillow and clouds for a bed, I went to sleep.

CHAPTER II.

THE WORLD'S METROPOLIS AND ITS UNIVERSAL UNIVERSITY.

On rising next morning, and after floating through a congeries of clouds some miles in length, we espied the world's metropolis. Before us it lay bespangled with the gems of architecture, and possessed of an adventitious resplendence through the reflection of the morning sun upon its revolving multi-coloured ruby, diamond, opal, and amethyst domes, steeples, and minarets. If former generations gloried in their erections of ugly massive stone, how overpowering is modern architecture, when the materials of masonry are those gorgeous brilliants which the ancients reserved for ornamentation! Architecture has emerged from its chrysalis state since science has made diamonds out of charcoal, topazes, emeralds and sapphires out of clay, and rendered these precious stones as plentiful as granite. Our age has thrown into masonry another beauty in the

introduction of floral effects. How surpassing are those spires with their garlands of shrubbery! How superb those piles of poetry personified when thus enclasped by the arms of lovely Proserpina!

But the metropolis, beautiful in its parts, how peerless is its whole! Such an elaboration of masonic genius! Which of its millions of buildings can be removed without marring magnificence? Its map pictures the soul of symmetry. How then can pen, pencil, or tongue describe the reality? It is more a garden than a city. Flora was the mason of Paradise, and is, therefore, well worthy to be wedded to architecture. Here are the grandest efforts of the poetry of the chisel. Here, epics, lyrics, and cantos in contour and construction breathe the eloquent language of vision. Noble works! Your forms are as lovely as the curves of a smiling Eve, and your colour as rich as those on Nature's palette—the rainbow.

We now heard the bells chiming concertos and sonatas, those strains which were wafting delight to so many souls. Flocks of aëronauts were already out—some driven by the swallows, some by crows, some by machinery, and some by thorough-bred eagles.

But, lo! the valve is opened, our machinery is silenced, we descend and alight after our flight of 3,000 kilomètres. At the terminus I met Stephenson Watt. Yes, there met we before our public life had reached the period of gestation, and before our names were indented on the tablets of history. Our minds being magnetic to each other, we took our wings out of our pockets and flew together to the Lyceum. With enthusiasm I viewed this the greatest of all terrestrial structures, and enrolled myself as one of its alumni. With glowing feelings I was then shown this marvel of the world's marvels by my cicerone. Covering a larger area than the Constantinople of the ancients, it is a city in itself. Its streets, its squares, its domes and spires, its gardens, nay, its artificial lakes, rivers, and cascades, defy description and mock panegyric. "The ancients boasted," said Watt, "of the seven wonders of the world, but these walls comprise a thousand wonders more wonderful. They embody the shrines of science, art, and politics. That hall, the largest on earth, is the world's Parliament House. These massy buildings, each peculiarly adapted to its purpose, are the

citadels of science, and those further on are the demesnes of art."

Having entered the regions of science, we beheld observatories, to which, in size and height, the Tower of Babel was a mere hovel, and the botanical gardens with Titans of trees, whose umbrage might have shaded the Pyramids.

Having entered a pneumatic-tube carriage, we were, in the course of a single heart-throb, blown to the top of the largest observatory. From its pinnacles we luxuriated in the peerless Pisgah prospect of the surrounding country. With wonder-fraught feelings we inspected the mammoth telescope stationed here. With an aluminium tube like a tunnel, with rhodium reflectors of some acres superficies, and with engines of 200 horse power to work its machinery, it possesses the great convenience of enabling 1,000 observers to peer through it simultaneously. We thereafter visit the optical chamber, with its diamond domes, ruby and amethyst columns, and pearled pillars, blended as if in the mould of symmetry, and with its stained windows interspersing all, to which those of the ancients were apprentice studies.

At one point rises a combination of precious stones, arranged so as to form an artificial rainbow, which, being reflected by periscopes, presents the appearance of a whole avenue of rainbows. Proceeding to the daguerreotype-room, we witness those telescopic mirrors by which scenes at great distances can be viewed by means of the reflections being sent on from mirror to mirror. By this arrangement we see Paris and its repository of sights; and Edinburgh, that beautiful district in the city of Britain. Thereupon the specula are changed at my request, and I behold my native place, 3,000 kilomètres distant.

We now visit the mammoth microscope, which appears like a mighty steeple in a mighty hall. Enormous in its optical power, and capable of being manipulated by a child, it is, nevertheless, adapted to 1,200 observers. That such a massive machine should be made of gold and silver, makes me moralize that while the ancients prostituted the noble metals to such ignoble uses as bullion and trumpery, we now consecrate them to the sacred channels of usefulness. Various objects we view through this cyclopean instrument. A grain of sand

becomes a mountain, crowded with crevices, loaded with boulders, and bristling with crags and peaks. A drop of water appears a lake, whereof the surface is covered with waves and ripples. In small seeds we see locked up, and only waiting for the key of Time to liberate them, numerous harvests of corn; within the small areas of their pericarps we behold reservoirs of juices, endless systems of tubing, myriads of little storehouses, and an array of laboratories furnished with a profusion of little essentials for the formation of sap and pulp. A breath blown across the area of vision becomes a cloud of vapour; corpuscles appear like fly-wheels. The confervæ seem giant oaks, and the animalculæ huge whales, while the molecules which cause smell look like oranges. Yet how far are we from knowing the ultimate particles of matter? As the telescope does not carry us to the bounds of space, the microscope fails to convey us to the confines of minuteness. Indeed, were both instruments a million times stronger, we should not find an ultimatum in either direction. Science has already told us that Nature, like its Author, has neither bounds nor limits.

The walls of Chemistry Hall we find divided into segments, each of which is composed of a different element—the noble metals forming the pillars. Around are built up the organic and inorganic compounds, of which the protean substances, carbon, nitrogen, oxygen, and hydrogen, alone fill some leagues of shelving. Commemorative of the victories of the Science, we notice an artificial diamond, equal in size to the largest Egyptian pyramid, on the top of which is placed the ancient trinket called the Koo-i-noor. We smiled as we thought how this little jewel, once valued at two millions of pounds sterling, had seen such a revolution that it was now intrinsically worth nothing; and how chemistry had unmasked the ancient pretensions of the diamond by showing it to be only a piece of carbon, and by triumphantly transforming the black into the real diamond. The reign of the gem among the great was thus ended. It was wrested from the lapidary and placed in the hands of the mason. Once only found in small atoms, and when found embossed in gold, it is now more plentiful than bricks, and forms the framework of entire cities.

Due prominence we also saw was accorded

to the deeds of those distinguished chemists who, by discovering the means to render glass, diamonds, and all other brittle gems, malleable, made them subservient to an immensity of new uses.

We now behold orreries and maps of the planets and plans of planetary cities. Glorious circumstance! Sidereal geography is now better known than was terrestrial geography in the nineteenth century. Flying to the next building, we witness the triumphs of acoustics. Here are scientific ears of Dionysius, so delicate as to render distinct the vibratory sound of the millionth part of a grain of matter, the ciliary movements of animalcula, or the growth caused by the enlargement and development of cells and molecules, both in animals and vegetables. Further on are auroscopes having communication with all parts of the globe, by means of which we hear the hum of waves in the South Seas, the singing of birds in Australia, and the music of a concert going on in South America.

In the architectural department we inspect the various styles from the primitive to the present, together with a museum of masonic

curiosities and eccentricities. Here are leaning towers of Pisa and telescopic steeples; and there are the wondrous jewelled erections, formed of the precious stones, embossed in gold, aluminium, cobalt, nickel, rhodium, and their alloys. Here are puzzles, enigmas, and fantasias in stone; there are sentiments crystallized into ornamentation, and histories congealed into sculpture. In our survey, we justly expressed our surprise that, notwithstanding the opacity, the cumbersomeness, the brittleness and friability of stone, hundreds of generations should have lived and died in stone-houses. When the grand masonry reformation did arrive, architecture glowed with a thousand new graces. No longer were houses built of opaque broken rocks, with glass port-holes. Transparent malleable building-material was used, which united grandeur to endurance and beauty to convenience. Simultaneously erections were rendered fire-proof. Not imprisoned as now, fire before this raged at large, and razed whole cities to their foundations—armies of fire-brigades and batteries of fire-engines warring against the enemy in vain.

Returned to our head-quarters, we were supplied with the last half-hourly edition of the *Times*, by which we saw that, a few minutes previously, the Australians had elected Wells King and Gray Burke as their representatives in the World's Parliament.

Remaining in-doors during the evening, we took advantage of the auroscopes in communication with the music-hall, a privilege in which ten thousand students indulged. Of vocalists, there were 30,000, in addition to a trained choir of 1,000 thrushes, linnets, and larks, an orchestra occupying an acre of benches, and a mammoth musical machine. Suddenly, an outburst of overwhelming harmony pealed forth, which swelled into such overpowering volumes, that we were irresistibly swept away before the floods of enravishment. On rushed this enrapturing tide for two hours, during which time our whole organism seemed concentrated in our ears.

The concert ended, Watt and I contrasted the nineteenth with the twenty-ninth century. The throats of great singers were then their mines of wealth; their every musical note

realized a bank-note. For warbling a small ditty they would receive more than did Milton for his immortal epic; for singing a few solos they would be paid more than Handel for his imperishable 'Messiah.'

CHAPTER III.

THE PARLIAMENT OF MAN.

NEXT morning (July 14, 2789) I was present at the most important parliamentary sitting of the period. On entering the world's senate-house, I was struck with its massiveness and its elaborate ornamentation. Its spacious dome and gorgeous domules, its countless galleries and aisles, its transparent forest-like columns, and, above all, the genius which crowded its benches, imbued me with veneration. Here, mused I, are the cream of the world's intellect, over whose deeds my young fancy has doted. Here are those whose brains are living encyclopædias, and whose hearts are the hot-beds of philanthropy. What a mighty force of braindom is here! What a concentration of ability! Before me I see one-half of the world's glory, as he who visited Greece, in ancient times, saw more than half of Athens'

glory when he saw Solon. How favourably does this house compare with the legislative bodies of ancient times! Then bats, owls, thieves, and legislators worked during the same hours. God's sun saw parliaments deserted, while under gaslight the laws of nations were equally formed, deformed, or reformed. Britain's laws, for example, were hammered into shape, or out of shape, at hours when honest men should have been asleep, and by a house composed, for the most part, of those who enjoyed a monopoly of wealth, land patronage, or honours. For centuries the poor country was misguided by nocturnal legislation. The very architecture of its house betrayed the love of its members for comfort and pleasure. Being the most fashionable club and hotel in the land, it was a conglomeration of refreshment-rooms and cooking depôts, and possessed only two small rooms for debating.

The day's business was:—A bill for the further training of the lower animals, especially the insecta,—A bill to teach quadrupeds to fly by means of electric wings,—A bill to reclaim 500 square miles of water, to be added to the

South-Sea peninsulas; and, lastly, A bill to level the mountains of the world, fill up its redundant lakes, and widen its rivers. All these measures passed unopposed, save the last, which elicited the longest debate of the century, to wit, four hours.

The arguments of Brindley Telford, the leader of the movement, were built with the sterling adamant of common sense. "What are mountains?" he asked. "They are the earth's lumber, which it behoves art to sweep away. They expose the earth's nakedness—nakedness which man ought to cover with the thrifty garments of vegetation. Nature has stamped them with ruggedness, fierceness, and sterility, to proclaim their uselessness. From them it has excommunicated the vegetable and animal creations. Winter alone, a fugitive from the other seasons, finds here any delight." Others trod the same path of argument. Rennie Smeaton characterized mountains as "scabs on the face of fair nature"; Sostratus Jones as "hunches on its back"; another declared they were "frowning wrinkles on the brow of the creation."

At length the grand debate closed, when the

Senate decreed that, in respect of the importance of the measure, it, like all supreme questions, should be submitted to the judgment of the world.

While the discussion proceeded, I was interested to see individuals in one of the galleries making peculiar gestures. My curiosity was quenched on learning they were compositors, putting up speeches into print. Delightful sight!—they were doing easily what was, in the past, the labour of a whole staff of reporters. But the greatest achievement in this direction, I could not forget, lay in printers not requiring to leave their offices at all, seeing the words of the speakers were carried to them by acoustical tubes.

Adjourning to the philosophical palæstra, where sat 100,000 disciples of truth, I heard discussed the philosophical problems of the day. Viewing the magnificent scene, I thought how all-powerful was science compared to those times when its soldiers had to fight their battles on the frigid frontiers of indifference, and when the harvest was plenty but the labourers few!

This same day, Stephenson Watt and I flew

out with electric wings to note the architecture of Constantinople. Rising about ten kilomètres above the ground, we alighted on the top of one of the chandeliers of the city. Perched here, I was thus instructed by my Mentor:—"Like all other cities in the world," said he, "its plan resembles that of the garden-spider's net. It thus allows of the greatest possible area for house accommodation, the simplest and most efficient systems of transit, and the greatest scope alike for ornamentation and convenience. It consists, you observe, of alternate concentric rings of water, vegetation, and architecture around the Lyceum, which forms its nucleus. Like an island, this kernel is belted by water, yet spanned on all hands by superb bridges. Then comes a girdle of cultivation in parterres and hanging gardens, pregnant with verdant profusion and bearing trees like hills of vegetation. Then, reposing on the bosom of Flora, follows a string of buildings, comprising fac-similes of the seven wonders of the world, and all the famous erections of past times. Here are Egyptian masterpieces, including Karnak, the Pyramid, the Sphynx, and the Theban palaces. Next come the

Assyrian wonders—the Temple of Belus, with its walls one mile in height, and quays and bridges of Babylon, and the masonic marvels of Nineveh. Then follow the artistic glories of Greece and Rome, with their Parthenons, Pantheons, amphitheatres, and temples. A duplicate of the Colossus of Rhodes strides across one of the radial rivers. The modern Pharos stands at another point. The flowery architecture of the Moors and Turks, the Goths and Britons, succeeds, including the Temple of Diana, the Alhambra, and St. Peter's. Encompassing this great museum of buildings is another belt of water, relieved by lakes at the spots where meet those silver threads the radial canals, and spanned at all points by the most brilliant jewelled bridges. A cincture of vegetation succeeds, and we are again brought to a perfect mountain chain of structural prodigies. Here are streets constructed of artificial ivory, diamonds, china, rubies, sapphires, mica, and the egg-shells of thousands of different species of birds. In another spot we have houses built by chemical means, by the simple precipitation of solids from liquids. But why enlarge? On and on

goes this succession of concentric zones of luxuriant vegetation, iridescent buildings, and glittering waters, until we reach the city's outskirts."

"Such a surpassing arrangement!" I exclaimed. "Every ring of vegetation is a country in the city, and every circuit of buildings a city in the country. Every edifice is at once inland and aquatic. Constantinople, by means of those radial and concentric rivers, is an amplified and beautified Venice. But what were the bridglets of the past to the thousands of magnificent jewelled bridges we now see? The gondolas, too, which emboss these waters beggar the beauty of the very barge of Cleopatra."

Re-ascending to the same point, we review the same scene by night. The chandeliers of the city, formed of these strong, yet light metals, aluminium and cobalt, from which hung millions of magnesium lights, all bearing a relation to the concentric and radial streets below, furnished an affluent supply of admiration to my young, ravenous fancy. Our conversation turned upon the great reservoir of light. Astonishing, it seemed to us, that

in the nineteenth century men should have so ignored the sun as to work while it did not shine, and to sleep while it did. Not till the following century did man realize the enormous loss he necessarily sustained. Wisdom itself decreed midnight as a point before and after which sleep should be an equipoise. By observance of this rule, the health and wealth of humanity were greatly increased.

The subsequent day was Sabbath, and its sacred solemnities seemed to me the very soul of sanctity. A thousand bells were chiming pieces from the oratorios, and millions were streaming along the streets to church. Acoustical tubes were simultaneously carrying the Word of God to thousands unable to attend worship. Devotion was in every heart, and prayer and praise on every lip.

In the course of another fortnight the world sat in tribunal over the question submitted to it by the Senate. In ancient times, Parliaments decided measures for the world; in modern times, the world more justly adjudicates measures for its Parliament. Formerly there was no gauge to test public opinion. Senators sailed the sea of politics, ignorant and unheedful of

the tides and currents of political opinion, and oft with only self-interest for their compass. Blessed are our times, when the world has the sense and the power to attend to itself, and when wisdom is ever found on the side of majorities!

The present plebiscite was conducted with such amazing despatch and serenity, that not a single wheel of the world's factories was stopped, and not a throb of the world's transit circulation mistimed. The opinion of each voter was quietly consigned to paper, and sent by pneumatic-tube to the world's booths or judgment-seat, where the sentiments of mankind were correctly collected and exactly ascertained.

The following day the result of the poll was published. Unlike past ages, when indifference always prevented a large proportion of the electoral roll from voting, it was found there was not a voter but had polled. Equally satisfactory was the circumstance that the majority was so decided. By a majority of suffrages in the ratio of 4 to 1·8, representing, in point of influence and years, the higher ratio of 28·1 to 3·2, it was decreed the

mountains should be removed and that six years should be allowed to permit of the maturation of proper plans, the equipment of sufficient armies, and the amassing of adequate machinery.

Thus, amid universal acclamation, it was decreed that the everlasting hills should be everlasting no longer.

CHAPTER IV.

EDUCATION—AQUATIC FARMING.

After this plebiscite I plunged into my studies. I roamed about the laboratories, observatories, and museums, laboured in thought, and experimented from morn till eve. The researches of those famous chemists who, by extracting aromas from substances and substituting those more congenial, revolutionized cookery, and put the peach and the turnip on a level, won much of my attention. Tasteless food, with a due proportion of nitrogenous and carbonaceous elements, is thus all that the table now asks, the eater being allowed to flavour his viands according to his wishes.

Our classes all the while were seeing everything worthy of a place in our retina, and being taught those fundamental truths most worthy of being treasured in the archives of our memory. The hydrostatic class, numbering one thousand

pupils, spent a week at the water-works of Africa. Among other sights, its fountain, the largest in this planet, its million *jets d'eau* so ingeniously and harmoniously commingled, and with its main gush of water ascending four kilomètres into the air, impressed me as breathing the very spirit of sublimity. The large lake around had equally powerful attractions. On its bosom we beheld daily the professors with their schools of swimmers, performing the evolutions of the aquatic terpsichorean art, and regiments of pluvial soldiers being drilled.

Our architectural class travelled from pole to pole for instruction; but probably no scene did we view with greater interest than the modern Tower of Babel, in North America. To say that its charm to the eye is as bewitching as music to the ear, is no hyperbole. Its symmetry and massive magnificence are as peerless as if grandeur and beauty themselves had been its architects. Its stupendous diamond base, its ruby and amethyst arches, its laboured ornamentation, its embodiment of every precious stone and metal, its chaste blending of forms, its aggregation of all species of structural effect,

its complexity of pillars, columns, arcades, convolutions, and buttresses, and its tapering tower ascending from mile to mile, until the diamond-pointed aluminium pinnacles seemed lost in the sky, conspire to fill the mind with admiring awe. But I do not forget that while the ancient Tower of Babel commemorated the time when outraged Providence thrust different languages into the mouth of man, its modern antitype celebrates the occasion when, by God's grace, the world was again blessed with a universal tongue. Nor was this grand structure like those meaningless monuments of the past, only an empty spectacle. As in all modern buildings, its ornament is only a graceful homage to its usefulness. It is a museum, an observatory, and a library. In its interior are conserved the riches of all literature; an arsenal, with models of all modern and ancient machinery; and a battery of the most powerful astronomical artillery. Of all its parts, the library pleased me most. Yet it was its smallness which captivated my admiration. In times past, the writings found here would have filled five British Museums, and weighed thousands of tonnes;

but seeing they are condensed into microscopic books, they are compressed into a few grammes of paper, and fill only a few mètres of shelving.

All this while I studied literature, ancient and modern, culled sweets from every author, and employed my best abilities in mental scrutiny, and other elementary literary feats. When the wings of my ambition were stronger, I commenced a larger work, which brought into play the full machinery of my intellect. For some years, therefore, I taxed my brain, my five senses, and my ten fingers, in thinking, reading, and making researches. Now I was constructing mental fabrications, anon smoothing them into simplicity. Now I was re-building my conceptions, and anon carving them into symmetry. Patiently I laboured on, now devising, and anon revising, not as one who worked against time, but as one who toiled in the trade of truth, and built as his brain supplied the material.

Agricultural excursions formed, also, an important item in my education. Our class was transported from latitude to latitude and longitude to longitude; from sea to land, and

land to sea, in order to view all the phases of the art. Aquatic husbandry was specially studied. With submarine equipments, we wandered over various ocean-beds, and noted all the varieties and peculiarities of oceanic crops. In referring to the art's advance, our teacher pointed out how two hundred generations of agriculturists had lived and died without appropriating one single square yard of the beds of those waters, which formed the greater part of the earth's surface. "Why!" said he, "the origination and development of aquatic farming were worth another world to man. So brilliant was the reality, that the retina of man's mind was at first dazzled with wonder. To the amazement of amazement itself, rocks were rendered fertile soils, sand-banks were made submarine farms, and marine deserts were transformed into fruitful fields. The regions of Neptune were occupied for ever by triumphant Ceres. Sea-weeds were dignified into sea-crops. By land and sea agriculture was universal. Enlightened science threw its bread on the waters, and we are reaping the fruits after many days."

Our Mentor also referred jubilantly to the agricultural hygiene applied to those territories of diseased soil found in olden times, called fens, marshes, wildernesses, and deserts, and how Ceres now sweats out of their improved mould the heaviest exactions year after year.

Concerning Botany, our Corypheus taught us how its glories lay in the luxuriant fields of its practical bearings, and not in the arid desert of its theory. Taking us to the world's botanical garden in Italy, we were shown how trees and shrubs could be cultivated to ten times their natural size, and be moulded into any form. We saw them shaped into chairs, tables, doors, frames, planks, sofas, and couches, demonstrating how well Nature could be made to ape the carpenter. The peculiarity and the number of the hybrids, I also duly studied and the amazing modifications made on trees and plants by physiological appliances. We saw fir cultivated so as to be harder than beech, darker than mahogany, heavier than rosewood, and, at the same time, moulded into extraordinary devices. We saw shrubs developed into trees, and trees dwarfed into shrubs. We

beheld, indeed, innumerable metamorphoses in colour, texture, and form, made on all species of plants—metamorphoses not mere curiosities, but important in their bearing upon the arts.

CHAPTER V.

LONDON—ITS ANCIENT DOWNFALL AND MODERN RISE.

Our favourite diversion at this time was short expeditions, such as a trip by rail or tube to America, to Australia, China, or Japan, where we would stay over-night and return to the capital in the morning. In one of our excursions we paid a visit to the small country mal-named Great Britain, and took a sail in an electric-magnesium boat along the Thames. We graduated its celerity according as the scenes were insipid or interesting. Reaching London, our reflections found rich pasturage upon its scenes of fallen greatness. Once a muddle of masonry, forming the hives of one of the mightiest swarms of saints and sinners ever huddled in one spot,—once the glory and the shame of the world,—once the medley, piebald metropolis of virtue and vice,—no city

in pre-millennial times ever attained to such eminence, or sank into such degradation. For a thousand years it reared its head as the pride of the world. But its history, groaning under the accumulated sins of thirty generations, was approaching the gibbet of retribution. Like a thunderbolt came the death-blow of its honour—its capitulation to the enemy during the Chinese invasion. Like another thunderbolt came the subsequent destruction of its palaces, and towers, and streets. Vengeance, unsatiated by the first calamity, was surfeited by the second. Can time ever forget the morning, while the sun's beams were gaily glittering upon millions of the city's windows, towers, and palaces, while the unsuspecting inhabitants were pursuing their several avocations, when a rumbling sound was heard, and the ground was felt quiver—tokens of Heaven's purpose, which the terrified millions instinctively only too well understood? Consternation and confusion in a single moment inspired them, for none doubted but London was the scene of an earthquake. The continuance of the frightful noises, and an increase of the still more appalling undulations of the earth, soon caused the

inhabitants to forsake their several callings, and rush for safety into the streets. Mothers hurried out with their children, coxcombs with their jewels, commercial men with their cheques, while misers, laden with their riches, emerged from grim retreats, determined to stand or fall by their gold. Those whose friends were bed-ridden hastened out with such doubly unfortunate victims rolled in blankets. Thousands of them were also let down into the streets, out of windows, by ropes. Others, frantic with fear, fell into fits. Specially sad was the emptying of the infirmaries and asylums. Fright and excitement precipitated the deaths of the dying, and rendered the weak weaker. Business-men, clerks, labourers, workmen—each as they were caught in their several duties—rushed to the streets, to further crowd the teeming highways. Terrible was the scene thus unfolded. Most were bare-headed, many bare-footed, some scarcely clad, thousands covered only by flimsy sheets, but the saddest of all the features of the throng was its inclusion of so many of the sick, the infirm, and the dying.

In these awful moments the houses of the

city disgorged into the light of day a greater array of spectacles of sorrow and suffering than the sun had ever beheld. Never till now since London was a city had its teeming haunts and its crowded alleys been completely emptied.

Scarcely had the houses dislodged their inmates, when the earth suffered another and more fearful convulsion. The streets, the churches, the palaces, and the towers of the metropolis, trembled and tottered. Here and there the disturbance was so mighty, that great palaces were shattered and ruined. The downfall of towers, the wreck of masonry, the cries of horror, formed a concert of agonies more dreadful than ever took place under the auspices of any tragedy. Fear and horror transfixed the hearts of the bravest. More terrible, meantime, became the horrid oscillations of the earth, more frequent the fall of towers, palaces, and columns, and more dreadful the yells of the alarmed crowds. Instinctively the multitudes, keeping the middle of the streets, rushed towards the parks and public squares. With commendable foresight, thousands likewise exploded many threatening towers and

lofty buildings, that the inhabitants might have a larger area of safety.

Happily, if London was a Sodom, it had still its ten righteous men. Heaven, therefore, sweetened its vengeance with mercy. Fearful as was this shock, comparatively few lives were lost. Providence was pleased to endow the Chinese who governed Britain with an amount of wisdom and alacrity that enabled them to rescue the citizens from the fate of the city. Aware from the beginning it was vain to save the metropolis, conscious that more earthquakes were possible, and a general conflagration from the fires already raging, inevitable, they wisely focussed their energies in preventing what was preventible.

With amazing speed they appointed their constables to rule the mobs, and issued manifestoes that the plans for the deliverance of the citizens were in execution. Meanwhile they had telegraphed to all parts of Britain for empty trains, that the city might be evacuated with the greatest possible speed. Simultaneously all the buildings around the stations were demolished, that the multitudes crowded around might be the more free from danger.

The wisdom of these plans purchased the lives of thousands, for though a shock ensued mightier than the first, the terrified citizens had now been so safely protected in the public parks and squares that little damage accrued to life or limb. The few hundreds sacrificed were victims to their vice and avarice. Thieves intent on rapine, and the greedy, sordidly tied to their possessions, were caught in their sins, and buried while glutting their vicious appetites.

Meantime the Government had concentrated in London fifty thousand railway carriages and ten thousand locomotives. The evacuation, therefore, proceeded with commendable speed. Charity itself ordained the order of the exodus. First were despatched the invalids, the infirm, and the aged, and then, consecutively, children and women, youths and able-bodied males. Last to leave the scene of this stern scourge of fate were the Government constables and officials. All night long they remained at their posts, witnesses of the unparalleled devastation, their love of duty transcending the almost imminent dangers. Hourly the smoke became more blinding and suffocating, and the air

hotter and more poisonous. Severe was the test to which their courage was subjected as night ensued. On all sides raged the devouring element. The heavens mirrored the most dazzling fires the world ever saw. Every minute the tide of flames increased, lashing fiery waves into the clouds, and engulphing street after street. Temples, synagogues, mansions, theatres, institutions, palaces, workshops, were all swept down before the advancing enemy. The falling of roofs, steeples and towers, the bursting of boilers, the acerbations of the tumult from the destruction of factories with inflammables, and the explosion of gas-works and war-magazines, formed some of the more prominent items of this most fearful inventory of horrors. Even at the time of dawn there were no symptoms of daylight, for London was covered by an impenetrable sky of vapours. The city was now but one great furnace, the fumes from which, like a mighty screen, seemed as if planted above to hide from the sun a sight so appalling.

Happily the exodus was completed in twenty-four hours, so that from the distance

the millions could view in safety this holocaust of London upon the altar of vengeance. For day after day the incense of its burning palaces ascended to heaven. For weeks the fire smouldered and loaded the ether with dust and smoke. Not till three weeks after this judgment could any one approach. Then rushed myriads to behold the remains of the dead city. What a mournful spectacle! For leagues extended a desert of desolation. A month previously there stood a city, to which Babylon was a village, and now it was but one *catafalque* of ruin. Where stood noble streets, towering mansions, palaces, and buildings, now extended promiscuous masses of brick, ashes, dust, and stone. Hovels and mansions lay equally undistinguishable among the charred heaps. Earthquake and fire had in their fortnight's feast devoured the labours of ten generations.

Myriads of Marii reflected over the ruins of this Carthage of a later age, who sadly read in this wilderness of waste the retribution due to the pride of the British Empire.

But the London of vice and corruption was wiped off the stage of existence by Heaven for

the gracious end of making way for the London of the millennium. What more thorough means could it have taken to sweep away such a mammoth Augean stable of vice? What human power could have obliterated the crowded alleys, the dens of infamy, the haunts of sin and vice, save the fell stroke of a devouring angel? Thanks be to God for his gracious dispensation, the earthquake and fire of London. Blessed was the curse—benignant the calamity. The sword of Providence dealt its blow against a corrupt member of the world's commonwealth, that the world's sorrows might be alleviated.

Sailing along the beautiful windings of the river, between the resplendent floral and fountain-flanked banks, and through the superb diamond, ruby, aluminium, cobalt, and gold bridges, we at length arrived at the sites of the Oxford and Cambridge Universities. We saw how their fate had been that of the temple, not one stone being left upon another. The ruins we viewed as indicative of the fall of a bigotry, for while education was fettered to these walls it was hampered and dwarfed. It was trammeled with tests and dropsied

with endowments. The universities, like the churches, were ruined by their excessive riches. Adam Smith exposed the error in the nineteenth century; but though some one had risen from the dead and used his arguments, the golden words would have fallen upon leaden ears. Midas-like wealth, tainted the very food of learning upon which the students should have fed.

Indicatory of the depraved tone of the universities, history tells us, that in the nineteenth century their scholarship did not cause such intense sensation as their patronage of exhibitions of brute force. The great feature of the session was a race between some amateur watermen belonging to the respective universities. The two crews, armed with poles, manned two planks, and amid the cheers of on-looking millions on both sides of the Thames, they spluttered and spurted, tugged and struggled, to beat each other in the menial art of paddling.

For fifty years such inane and insane performances continued, though their palpable effect was to make the students' minds martyrs to their muscles, and to sow the seeds of betting and debauchery among the public.

This same day we visited Epsom, the place in which were once held the annual festivals of England's roughs, ruffians, betting-men and horse worshippers. Strange to say, while those occasions formed the parade days of the nation's scum, they were patronized by royalty and fashion, and while they opened the gateways of vice, parliament shut its doors upon the days of their celebration as if they had been holy. Such homage was paid by legislators, princes, and noblemen to the great gala day of England's blackguards.

On another occasion Watt and I visited the atmospheric depôt which regulates the weather in Canada. Here it was discovered that electrical apparatus could control the elements, clear the sky or fill it with clouds, bring rain or cause sunshine. Here originated that great meteorological system of our day, by which art has interdicted asthmatic Boreas from blustering and raging on the one hand, and fulgent Phœbus from scorching the land on the other, and by which artificial breezes and artificial weather are dispensed to the whole world. Admiration rewarded our inspection of the weather-works. It having been ascertained sufficient

rain had fallen, it was resolved at this moment by the clerks of the weather to change the wind, produce an Italian sky, and instil a certain amount of ozone into the air. By means of the electrometer, cloud after cloud was dissipated, and in a few minutes the sun appeared in all its effulgence. Could even the magic of the ancients have aspired to this? Philosophers of the past failed to rise even to the dignity of prophets of the weather. Had any one suggested the possibility of man becoming a meteorological controller, the idea would have been scouted as the fantasy of a madman. The conjectures of our forefathers did not come even within sight of present realities. The wildest hyperbole never ventured to suppose man would ever literally ride the whirlwind and direct the storm.

CHAPTER VI.

CALORIC DEPOTS—THE WORLD'S FACTORY AND FOUNDRY.

LIKE the other students, I aided in the various scientific investigations of the times. Among other things, I served in the array of *dilettanti* under Mendelssohn Beethoven, who was commissioned to make certain advances in acoustics.

An important item then prominent in the index of history was the adoption of Greenland as the seat of the world's factories. This step was taken because the measure having been previously adopted to warm the polar regions, not only with artificial breezes from the equator but with caloric from the earth's interior, it was resolved to make the motive force thus obtained subservient to drive the wheels of art as well as control the weather. The great thermal operations had already been

carried out by Black Lambert. As history shall ever delight to record, he performed for posterity a service which can never be forgotten, and with a zeal and indomitability which shall ever elicit admiration. Boldly penetrating the crust of these snowy mantled regions, through the agency of a million of workers, and a proportional budget of machinery, he made a huge yawning abyss which every day deepened. To the inspiriting sounds of the most sublime music the workers bravely stormed the difficulties they met at each step, and tunneled their way further and further through the earth's rind. Rocks were blasted, subterranean streams were stemmed, great caverns impregnated with poisonous gases were purified, great seas of liquid lava and burning bitumen were forded, the evils of choke-damp combated, and great non-fusible embankments built throughout the whole route to ensure that the pathway to this Avernus might be safe and enduring; while railways, pneumatic tubes and telegraphs were constructed along the course, that the workers in this nether world might enjoy all the resources of the upper. Happily, as the operations became more

complex, the energy and machinery of the thermal army became more powerful.

Ere the downward march had proceeded forty miles, it engendered a larger fund of heroism than all the wars of the most warlike ages. It educed more enterprise than had been expended upon any fifty schemes in pre-millennial times. With so long a line of supply, with fiery inundations threatening from below, and watery or gaseous irruptions from above, the work still progressed. But it would take volumes to give the mere details of the thousands of great and the millions of small difficulties which were met and overcome ere the eightieth mile was reached, and with it the earth's molten yolk. No sooner was this point gained than the caloric tubes were dipped into this incandescent sea, and laid all the way to the earth's surface, so that the subterranean heat might be borne thither. Ere this the weather-works were completed; consequently, the day which saw the thermal tubes extended to them was that in which Greenland doffed for ever its snowy top-coat, and donned the green garments of Ceres. This part of the work fell under the supervision of Reaumur

Fahrenheit, who nobly succeeded, by means of his mighty army, in softening the asperities of the climate, and in introducing summer into this erewhile barren region.

With mushroom-growth speed rose the world's factories. Trenches were succeeded by walls, walls became roofed, and soon the great houses were the emporia of the most powerful machinery the world had ever possessed. Factories and workshops, erst scattered over the globe, were here mobilized, that the world's industrial operations might be conducted with the greatest possible economy. Unfortunately, the work was nearly finished when I received my appointment in the chemical corps of this great army of industry. My term of service happily extended sufficiently long to enable me to sow new crops of ideas into the fields of my mind. Studying the subject of heat, I thought of the nineteenth century, when cities teemed with fire-devouring monsters of machinery, monsters whose voraciousness was such that it was dreaded they would soon consume the whole colliery supplies of the world; and when, withal, the absurdity was not even suspected of men complaining for

want of fuel when they lived on the crust of an astronomical furnace.

The earth had only completed two ecliptics after this, when the Greenland factories were able to supply textile goods to the whole world. Covering, as the buildings did, so many square miles, and embracing such a vastness of machinery, their sight was only rivalled by the magnitude and splendour of the caloric works. The awful appearance of the furnaces, that artificial Tartarus, none dare describe; for what did e'er human eyes behold to which they could be compared? As to the ocean of machinery which has now for so many years performed the world's work, man beholds here the largest engines ever constructed. The cylinders are like hills, and the fly-wheels like rainbows. Here we are amid a rolling sea of wheelules, wheels, and arch-wheels; and there, amid a host of battling, tearing, and striving rods, shuttles, and beams. Here we are encompassed by mountains of raw, uncouth material; there we stand in the midst of hills of newly made goods. Here we are surrounded by forests of engineering, and there by labyrinths of looms.

But behold the massiveness of the operations! Here are thousands of bales of flax in the process of mastication by the million-teethed jaws of the machinery. Next moment we behold them torn, triturated and digested, trimmed into threads, interwoven into patterns, and, lastly, issuing as acres of linen. What a pleasure to witness this wondrous reality—to behold cloth made at the rate of a mile a minute—and to think that the wool which may be covering the backs of thousands of sheep, and the lint and cotton fragrant and blooming in the morning may, in the course of the day, go through the gradations of clipping, washing, bleaching, dressing, spinning, weaving, shaping and tailoring, and be covering the backs of thousands of the human family in the evening!

Then followed the erection of the world's laboratories and foundries. Hitherto scattered over the globe, they were now centralized at the caloric emporium. The earth being but a mighty cosmical crucible, it was wisely seen that artificial furnaces were a superfluity, and that it only required the necessary enterprise to appropriate Nature's own alembics, and to

avail ourselves of its subterranean laboratories. Forming a unit in the millionaire army that undertook the complexity of operations necessary to achieve this great object, my enthusiasm, as well as my mere attention, was drafted into the measure. As the world well knows, the result of our labours was superior even to our high-pressure expectations. Completed, we found to our joy that one-fourth of the former staff of men were enabled to supply mankind with minerals and chemicals. The newly constructed works were justly for the time the wonder of the world. Below were the mighty recesses in which were conducted the melting of the ore and the smelting of the metals. Upon the ground were ranges of fusible-proof pumps, which disgorged as needed streams of the molten alloys; around were the beds for the moulding, and above were the workshops in which were executed the polishing and finishing.

What an amount of metals, alloys, and amalgams are here daily prepared! What loads of machinery are daily cast, mounted, and exported! Here are seen hills of cobalt cables, cobalt ropes, palladium engines,

aluminium steeples and optical apparatus, magnesium wire, and etceteras that baffle enumeration.

The aluminium department was then, as now, deemed the greatest of the sights. Here were seen vast pyramids of clay and potsherds gradually being swallowed up in a huge yawning pit, and being carried through a variety of crucibles, and ultimately re-appearing on the one hand in a stream of gold-like aluminium, and on the other in heaps of silicon. Around were seen the millions of articles into which the metal was moulded, and for which it was so extensively used by reason of its union of levity with durability, and strength with malleability.

The magnesium department was scarcely less interesting. There one saw the strange metamorphosis of the magnesia dust, or Epsom salts, into the pure metal; while around were beheld the thousand and one uses which it subserved.

Finding so much delight in the state of the arts in the twenty-ninth century, I was in love, albeit, with its political economy. It entails the maximum of speed and excellence in work-

ship with the minimum of trouble. Time was, I mused, when frail flesh and blood, urged by beating and o'er-pent hearts, did what is now done by unsweating and unwearying wheels, and unfatigued and unfatiguable pistons. Nine-tenths of men were hewers of wood and drawers of water. Man, made by God a little lower than the angels, made himself lower than the brutes. Clad in the weeds of beggary, and ill fed or unfed, he often spent his life slaving in pits, in ditches, or in quarries; oft he was imprisoned all day long in factories, or for months on end in snail-paced floating prisons. Some more unfortunate still pursued the sacrilegious trade of making their sacred tabernacles the targets for the shafts of death, and their hands the ministers of murder and massacre. Nor did the ancients seem to think that, while man needed much recreation and refreshment, the iron limbs of art needed none. Accordingly human and mechanical machinery were then worked the same amount of time. Long was it ere man was released from his overburdened manual labours, and the due and fullest exactions laid upon the mechanical powers. Nor was the measure quickly con-

summated. An improvement was first introduced by having two relays, then three relays, of workmen to work alternately the same machinery. Lastly, there was the combination of the system, in having four shifts during the twenty-four hours, each of which labours six hours.

CHAPTER VII.

THE GEOGRAPHICAL REFORMATION.

I NEXT served as a cadet in the army of geographical research, which investigated how the mountain chains and table-lands might be best levelled and appropriated, and how Ceres might clothe sterility with the joys of vernal bloom and autumnal riches. Never was there such a talented conclave of the aristocracy of science. Its organization and its heroic energy were prophetic of the grandest results. Though sundered into 3,000 isolated battalions, which were scattered over the whole earth, the telegraph, pneumatic tubes, and the railway knit them together, and enabled them to enjoy all the advantages of concerted action.

Only three years had run their course from the present tense into the past since the measure had been adopted by Parliament—years which had been diligently spent, accord-

ing to the world's decree, in overcoming preliminary difficulties and in maturing plans for future procedure. During this time platinum and palladium tilt-hammers and battering-rams of transcendent strength had been forged, huge diamond boring-engines constructed, electric engines of unequalled strength factured, immeasurable quantities of fulminates and re-agents amassed, and huge arsenals equipped, replete with cobalt chains, aluminium trucks, diamond rails and railroads, ruby mounted wheels and electric balloons. Above all, the brute creation had been made subservient to the acceleration of the work. Under the leadership of Aldrovandus Ray, a levy of 40,000 naturalists were engaged for years in forming 100 different zoological armies. Each of these were, by an admirable system of drill, brought to such a high state of discipline that a brigade, consisting of 1,000 elephants, 1,000 rhinoceroses, 180,000 monkeys, and 15,000 other beasts of draught and burden, could be officered with perfect ease by as few as 100 naturalists. Birds of burden and fish of burden were in like manner drafted into the ranks of the zoological army, and, being

subjected to similar training, were brought to a similar degree of efficiency.

Furnished with these mighty forces and this mighty artillery, our mighty pioneering campaign commenced. On September 22, 2792, we were marshalled at our head-quarters in the Himalayas, when we arranged upon plans for future action. In these unbounded scope was offered to all the leaders for originality of procedure and for strategical action. All the wars that ever disgraced nations never supplied such a fruitful field for manœuvre. But the master-minds of the world were equal to the greatest labours. The grandest masterstrokes of a Hannibal and a Napoleon in tactics and in rapidity of action were surpassed daily. The leaders who were appointed included, to my great delight, Stephenson Watt, who, though only bearing the experience of twenty-three summers, his comprehensive genius was already rising like a morning sun over the commonwealth of intellect. In his brigade I served. Having our attention directed to the Andes, we traversed its four thousand miles with our balloons, eagles, condors, and scientific artillery. In our untrodden course our eyes were fed on the strange

phenomena peculiar to such altitudes; snow mantled the barrenness below, and mock suns and phantasmagoria relieved the azure canopy above. Our geologists inspected the whole of the strata of the ridges, our mineralogists their metals, our chemists their elements, and our botanists their plants. Our researches were deemed so important that a concentration of all the mountain iconoclasts was ordered upon the Andes. In a few hours balloon after balloon arrived. For their accommodation, a large camp was formed on Cotopaxi, which was supplied with caloric from the volcano by means of thermal tubes. In eighteen hours the muster was complete. It was now evening, and the moon, as it shone down upon its mistress world, viewed one of the most sublime sights of history. Our army of 800,000 men was ensconced on this pinnacle, along with a retinue of thousands of quadrupeds, tens of thousands of bipeds, and an enormous aërial flotilla. Amid the sublime fascinations of music, our extempore city spent the evening on this virgin peak.

Next morning not a vestige was left to betray the place of our bivouac. Under the leader-

ship of Stephenson Watt, Brindley Telford, Rennie Smeaton, Black Lambert, and Lavoisier Priestley, our aëronautic armada had sailed, our eagles had flown with their human burdens, and we had commenced our survey along the Andes chain. At seven hundred different spots we blasted enormous peaks and crags. The explosions, the most terrific that had been attempted in history, were heard for leagues around, and made hideous gashes in the mountains' sides. The result was most satisfactory. The neighbouring cities, forewarned of the blasting, were so forearmed that not a single accident occurred; while, on the other hand, seventy-six most precious mineral beds were discovered. In consequence of these results, we telegraphed for a new army of sappers and miners, which arrived that afternoon, and which in a few days amassed no less than 20,000 tons of rich metals.

The following day a scientific congress was held over our researches, and the great army was then dispersed into its previous divisions throughout the world. After some further triumphant explorations, which disclosed some thousands of tons of precious metals, we were

concentrated at the Uralian Mountains, and encamped on Mount Taurus for two successive evenings. During the next month our army was focussed in its full strength at all the great mountain ranges, finishing with the Hymalayas. Here our researches were summarized, and among the leaders specially honoured for their scientific intrepidity were Russell Lesseps, Mercator Humboldt, and Stephenson Watt. The rank and file of our own body, having now performed their mission, were disbanded, while the leaders resolved themselves into a council, to subject the enormous stores of our investigations to an analysis, and to frame plans for the proposed geographical reformation. Nobly they fulfilled their Herculean task. Rapidity of decision, unerring generalizations, brilliant generalship, characterized their rule. Not a moment was prostituted on delay. The unanimity was unruffled. Before the sitting had lasted one hour, they had arranged upon plans for carrying out the rough part of the work, especially in the table-lands, reserving details for more mature deliberation. Brassey Brunel was accordingly ordered to levy an array of 3,000,000 workers, 10,000,000 beasts

and birds of burden, 8,000 locomotives, and 50,000 A 1 balloons. The commission was fulfilled with all the amazing alacrity of this arch-genius. Telegraphy, convulsed in its great network of wires and needles over the whole globe, was enlisting the services of myriads, and the entities of the mighty army, in answer to its call, were hieing from all latitudes. The Underground Railway groaned under its loads, and the air became blackened with the mighty scientific armaments flying to the spot. In twenty-four hours the mobilization of the mighty army was effected at the Himalayas, and operations were forthwith commenced. The very skies seemed to resound with the blows of the battering-rams with which art now bombarded the mountains. The electricians, under Galvani Volta, with machines a hundred times more powerful than lightning, were rending peaks, larger than the pyramids, to their foundations, and shaking mountains for miles around. An army of chemists was busily preparing re-agents, which melted the rocky structures like salt. Huge lakes of nitric, sulphuric, hydrochloric, and hydrofluoric acids were collected, rivers of which

were sent to all the necessary points. The fountain-heads of these lakes were laboratories covering several square miles. The transit system meanwhile was rendered so perfect, as to transport millions of tons of *débris* weekly by balloons, birds, and by rail, to fill up superfluous lakes. Two millions of miles of diamond rails were laid, which, by reason of their gradients down the mountain-sides, bore away the loaded trucks by mere gravitation. Enormous foundries were stationed along the peaks, at intervals of one hundred miles, to supply and repair the artillery for the mammoth army. Myrmidons of mineralogists and geologists were encamped on the peaks, and, like plunderers, seized on all the precious metals which were disembowelled, and had them sent on to head-quarters.

CHAPTER VII.

REMOVAL OF THE MOUNTAINS.

THE Titanian performances soon made enormous breaches in the gigantic flanks of the mountains. Our great tacticians showed the most brilliant generalship, by so disposing their forces as to produce the greatest amount of work with the least expenditure of labour. While each division in the millionaire army had its specific duty, the operations of the countless detached detachments proceeded with the harmony of clock-work. Two months afterwards, various of the mammoth enterprises of mankind having been completed, our veteran strategist received reinforcements to the extent of two millions of men, and a proportional amount of plant. Then arose other armies of equal massiveness. Brindley Telford, with three millions of men, assailed the mountains of Africa; Rennie Smeaton, with a force of

equal strength, attacked the mountains of South America. Under the leadership of the latter were numerous sub-leaders, one of whom was the young in years, but old in ability, Stephenson Watt. My honoured companion was too great to allow his distinction to allure him from the safe bournes of humility. He neither flapped the wings of elation, nor sank under the burden of his responsibilities. The leader of an army larger than was ever led by a Napoleon, he set to work with invincible determination, with an eye to every exigency, an ear ready for every cogency, and a mind equal to every emergency. Under the force of his prolific brain, electro-factories, magnetico-factories, and calorico-factories arose along that portion of the Andes peaks wherein his work lay. Economizing the mental force of every man, and the physical force of every animal and machine under his rule, his ambition was still unsatiated. His great mind, Samson-like, burst all obstacles, and he resolved to make the very clouds and winds of heaven his assistants. Mustering myrmidons of meteorologists under Franklin Leyden and other doctors of the weather, he constructed huge atmospheric

batteries along the mountain-tops. Having by their agency wielded the bellows of Boreas and the rain-stores of Pluvius, he ordered the windows of heaven to be opened at the cessation of each day's work, so as to wash down the *débris* from the mountain-sides, and thus expedite the great undertaking. For a while the crudeness of the atmospheric apparatus raised in place of clearing difficulties. The cold of these lofty regions congealed the rain into snow and the water into ice. The paths were thus blocked with avalanches, and the scenes of operations buried in snow. But Stephenson Watt declared that the failure turned outside in could be transformed into a success. Undaunted, he therefore brought forward great stores of caloric from the neighbouring volcanoes. With this force he so modified the temperature that the mountains reverently doffed their icy caps and stood with uncovered heads. In his gigantic attempts to make Aquarius an auxiliary, Watt, like another Moses, never came down from the mountain until his purpose was achieved. Never, in their Alpine journeys, did Hannibal or Napoleon labour against such legions of obstacles, and with such patient

determination, as did Stephenson Watt on the Andes. Stationed in a meteorological depôt, he and I spent sleepless nights in studying the great question of the day; in nursing the storms, deluging the uplands with rain, and in modifying the weather. Such was the programme of each night's meteorological performances. In the afternoon, our electrical batteries accumulated mighty conjugations of black and thunderfraught clouds. The climatic factories within a thousand miles of the mountains, in accordance with the skilful arrangements of the Chief Commissioner of the Board of Weather Control, increased the effect by blowing great clouds onward to the scenes of our labour. From thin and small congeries of vapour, the arsenal of storms increased in fierceness and power, until heaven seemed to have yoked above our heads its complete armaments of thunderstorms, hurricanes, hail, rains, and squalls. The ominous silence amid which the wild frowning tempests were marshalled, foretold the bitterness of the approaching war. The features of the crags and peaks, darkened by the black clouds overhead, seemed themselves to scowl back upon the heavens,

and challenge the elements to battle. At length, when the night had approached, and the myriads of iconoclasts had evacuated the cloud-invested peaks, the signal was given to work the pluviofiers. In a moment heaven's batteries were unmasked, and her artillery was unlimbered. While the lightning flashed in awe-inspiring sheets, and still more awe-inspiring angles, the clouds launched out avalanches of rain, and the winds howled and yelled as if they had issued from the throats of a million of fiends. Fiercer and wilder grew the ceaseless volleys of the storm. In its wild cannonade, it lashed against the peaks, and swept down their flanks thousands of tons of sand and stone. The rage and fury of the elements lasted until the dawn of morning, when we reversed the electrometers, applied meteorological astringents to the atmosphere, dispersed the clouds, and uncurtained the bed of the rising sun. Genial sunshine now bathed the mountains and prepared the crags for the occupation of the denizens of science.

In one of the most sacred nooks of my memory are cherished the reminiscences of the first night in which we invoked the rage of

Boreas. With great satisfaction we viewed our successful, nay, our super-successful efforts, in yoking such an immensity of storms overhead. Such was their violence, that telegraphic messages came from other citadels along the peaks, proclaiming that, as the insulation of some wires had been broken, it was found necessary to lessen the virulence of the storm. In another hour, notwithstanding this precaution, we received intelligence that the riot of the elements had caused terrible inundations. Apprised of this, we at once stemmed the storm and dispelled the clouds. When the sun raised the curtain of darkness from the stage of the country, what a scene was unfolded! The mountain-streams were swollen into rivers, precipices had become Niagaras, plains seas, and the surrounding cities Venices. The very success of our scheme had raised new difficulties. Stephenson Watt's intrepidity, however, soon supplied a remedy, by arranging courses for the artificial rivers, and enabling the great stores of water to bound and rush on in their headlong course, without overwhelming the haunts of humanity or the scenes of vegetation. Gradually the apparatus for all the various

meteorological purposes were improved, until the weather became a most valuable ally. The success of these measures being proved, the other armies introduced similar plans to forward the great work. Thus was the day portioned so as to economize labour. In the morning the mighty explosions were made which rent the Cordilleras and peaks. Simultaneously the chemical sluices were opened and streams of re-agents made to pulverize the broken rocks. Then were seen to spring from the surrounding plains, with a speed that might have made magic itself marvel, armaments mightier than the mightiest ever led by warrior. Glistening in the sun were the bright sides of myriads of trains of aluminium waggons. Rushing along the open country, with a precipitancy which made the heavens resound with noise, were mighty cohorts of elephants and beasts of burden. Darkening the horizon were armies of birds and fleets of balloons. Soon the imposing aërial and terrestrial squadrons had invaded the mountains, when the seeming confusion and wild uproar merged into most admirable order and discipline. Armies of chamois, llamas, and rhinoceroses,

which were laden and unladen by monkeys, brought on loads of rock towards the improvised railways. Here elephants were, with amazing sagacity, lifting into the trucks, by means of their trunks, the larger masses of rock, while birds of burden undertook the freighting of the smaller pieces. The trains of laden cars were then unspoked, and, by the force of gravitation, allowed to rush miles away to the plains below, where were the depôts for the distribution of the cargoes, and where great troops of the animal creation, in like manner, were rendering man equally valuable assistance. The alertness and expertness, the agility and prowess, of the lower creation evinced in this work transcended expectation. Gorillas and orang-outangs particularly bounded and scampered about with such celerity and dexterity, as contrasted strongly with the mincing steps, hobbling gait, and snail-paced movements of man. It showed how immeasurably astern of the brute creation was man in corporeal attributes; and that, but for his mind, he could not have maintained a place in the creation. Too stiff and slow to flee from danger, and defenceless to face it, but for his artifice

a few years would have sufficed for his extermination.

All day long full trains were rattling down the mountains and empty carriages were returning, the animal army all the while working with an industry that gave the waggons no rest. On proceeded these performances until the approach of evening; when the mighty array retreated to the plains. Now it was that the floodgates of the clouds were opened, and rain, falling all night long, sponged the lacerated sides of the mountain, deluged down the *débris*, and presented a fresh surface for another day's onslaught.

But our engineers still aspired after further improvements. The winds were the next agencies they drafted into their service. Erecting huge windmills, they caught the benefit of all the artificial breezes caused by the atmospheric machines, and bottled up the great stores of force with which they were thus supplied. Having increased the efficiency of these machines, they supplied themselves with a most powerful dynamical store, which, by the correlation of forces, they were enabled to transform and dispense at will as chemical

affinity for the chemists, as electricity for the followers of Galvani Volta, or as heat for the forces of Black Lambert.

Nothing possible was left undone or untried by the great iconoclastic armies. By day man, with his million of machines, thundered upon the mountains, and by night storms, tempests, and torrents acted as his delegates. The earth, indeed, had not journeyed two orbits ere these triumphant labours were fruitful in revealing numerous hidden Potosis and undiscovered Cornwalls.

CHAPTER VIII.

ZOOLOGICAL BUILDING.—ATLANTIC AND MEDITERRANEAN BRIDGES.

WHEN my short commission in the mountain army had expired, I studied theoretical and practical zoology. In this field of labour, I could not but draw my eyes pitifully to the times when the science was confined to the bare bones of nomenclature. Up to the nineteenth century millions of the lower animals roamed about wild—a terror not only to each other but to man himself. The great commonwealth of the creation were rebels from his dominion. What a physical force man thus lost! And why? Because civilization waged war against the world's Fauna. The *penchant* of those times was blood. The highest kind of game was man, and the highest order of hunters warriors. Then fol-

lowed the Nimrods of all grades, down to the sportsman and the angler.

Our times, believing in the sacredness of life, not only among men but the lower animals, view this ancient system with grief. Zoology has taught us that the members of the brute creation are not aliens but allies. Through its advance, the once savage beast is savage no longer. The science is exalted to that pitch whereby man has been enabled to resume his primeval sovereignty over the animal kingdom. Lions, leopards, and tigers have become beasts of burden. Armadilloes, moles, ferrets, foxes, worms, rabbits, and marmots are miners. Birds are messengers and musicians. Eagles, swallows, and ostriches are the Mercuries of man. Elephants and alligators are labourers. Fishes are sailors. That mighty sea-king the whale has got a hook in his jaws and a bridle in his mouth, and is trained to draw vessels. The coral by sea, the beaver by land, and the unnumbered genera of Crustacea and Molluscs in both elements are masons. The insecta are dyers, spinners, and wood-cutters. That erewhile loathed animal the spider is a weaver of un-

rivalled fabrics, and might again challenge a Minerva to equal it in this craft. Rats are scavengers, moles and mice irrigators, beetles enamellers, while monkeys work in every trade. Even the once-detested bugs and lice have their employment; and every animal, from the amaiba to man, has its mission. But zoology has also taught man how to rear stock. As the cultivated surpasses the wild rose, so do the splendid breeds of modern thoroughbred animals excel the specimens of olden times. Eagles are now so powerful that boys can ride upon their necks. Some varieties of modern oxen are as fleet as the once-famed Derby racers. Others are stronger than the most powerful dray-horses of ancient times.

Physiology has likewise promoted the interests of zoology. It has taught men to acclimatize Polar beasts to torrid zones, and tropical animals to the frigid regions. Witness, too, how proper training has made peace reign over the great commonwealth of zoology. No longer does one race of animals live upon another. Vultures fare no more on carrion, eagles on lambs, or the lion on prey. Uni-

versal concord rules the animal kingdom. The prophecy, that the lion would fraternize with the lamb, has been fulfilled.

While in the zoology class, I, along with the other pupils, received great facilities to study the practical part of the science. We were engaged in superintending the plaster-work by barnacles of many of the Adriatic bridges, and took part in the instruction of the arachnida and many other species of insecta in textile manufacturing, in addition to various zoologico-engineering, zoologico-architectural, and zoologico-mechanical undertakings. The most important of these was the Embassy, which, by means of immense beds of oysters, mussels, periwinkles, and snails, conducted the alterations and repairs on the Panama Straits bridges. A few weeks sufficed to veneer them with the shelly layers desired, and a few days more saw their ornamentation completed. The beauty and strength of the work were such as brought the bridges up to the zenith of modern excellence.

When further advanced in my studies, I assisted in one of the great enterprises of the

times, the elucidation of the language of the brute creation. Adam unquestionably understood their vocabulary, and research ere long shall doubtless put us on a level with our primitive parent on this important point. Thanks to the efforts of philosophers, we are now supplied with a key to the rudiments of the zoological language. The successes of our specific efforts are well known, and they shall be heralded with praise when all the infernal squabbles of the ancients, known by the name of Trojan and Punic Wars, the Crusades and Continental campaigns and invasions, shall only be remembered as the scourges and curses of bygone history.

In the course of our studies we were taken to these masterpieces of zoology, the Atlantic bridges, and received there practical illustrations of the different species of masonry constructed by the molluscs and others of the humbler members of the zoological constituency.

What a mighty enterprise—nay, what an aggregation of enterprises—is each of these bridges! Man unaided could not have built

them in centuries, but with the assistance of the lower animals the great cumulation of work was focussed into the limits of a few years. Sublime was the conception to muster coral from the South Seas, crustacea and zoophytes from every shore, whales from Greenland, fishes from every ocean, to concentrate them in the line of operations, and make them subservient to all the purposes of aquatic building. Triumphant was the success by which the crustacea and molluscs, and all shelled animals were insensibly not only taught the art of masonry, but how to render their own secretions their material, and their own viscera their quarries. By most ingenious physiological measures these secretions were increased, and the work correspondingly expedited. View the mighty results which proceeded from this knowledge and these discoveries! Millions of corals, spitting out their excrements, formed the piers of some arches. Billions of diatoms and the foraminifera, legions of oysters, cockles, barnacles, whelks, limpets, and mussels, discharging from their entrails stores of solid masonry, soon added their stones—to wit, their own shells—to the cairns.

Thus were the piers of these mighty bridges the work of animalcula and molluscs, whose only tools were their own organisms, and whose only bricks were their own teguments and excrements.

The whales, sharks, and dolphins were commissariats, who bore huge trains of provisions for these geological labourers and masons; and the smaller fishes were engaged distributing the supplies.

When the aquatic masons had built up the piers to the surface of the water, naturalists brought forward land-masons in the shape of hosts of aves and mammalia, insecta and mollusca. The railways groaned under the weight of the snails, gastropoda, tortoises, and armadilloes, sent on hourly for week after week. Flocks of birds arrived apace from all quarters of the globe, under the command of the most distinguished ornithologists. Two millions of men superintended the mammoth undertakings, who manned the largest etherial navy that had ever been engaged upon one work. Daily as the mighty machinery of men, animals, and instruments became mightier, the operations veered towards simplicity. Difficulties melted like mist before

the powerful array of talent. Every day saw new crops of improvements and inventions harvested and appropriated. Every day added strength to the hopes of the architects.

The extraordinary strength of some of the coarse-shelled molluscs being noted, the abutments and central parts of the piers were rendered the sphere of their operations; while the more polished deposits of the tortoise, the mussel, and the oyster, and the pearl secretors, gained for them the mission to enamel and veneer the rough work of their fellow-tradesmen.

The first bridge, though the smallest and most humble of the seven, was the noblest in respect that it inaugurated the great achievement of making the vast kingdom of zoology subservient to the purposes of architecture. As the humble engine of Watt is more renowned in the eye of fame than the thousand elephant-power machine of our day, so this bridge, though now infinitely outstripped in elegance and strength, will be enshrined in the temple of fame as the most celebrated of all zoologico-architectural undertakings. History

shall ever delight to tell how, as year after year was added to the conquests of time, the piers saw beauty joined to their strength and strength to their beauty. Over a wider field than could be grasped by a thousand different eyes at a thousand different spots, rose out of the water the huge pillars, each crowded with the denizens of the field, surrounded by flocks of balloons and birds in mid-air, fleets of vessels on, and shoals of fishes and submarine crafts under, the water. At length the lower animals had all but completed their wondrous commission, and, as if satisfied with their labours, extraordinary was the extravagance of their gambols and frolics. The linnets, larks, and nightingales sang with greater glee; the eagles, albatrosses, and condors flew about their work as if embued with a new energy; while the flocks of the other animals frisked about as if to add their testimony of delight.

The artillery of science was now forwarded to span the pedestals already raised. The mightiest agencies in the world were brought into requisition, and mountain loads were raised and adjusted. The gigantic feats outfabled

fables themselves. Millions of kilomètres of cobalt chains, millions of acres of adamantine flooring, and millions of tons of alloys were used in the great work, and duly built into position, tested, and found satisfactory. In a few years, to the joy of the world, posterity had received one of its grandest legacies. Europe and America had been knitted by this marvellous zoologico-architectural isthmus. The day of the bridge's opening was one of history's red-letter days. No fewer than forty millions crossed in the procession from Europe into America, and an equal number in the procession from America into Europe, each of which comprised forty thousand three-story high carriages and one thousand locomotives, and in length extended over thirty miles. Triumphant were the journeys. Fleets of vessels, from one to a hundred thousand tons burden, decked with bunting, lay on each side of the bridge, or were passing and repassing through its capacious arches. Armaments of balloons filled the air, burnished with embellishments; while the mammoth menageries of animals, erewhile engaged in the work, were present to add to the spectacle. Birds sang,

dolphins gamboled, sharks playfully wriggled, and the mighty army of leviathans disported around the scenes with their nasal fountains in full play.

The splendid success which crowned the building of the first bridge formed only the prelude to greater exploits. Bridge followed bridge, each grander than its predecessor. All the beauties of architecture found their way into their formation. Every successive bridge was more and more enriched with the garniture of splendour, until the seventh, which was forty times stronger, four times broader, and infinitely more beautiful than the first, though its construction only occupied one-seventh of the time.

O noble work not built by hands, yet planned by brains! For thee no quarries were disembowelled, nor forests felled. As with Solomon's Temple, so with thee, neither the sound of hammer nor axe was heard during thy formation. For thee no mortar was required, nor elaborate scaffolding. Human hands neither chiselled thy sides nor built thy piers. No. Thou art mountains of excrement. Thou wert formed by the plasmic power of the

lower animals ; and yet such achievements in symmetry, and such feats in beauty ! Steered by the helm of Science, and impelled by the oars of Art, to what perfection has Nature been impelled !

CHAPTER IX.

LIONIZING THE WORLD.

In politics, my first lessons took the form of travel. I joined the peregrination class, of one thousand pupils, under Cobden Bright. As an humble memento of my respect for my teacher, I will sketch some of the details of our sojournings. In this pleasing duty, I cannot hit the eye of my purpose better than by making the following lines a setting for the various gems of his observations during this time. In setting out, we took the marine route. Boarding our steamer at the Lyceum, our Mentor gathered us around him, and taught our eyes to see, and our minds to perceive, judge, and reason.

"About to make a few windings," he said, "round this small ship in the solar fleet called the earth, and to view the scars and vestiges scraped or scattered upon it called wonders, let

us ever keep open our eyes and ears, these portals to the granary of our brain, for thereby we may glean a rich harvest of information. When we consider that Time in ancient days plundered in a million preventible directions from travellers, and that weeks were wasted in prisons on wheels, months frittered away in marine lock-ups, and that man was then but a crawling crab at the bottom of the world's aërial ocean, without the capacity to soar or the power to burrow, we see how mighty are our opportunities, and therefore how deep our responsibilities. Speed has so mended its pace, that science, with its seven-league boots, can give us our breakfast at the North Pole, and our dinner at the South Pole. Already the scene is suggestive. See how, in our electrical steamer, we are flying past those myriads of crafts, through those artificial rivers, below those jewelled bridges, and amid those luxuriant buildings and gardens. But, behold, we are emerging into the Sea of Marmora, where we view around us vessels compared to which the Great Eastern of ancient times was but a pigmy. Survey one of the first-rate ships of our times. Its deck is covered with gardens and hamlets,

and teems with a city of inhabitants. In size, it is a floating island; in resources, its hold and decks are mines and storehouses. Its machinery is a whole range of engines. Of paddles, it has dozens. Manned by an army of sailors, some on horseback, and others who are accoutred with electrical wings, its power and force are such as only to make frolic with the hugest of breakers. The great triumph of navigation, however, now lies in its perfect safety. In past days the seas were crowded with rocks, reefs, shoals, and sand-banks. Millions went to sea to find their grave. Rivers of bitter tears have flowed over the tragedies of seafaring life. Full many Euphrosynes have been changed into Niobes through the woes thus engendered. Not till the blessed era of universal peace, when the stagnant pools of perverted work were drained towards channels of usefulness, was commenced the enterprise of improving the highway of the seas. Science, then, with divine energy, burst the rocks and cleared sea after sea of its snares. The end was gloriously crowned by having the coasts margined with soft material, on which it was impossible for vessels to be wrecked. Simultaneously, man's conquest over the

elements by means of weather-works erased shipwrecks from the catalogue of man's vexations."

Having reached Greece, we disembarked. Bright thus philosophized over the thoughts conjured by its scenes:—"Where are now the isles of Greece? Alas for poetry, but all hail to science, they are coalesced into the mainland. Like all isles, they are obsolete. Bridges and artificial isthmuses have transformed them into peninsulas. Witness the triumphs of science, and behold how its revolutions are reformations. The Suez Canal and its development into the Suez Straits transformed the peninsula into the island of Africa. But the wheel of time has re-united the continents by means of ten mammoth bridges. Look at the Mediterranean, and compare the charts of the nineteenth century with those of our day. Its islands are affiliated to Europe. Note the atrophy suffered by the Black, Caspian, and Adriatic Seas, and the corresponding hypertrophy undergone by the land. Seas are dwarfed into narrow friths, and the whole land is irrigated by artificial rivers. Lakes are obliterated, and islands wedded to the mainland."

We now hurry on by one of the Africo-European bridges to Africa. Africa! What libraries of meaning slumber in this word! Formerly an unknown and untrodden region, abounding in deserted deserts, every acre of its surface now yields its increase. Famed among the famous are the pioneers who pierced its arcana. Above that of conquerors, their glory equals that of a Columbus. Bruce, Speke, Grant, Baker, and Livingstone are names which even the ravenous tooth of Time shall not tear. Dissecting the geographical viscera of this mighty continent, their researches foretold how the hitherto unknown heart of Africa would pulsate with the full vigour of commercial life, and that its aorta, the Nile, would teem with navigation.

Having reached Cairo, we cast a sneering eye at those poor pigmy attempts at massiveness, the Pyramids. How insulting to the pride of the ancients that our age, by means of its monstrous machines, could take them down and re-erect them in half-an-hour! We next hie to Thebes. When here could our memories fail to burn with remembrances of the ancient city with its hundred gates, or could our hearts fail to swell

when we thought how, at the sound of a second Amphion's lyre, Thebes redivivus arose to eclipse its predecessor, and to take its place as one of the gems of the geography of the millennium?

Going on by Abyssinia, we behold the beautiful country of Sahara. Bright waxed eloquent as he told us how an Eden had been made of the desert, and how the prophecy had been fulfilled, that "it would rejoice and blossom as the rose." In its metropolis we spent the night, and next morning we set out for the Cape of Good Hope, paying a visit to the peninsula of Madagascar in passing. We afterwards travel by the Pacific Submarine Railway to the South Sea Continent. Lastly, we hurry on to the South Pole, where we stop for the night to admire its city and its observatory, with its golden circle, whose centre forms the exact axis of the earth.

While here, our Mentor, in speaking of travelling, said, "Up to the nineteenth century it was a penance plus peril. There were collisions by land and shipwrecks by sea. To cross oceans, one was pent up in an aggregation of planks sometimes for months without ever

seeing land, and burdened with the horrors of exposure, scanty victuals, sometimes starvation, and often disease. Railways then, though powerful agents according to the small ideas of the times, were merely embryonic. In the great march of railway reform, full many a difficulty was bridged ere the culmination of the underground system, by which the earth has been completely honeycombed and mutilation and waste of its surface avoided."

Our teacher then dilated on the mal-management of the ancient railwaylets. "Transit systems," said he, "then belonged to hundreds of different and indifferent hostile companies, whose aim was usury, and whose enterprises were always speculations and often peculations. High fares, yet small dividends, discordant arrangements, an endless array of officials, and yet an endless succession of shameful accidents, were the attributes of this *impolitic policy*. The first step in the creation of order from this chaos was the growth of the rudimentary schemes of these stockbrokers into great national railway reticulations, and the last step was the consummation of the present cosmopolitan system —a system which presents in its simplicity

a mighty clockwork. The movements of trains, like those of stars, are the embodiment of harmony and synchronism. The pulsations of the great arteries of trade in the world's anatomy beat with faultless normality."

"But roads as well as railroads," he went on to say, "were pilferers of the soil in those days, to keep up which there was an unpalatable impost, which, like the generality of imposts, saw the lion's share of what was collected going to the private pocket of the collector. Totally reversed is the modern plan. Nature's carpet, cultivated in a peculiar way, is our highway. Nature alone is our road-repairer, so that the dark ages of tolls, road trustees, stone breakers, causeway cleaners, and horse-shoes are ended.

We now take the wings of the morning to fly to the uttermost parts of the seas. Descending to the South Pole subterranean station, along with 4,000 passengers, we enter an itinerating town of carriages, and, regaled by music, are soon bowled along at the rate of 1,000 kilomètres per hour below the Pacific Ocean. In a few hours we stop, when we evacuate the wheeled

buildings, ascend to the earth's crust, and find ourselves in Iceland—an ice-land no longer. Having surveyed its sights, we embark with 1,000 miscellaneous passengers in a ship towed by fifty whales. After various excursions about the Arctic Regions, we land at the North Pole city. The journey hither seeming so simple, I wondered how men had lived and died for 7,000 years without viewing the world's pivots. A panorama of historical pictures rolled before my mind's eye when I remembered how Franklin and many others, in their endeavours to reach them, only reached martyrdom. How malignant were the elements in those days, and against them how weak was man's defence! How different from the present, when caloric works have smothered the rage of Boreas, and when, clad in caloric-proof dress, man can brave a temperature that would melt metals or freeze alcohol with as much ease as though he only experienced summer heat!

Next day we reconnoitered the cities of Greenland and inspected those great caloric depots by which a mild climate is produced in the frigid zone, and by which artificial sun-light

is produced during the darkness which broods here half the year. During the two days we spent here we had submarine excursions on whale-back or in diving-bell-boats driven by walruses,—in the course of which we inspected the rich bed of the Arctic ocean. Visiting thereafter Hudson's Bay Territory, our cicerone, by making us contrast antiquarian with modern maps, showed us the wondrous change man had made on the geography of this district.

Having sailed on by the North-West Passage, we landed on the west of North America and spent the evening with one of the many divisions of the mountain iconoclastic army. The following day we witnessed some triumphs of modern agriculture. Boundless prairies, where only grass grew and buffaloes lived, we saw teeming with the richest of Ceres' spoils. Sailing on by the Mississippi to the St. Lawrence in a vessel towed by salmon, we pay our tribute to the genius which had married these noble rivers. Reaching the Canadian lakes, we glance over the mighty topographical revolutions here, and then cruise along one of the many artificial rivers which join the Atlantic to the Pacific.

The following day we are in the other hemisphere. By one of the sub-Atlantic railways we travel to Amsterdam. Our forces thereupon donned their aëronautic equipments and flew in a covey to the carnage field of Waterloo. Thence we hied to Rotterdam, and, by way of variation, we rode up the Rhine on the backs of porpoises. Having arrived at Strasburg, and having contemplated its ancient cathedral,—now a beggar and a dwarf among modern buildings,—we re-arm ourselves with wings and fly to the shambles of the mighty slaughter of 1870 and 1871. Forbach, Wissenburg, Metz, Gravelotte, Sedan, Orleans, and Paris, where Moloch had so triumphantly celebrated some of his great gala days, are successively visited; our Mentor showing us as we proceed the course of the armies that heedlessly as needlessly sacrificed their thousands at the altar of ambitious kingcraft. "Alas," he moralized, "battle-fields were the playgrounds of kings, but the purgatories of the people. O war, where is the measure whereby we may compute thy crimes and vexations? The sight of thy enormities might curdle the blood in the very chambers of the heart. The spectacle of thy maddening

evils might convert a Democritus into a Heraclitus."

In Paris we view these Ionas of France—Notre Dame and the Louvre. There they stand dark and grim hovels, while all around is glitter and magnificence. Yet it was well to spare these piles. Representing mediæval architecture, they stand as a landmark to show the immeasurable advance of art. Formerly Paris's grandest spectacles, they are now France's meanest. They are the monuments of the artistic pauperism of those ages of which they were once the pride.

Next day we proceed to Switzerland, where we spend a few hours in examining the operations at present in progress for the removal of the mountain chains. What mighty gaps, fearful chasms, stupendous precipices, and horrible devastation the work has caused and is causing! was our ejaculation over the wondrous scene.

The following day we review in their chronological rotation the scenes embalmed in the history of the world's boyhood. Among other cities, we scrutinize with the vigilance of an Argus modern Troy, famed for its Hectors and Priams in science. The fall of the original

raised the sad moral *Troja fuit*, but our age can again say *Troja est.*

After wandering the many years' journeys of Æneas, in a few minutes we find ourselves in Rome. It was the passionate wish of St. Augustine to have seen the Eternal City in its imperial glory. How much more intense would have been his longings to see it now, when its so-called Augustan age has been so completely out-Augustaned!

Taking the track of Scipio, we are soon in Carthage. The Hannibals, Hannos, and Hamilcars of war produced the downfall of the ancient city. But the Hannibals, Hannos, and Hamilcars of science have not only effected its regeneration, but invested it with perennial distinction. "Carthage has fallen," was the sigh of the ancients. "Carthage has risen," is the exultation of the moderns. Persepolis, Ecbatana, Pompeii, Alexandria, and other cities are likewise embraced in our tour, — cities which, though desolations in the Middle Ages, have, phœnix-like, risen from ashes.

The following day the intricacies and advantages of the pneumatic railways were explained. Cobden Bright showed that by this system

limited traffic was compensated by unparalleled speed, and that man, through its agency, actually possessed the hat of Fortunatus, which enabled him to be transferred almost instantly whithersoever he desired.

Siberia, this erewhile sterile, but now lovely, land, is next invaded by our sight-seeing band. Its prolific plains, pregnant with the burdens of agriculture, breathe into the soul the fragrance of joy. Little did I think as I, along with my friends, traversed this luxuriant garden that I would in future be its President. We next change our camp to China and Japan, where we remain two days. At Hong-Kong we bid farewell to this region, descend to the station, and are forthwith spun round the curve of the Pacific by the China to Peru Railway into South America. Arrived here, we ascend its mountains, inspect its volcanoes, sail down or up its great rivers, and review the wondrous machinery of its commerce. What changes time has wrought on this once-stagnant land! Its volcanoes are caloric depots, its pampas are paradises, and its llanos Elysia. The noble Amazon, erewhile spouseless, is now joined in geographic wedlock to the Orinoco, the Rio

Grande, the Parana, the Rio de la Plata, and its other neighbouring rivers.

In subsequently crossing the Straits of Mexico by one of the Panama Bridges, our pitying admiration shed a tear for those men who unsuccessfully strove to open this door to two oceans—this clasp binding two continents —this Suez of the Western Hemisphere. Could sympathy fail to remember those noble Scotchmen, greater than their countrymen who fell at Bannockburn, who here became martyrs to the Darien scheme, and whose bones were left to bleach unavenged on the belt of land they had hoped to cut.

This ended our excursion, and we therefore entered the underground railway here, and in a few hours more were in the Lyceum.

Thus, after making the tour of the world, we returned to our head-quarters, our sympathies enlarged, and our minds enriched. In a few days we had travelled more than a man in the nineteenth century could have done in a lifetime. We had seen all the world's lions, had skipped round and round its circuit as if it had been but a few kilomètres in diameter, and had

stowed an infinity of valuable information into the bunkers of our memory.

My narration now arrives at the date November 19, 2794. Then was the enterprise commenced of having a complete control over the temperature of all climes, and of making the earth's caloric subservient to universal use in the mechanical world. In the mighty army of *savants* who superintended the scheme, I served in the detachment which, under Fahrenheit Centigrade, had allotted to it the onerous, and therefore honourable, task of investigating the economy of volcanoes. The heroic nature of our labours, and the victorious sway of our researches, being already recorded in the register of history, require only a summary reference. On March 22 in the following year, our centurion brigade, armed with fire-proof habiliments, entered the door of the fabled workshop of Vulcan—the umbilicus of the world, the crater of Mount Etna. Performing the great feat of Empedocles, how different was the result! The magnificent boldness of our explorations, mile after mile, through the molten regions, our wondrous adventures, our still more wondrous discoveries in this fiery

country, and, at last, our re-appearance upon the earth's crust at the crater of Mount Vesuvius, at the end of our subterranean sojournings, are as pregnant with instruction as romance. The feat, unparalleled in history, did not incur one iota of danger. Our amazing scientific inventions enabled us to swim with ease through the white-hot region, and rendered us Shadrachs, Meshachs, and Abednegos, upon whom fire had no effect. By means of these and similar bold explorations into the fiery entrails of mother earth, our army stormed the heights of their purposes. Caloric emporia were established in every latitude, thermal springs and geysers introduced into every town, and an unlimited supply of caloric force supplied, not only to every factory but to every household. In my later labours upon this distinguished phalanx of *virtuosi*, I invented the means to form an artificial lake of fire near the thermal works of Greenland, by pumping up caloric from the earth's yelk. I was promoted for my invention, and appointed to supervise my scheme. The fiery lake was accordingly formed under my directions. The magnificence, joined to the utility of the undertaking, brought upon

me an unexpected share of public notice. Finished, millions flocked to the artificial Gehenna. A lake of fire had hitherto been supposed peculiar to Hell alone. Here, however, was one of immense magnitude, surrounded by an embankment resplendent with gems, and skirted with fountains and cataracts, vomiting forth white-hot molten liquid. The scene formed the brightest page in the history of illuminations. Pyrotechny, though an art, which dated from the moment in which Adam made his first fire, triumphed here over all its past triumphs.

But the caloric reformation achieved still grander conquests. As politics had seen the rugged inequalities of society smoothed and a universal community of goods and virtue established, art now so adjusted the disparities in climate as to introduce a uniform temperature throughout the world. The former crude measures of tugging icebergs to the Equator were rendered obsolete. Thermal depôts were so numerously established that ice was no longer produced by nature, but only by art. The Arctic and Antarctic regions were heated by the overplus of warmth in the Tropics, so

that 2800 saw the last winter in history. Then, for the last time, the dying year was swathed in a winding-sheet of snow,—then the icy monarch unloosed his frigid grasp of the two Poles for ever. The whole world was now isothermal; Greenland was rendered an Italy, Iceland an Elysium, and the Frigid and Torrid zones were now only frigid and torrid in name.

CHAPTER X.

ANCIENT SCIENCE.

Two years more had been swallowed up by the maw of Time, when I published the marrow of my meditations on science and literature. Abounding with the precipitate reasoning and plethoric periods so characteristic of a young, fiery, undisciplined pen, the book's faults are such as I need not excuse or palliate.

This is the book's prologue:—

"Science, in its infancy, had to encounter the storms of sophistry and the winters of indifference. Its beginnings were a few seeds of truth, hidden amid the chaff of fallacy. The cruel curb of ignorance stifled its growth, until, like infantile Hercules, it strangled the serpents of error and amazed the world by its victories. Making inroads into every hole and corner of Nature, it showed that the universe was an organization of Divine wonders, embracing

millions of harmonizing phenomena, all in tune with God's eternal and irrevocable purpose. Yet philosophy had bastards in its apprentice days, who affected to draw logic from absurdities, and truth from sophistry. They essayed to make Science spit in the face of its twin-sister Religion, though truth told so boldly how science was the religion of God's physical laws, and religion the science of God's moral laws, and that both were chords in Theology's harp, striking different yet concordant sounds."

Agriculture, as the first-born of the sciences, I first review. Narrating its imperfections before Ceres supplied sufficient stores for every stomach, I lamented the ignorance of the times in suffering from drought when three-fourths of the world's surface was covered with water; from want of sun, simply because it was veiled by clouds; and in enduring famines, when such immense territories of the world, cultivatable, were uncultivated. By the elevation of Adam's profession to the modern standard, I showed how billions of plants sprang up where none grew before, and corn flourished where formerly were weeds.

Touching geology, and descanting on the first chapter of Genesis, as the *vidimus* of a work which took millions of years to fulfil, and would take a library of volumes to detail, I dwelt on those advances in science by which the dates of rocks can be as accurately ascertained as those of history, and finished by alluding to solar, lunar, and stellar geology.

Treating of chemistry, I demonstrated that its systems of analysis and synthesis were the two sides of its ledger; that every substance had a threefold form—as a solid, liquid, and gas—and could be as easily reduced into its elements as a word into its letters; and that chemical compounds were built, like houses, upon plans, and that by a knowledge of chemical architecture the elaborate perplexities of organic substances could be easily unfolded. Though there could be mustered such legions of substances, that a census could only be taken by the laws of combinations and permutations, I showed how modern notation—the alphabet of the science—was a key which opened the door of its difficulties, and reduced intricacy itself into simplicity.

Of medicine I say,—"Horrible and deplorable

were the ravages of disease in pre-millennial times. Medicine battled in vain against the hosts of maladies, epidemic and endemic. Violence slew its thousands, preventible diseases their millions. Youth and health themselves had no panoplies against the shafts of death. Gouts attacked the rich, rheums the poor, fevers both, while pestilences, with their mitrailleuse shafts, cut off their hundreds in one sweep. Strumous and debilitated constitutions were found in every family. There was none but had his *tendo Achilles* vulnerable to Disease's arrow. Germs and Vibriones, the messengers of death or disease, travelled in every breeze. By reason of this dire mortality, husbands and wives, parents and children, were untimely wrenched from each other; and to remedy the irremediable gaps, there arose complex relationships, which oft rendered life's tragedies more tragical. Second, and third, and even fourth marriages, step-mothers, step-fathers, and step-sons, and other alloyed alliances, were formed, often only to snap former ties.

The treatment of cases rivalled the diseases in point of horror. The incisions, excisions, extractions, and the "toomies" of the times

might have sickened a Pluto. Limbs were frequently blasted off entire; bones, eyes, and tongues were excavated, and the whole body quarried, mined, furrowed, and bored by the sappers and miners of the human frame. The very thought is almost an emetic.

"But now that the air is purified, and the body no longer beleaguered by the invisible vibrionic pursuivants of Death, the age of medicine is past. Science has confiscated the contents of Pandora's box. Asylums, hospitals, dispensaries, life-insurance companies—institutions which flourished when life was unstable and disease ubiquitous — have all expired, because people now live long, and only die of authanasia."

Concerning the consanguinity of the sciences, I say,—"Amid the peerless beauties of Nature's plan, how sublimely marvellous is the correlation of forces. Wonder itself wonders to be told that galvanism, electricity, heat, chemical affinity, and friction, are but transformations of each other, and that all are but the various *rôles* of the versatile actor—force proper. This knowledge was the key-note of a scientific revolution. Man, armed with new power, was

now enabled to bottle up 1,000 leviathan-power force into a cubic mètre, graduate it at will, and use it as whatsoever force he pleased."

Touching the short-sightedness of science in its infancy, I say,—"Ignorance cast nicknames at the most useful things. The epithets dregs, dross, scum, and scourings, were applied to what a statesman of the nineteenth century rightly declared to be matter in its wrong place. The bye-words 'weeds' and 'vermin' were, in like manner, applied to what were flowers and useful animals in their wrong place. Such misnomers were treasonable to the King of Kings, who made all things perfect. To the thrifty eye of Nature, in its scorn for expletives, even putrefactions, excrements, and garbage are valuable, for they are the food of its inanimate masterpieces."

I next review the geography of the infinite:—"When the infant world wore the swaddling-clothes of ignorance, astronomy was invested in the superstitious mantles of astrology. The very men who ought to have been liberators of truth were champions of falsities. Galileo, for raising the standard of that sublime truth which proclaims Divine omnipotence, was cast

into jail by a base theocracy. Better wert thou, oh, Galileo, enthralled in the dark, dreary, and damp dungeon, than those unpriestly priests who stifled knowledge. Thou in the prison wert free, and had the rays of a grand truth beaming upon thee that would irradiate thy name for ever, while thy detractors, amid their pomp and power, were the slaves of prejudice and the cat's-paws of ignorance. Thy body, oh, Galileo, that evanescent admixture of dust, thy mind's earthly lodgings, was in captivity; but thy immortal soul was free, and its emanations radiating amid the boundless realms of immensity, and luxuriating in discoveries too sublime to be understood by the lackeys of bigotry.

"Shame upon thee, oh, priestcraft, for thy defections and deflections from truth, and for thundering thy bullying bulls against the great verities. But, alas! as inimical to justice and right were oft the canons and bulls of the priests as the cannons and balls of the professional murderers. But why waste words upon those who, while they credited absurdities, would have denied axioms, and who, in their proud perversity, would have preferred the

false glare of a tallow-candle dogma to the sunlight of truth."

Further on my pen travels over the following ground:—

"What flows from our researches into astronomy, up to this the latest breath of time, but the overwhelming proof of the boundlessness of space, and the infallibility of those movements which have made the universe a wonderful machine, whose wheels are planets, whose pivots are suns, whose systems are clocks and almanacks, and whose worlds are locomotives brimful of fire? Unerring mechanism rules the gyrations of these stars. Millions upon millions in number, each has its incomprehensibly long orbit, and not one finishes its circuit a minute too soon or too late, nor diverges one inch from its predestined path. Synchronism itself rules the speed and geometry the direction of those mighty volutions.

"Triumphant inquiry, forward with your scientific batteries, armed with all the equipments of ingenuity, and manned by the full muster of the world's intellect—launch your sorties into the regions of doubt and darkness, and raise the standard of knowledge on new

intellectual territories. Proud man finds in knowledge the best agency to keep him within the holy frontiers of humility. Is not the obscurity of our worldule a rebuke upon man's arrogance? It is a mere drop in the boundless oceans of the universe. As our moon circles round the world, and the world around the sun, the sun is mayhap a mere satellite, revolving with its retinue around another superior body, which superior body, with its countless secondary and tertiary bodies, is perchance itself only a sub-sub-sub-ordinate system. This arrangement of sunules round suns, and suns round archsuns, and skies round macrocosms mightier still, seems to be a feature in the architecture of infinity. Secondaries roll round primaries—primaries which are themselves the secondaries of the secondaries of secondaries. Let our soul travel in thought to the focus of those vast gyrations, the great heavenly axis which forms the nucleus of infinity. This is the shekinah of the universe, a shekinah before whose immeasurable immensity arithmetic stands aghast, and whose grandeur blinds the frail eyesight of human conception. Enthroned here, God views an eternity of space, and an eternity of

time, and rules with unfailing wisdom the intricate rotations of those unbounded realms through unbounded time—nay, the millions of billions of details peculiar to each of those millions of billions of worlds. Compared to thee, the stars of our firmament are but a few molecules in heaven's anatomy. They are mayhap mere sparks, which have scintillated from the forging of the great central heavens. Oh, great metropolis of immensity! contrasted with thee, the regions of man are but the abode of worms—worms, but worse than worms in presuming to be aught else. Human computation cannot conceive of the number of thy citizens—who are angels, nor thy cities—which are Jerusalems! Clothed with a million superhuman attributes, thy heavenly inhabitants stretch their eye to that dot in creation which is our worldkin, and view our most noble achievements as the throes of grasshoppers."

CHAPTER XI.

ANCIENT LITERATURE.

Coming to metaphysics, I showed how it was not till war had fought its last battle, and the bleeding wounds of humanity had become convalescent, that the mind of man was enabled to cultivate its territories. After posting through the fields of science, my pen arrives at literature, in whose honour it paints the following florid picture.

"Thou art the casket of the jewellery of thought. Thou art the palace built with mental masonry, in which are preserved the creations of mind. Ten thousand pen heroes have been thy architects. Thine are the Corinthian beauties of poetry, the Ionic solidities of philosophy, and the Doric elegance of historiography. Whether we view thy holy of holies, the classics, with their massive symmetries and gorgeous beauties, or thy entire erections, from the majestic fabrications of genius to the crowded

edifices of mediocrity, admiration must stand astounded before thy accumulations of the achievements of intellect. From the domes and spires of sublimity to the outhouses of promiscuous dissertation—from the chisseled excellences of talent to the amorphous verbosity of newsmongery, what an amazing miscellany of marvels dost thou comprise!

"Thy triumphs were mighty even when the sons of Adam were in their thoughtless boyhood, and when Satan had indentured them to an apprenticeship of broils, wars, and infamies. When ignorance was man's loadstone, and hell society's magnet, and when man's barbarism was irrigated by the blood-stained stream of human events, thou wert the instrument to proclaim 'peace and goodwill among men.' And, like all heavenly blessings, thy light glowed in the valleys of humility, while the peaks of ignorant pride were left cold and barren. Structures of the brain, comprising the true wealth of this world, were, even in barbaric times, ungrudgingly dispensed over the commonwealth of mankind. A few pence could purchase the whole produce of Shakspeare's wondrous brain factory and the works

of men like Milton, Dante, Bunyan, Cervantes, and Cowper, though works more majestic and more enduring than the greatest cathedrals of the architects were cheaper than toys. Even when false prophets mustered their thousands, idols their tens of thousands, and Christ only his tens, who in Christendom had not his Bible? Never did mercenary ages see a nobler bargain to the purchaser than the Book edited by God, and enriched by the heritage of saints and prophets, selling for a few pence."

Further on, I picture the wide but shallow stream of the "Belles-Lettres" in the nineteenth century.

"Flimsy profuseness was its weakness. It was the counterpart of our age when productions only find a passport through the portals of distinction, after being smelted in the furnaces of thought. Authors were then successful according to the speed with which they span their mental yarns, and according to the sensational texture of their fabrics. Cant and rant best suited the perverted palates of this period. Consistent with the age's inconsistencies, heroic mental expeditions into the unexplored provinces of thought excited little interest, while

the vagaries of the harlequins of pencraft were applauded by multitudes. Deep pensive work by the richest brains commanded but a poor quotation in the mart of letters, while crowding myriads eagerly invested in the frivolities of fiction or the frolics of farce. Talent was prostituted to Mammon. Amid the multiplicity of authors and authorlets there was scarcely a teacher. The pen, however skilfully wielded, surely beat the air when it pointed not, needle-like, to the polestar of progress as regards this world and the polestar of holiness as regards the next. Brains were mulcted so fearfully to produce the greatest amount of literary ware, that their force was dissipated in the deserts of quantity, instead of being treasured in the gardens of quality. What skull ever enclosed a brain that could possibly fill three volumes of thoughts worthy of being deposited in the sanctuary of literature? Authors who aspired to do more were like the frog, who, for want of substance, substituted wind. What folly for a man to write a hundred books, when all the rich thoughts his brain ever hatched could be compressed into as many pages. Philosophy itself suffered from the obesity of

ancient literature. In those ages when even the most aged scarcely lived the short period of one hundred years, when man's active service in the campaign of life was actually curtailed, by infancy, dotage, debility, and disease, to a few years, scientific books overloaded libraries, and defied more time for their mastery than any human being could afford. One fact was diluted with a hundred surmises; one truth was watered with a myriad of theories and hypotheses. The world saw the sad incongruity —life short, and text-books long."

In my remarks on literature's artillery—history, with its ponderous volleys of human action—I say:—"History is the cemetery of the past. Its archives are the mausolea of bygone deeds, and its pages the inscriptions and tombstones recording its data and dates. What moral can we extract from the contemplation of this vast sepulchre of human records, save the sad story of a race which, till within the last few centuries, has as determinedly broken all the commandments as Moses broke the tables on which they were written? For centuries, even of the Christian era, the world was within the fiendish claws of the devil.

This hellish hold was never more spasmodically tightened than when the irruptions of the Goths, Vandals, and Huns, like a second deluge, nearly annihilated Christianity. The Bible was the ark, and Christians the Noahs, that escaped the flood of barbarism, and Britain and Germany were the Gospel Ararats. It was a second Red Sea scene in history, when the world, aroused from the lethargy of 7,000 years, arose, and, led by a second Moses, re-established the standard of Christendom. Oh, noble work! The blood of Christians was not here weighed against the blood of infidels in the unjust balance of war. No. Irreligious religions melted not before the thunderstorms of battle, but before the still small voice of Christian intelligence."

Of Laurence Koster, I say:—"His name is as conspicuously niched in a temple of fame as that of the leaders of war-herds on the pillories of infamy. He gave literature a tongue and a memory. The world, by his instrumentality, instead of a lisping prattle, began to speak with fluency and volubility. He invented a conserve in the shape of print which preserves the treasure of thought from the rot of oblivion. His types

are not only the sails which bear the golden argosies of knowledge, laden with the spoils of time to every port, but the anchors which enable them to ride with safety amid the storms of circumstance in the tide of time."

In viewing the vista of literature, I am pained at the cruel treatment which genius received in early ages. The greatest writers grovelled in poverty, though their works were destined to become the wonders of the world of intellect,—mines of wealth, which filled booksellers' and publishers' coffers, and elysia of solace to millions of readers during every successive age. But while nearly all the intellectual Anaks among the ancients performed their feats on the soil of indigence, there were literary manikins in the nineteenth century who could buy paper at a few shillings the ream, and sell it for several thousands of pounds. Homer, Shakspeare, Milton, and Cervantes reared for a few coppers those immortal edifices of the mind which even ruthless time venerates, while poetettes and scribbler-kins in the nineteenth century received vast sums for works which crumbled quicker than their bones. Even the governments of those times, in virtue of their

political logic of draining from the dregs of the poor to swell the overflowing cups of the wealthy, could not and did not endure such men to swim in riches without the exercise of the expletive generosity of heaping upon them honours and honoraria, sinecures and subsidies.

Touching the slang influences which corrupted pre-millennial language, I remark:—"Literary banditti were then rampant, who rebelled against the laws of the Republic of Letters, forsook Helicon for Billingsgate, coined base vulgarisms, shifted the moorings of language, and thus brought shoals in the way of literary voyagers. As to the conversation of those times, it was filled with expletives, now contraband. We, in this age, cannot realize how much the devil monopolized the dictionary, and how diligently among his votaries he plied the sale of diseased language."

The adoption of phonetic spelling, and the abolition of the four thousand and one languages of the past in favour of the universal tongue, I warmly applaud:—"How deplorable," said I, "was the state of the language currency of man before it was rendered uniform. Each

people had a special coinage, so that works could not be exchanged from their original tongue without a heavy brokerage from their value."

I next narrate at length the achievements of Art. Among these I particularly laud the consummation of the underground railway system:—"On October 12, 2492, the great work was brought before the world's mind. In those times the wheels of progress were so clogged, that it was not till the following year Parliament approved of the measure. The most stupendous engineering operation in history, its originators knew their labours would not be for themselves but for their children's children. Heroically they resolved to tread a wilderness, that their posterity might enjoy a Canaan.

"In 2517 the plans of the scheme were being developed, and in the following year the undertaking saw its practical commencement. Every country was drafted for workers and thinkers, so that in a few months an array of thirty millions had been organized. Millions quarried and mined, and millions constructed the requisite machinery.

"The first lines were opened at the Sahara, in order that, by the *débris* afforded, this naked land might be swathed with rich alluvium.

"In 2534 other lines were commenced, diverging from Siberia, in order that this nation might also be habited with an artificial surface. Only ten kilomètres of tunnelling was performed in the month at the outset, but ultimately the rate was increased one thousandfold. New contingents of men, animals, and machinery were all the while pressed into the service, which were spared through the downfall of the myriads of the useless professions of the past.

"The world soon reaped the fruits of these labours. Siberia and Sahara became Edens, watered by artificial rivers longer than the Danube, and supplied with canals longer than the Nile, and lakes larger than that of Geneva. To populate these artificial paradises, the congestions of population in Britain, France, Germany, and China were relieved by millions being sent thither to found cities, and introduce agriculture and commerce.

"These were the boons upon which man calculated, and wherein his expectations were overpaid; but other blessings flowed from the change,

which were equally unexpected and pleasing. The climate throughout the whole world was improved. The sirocco blew its last fatal blast, and the simoon was rendered a relic of the past. By reason of the increased area of cultivation, a higher ratio of oxygen and ozone was instilled into the air, which had the blessed effect of decreasing the world's death-rate, and adding greatly to man's longevity.

"In 2580 the world was circumtunneled. In view of this result, 50,000,000 had been previously engaged to construct the rolling stock, so that no time was lost in introducing the full complement of trains, and in developing the mighty traffic. Meanwhile the framing of the other reticulations of the world's subcutaneous circulatory system proceeded with increasing impetus. In 2602 the Indian portion was connected with the first line; in 2610 the Hudson's Bay branch was finished; and in 2620 the New England branch. On and on went the work until 2649, when not only had the original plans been completed, but numerous codicil projects.

"But even then there was no halt in the march of progress. Myriads of improvements were

introduced, great extensions made, and numerous inventions framed to increase the efficiency of the rolling material.

"The rails, at first made from the cannon used at the battle of Armageddon, were afterwards framed of agate, then of artificial malleable rubies and diamonds. The carriages, at first made of wood, were afterwards made of aluminium. The rail gauge, at first only three mètres, was broadened to ten. The tunnels, at first only adapted for one-story carriages, were deepened to suit those of three stories."

I close the book thus:—

"All hail, oh Science! Thou art the unpublished appendix to our Bible. Thy teachings are elucidations of a Gospel, written in Nature's hieroglyphics. Thou art the audit of the illimitable treasures and domains of our Father in Heaven. By thee we behold an infinitude of intricate phenomena in an atom, and yet sweet simplicity in the infinite. By thy genius every noble principle has been enfranchised, and the vile brood of ignorance driven backwards to its native quarters in hell. Thou art the chain which has bound the devil. Thou art the

chart of truth by which man has steered his way into the haven of a Utopia."

In writing this book, I had more than once occasion to be thankful for the little manual labour modern authorship entails. In the past it took the swiftest penman a whole day to write what could be read in an hour. Short-hand, now universal, was then only known in its primitive state to reporters. What a great reformation caligraphy has since seen! The march, or rather the gallop, of the pen is now so brilliant in its speed, and so beautiful in its curves, as to place modern penmanship far beyond the area of comparison with the cramped, disjointed, mal-formed pen-craft of the past.

I now gave the book its *imprimatur*. In the morning it was printed; at mid-day it was dispersed over the world; and in the evening the newspapers contained critiques upon the work. What a triumph! Time was when it took a compositor a whole hour to put up a few lines of type, not mètres, as now.

CHAPTER XII.

THE WORLD'S RELIGIOUS ASSEMBLY—GEOGRAPHICAL REFORMATION.

On March 25th, 2807, I attended the sittings of the world's assembly. Millions made their pilgrimage to Jerusalem on this hallowed occasion to worship at a spot rendered sacred by the most heavenly of earthly associations. Superb though the modern temple be with elaborations of design, which symmetry itself might envy, and with a concentration of architectural perfection which splendour itself might admire, our minds were borne above the realms of eye-wonder by the sublimity of the services.

After the devotional exercises, Calvin Luther—the earth's moderator—gave his address. He drew with almost mathematical fidelity a parallel between the Church's past contentions in the jungles of sectarianism and its present peace.

"Denominationalism," said he, "being an import from Hell, bristled with the stings of a thousand conflicting edges; but truth being indigenous to Heaven, was perfect in its symmetry and uniformity." Amid a storm of declamation, Calvin deprecated creeds and formulæ, those dragon's teeth which developed into the men of dissension that slew each other. "Standards and confessions," said he, "were the rocks of religious navigation. Ism rose against ism, until Christianity became a filthy ferment of anarchy. Clerical quacks, in raptures over these ruptures, arose daily, exploded old and created new doctrines. As the Israelites left the true God and worshipped idols, so erring divines raised creeds with their own uninspired hands, and called upon men to do them obeisance. In their intolerable intolerance all mankind living and to live were declared heterodox if they did not allow their consciences to be stretched on those religious beds of Procrustes. Building, as men did, doctrinal Babels, no wonder Heaven stopped their work by sundering them into sects.

"Fighting against the current of reason, leaving the broad estuary of unity, and

struggling up the schismatic river, the Church lost itself amid the multiplication of its divisions. Thus its tide of usefulness became narrowed, its peace broken over polemic cataracts, and its zeal frittered amid the rocks of sectarianism, the marshes of religious indifference, and the icy heights of bigotry.

"Things were changed in the twentieth century. Impelled by the gravitation of truth, each sectarian tributary flowed towards the river of the universal church. On and on meandered the great stream, daily gaining new accessions, becoming daily more placid, until it lost itself in the great ocean of Catholicity. In these historical phenomena, specially wondrous were the workings of Providence, in making the Roman and Protestant Churches cast off their perversions and embrace each other as brethren, after their long and painful separation. O beloved Church of Rome! Despite thy idolatries, shams, and deceits, how much was there in thee to love, and how much more to pity! How often, despising thy external sores, did thy enemies forget thy internal excellencies. And thou, oh beloved Protestant Church, despite thy liberalism and evangelism,

how much was there in thee to hate! Both of you, alas! blinded by your mutual corruptions, saw not each other's beauties. Little did you think that, at the very time when you hated each other most, God on high looked down upon you as his dear though erring children, and guided and guarded you both with a father's love.

"Union was the Aurora of the Church's day. The clouds which had filled the religious atmosphere with unending storms were then dispersed, and forth shone the sun of truth. The winter of the Church merged into spring, and we are now glorying in the harvest. The Church is liberated from State fetters. The days of isms and schisms are ended! Rivalry no longer exists between congregations, nor are members perplexed with a needless multiplicity of churches and churchules. Through the magnificent improvements in the arts, one tabernacle suffices for a city. Our cathedrals, with their amazing aggregations of concentric galleries, aisles, and naves, accommodate half a million of sitters, while the acoustical tubes so carry the word of God into every house, that every city is but one large synagogue, every

chamber a chapel, and the aged and infirm, even when in bed, are participators in public worship."

The grandeur of the other services I must pass over with reverential silence. My pen is unworthy to tread upon such holy ground.

The Senate at this time was engaged with the great scheme of Shakspeare Socrates, for the extension and modification of the former measures for the removal of the mountains. The force of his genius, buttressed by an army of noble intellects, was successful in carrying the Bill. His speech on the occasion, an hour in length, and therefore one of the longest parliamentary orations of the age, was a beautiful specimen of succinct exposition. Eloquently he advocated that the face of the earth should be so re-chiselled as to beautify its features, expurge its geographical amenities, abridge its useless lakes, and enlarge its useful alluvial domains. In the mountain chains he suggested that peaks should be left at intervals, furnished with observatories, museums, store-houses, workshops, galleries, caves, circular vertical and radial railways, and equipped on their tops with meteorological and astronomical batteries.

Already so many plateaux had been and were being lowered, and so many gashes appeared in the typography of every land, that the world seemed for the nonce in a condition of agricultural and architectural dishabille. Great masses of brown earth stood where Flora had once displayed her richest vestures, or where Architecture had raised some of its choicest productions. Entire cities had been erased, entire forests felled, and lakes obliterated. Such was the economy of labour, that the very rivers had had their courses changed, and their watersheds altered, and their erosive power utilized in abrading rocks in the uplands, spreading alluvium in the lowlands, and forming deltas in the sea.

The sacrifices to which the world had been put were immeasurable. One-half of the human race had been thrown out of their homes and billeted upon the remainder of the earth's population. A million miles of railway, two million miles of pneumatic tubes, forty million miles of acoustical tubing, and eighty million miles of electric wires had been deleted. The transit system of the world was temporarily lamed. The postal deliveries

were rendered irregular, and, worst of all, the earth's skin was so flayed and mutilated, that man had for a few years to depend principally upon marine crops.

Hurried by the momentum of millions of new inventions, the work proceeded. Asia, the land of Nature's geographic masterpieces, became the land of man's greatest scientific victories. Its steppes became gardens. Thibet was lowered from the regions of ice-bound barrenness to the realms of summer. The Himalayas and the Caucasus, which, since the morning of history, had been the retainers of winter, now threw off their old allegiance, and paid tribute to the genius of cultivation. By displosions, by fluvial, chemical, electrical, and mechanical erosion, the great masses were disintegrated. By flocks of porterage birds, by armadas of 20,000 tonne burden air-ships, by trains and tramways, by marine and submarine vessels, and by studs of whales, the mountains were carried piecemeal southwards, in order to broaden the Australo-Asiatic isthmus, and to enlarge Polynesia, that thereby trans-equatorial lands might be made to poise cis-equatorial lands.

Meanwhile, the erasure of cities from the map was so cleverly performed, that not a single building of any importance was damaged or destroyed. The edifices which it was resolved to preserve were dismantled and then removed entire by means of specially contrived leviathan balloons.

Some of the Swiss cities, such as Berne, Geneva, and Zurich, owing to their beauty in their congregate condition, were transplanted to Italy, and at the close of the iconoclastic operations re-established on their former sites.

Whole forests and gardens were likewise transposed to other countries, until their native soils were levelled. These undertakings were so unique and stupendous, that they justly entranced the interest of the world. Mankind, therefore, nobly reinforced the direct and indirect forces of the mountain armies, until they included more than one-half of adult humanity, three-fourths of the world's beasts of burden, and one-third of its machinery.

CHAPTER XIII.

THE EARTH'S PRINTING ESTABLISHMENT AND ITS NEWSPAPER.

DURING this same beat in Time's pulse I was appointed a member of the commission which established the cosmopolitan printing institution. Man had long seen, with sorrow, how far the present publishing arrangements fell short of the ideal, the minimum of workers performing the maximum of work. The demand for men, in furtherance of the geographical reformation, necessitated great economy in the world's arrangements, for mankind was never so overwhelmed with business as at this moment. Hence, we boldly introduced a plan by which the printing of the world could be performed by one-sixteenth of the present number of men. In the twentieth century the world vaunted that it possessed two millions of different, and therefore indifferent, periodicals,

and an equal number of publishing establishments; but man in wiser eras saw that this seeming robustness was latent weakness. Accordingly, the twenty-fifth century saw a most useful reformation in the consolidation of printing presses, to the extent of limiting one newspaper and publishing office for each hexagon of one thousand of miles. Our present object was to furnish the means by which our planet could be treated as but one city, its vast population as one people and kindred, and its great membership as one sect, so that one newspaper might suffice for the whole human race.

Panama we fixed as the site of the world's Press Office. Here we built a Babel of buildings, for all the purposes of paper-making, printing, and publishing. In the centre were erected the great galleries for the typing and stereotyping machines. Around were the paper factories, chemical works for the production of ink, with reservoirs for its storage, telegraph-rooms, and the various publishing departments. In the precincts were the houses for the printing of all species of books and treatises, and the offices for the

distribution of the newspaper by pneumatic post.

In a year the great congregation of erections was finished, and stocked with the necessary scientific furniture. Simultaneously arrangements were perfected by which the pneumatic tubes were rendered equal to this new task.

Walter Bennet now took the superintendence of the great establishment, and on August 15, 2811, all the periodicals of the world were hushed, that the world's *Times* might reign supreme as the organ of man. Its first impression was received by man with avidity. While the eastern hemisphere was asleep in the bed of night, and while the rising sun was just about to gild the steeples of China, the great trumpet-sound of the newspaper which had swallowed up all its contemporaries was heard for the first time. Millions of numbers were thrown off each minute, and despatched onwards to Asia and Australia, in order that their inhabitants might enjoy their news at breakfast.

According as the sun travelled westwards, and called upon successive millions to leave their pillows, so travelled the paper's distribu-

tion. In the area from the sun's vanguard to its rearguard, the pneumatic tubes were incessantly disgorging to busy humanity the latest news. All the while the paper was changing its editions. Ten relays of workers were ever substituting new for old intelligence. This superb system even from its cradle proved a wonderful success. A hitch never occurred by which the wondrous pneumatic circulation suffered any congestion or obstruction. Speed never fevered into flurry, nor activity boiled into bustle.

The world soon reaped inestimable blessings from this new polity. The latents, erst diluted over thousands of periodicals, were now concentrated, and the leakage of energy caused by a needless multiplicity of newspaper and publishing offices was now prevented.

My labours upon the News Reform Commission were so prominently brought before mankind, that I saw my life's orbit was destined to revolve in a firmament of publicity. My impressions were confirmed, for in a few months Bolingbroke Swift retired from the Presidency of Siberia, and I was appointed his successor.

CHAPTER XIV.

MOUNTAIN TORPEDO EXPERIMENTS.

THE dial of time pointed to May 4, 2812, when I received this commission. Siberia even then teemed with a population more numerous per square mile than the Flanders of the nineteenth century. The genius of agriculture had drained its mosses, plastered the whole country with rich alluvium, and transformed Siberian barrenness into Egyptian luxuriance. Architects had spangled it with cities, engineers had embellished it with canals and artificial rivers, and the doctors of commerce had made it vibrate with the full, bounding pulse of trade.

My office raised me to such a platform of usefulness, as rendered my time not my own, but the world's, and a moment's loss of time on my part a loss to mankind. Under the quickening stimulus of my responsibilities, I

eagerly endeavoured to profit by my privileges, to till my talents, and to weed my faults.

The next event in my life's calendar was my marriage to the daughter of Shakspeare Socrates. Had this been an age when the charms of women were encrusted with vanities, I might have moralized over my excellent choice. I might have deplored how marriage oft unveiled Zantippes under the mask of Helens, and how wedlock was oft padlock. The education of our time, however, has rescued us from these deceptions, and moulded every woman into a pattern of learning, fascination, virtue, and, last and least, beauty. The stream of love is now cleansed of all snares and obstacles. The converse of Shakspeare's time, "the course of true love always does run smooth."

To return to public matters, the full pressure of my energies was directed to the removal of the Ural and Altaian mountains. Mighty were the advantages I inherited from my predecessors on facing my work. The zoological forces alone which he had mustered comprised an army of antelopes 100,000 strong, cohorts of camels to the number of 80,000,

brigades of bears to the extent of 10,000, and a proportionate array of elephants, alligators, and other beasts of burden, all officered by an efficient staff of naturalists. Such, however, was the high discipline by which this and all other departments of the mountain army were animated, that my leadership entailed upon me little trouble.

By the economy of labour we produced prodigal results.

Day by day my millionaire forces were increased and my artillery strengthened. Two millions worked under Semiramis at the building of Babylon, but I mustered twice that number to burst the mountain chains of Siberia. The work I superintended was reckoned as equal in magnitude to the mechanical labour which would have been required to erect one thousand Chinese walls. The brunt of battle lay in the centre of the Ural range, where, according to the plans, we had to rear a vast artificial peak. In other countries, where they had similar commissions, eagles, hawks, condors, balloons, and Cyclopean catapults were employed to raise these Ossa on Pelions; but our Siberian council, by dint of great

ingenuity, invented enormous rocky torpedoes, by which masses of mountain, one thousand tons in weight, could be pitched out of their places to twenty miles distance. To view our preliminary experiments, the members of the world's scientific and political congress were blown into Siberia by means of the pneumatic tubes. Other myriads arrived with the same view; so that by the time appointed for the operations the air was studded with spectators, who, lodged in balloons, perched high in mid-air, had a better view of the proceedings. Amid great anxiety the programme was commenced—anxiety which melted into joy as our experiments, one after another, were triumphantly consummated. Ere the sun had forsaken our latitude, one hundred different large rocky crags had been successively and successfully burst and deluged on the tops of the artificial columns. As the work progressed the scene became more and more sublime. The morning's triumphs being trumpeted throughout the world, every hour brought on millions by rail, by balloon, by wing, and by tube, to this present battle-field of science, to behold the great victory of mind

over matter. That same night Parliament, satisfied with the results, decreed the other mountain chains should be prostrated, and the peaks upheaved by similar tactics. Pursuant to this arrangement, Shakspeare Socrates, as the leader of the mountain iconoclasts, supplied the necessary plant so quickly, that in a week's time the rocky torpedoes were in universal use. These artificial earthquakes burst the upland ridges with a force and success which bordered on the wonderful, until the occurrence of the first catastrophe which had taken place within this century. This supervened in connexion with an attempt at blasting which knew of no counterpart either in fact or fiction. Mount Matterhorn arose like a giant among the mountainous giants, and being, in the thrifty eyes of science, mere lumber, it was resolved to blow it in its mighty entirety to the top of Mount Rosa, which had been fixed as the site of an artificial peak. An encyclopædia of precautions were taken to ensure success. The question having been raised, that, seeing even a snail cannot crawl without altering the earth's centre of gravity, was it not possible the terrible force of the eruption might swerve the

earth out of its orbit, and so impair the nice adjustment of the solar system as to destroy it for ever, and render the planets a series of mighty macrocosms to crash each other to ruins,—a commission of astronomers was appointed to consult the oracle of truth, so that man might be guided aright. Beautiful were the researches, and pleasing was it to learn, that though the explosion would temporarily alter the earth's orbit, it would not impair the infallible mechanism of the solar system.

CHAPTER XV.

THE GREAT ACCIDENT OF THE AGE.

At the appointed time millions turned out to witness the mighty voyage in mid-air of one of the largest of the world's mountains. Half-an-hour before the explosion the signal was given for the spectators to vacate the regions of danger, and eagerly this time was occupied in perfecting precautions. The inhabitants within a radius of five hundred miles shielded their buildings with tortoise-like shells, while the multitude of on-lookers armed themselves with rock-proof panoplies and non-aërial respirators. The fulminates of the torpedoes being sufficient to generate fifty cubic miles of carbonic acid, carbonic oxide, and nitrous gases, measures were adopted to supply the necessary rain and other re-agents to precipitate and neutralize the whole of these noxious vapours. With this view meteorologists had

planted huge weather-works all around, and had immense clouds in readiness. Ten thousand telescopic batteries were likewise erected in balloons stationed high in mid-air, so as to allow the spectacle to be seen with the greater distinctness.

We now awaited the death-throe of the mighty mountain. Minutes seemed hours. All our emotions were drowned in suspense. Knowing how fearful the artificial mountain-quake would be, knowing how our headlong and headstrong eagerness to reform the world's geography had enthralled us in a maze of hazards, our souls were saturated with thrilling excitement.

We felt every beat of our hearts drew us nearer that terrible moment in whose brief compass were focussed such awful stakes. At length the crisis came, and mankind quailed before the most dreadful detonation that ear or earth had ever heard. Compared to the sound, thunder was a mere whisper. Compared to the concussion, the earthquake of Lisbon was but a gentle tremor of the earth's skin. The heaven seemed as if it had rebelled against the earth, and the earth against the

heaven. All who stood within a radius of one hundred miles were thrown to the ground. The atmosphere in its horrid convulsions was lashed into a million contending whirlwinds and hurricanes. Storms buffeted storms, cloud crashed against cloud, inflaming the elements into paroxysms of passion. The armadas of balloons, erewhile floating tranquilly in mid-air, were tossed about like straws in a cataract. All the birds caught in the blast were poisoned by the noxious fumes, while even men, with all their respiratory equipments, failed to fly in the sulphury air with freedom. I who, along with Brindley Telford and Stephenson Watt, viewed the mighty eruption from the shores of the atmosphere, escaped the brunt of the fearful tornadoes, and had the most heart-rending scenes unfolded to my eyes. With all the vividness of reality, my memory pictures the mountain, rending at its foundations, with flames bursting out miles in length, belching worlds of smoke and blinding clouds of stones and dust, while the dark storm-pent heavens above lent a scowling fierceness to the flash, and enveloped the scene in horrific uncertainty.

It was a tremendous moment—a moment which threatened the safety of thousands. A lifeful of terrors seemed focussed into a single heart-throb. Anxiously scanning the bright flames amid the darkness, and the darkness amid the flames, I saw Mount Matterhorn, fearful in its immensity, bursting up from the seas of fire and oceans of smoke, and losing itself amid the lurid clouds. But the dreadful noise, the more dreadful revulsion of the elements, and, most dreadful of all, the thunder volleys of rocks and stones, stupefied our senses. One large avalanche of stone, tons in weight, whiffed past us, whose draught swerved our air-ship out of its course. Numerous small rocks were likewise dashed against us, which, happily, only damaged our vessel's ornamentation. Almost simultaneously we were buffeted in the elemental panic caused by the vacuum of the blast. We were whirled into the mazes of bewilderment, and did not regain our senses until we heard the yell which arose from millions, when it was found that the huge mountain was taking a wrong direction. Never during the millennium was the heart of man so wrenched by consternation as in this crisis,

when a world of rock was seen falling upon a densely-populated city. All but a few were paralyzed with awe. Near the site of the catastrophe ourselves, we rushed to the rescue, viewing the while the flying mountain as it made its horrid curve in mid-air, and dashed downwards upon the city of Rosetown. Descending with an impetus fearful to behold, and striking the city with a sound horrible to hear, the spectacle unmanned the bravery of the bravest. Down it plunged, crashing and crushing the steeples like reeds, and the great stately mansions like egg-shells. With our eyes bedewed with tears, and our hearts palpitating with terror, we soon arrived at what we dreaded might be the sepulchre of the city. Here almost all were the victims of perturbation. A horror-hurricane had in a single second wrecked the equanimity of the great household of humanity. Aristotle Newton, the cosmopolitan President, fortunately early arrived, and by his amazing genius and presence of mind reduced the chaos into order. The twenty thousand of the city's inhabitants who lived in that portion of the city which had escaped burial, and whose minds were unsaddled by excitement, he wisely

ordered to be removed. Having next organized an army of miners, and having set them to work in the great scheme of deliverance, he ordered the pluviofiers to be worked, the skies to be emptied of their rains, and the sun to be unveiled. Concentrating his energies then on the speediest means of disburdening the city, he formed the brilliant conception of making a second attempt to blow it in its entirety to the top of Mount Rosa. This would have been hazardous had he not backed it up with the scheme by which the fulminates would not be fraught with danger to the entombed victims. We had ascertained there were 80,000 immured, and whether they were alive was the question before which our hearts quaked. Our souls were harrowed with the apprehension that we might witness, for the first time in this age, the sad spectacle of mangled and mutilated corpses. Determined, however, that if energy could save even a single life it should be forthcoming, we had machines forwarded, and commenced at once to pierce underground passages through the hill towards the buried city, as a means of deliverance to the victims, and also to dig

mines for the reception of the fulminates to blow the mountain from its position.

Meanwhile the whole human race was immersed in dismay. Factories were closed, navigation stopped its engines, and pitched out its anchors. Railways, the world's blood-vessels, had their flow repressed, because the world's heart was rent with sorrow. The voice of machinery was dumb by land and by sea. Explorations were checked, and every avocation was forsaken, that man might know the sad narrative and beseech deliverance.

But the prayer of mankind was heard, and this mightier incubus than buried the city of Pompeii was as remarkable for its harmlessness as its fearfulness. So it was that the inhabitants, having foreseen the dreadful burial with which they were threatened, adroitly occupied the few spare moments in escaping into underground recesses, and in arming themselves with rock-proof panoplies. Happily, moreover, the gentle eminences in the town, like great buffers, saved the city from the mighty damage which would otherwise have been inevitable. Hence, as our investigations proceeded, we came upon band after band of citizens ensconced

in subterranean retreats. By one o'clock next morning, when the arrangements were completed to blow the erratic mountain to the top of Mount Rosa, nearly one-fourth of the victims had been delivered. Night though it was, Aristotle Newton's genius cleared all difficulties. Having renewed and increased former precautions, we temporarily stopped the search for the victims, had the fulminates pressed into their mines, and gave the warning for all but the leaders of the mountain commission to depart from the locality. The leaders then fortified themselves with the proper shields and behind the proper barricades while Newton applied the fuse. Upon this the night was disturbed by the appearance of a hell upon earth. Flames like another world in size flashed up to the skies, a sound as if the earth had been a bursting bomb-shell rent the heavens, but where the mountain now was none as yet saw or knew. For a few minutes there was horrible suspense, for we dared not issue from our retreats, in consequence of the impending clouds of dust, *débris*, and stones. Meanwhile showers were induced to clear the poisoned air and subdue the rebellious winds, and vast

electric lights were brought forward to illuminate the darkened country. We then pressed onward to Rosetown, and found the mountain had been blown from its abnormal position with perfect success. The measures were straightway expedited to relieve the buried citizens. These were simple, as all that remained to be done was to remove a little *débris* and signal those below to leave their dens and ferret their way to the earth's surface. No sooner was this done than the earth gave up the entire population of the city. By this time the spectators, who had hurried away from the scene during the explosion, had returned in millions, so that as they beheld the safety of their buried brethren, rejoicings were excited of such enthusiasm and spontaneity, as sealed an indelible impression on the memory of all who had the happiness to be present. The heart of man was swollen with heavenly gratitude.

But our minds were unsettled. It was an enigma whether the mountain had hit the target at which it was fired, though negative evidence proved its flight had not again imperilled life. To solve our doubts, Shakspeare Socrates led the van of a great procession to Mount Rosa.

Ten thousand balloons were engaged in the procession, all of which glowed with pyrotechnic display. The line of the aërial armada was a sea of flame, which illuminated the subjacent land. At length Mount Rosa was reached, at the base of which was found the mountain whose wonderful wanderings had been fraught with so much anxiety. This was the key-note for anthems of delight — delight the more jubilant, seeing our souls hours ago chaunted their sad strains on the clef of apprehension. The summary of the injuries proved that not a single life had been lost. The virulence of the whirlwind and the showers of stones and rocks had caused only trifling injuries to 20,000 souls. The citizens entombed had suffered only a few bruises and still fewer fractures.

By what measure can we estimate the amount of gladness generated when the news was announced of the safety of those who had been buried alive? During the vigils of the night, while the work of exhumation proceeded, the mind of man had been so dislocated by anxiety, that not a single bed in the world found a sleeping occupant. All the human family, agitated with doubting hopes and hoping

doubts, were awake to hear the tales which the telegrams told from minute to minute. To us at the scene of the work it was the relief of the most cruel mill-stones of anguish from our minds to see the resurrection of the victims, and specially those who were surrounded by their little ones. The sight might have thawed icy stoicism.

Oh, blessed consummation! Morning saw the city in its virgin bloom, night saw it under a mountain, and, ere the next sun had dawned, the thousands buried alive had enjoyed a living resurrection! Never, during the stages of any calamity had the hearts of mankind suffered such paroxysms of horror and fear, and never did they rebound from the depths of despair to the pinnacles of joy with such triumphant resiliency.

Despite this hitch the blasting proceeded with modern rapidity and safety. The miscarriage, indeed, made us more proof against future failure. Our boldness was undaunted, because it was buttressed by the most thorough caution. Before the battering-ram of determination the mountains cowered into insignificance. Had they been of snow as they were

once snow-capped, they could not have melted more quickly. In the sublime Scriptural words, "The everlasting hills were scattered, the perpetual hills did bow."

Our next advance along the road of progress was to blast entire mountains from their apex to foundations by an improved system. The first experiment was made upon Mount Vesuvius. On May 30th, 2814, a party of salamanders, armed with fire-proof panoplies, descended its crater for two miles, and, by dint of great ingenuity, placed a huge torpedo in its centre, and so surrounded it with fire-proof material, that it would not explode till desired. Networks of smaller torpedoes were also so stationed at different points, that by bursting simultaneously they would shatter the mountain into such minute fragments as would render their fall upon neighbouring cities harmless. The evening previous to the explosion Italy was evacuated by its inhabitants, the cities being previously shielded. All precautions being matured, the leaders of the movement left next morning for the observatory at Carthage, where they were met by thousands of the leaders of the world's household. At the moment prescribed, Shak-

speare Socrates applied the electro-fuse. Next moment, a brilliant reflection on the sky proclaimed that Mount Vesuvius was no more.

Having waited half-an-hour to allow the detritus sufficient time to fall, and the poisonous gases sufficient time to be neutralized, we hied to the scene of operations by a Mediterranean bridge train. When half-way across, we heard the thundering roar which Vesuvius made in the hour of its death. On approaching nearer, we found the air darkened with smoke, dust, and foul vapour. Our train had thereafter to halt, as the way was blocked. We accordingly performed the remainder of the journey on wing. We had not been ten minutes in the skies when the sulphury fumes became so powerful, that we were forced to use the artificial breathing equipments which our foresight had taught us we would require. At the same time, the meteorologists pressed forward their machinery to clear the air, by producing thunder-storms and heavy torrents of rain. Soon showers began to fall, lightnings to flash, thunders to roll, and as the storm increased the air became clear and pure, revealing the strange spectacle of a plain where, from the

first day of the creation, there had been a mountain. Its proud head had been scattered to all the four winds, its ashes had deluged the country for miles around, and entombed the neighbouring cities.

But already Italy had been invaded from all points. The blocked bridges had been opened, the population had returned, and a detachment of the great army of mountain iconoclasts was busily clearing the neighbouring cities of their ashes. So well had the super-architectural shields suited, that not a single building, even in Naples, was damaged. In a few hours the removal of the lumber and the dismantling of the cities' covers were completed, and the Neapolitans enabled to return to their homes. The re-entry of the inhabitants was a scene which lent to the day's proceedings brilliancy and interest. Arriving in a covey of balloons which darkened the air, they alighted upon the city in a beautiful procession, led by Mazzini Cavour.

Meanwhile, many of us were inspecting the volcano, which, after a consultation, we resolved to transform into a caloric work. The other divisions of our army, meanwhile, were export-

ing the mountain's remains to the prescribed sites, to assist in shaping the land in other countries into the desired gradients, curves, and levels enjoined by the revised geographical plans. So quickly did the work progress, and so mighty was the metamorphosis, that in a few days not a vestige was left to mark the spot where once stood the proud Vesuvius.

Such, then, oh Vesuvius, was thy adieu to the world! Once the boast of the poet, the study of the philosopher, the delight of the student, and the wonder of the sightseer, thy huge body has now been scattered to all points of the compass!—thy mighty frame now chokes up lakes and marshes in foreign lands! Who could, in ancient times, in surveying thy great hulk, have imagined that thy classical mould would one day be used to cover the atolls of Polynesia, and to raise land in the Southern Seas?

But the extirpation of Vesuvius only formed an example of the performances that were repeated on hundreds of other hills day after day, to the glory of the present age, and to the advantage of posterity.

As regards the district under my especial supervision, the work progressed with such

speed and success as enabled me to devote much of my time to my heart's hobby, trans-aërial travelling. Rapidly and more rapidly the great undertakings advanced, until mountainous lands became undulating plains, the erst regions of winter, the haunts of luxuriance, precipitous streams navigable rivers, and rocky defiles verdant vales. A layer of rich artificial soil, a string of magnificent cities, a transcendent transit system, and peerless artificial rivers, supplanted those regions on which were erewhile based the incubus of barren mountains.

CHAPTER XVI.

ATTEMPTED VOYAGE TO THE MOON.

A UNIT of the band who descended into unprecedented depths, I was also one of those pioneers of aërostatics who ascended to unparalleled heights. Under my leadership the Siberian council took up the question of ultra-aërial navigation. A balloon of superlative skill and power was accordingly constructed, which embodied two hundred and sixty-one inventions, specially framed for our expedition, including engines for trans-atmospheric navigation, apparatus for the sustenance of life in the inter-planetar spaces, and ultra-aërial log-lines, and aneroids. Our ship was so constructed that by a rocket action it would be enabled to ascend, even when its specific gravity exceeded the menstruum in which it floated. To effect this object, we bottled up in its interior sufficient electrical force to keep its engines in average action for the space of three months. To man

our vessel we mustered the world's ablest doctors of machinery, Caxton Arkwright, Hargreaves Cartwright, and Brunel Penn; its great meteorologist, Kepler Gauss; its leading astronomer, Copernicus Galileo, and a crew of other five, distinguished for scientific intrepidity. We aspired to the hope that if we were not able to cut the Gordian knot which bound man to earth, we would, at least, make the feat possible to our children or grandchildren. It entailed a mighty budget of toil on the part of thousands to perfect arrangements. Such labyrinths of difficulties blockaded the progress of our scheme, that they were only surmounted after the most determined mental assaults by our army of thinkers.

My energies were so espoused to this great measure, that I saw I could serve my fellowmen better in investigations beyond than in labours on the world. I therefore resigned my Presidency of Siberia, resolved to lay honours, position, and the sweets of society aside for a time, that I might assist in the attempt to overcome the Hesperidian difficulties which prevented man from piercing his way to the stars.

We sailed on the morning of April 6, 2815.

Squadrons of aërial craft escorted us to the shores of the atmosphere, where, amid the tender farewell of the millions, we burst the apron-strings of mother earth, crossed the atmospheric boundary-line, and launched our bark into that mighty un-navigated trans-aërial ocean, amid the immensity of which the solar system is but an insignificant cluster of islets.

Having previously applied our ultra-aërial engines, and donned our trans-atmospheric breathing equipments, we were delighted to find that both worked in harmony to the tune of perfection. The vessel's progress was speedy, its steering powers unimprovable, and the air supplied by our apparatus so sweet, that our respiratory organs did not seem to be aware of any difference. But our emergence from the atmosphere plunged us, by a rude transition, from a Goshen of beauties into a wilderness of gloom. Before in the midst of charming sights and enravishing sounds, we were now in realms where our eyes viewed a desert of darkness, relieved by only a few oases of light, and where our ears were exiled from the joys of sound. Shut out from the aërial purlieus of the mansions of the world, with their gorgeous

furniture of refractive and reflective glories, we saw the more clearly and admired the more deeply the wondrous splendour of Nature's upholstery. We saw how the invisible air, by Nature's magic, rendered visible millions of beauties else unseen and unknown. Wanderers from these surpassing scenes, we viewed the most amazing paradoxes. The convex world appeared concave. Our impressions of an "above," a "below," and a "horizon," were obliterated. We knew not whether to consider our heads or our heels uppermost. The sun, though blazing in meridian splendour, was to us encased in deepest darkness. Night ruled in the kingdom of day. The starry hosts boldly confronted the sun. Noontide viewed the firmament of night.

In these auspicious moments, when we, the first ten of the billions of souls who had tenanted the globe, found ourselves with the whole world behind us, and the vast ocean of immensity before us, we felt a glow of divine joy over the unparalleled achievement, and, falling upon our knees, we resigned ourselves into the hands of Him who held the earth in the hollow of His hands.

Foresight having forewarned us that in these non-aërial regions our organs of hearing would be out of their element and inoperative, we had an apparatus to meet the exigency, which we now tested. But, alas! being faulty, our mouths and tongues moved without sound, and the machinery of the balloon rattled on in magical silence. Our car was a deaf and dumb asylum, in which signs had to be our language and writing our conversation. Caxton Arkwright laboured long to improve the invention, and at length partially succeeded. Roaring *fortissimo*, however, the sound was only *pianissimo*. Despite this, it was delightful to our ears, after suffering such a dearth of sound, to be administered a little auricular nourishment. Immediately after this our hearts, for the first time, beat out of tune, on experiencing a concussion which knocked some of us down. But we were re-assured next moment, when Kepler Gauss cried out, "All's right, only a meteor has struck our vessel." Meantime, with indescribable sensations we were viewing the awful sight below and still more awful sight above. There was pleasing excitement in our very danger, and apprehensions amid

our very joys. Though the first occasion in which man had ventured into the trans-aërial ether, such was the excellence of our engines, that their action carried us upward and onward with sweet imperceptibility. The speed increased hourly, as our inertia was now untrammelled by the remora of friction, and unburdened by the full stress of gravitation. The circle of our vision compassed a larger area of the earth every successive hour until night, when our eyes nearly grasped the whole hemisphere. The panorama of scenery merged into a geographical map. Cities were shrunk into spots, rivers into threads, and mountains into mole-hills. Long ere this we were interested on beholding a dusky rim upon the eastern portion of the earth. This was approaching darkness. Our fancy was fascinated by the kaleidoscopic scene of the draperies of night shrouding latitude after latitude, sea after sea, and land after land. Soon Erebus had advanced as far as Spain, and, having quickly invested it in the apparel of night, marched across the Atlantic towards the Western Hemisphere. At length only a golden margin of light remained on the eastern shores of

America. All this while we were under the beams of an unclouded sun. On account of our height, sunlight was extended hours beyond the limits on the earth. We had already divided our crew into watches, of which Copernicus Galileo headed one and I the other; but the awful novelty, the fearful boldness of our adventure, and our unearthly position, prevented any of us from retiring to rest. Every soul in our bark was transfixed with interest in the scene below, and every eye watched the sun as it retreated behind the shores of the Atlantic. There being no atmosphere to slope the way, by means of the pleasing compromise of a twilight, from light to darkness, we were in a single moment precipitated from the brightest sunshine into the deepest gloom. The transition was a shock to our feelings. We felt that till this moment we had never realized the horrors of night. Nor had we a remedy for this inconvenience, for our electric light proved but a feeble spark, seeing it had no atmosphere to refract its rays. No marvel, then, that the horns of anxiety gored our courage. Ghostly and ghastly fears haunted our souls, which all our philosophy

could not exorcise. The silence of the wilderness in which we journeyed, and the blankness of the sky by which we were circumvested, formed nourishment to our solicitude. Up to this time we had never truly known what a horrid vacuity and dearth was silence. On the earth quietness may be found, but never a total absence of that ever constant aural atmosphere —sound. To know silence—to feel its horrible vacancy, its unspeakable void, its indescribable gloom—one would require to come hither. Happily these sensations soon lost their sting. Custom, with its genial balm, rendered the unearthly stillness tolerable, and so strengthened our seeing that thousands of things, erewhile invisible, burst upon our vision. The stars became intensely lustrous. Battalions unseen on earth twinkled with unusual brightness. The milky way appeared more like a riband of fire than a band of nebulæ. Had we been infidels, the awful scene and our more awful position must have shattered our scepticism.

Having, by the telegraph of prayer, sent on to the altar of heaven our homage to God, the watch, under Copernicus Galileo, retired to rest. It was a weary but a short night. Long

before the sun had tinged the tops of the Constantinople steeples we were exulting in daylight. The change was necessarily sudden. Without a moment's warning we were inundated by the rays of the sun. The sight of Nature's face, when the eyelids of darkness were thus opened, our memories can never forget. Below us lay the world, shrunk into a dark ball of only a few degrees; hence, for the first time in history, man received optical proof of the truth of the Copernican system. Our retinæ, with their areas of only one square inch, embraced the whole world. What an amazing eyeful! In one glance we grasped the two poles. To our vision continents were only specks, oceans' drops, and the world itself but a globule. Another item in the catalogue of wonders unfolded to our eyes was to view below us those objects to which man has to uplift his eyes—to behold, forsooth, beneath our feet not only the cloud-invading mountains, but a sky with myriads of stars. In one direction we beheld the Plough, in the other the Southern Cross. The scene ushered us into the sacred shrines of humility. Surely, we thought, the inhabitants af this speck in the firmament

are emmets, when so many millions of them can tread such a pinfold.

Just while impressed by these feelings, we were thrown into a panic of consternation on feeling our balloon whirl out of its path, and gyrate in a manner which struck terror to our souls. Uncertainty fanned our fears. At length we saw a large body above us, on our starboard side, and moving westward. The spectacle at once dissipated our dreads and whetted our curiosity, for we knew that this was a satellite of the earth. It was too large to be called a meteor, for we felt certain its diameter was as much as five kilomètres. Before immersed in a cauldron of apprehension, we were now exulting in the bowers of joy. Allowing ourselves to be drifted westward by the moonule, we were enabled, before tacking from it, to ascertain its orbit, its revolution, its velocity, and its distance from the world.

Our next adventure happened two days further on, when we actually passed through the midst of a constellation of moonules. On this occasion we were entangled in their midst ere we saw our mistake, and it was only after the greatest difficulty that we extricated ourselves from the

snare, and made up the leeway. Our dangers, however, did not prevent us from investigating and discovering their leading phenomena, their relation to each other and to the world, and their course and velocity.

Nothing noteworthy happened until the evening of our eighth day in ultra-aërial realms, when we noticed what appeared to be another constellation of moonules. It consisted of five bodies, the largest of which was equal in size to the island of Heligoland. We discovered, after a little research, that it formed a small system, which revolved round the earth. We had ample opportunity for our investigations, as we were at one time within fifty miles of the system. Our discovery, pleasing in itself, still opened our eyes to the danger of ultra-aërial travelling, seeing that at any moment we might come into collision with a moonule.

Meanwhile we were busily reaping a harvest of researches, and viewing an immeasurable catalogue of known and unknown phenomena. Meteorology, physics, and chemistry, all profited by the luxuriance of our investigations. As we journeyed on, Caxton Arkwright and his disciples tested and improved the every appliance of

our wondrous machine, and Gauss and Galileo, with their disciples, garnered their researches. Chief among these were the brilliant discoveries regarding the different kinds of meteors.

Up to this time we had dreaded that ultra-aërial navigation would be fraught with danger, on account of the myriads of meteoric waifs with which the trans-atmospheric ocean swarmed; but we found that only those which belonged to the earth were large, and the others so small as to be incapable of damaging our balloon. Now and again we were hit by such bodies, but the meteoric-proof envelope of our vessel rendered such collisions harmless. Day and night our little world was at work. We took watches, kept our log-books, noted everything notable, and laboured from morning to evening, and evening to morning, at our several tasks. Nor did we overstrain our energies through the want of proper recreation. We had with us a library of microscopic books, by the aid of which we were enabled to make leisure a pleasure. Than books, indeed, what could have been to us more valuable? Bringing them with us, we had, as part of our cargo, the

greatest riches the world could afford. They contained the jewels of thought cut and burnished by the greatest minds. They contained what were the best products of the earth during 8,000 years. Classical works are the shells and pearls of genius. Long after their makers have died, they lie on the shores of time to allure the mind's-eye of the passers-by.

Gradually, with increasing distance, the green-mantled earth began to appear an immense silver ball. From day to day, as its size lessened, its brilliancy deepened, while, on the other hand, the moon gained in size what the earth lost, and lost in brilliancy what the earth gained. As time rolled on, we became acclimatized to our unearthly position, and inured to our hardships and privations. Though but an experimental voyage, we saw our campaign into the unknown fields of space would prove more successful than even Hope dared to hope.

At the end of four weeks we had ascended 50,000 kilomètres. It was then that the impossibility of proceeding further stared us in the face. Our food supply was nearly exhausted, and our health was sensibly impaired. Succumbing to these difficulties, we surrendered

our expectations of success. Hence, after spending another day at our high altitude, in completing sundry investigations into trans-atmospheric phenomena, we retreated.

Meantime, as our small bark had been watched from all the observatories of the earth, and as we had kept our brethren at their terrestrial homes duly informed of our adventures and observations, by pitching out missives to them, the depth of the interest excited by our expedition was unfathomable. The strategic movements of hostile armies, with the fates of kingdoms centered in their balls and bullets, were never regarded with so much concern as was the progress of our balloon. The sympathy of mankind was so focussed upon our small entity of worldom, that each hour of each day saw despatches regarding our expedition issued from the observatories. The pressure of enthusiasm was such, that when the news of our retreat was published, the whole world was plunged into disappointment. Sanguine hopes were overthrown, and the keen excitement raised by our long march through vacuity suddenly exploded. Such, however, was the gratitude of our fellow-men for the

successes with which our failure abounded, that they prepared us a great reception. Meteorologists filled the skies with an array of clouds, which they irradiated with the most irridescent colours, and arranged in symmetry's loveliest shapes. The firmament was rendered a mighty picture-gallery, glowing with all the tints of Iris. These grand preparations were made at the very moment our retreat of 50,000 kilomètres commenced, for it was known that, unfettered by the drag of an atmosphere, and aided by the powerful force of the earth's gravitation and the balloon's engines, we would be enabled to travel hundreds of miles every minute. Our speed, indeed, was the most terrific ever recorded in the long programme of human annals. Yet, so were our senses deceived, we had not the feeling we were falling upon the earth, but that the earth was rushing precipitously usward, and threatening to overwhelm us in ruin. It was a fearful sight, and had we trusted to our vision instead of our reason, our hearts would have been panic-struck. Larger and larger became the huge disc. Nearer and nearer it flew, until we could decipher the lineaments of its geo-

graphical face. Every minute the scene became more awful, until, but for our philosophy, we could not have viewed it without a shudder. Such was our confidence, however, in our instruments, that we openly stared at the appearance of imminent danger, and laughed to see our eyes so cleverly cheated. At length, after an hour's downfall, we drew up within a few miles of the world's air-suburbs. One hundred and twenty-two days were expended in the retreat of Cyrus's army, though extending only over a tract of 1,900 miles; but we had performed twenty times the distance in the thousandth part of the time. We had now leisure to behold the great ovation in our honour. Aëronautic fleets crowded the shore of the atmosphere, and below them were clouds arrayed in their richest splendours. On entering the aërial sea in which our earth is submerged, our ears, so long immured in a desert of silence, were regaled with the heavenly fare of music, and our eyes, so long banished from the bournes of colour, refraction, and reflection, were feasted with all the fascinations of vision. An aërial procession was meanwhile formed, in which we were ranked

in the place of honour beside the balloon which accommodated the earth's President. The myriads of balloons, the picturesqueness of their descent, the magnificent etherial nebulous scenery, and, above all, the sight of the millions in the air and on the earth, were the additions of grandeur to beauty. On China we alighted, and the reception we received on earth even surpassed that above the clouds. Along with other ten thousand of the earth's leading citizens, we now took the subterranean railway to the Lyceum, where we arrived at sunset. Here the rejoicings were renewed. We found the superb streets of Constantinople replete with embellishments, and the waters glowing with grandeur. The multitudes of the sons of men that graced the occasion baffled calculation. For news there was such a demand, that the House of Congress was procured as a suitable place to give them their *imprimatur*. Accordingly, before the myrmidons of hearers, both within and without the house, I narrated the outlines of our journey. Kepler Gauss, Copernicus Galileo, and Hargreaves Cartwright, then individually unsealed to the minds of men their wondrous dis-

coveries. Breathless attention was observed, save at those breathing times when the acclamations of the million-eared audience resounded like thunder through the long aisles and galleries. Their speeches were far beyond the mere glittering tinsel to which such an undue importance was attached in ancient times. They were budgets of unrevealed tidings, compendia of unknown marvels. Their every sentence unveiled some undiscovered truth, or interpreted some unriddled phenomenon. Their tidings, as a whole, told science that it was about to enjoy a glorious amplification, and its disciples new fields of inquiry. Never had science seen such a sight, never had its sons garnered such a glorious harvest of discoveries.

Next day our small band was busy publishing the details of our trip, and the world was eagerly appropriating the many facts our voyage elicited. The number and excellence of the books written on our discoveries formed no mean panegyric on our labours.

CHAPTER XVII.

BETWEEN HEAVEN AND EARTH.

THE idea of a journey to the moon was now rescued from the dungeons of scepticism. The hitherto untrodden cantons of ultra-aërial dynamics were soon overrun by the feet of research. Improved altimeters, non-aërial barometers, and thousands of trans-atmospheric apparatus were invented weekly. The mountain tops of success are ever invested by pathless glaciers and precipices. Determined to storm these redoubts, we advanced with hearts garrisoned with the ammunition of courage and perseverance. Accordingly, we prepared to make another expedition into the firmament. We commenced by facturing a more complete ultra-mundane locomotive, which comprised such an amazing concentration of ingenuity and such an aggregation of inventions, such an embodiment of skill, and such an incorpora-

tion of volatility and strength, that it took two years to focus these wondrous properties into its workmanship.

It was a mechanical marvel. The same size as the last, it was a hundred times more powerful, and it possessed the additional advantage of requiring a crew of only half the number. The trial trips in this engine extended over six months, during which time we greatly increased its velocity, and introduced into it a large budget of little comforts.

The grand but abortive attempt was then made to invade the moon. Our trans-aërial ship was not only stocked with the most nutritive food, but a new idea was adopted, in supplying each of its mariners with physiological antitriptic apparatus. Such was their excellence, that a few grammes of food and a tablespoonful of water daily were rendered quite sufficient for the maintenance of life. The other arrangements were so consummately ingenious, that we verily believed we would be enabled to cross the mundo-lunar gulf. Our effort was sublime in its boldness. Perhaps our band might never again see earth. Sacrifices on the altar of scientific research, we might

be wafted like meteoric stones upon some other world. Our bones might not return to the dust whence they came, but be revolved for an infinity of time in an infinity of space. The thought could not but make us turn our eyes to our Father in heaven, bold in the assurance that though our remains might be waifs in the universe for thousands of ages, we would still be supported by His gracious hand. Even if martyrs, we were dying for the greatest cause of this great age. When, in the past, men went to the field of slaughter to murder or be murdered, merely on account of the silly squabbles of kings as to what kind of flag should flutter over a certain piece of ground, could we grudge to risk our lives for the noblest of projects in this the era of cosmopolitanism, the epoch of the millennium?

Our crew, consisting of Copernicus Galileo, Stephenson Watt, Caxton Arkwright, Shakspeare Socrates, and myself, left our terrestrial home amid the benedictions of our fellow-men.

Millions had come from every quarter of the world to view the great ascension, and the scene and services merited their assemblage. The very circumstance that it was Mount Ararat from

which our Hegira to the moon took place, lent a sacredness to the solemnities. Where the ark had first rested we were now about to embark in another ark, in which we were to seek another Ararat in another world. Henry Bunyan, who conducted the services, spoke with an inspiration which have endowed his words into the classics. Millions on the Mount and in the air, by means of their auroscopes, heard his molten language; and never did ears listen to a more impressive discourse, or eyes witness such an impressive sight. At length our balloon weighed anchor. A procession of ten hundred thousand aërial mariners escorted us to the suburbs of the atmosphere, anthems being played the while with such beauty, as swathed our souls in a halo of heavenly joy. Arrived at the shores of the air, we left the great sight and the triumphant sounds behind us, and launched into the dark gloomy trans-aërial ocean. For a while our eyes and hearts wandered back to our friends, but our duty soon urged us to direct our eyes upwards, and centre our resolutions in winning the moon. Our speed was equally pleasing to ourselves and our brethren on the earth. With natural

delight we saw terrestial objects exact a small and still smaller dividend of our retinæ. Every incident omened well. The non-aërial breathing machine, the acoustical devices, and the log-lines, worked with success, while our spirits were buoyed up with the most cheerful expectations.

At mid-day we had our first meal, according to the antitriptic system. Two and a half kilogrammes of food sufficed us all, yet each of us had enough to satisfy his requirements. Not since the multitudes had fed on the loaves and fishes did ever any company have their appetites slaked with so small a proportion of viands. Chameleon-like, we might have almost have been said to have lived on air.

But the mere skeleton of a summary must suffice for the log-book of the trans-terrestrial voyage. In the first week we journeyed 1,100 kilomètres daily on an average, during which time we observed four undiscovered moonules. In the second week, in consequence of being nearer the moon, and having a greater share of its gravitation and less of that of the world, we averaged 1,300 kilomètres daily. In the third week we increased this to 1,600, in the

fifth to 2,000, in the sixth to 2,600, and in the seventh to the amazing velocity of 3,500 kilomètres daily. Up to this point we surmounted every difficulty, though all the while deeply alive to the peril of our position and the wildness of our adventure. Now we had collisions with meteors, anon we were drifted out of our course by a constellation of moonules. Nestled in mid-air, 80,000 miles from a world, we lived in regions in which there was no air to breathe, no food to eat, and no water to drink. Though the physiological plans which enabled us to breathe where there was no atmosphere, and to fast without suffering starvation, were akin to perfection, our eyes longed to view the fair face of our mother earth,—our mouths watered to taste its fruits, and even our souls thirsted to feel the enjoyments of home. Coffined within a small car, we felt as if we lived without feeling life. Beyond the scenes and influences of humanity, our very senses were famished. The appetites of sight, smell, touch, taste, and hearing, each suffered a dearth. While our mind's machinery was in full play, our physical feelings seemed exiled from their true spheres. A small balloon was our world,

wherein our ears only heard the sound of our own voices, and our eyes viewed the awful sight of a double firmament with its zenith and nadir. Heaven to us was not a canopy, but a great rotund vault, of which we were the centre—a vault marvellously bespangled with star brilliants, and a vault whose milky way was a silver way, and zodiacal light an aurora. Half the day we looked down upon the sun. Day and night a firmament with myriads of stars lay beneath our feet. Alone in the trackless tracts of immensity we saw our native world dwindled into a moon. We were in regions concurrently cheered by sun-light, moon-light, world-light, and star-light. What appearances could have been more reverence-inspiring than those we viewed? Could the wildest of Dantes, Miltons, or Coleridges, have supposed anything more wonder-fraught than a miniature world of a few mètres in diameter, with a population of only five inhabitants, and in possession of a firmament containing two moons to which in size ours was a dwarf and in lambency a rush-light—a firmament not of 190°, but 380°, in which a sun, two moons, the milky way, the zodiacal light, and a complete muster of the

stellar hosts, shone simultaneously, undimmed by the medium of any atmosphere? Yet truth, which so out-fictions fiction, rendered these wonders realities. Above our small entity of worlddom was the earth-like moon, below was the moon-like earth, and all around the glorious unclouded stellorama of infinity. What conditions could arouse more intense feelings or excite more sublime ideas? Even the writings we composed in those vacuous realms breathe a religious fervour, nobility of sentiment, and earnest glowing eloquence, equalled in none of our earthly works. Could any circumstances so estrange us from the sordidness of the world as the possibility that we might never return to it in the body? Never was such a sermon vouchsafed us on the littleness of man, and his utter dependence upon Providence. Those who have never left the fire-side of the earth cannot appreciate the numberless bounties which rain unconsciously upon them during every throb of their pulse; but we who were removed from its scenes were enabled to see them by the powerful telescope of their absence.

But I am brought to the straits to which we were driven after having lived eight weeks

upon the unnatural method essential for territories without food, air, land, or water. Our strength began to fail and our courage to be damped, so that we were outflanked, and forced back to the conviction that science was still unable to cope with the multitudes of exigencies which such a journey as ours entailed. Nevertheless, we held out for another week, feeding our fortitude on our moonward ambition. Our speed during this time was four times that at our outset. On this account we stood exactly half-way between the earth and its consort on the sixtieth day of our extra-terrestrial exile. Each day had seen these two visually great, but astronomically small, orbs changing, the moon growing larger and larger, the earth smaller and smaller, both merging from their gradations, of new to full moon and full to new moon, new to full earth and full to new earth.

Having proceeded so far, we again tried to blow up the embers of our determination. Our hearts being magnetic towards moonland, we strove on three days longer, when, to our unutterable grief, Galileo took seriously ill. The rest of us being far from well, we were forced

amid heart-rending regrets to behold the death of our cherished hopes, and to take a longing look at the moon, after having journeyed towards it more than half-way. We then relaxed our dietetic system, halted our aërial chariot, and made a few final investigations before sounding our retreat. Applying our scales, we found the force of gravitation so small that our balloon only weighed a few pounds and ourselves a few ounces. We next threw a few small articles out of our bark, and found they only fell a few inches in a minute. Interested in a tenet which science had so long held, but which the senses had never before witnessed, I boldly jumped out of the balloon into the great abyss of vacuity. Unnatural though it seemed, I fell not, but then I was standing on nothing. Like Peter, my faith led me to walk on an unwonted element, but, like him, my valiantness soon melted. Though at first delighted with the singular sensation of being suspended in a vacuum, I became terrified when I looked down, and still more when, in my absence of mind, trying to advance towards my aërial vessel, I saw all my exertions brought me not nearer it one iota. I had forgotten,

indeed, in leaping out, that the element in which I had ventured was not one in which I could swim. My friends laughed heartily at my needless anxiety, and to comfort me Stephenson Watt leaped out and bore me company, while he, at the same time, handed me a rope with which we were enabled to re-enter our craft. After a few further experiments and investigations, night came on, and night though it was, we at once shaped our course to the earth. We erringly thought we should not err by trusting only to our instruments. The action of the engines, joined to the increased force of gravitation, made us dart down with a velocity at which speed itself might have been startled. Every moment our momentum increased, but as there was no atmosphere to clog our inertia or to make us feel that when falling we were falling, we had only the sensation of being stationary, while the world was a huge ball advancing usward, and the moon another in full retreat. Such was our composure, that we failed to take the precautions which were so necessary—we failed to note how quickly the world was becoming world-like and the moon moon-like. Shakspeare Socrates and Stephenson Watt were busily

engaged in completing some investigations; Caxton Arkwright was studying the action of our bark's machinery; while I was employed in nursing our sick brother Copernicus Galileo. Our speed, moreover, was so much beyond our calculation, that we were startled when daylight dawned four hours afterwards, and showed us the earth at a distance of only a few hundred miles.

It was now too late to reverse our engines, and apply the ultra-aërial drag to impede our impetuous impetus. With the energy of despair, however, we strove to lessen our danger, but, short of a miracle, nothing could enable us to escape, and a miracle not being forthcoming, we crashed against the atmosphere with such suddenness and violence, as kindly bathed us in the sweet waters of insensibility. Happily, those on earth had noticed our Icarus-like fall, and had prepared a suitable arrangement to save us from serious injury. Despite this, the concussion was so great, that each of us, Vulcan-like, had our legs broken. Such was the suddenness of the accident, and such the wild overthrow of our senses, that our ship was wrecked ere we had time to realize we were near the world. Our ultra-aërial equipments were undoffed, for, in our stupor, we knew

not the moment when we had entered the atmosphere. As for our wounds, it was only the case of Galileo that gave us any concern, on account of his previous indisposition. Happily he, as well as the remainder of us, rallied so quickly that our misfortunes did not vex us so much as the damage to our balloon and our instruments. A few days' hygiene repaired our tabernacles, but it took weeks to refit our mutilated locomotive. The accident, as being the only one which had happened in the world since the Matterhorn catastrophe, was deeply deplored; but it could not daunt the irrepressible energies of man to make renewed sorties to the moon. Our mission, notwithstanding its failure, had reaped a rich harvest of scientific discoveries, and glowed with the omens of future success. The composition of the trans-aërial ether, its electrical peculiarities, the countless shoals of meteoric with which it abounded, its peculiarities at different altitudes and under diverse conditions, had not only been investigated, but their phenomena completely unveiled. We had likewise proved the possibility of man living for weeks and even months by artificial physiological adaptations in the regions of vacuity.

CHAPTER XVIII.

CREW MISSING IN THE SKIES—CLEARING MUNDO-LUNAR STRAITS OF THEIR SATELLITIC ROCKS.

When our broken bones had been mended, we renewed our great efforts in the good cause with remarkable though unsuccessful results. Five ultra-aërial locomotives were made and manned by different crews, so that by the close of 2820 fourteen cruises had been made, five of which exceeded our own in success. The greatest distance run was that of the vessel under the command of Murchison Livingstone, exceeding, as it did, all others by one thousand miles. Though these were voyages in which no haven was reached, they were not barren excursions. There was not one but saw new discoveries harvested and the sciences enriched. They were, moreover, reconnoitering expeditions, by which we were enabled to learn how to pierce our way to the moon

citadel. The dangers of the path were duly explored. Thirty different satellitic systems were found to revolve around the earth in addition to tolerably large meteoric stones. The courses, speed, extent, numbers, and all the phenomena of the meteoric tides were duly scrutinized; comets were boarded and their tails analyzed; and great funds of the secrets of the inter-planetar ocean revealed. Charts were accordingly prepared for the guidance of trans-aërial mariners, preparatory to the adoption of a system by which the mundo-lunar fury could be thoroughly cleared of its dangerous obstacles. As a nearer stage to the goal of our wishes, a council was appointed, in which we debated what should or could be done to effect this great object. We were spurred to restless activity in the solution of this difficulty by reason of a perilous journey performed by M. Livingstone. Leaving this world along with five others, on Feb. 15, 2826, days summed up into weeks, and weeks to months, yet of or from them we had no intelligence. The world took alarm. Millions of telescopes, manned by tearful and anxious eyes, searched the empyrean in vain. Some conjec-

tured they might have succeeded in reaching the moon, but most dreaded that their vessel had been wrecked upon a meteor. Fear-clouds gathered so ominously over the citizens of the world, that the lingering rays of hope flickered and died. Our distresses were embittered the more because we were helpless to help. Deliverance seemed impossible, remedies beyond the reach of human power. Suspense tortured us for weeks, until it froze into despair.

How, then, can I describe the joy with which the announcement was received of the safety of those whom we had already mourned as dead? It happened that Parry Park, making a moonward journey, and having reached the distance of 150,000 kilomètres, espied a moonule about three miles in diameter, of whose existence the world was still ignorant. Subjecting it to the test of the telescope, what was his and his compatriots' wonder to behold it inhabited.

This wonder was translated into joy before the almost certain probability that the inhabitants were our lost brethren. Steering towards the satellite, their hopes were soon realized, and, boarding it, the deliverers and the de-

liverees were in each other's arms. The mystery was then solved how, instead of a dark tragedy, there had been a glorious drama. So it was that M. Livingstone and his brother travellers, proceeding onwards in their moonward course, had come so suddenly upon this islet in the trans-aërial ocean, that they were shipwrecked upon its shores. Happily, they had sufficient time and presence of mind to enable them to purchase their safety at the sacrifice of their balloon. But it soon appeared as if they were saved from speedy death only to suffer a lingering and horror-fraught dissolution. They were threatened with the danger of being drowned in the trans-atmospheric ocean, for they had only sufficient air in stock to last for a few weeks; and they were faced by the terrors of starvation, for they had only a few days' supply of food. But these difficulties were triumphantly over-ridden by their knowledge of chemistry. Finding nitrogen and oxygen locked up in sundry strata of the meteor, they subjected them to decomposition, and supplied themselves with air; and finding in the rocks alike the carbonaceous, nitrogenous, and aqueous elements that go to form man's aliment, they ingeniously

reduced them to their components, and thus transformed stone into bread and rocks into water. Simultaneously they built a house and supplied themselves with the few attainable comforts to be found in this barren pinfold.

But words are defective pigments with which to paint the fearful Stygian horrors these poor shipwrecked mariners had to endure. In the course of one day they were tortured with greater sufferings than the sum total of the afflictions of many during a whole lifetime. To them it appeared hopeless to hope. To their sorrow-stricken souls deliverance appeared only a mirage-mockery.

The voyage of Parry Park having culminated in this unlooked-for stroke of Providence, arrangements were at once made for the return home. But the entrance into the earth requires no comment. As the telegraph flashed the news through its billions of wire to the millions of peripheræ, prayers of gratitude and thanksgiving arose from every household. Imagination alone can compass the intensity and immensity of the enthusiasm of the sons of Israel over the safety of their lost Josephs.

The unfortunate wreck had its fortunate

issues. It goaded the world to expedition in removing rocks from the paths of the ultra-aërial mariners. With magical speed, a huge fleet of trans-aërial ships was constructed, which, having been manned and placed under the command of Mercator Humboldt, left for the earth's nearest moonule. On the second day's flight we hailed our haven. By dint of great skill the various air-ships were borne to its soil in rotation in safety. This afforded as much satisfaction as the pilotage entailed tact, seeing we were unaccustomed to land upon meteoric shores. Inspecting the great floating island, we found it possessed no atmosphere, no water, and no soil. Only a huge barren rock, we at once decreed that it should be impelled to the world, broken up, and dispersed over its surface. We then addressed ourselves to the task of dislodging it from its orbit, so that we might bring it nearer the earth, and thus render it more amenable to future treatment. With this view, we made a pit upon its leeward side, which we filled with fulminates. Having then applied a half-hour's fuse, we returned to the moonule's antipodes. At the desired moment the explosion took place, the recoil

of which was so fierce that the moonule's orbit was brought nearer the mother planet by two hundred kilomètres. The following day we repeated the operation, and brought it to the shores of our atmosphere. We desisted at this point, as another explosion would have dashed the satellite against the earth, and perchance done much mischief.

We now equipped another flotilla of ultra-aërial vessels, with the view of trafficking between the moonule and the earth, quarrying it, and ferrying its ashes to the world. Commencing by bearing loads of one hundred tons daily to the globe, the work increased until ten thousand tons was the amount of the daily freight.

All this while the moonule was literally crowded with workers. As many as half a million generally occupied its shores, all of whom subsisted on artificial air. Meantime the great trans-atmospheric fleet had been divided and dispersed among the several moonules and meteoric constellations, seeing that they were each small in comparison with the moonule that had been dis-orbited. Each ship was commissioned to land upon a satellite,

and accordingly each was manned by a complement of twenty souls. The great desideratum was concerted action, so as to prevent any collisions. This was effected by means of signals on the face of the earth, consisting of great figures of electric light, some of which were five hundred kilomètres in length.

At this point operations entered on a new phase. Kepler Gauss, having shown how many meteoric stones revolved in the trans-atmospheric ether too small to be easily observed, and yet large enough to commit damage to astronomical ships, another fleet, consisting of 500 vessels, was commissioned, with the express view of clearing away these amenities. Happily, as they were found within the plane of the lunar ellipse, the labour of searching for them was rendered comparatively easy. By the system adopted each balloon had a prescribed area to clear of satellitic obstructions. A month had not worn itself away, when no less than 1,000 stones, weighing altogether 5,000 tons, had been brought down captive to the world. In the next, 1,200 were taken, afterwards 800,

then 600, and so on, until not one was left. Meantime all the larger moonules and meteoric constellations, save the isle on which Livingstone was wrecked, had been brought almost to the air environs. Man now addressed himself to the work of landing them upon the earth. The first was boarded, and an explosion made on its leeward side, which tossed it three miles within the world's ethereal capsule. The whole human family were now on the alert. The inhabitants on land, the mariners on the sea, and the navigators of the air in the line of its orbit, evacuated their positions, and retired to spots far enough away to be clear of danger, and yet sufficiently near to observe the flight of the great rock. Interesting were the phenomena caused by the air's obstructive influence. Erewhile revolving in silent majesty, the moonule now reeled, writhed, and wriggled in the aërial sea, with a sound like distant thunder. In a few moments the furious friction made it fire up and fume out great bursts of smoke. This flagration increased until it was like a monster comet, with a rock for its head and a great trail of reek for its tail. Nearer and nearer meanwhile to the

earth became its flight, fiercer and more fierce its appearance, and louder and louder its roar. But the air soon held it prisoner, and after a few more convulsive lurches and death-throes, it fell exhausted into the Pacific Ocean. But even in its death it was mighty. The meeting of the world and its moonule was terrific. The water was dashed in streaming water-spouts to the clouds, and fell in mighty water-falls and showers over an area of a hundred kilomètres. The waves were tossed into hideous commotion, and the sea around the spot was a mighty seething, hissing cauldron. For an hour the rebellion of the elements was uncontrollable. The wind, disturbed by the flight of so mighty a microcosm, blew for a while with an intensity that only mocked the preventive measures of the meteorological weather works.

Such was the massiveness of the moonule, that after its fall it stood an island in the Pacific. But this infraction of the world's geography was soon remedied. Ten thousand ships, like vultures, ate up its great fabric, and bore its remains as a donation to the new artificial trans-equatorial lands, and especially for the consummation of the time-honoured scheme

for translating the South Sea peninsulas into a mighty continent.

The next moonule was thereupon brought into the atmosphere, and, after whirling above the heads of mankind for a few days, wrestling and struggling in the arms of the atmosphere, and after reeling, roaring, and belching from its huge body mountain volumes of smoke, it succumbed to friction and gravitation, and struck the vacated town of Königgratz, crashing its erections into dust. Such was the force of the blow, that the meteor was half buried in the earth, while the houses for miles around were more or less burnt or damaged by the violence of the concussion.

But a few days, as in the former case, saw the huge hulk sundered, and its ashes dispersed to the southern seas by the geographical army. Meantime the moonules of the first great constellation were launched into the world's aërial ocean, and after the usual phenomena struck the earth. One fell in the Bay of Aboukir, one at Blenheim, one at Glencoe, in Scotland, and one at Gettysburg, in America. All, of course, com-

mitted great havoc—havoc which, nevertheless, was infinitely cheap when we viewed the recompense.

Six more satellites were now drifted simultaneously into the border-land of the atmosphere, so confident was man that he would be enabled to manage their descent in safety. Conformable to the new plan, sappers and miners boarded each as soon as they came within the grasp of the air, who filled them with explosives, so that at the moment required they were burst into such small fragments, that their fall upon the world committed but little damage. The system suited satisfactorily. The foremost moonule, when above Algiers, suddenly disploded, with a force which threw the fretful elements into hurricane passions and whirlwind spasms, scattering the broken fragments, in the shape of a hailstorm of *débris*, over the Mediterranean, the Holy Land, and the heart of Africa. The second burst, amid equal paroxysms of meteorological rage, upon Waterloo; the third over Pultowa; the fourth over Richmond, in Virginia; and the fifth over the roads of Copenhagen. The discharge of each, though ruffling the equanimity

of the weather, did happily naught but reparable mischief.

The remainder of the world's satellites, save that discovered by Murchison Livingstone, were now drifted across the frontiers of the earth's air-ocean. The spectacle thus revealed was sublimely awful. Day and night the massive smoking bodies whirred and whirled around the earth like huge comets, causing all the phenomena of solar and lunar eclipses. In any age but our own, with what terror man would have viewed these bodies!—with what fear would he have beheld them rolling and roaring above his head, and hourly rushing nearer and nearer! But such was our trust in God's laws, and such our hold over Nature's reins, that none felt the slightest uneasiness. One after another, when sufficiently near the earth, was boarded, mined, loaded, and fused, then vacated, and allowed to burst at the prescribed time. With uniform success the whole array was thus managed, until the world had captured them all, and left the atmosphere once more clear.

The only obstruction which now remained in the mundo-lunar straits was the Livingstonian

island. This was left advisedly, in order that it might be colonized as an intermediate station between the earth and moon, for the benefit of mundo-lunar travellers. Circumstances, however, rendered this unnecessary, and afterwards it was decided it should share the fate of other circumterrean satellites.

After due deliberations, eighty astronomical mariners sailed towards it, and caused several explosions, the last of which brought it within the pale of the earth's air-zone. To mine it was deemed inexpedient, and hence it was evacuated by its inhabitants. The excitement now engendered was immeasurable. Slower became the flight of the microcosm, louder its roar, larger and more fearful its appearance. Round the world it tottered and librated with a trail of smoke which darkened the subjacent country, reeling more and more in its flight, and becoming hourly a more certain prey to the earth's gravitation. Down, down it came before the eyes of the millions, and at length dashed with frightful impetus upon Sebastopol. The sound of the collision out-thundered thunder itself,—the devastation was tenfold greater than the Lisbon

earthquake. Burying itself in dense clouds of dust and smoke, it found its rest on the earth, after having revolved around it from the creation.

The world, in its joy over the final consummation of clearing the mundo-lunar fury, employed its transit system in radiating mankind to the Crimea. In their presence the dissection of the great body was commenced, its anatomy proving to all the source of infinite interest. Science saw and noted the significant fact that it was composed of concentric zones of many chemical elements, the lightest of which were exterior, and the heaviest interior. It was a miniature world, with rocks for its crust, and platina and gold for its heart.

Now followed the operations of distributing over the earth this fund of satellitic booty. Happily this work harmonized with the labours of the Geographical Commission. The acquisition of the new territory enabled them to plant continents in the midst of the southern seas, and peaks upon the bosoms of plains.

I have now run down the stream of time, so far, in describing these events, that I must halt, and retrace my narrative a few years,

to refer to sundry noteworthy events, still unnoted, which happened during this interim. Suffice it to say, in the meantime, regarding the subject of extra-terrestrial navigation, that we strove onwards in our great campaign to storm the moon citadel, until I at length hit upon the invention by which our labours were crowned with unalloyed success.

CHAPTER XIX.

MY RETURN AS A MEMBER OF THE WORLD'S PARLIAMENT.

TIME had spun out the thread of my life half a century, when I was exalted to a position reserved only for one out of several millions. One of the representatives of the 16th latitude having previously retired, I, along with forty others, was brought forward as a candidate. A few hours thinned our numbers to thirty, and ere the world had made another couple of revolutions, there were only Mirabeau Lamartine, and myself left. Whether appointed or disappointed, I felt that in having had him as my rival I had been honoured. The following day the hour of choice arrived. The polling-booth was opened, and the telegrams and pneumatic tubes hurried on thousands of votes during every beat of my excited pulse.

In an hour the battle was ended, and thus stood the votes :—

For myself	4,683,212
Mirabeau Lamartine ...	3,216,118

Half-an-hour afterwards, the latest edition of the *Times* contained articles on the election from many in different parts of the world, and at mid-day I returned thanks to an audience of 300,000 by direct hearing, and 2,000,000 by acoustical tubes. I said, that while gratified in attaining an honour of which the humblest might be proud, my heart's first love was not general politics, but trans-aërial travelling, and that to its promotion I would still devote my days and nights, and that I would use my exalted position as a lever to greater exertions in the good cause.

In the evening of this great day of my exultation and exaltation I took my seat in Parliament, a position which I have since held. Mighty have been the events which the zeal of the senators has crowded into the gulf betwixt the "then" and the "now." Punctuality, the want of which in ancient times entailed such a ruinous discount of waste in the lives of men and nations, had

all this while been sacredly observed. Speech-spinners were not allowed to rob us of the golden bullion of time. Never more than a few hours had ever been spent upon any measure. Senators went not to Congress to be entertained with tournaments of talk, nor to play at pettifogging games of power-hunting, political jugglery, and party snip-snap pugilism. They went, with decided minds and impartial judgments, to push on the maximum of the world's business in the minimum of time.

The woof of my life is from this point inter-woven in the warp of the world's annals. To tell my story is to tell part of that of the world. My labours lay in building history. Such is an epitome of the commissions in which I was engaged at this time:—The amplification of the measures to level the earth; the equipment of new expeditions to the moon; the scheme to develope the phosphorescence of the Medusæ and other glowworms of the sea, so as to enable mariners to sail more readily during darkness; the projects undertaken under Young Rumford, by which water was reduced to its elements, and the application of the gases thus obtained condensed into solids, to what was pre-

viously monopolized by electrical, mechanical, and steam engines; the extension of the pneumatic tube system, and its development for increased passenger traffic; the extension of the sub-aquatic whale-stables; the introduction of sub-marine electric lighthouses; and, lastly, the gigantic meteorological victories by which artificial auroras and wildfire were created, to supply man with a substitute for the sun during night.

Man's great mechanical work, the geographical reformation, formed our greatest feat. The sublime resolution with which the genius of the world embarked upon the task, and the rapidity with which the million leviathan power-machines and the rocky torpedoes crashed and crushed the typographical tumours, and razed them to their foundations, transcends admiration. The prophecy of Isaiah seemed to have its literal fulfilment—"Behold I will make thee a sharp thrashing instrument having teeth. Thou shalt thrash the mountains, and beat them small, and shalt scatter the hills as chaff."

For the last twenty-five years several cubic kilomètres of earth had been delved away

weekly. The map had been completely metamorphosed. The noses of capes had been polished, all rivers and straits had been rendered navigable, and the shores of the world but one continuous harbour. Every isthmus had been converted into a strait, and every strait bridged and undermined. Oceans had been netted by bridges above and by tunnels below, while all rivers had been joined by an anastomosis of canals. No lands had been left insular, and no waters lacustrine. Lakes, no longer invested by land, had now communication with the ocean by artificial rivers. Canals, the capillaries of the world's anatomy, irrigated its whole area. There was a universal union among waters by means of artificial rivers, straits, canals, and viaducts, and a universal union of land by means of bridges, tunnels, and isthmuses. Ships could sail into the core of continents, and trains run through the heart of oceans. Neptune had invaded the land and Ceres the sea. Animals could roam from pole to pole without touching water; fish could swim through Asia, Africa, Europe, and America in their own element. Each city was amphibious. With one arm it clasped the

waters, with the other the land. Where the mountains had raised their mighty bodies there were now plains, rivers, and cities,—where there had been volcanoes there were now caloric emporia.

During the progress of the great labours there existed unparalleled devastation. The very bowels of the earth were gashing with ugly wounds. Buxom Ceres and lovely Flora were, for a time, exiled from their favourite haunts. But for these sacrifices man was reimbursed by a reformed system of vegetation, the wise features of which not only eclipsed those of the past, but seemed to bid defiance to improvement in the future.

The beauty of nature, in its rejuvenescence, and the increased facilities for industry, for transit, and for scientific enterprise, were consignments of blessings destined to be borne down the stream of time to latest posterity. Chaos had been disinherited of all his former earthly possessions. We had rendered the crust of the globe but one large piece of artificial typographical sculpture—one large Eden.

After a few more years, the artificial peaks

of the world, the last items in the programme of the geographical reform, were finished. Wisely were they made diverse in contour, in construction, and in magnitude, to render their uses the more numerous. Some were pyramidal, and stood on the plains as monuments of massiveness; some, with easy and majestic lines, uplifted their summits beyond the clouds; while others, spire-shaped and taller still, pierced into the skies as far as the precincts of the atmosphere. They stood in lonely majesty, charms to the observing eye, feeding it alike with awe and admiration. But their appearance was subordinate to their uses. All were citadels of science and repositories of art. They were studded from base to apex with scientific batteries, museums, and laboratories. Every swing of Time's pendulum enriched them and rendered them greater ministers to man's wants. All were great meteorological hearts, whose wondrous movements regulated the rhythm of the aërial circulatory system. To suit the great aërostatic traffic, the atmosphere was divided into ten strata, five of which were affluent or arterial, and five refluent or venous. Some of these currents were rendered slow,

others rapid; some rain-gorged, and others dry. A few of the peaks were mounted by huge observatories, which, like beacons, rose above the aërial ocean, their tops being manned by astronomical sentinels. There telescopes were free from optical aberrations, and there man could study the phenomena of the meteoric tides which sweep past the earth. Another purpose which they subserved was the adaptation of their summits as candelabra for mighty electrical lights, for the illumination of the vast floor of the world. At first these great lamps were fed by electro-magnetic batteries, but the trees of the world did not see two additional rings added to their circumference when Wheatstone Morse told man that inasmuch as our planet was a huge electric machine, it was absurd not to put it in action and appropriate its inexhaustible resources. "Give me," said he, "forty millions of men, and in one ecliptic I will illuminate the whole exterior of the world by the electricity in its interior." His wishes were gratified, and thousands of wires were affixed at the magnetic north pole, and other thousands at the south pole. The meeting of the currents accordingly supplied

men with a simple yet powerful light-giving agency.

But the primitive plan was soon amplified. Millions of wires were soon applied to the positive and negative poles of the world-battery, with the result that the force thus obtained was used for as many purposes as would require a volume to enumerate.

The mammoth iconoclastic armies were now disbanded, and the great mental and mechanical energies focussed upon the great task were appropriated to hasten the other labours of the age. Only two millionaire armies were left to finish sundry geographical reforms, which, as we shall see, had their labours extended over a generation.

The completion of the labours of the Geographic Commission was hailed with great joy, —joy not evinced as in king-ridden ages by the fluttering of cloth on poles, the explosion of gunpowder in iron cylinders, or the traffic of sin-inspiring wine from glass bottles to the recesses of man's tabernacle, but by heart-flowing gratitude which disdained the empty and vain fripperies of outward show.

CHAPTER XX.

ASSEMBLAGE OF THE WHOLE HUMAN FAMILY. THE WORLD'S PRESIDENTIAL ELECTION.

I NOW gave birth to an idea which had long lain in the womb of my mind. For years I had thought how sublime it would be to assemble all the sons of men at one huge family hearth. In introducing my scheme to Parliament after these years of incubation, I had one of the largest audiences that ever listened to speech of man. The grandest oration of Demosthenes was not heard by more than a few hundreds, but mine was delivered before half a million of intra-mural and forty millions extra-mural hearers. When I commenced, I dreaded my tongue was unequal to the task of administering worthy sentiments to such a world of ears. Fortunately I managed to course my thoughts in the orbit of oratory. My words, indeed, were so appre-

ciated, that I gained my point ere my speech was well begun. The speakers who followed swept with the full tide of eloquence my cherished scheme into the sanction of the house. Unlike those ages when reform measures were carried at the cost of millions of conflicting words, and never passed until the flood-gates of public opinion had been opened, —until those juntos called cabinets had been pelted by an increasing storm of petitions, and pamphlets, and public meetings, and until the whole political atmosphere had been filled with hurricanes of debate and thunder-storms of indignation,—my Bill was in an hour and a half fledged into an Act. In accordance with its terms, it was decreed there should be a reunion of the human family every half-century.

Shortly before the great cosmopolitan assembly on June 7, 2832, Aristotle Newton, the world's President, whose dazzling genius had so long irradiated the political firmament, intimated that his advanced age bade him seek retirement below the horizon of active life. It was, therefore, resolved to render the first great meeting of the citizens of the earth the more memorable by making it the occasion of the

earth's Presidential election. The close of such a distinguished career as that of the good, great Aristotle Newton, brought tears to the eyes of the world—tears of gratitude for the plentiful harvest of his good works, and tears of sorrow that the burden of two hundred and ten years told us his life's goal was nearly reached. To follow his footsteps in the fields of virtuous usefulness was a commendable ambition; and gladly, therefore, the world saw a constellation of rising stars in the welkin of public affairs, including Shakespeare Socrates, Homer Virgil, Pythagoras Savonarola, and Algernon Sidney, —men truly worthy to be men's leaders.

Every provision that prevision could suggest was made to render auspicious the first great worldly Olympus. Paradise, as the cradle of the human race, was appointed the rendezvous, and, accordingly, temporary cities were built on its plains, and a provisional net-work of railways and pneumatic tubes framed near the spot in connexion with the world's main lines.

During the muster the whole transit-system of the world was convulsed. Engines with their three-story carriages, pneumatic tubes with more humble burdens, tramways with

their millions, and coveys of balloons driven by electricity, eagles, and condors with their tens of millions, all radiated towards the common centre. At 1 A.M. the concentration commenced; at 8 o'clock the same evening it had been completed. To ascend as I did among the mighty aëronautic navies and view the hordes of Adam's sons, crowded around for leagues, was an unspeakable treat to the eye. Till sunset we indulged in a rich repast of intellectual joys, worship followed, and then the great assembly retired to rest. Nor did our host need sentries or watches. The game of murder was obsolete. We could fall asleep in peace, for God was our King and his angels were our sentinels.

Long ere sunrise next morning, I, along with thousands of mercurial spirits, ascended to the purlieus of the atmosphere to view the scenes of activity which would ensue when the family of Adam would arise from their beds to pay their homage to God. Here with our telescopes we took a Nebo-view of the whole human race. Such an extraordinary eyeful! Despite all the slaughters, plagues, and diseases, mused I, which have mowed down the sons of

men in the past, to what amazing bounds they have multiplied! Strange that Adam and Eve can claim the parentage of so immeasurable a family! What a creative force there is in vitality! If death slays its millions, life creates its billions. When death commenced its war against life in this world, there was only a handful in the land of the living; but, despite the ceaseless shower of Death's arrows, behold how life has ever tenanted two new tabernacles for one it was forced to surrender, so that to-day I view with amazement the gigantic dimensions of the human race. Oh, death, where is thy sting? Even thy victims shall yet be thy victors, for they only sleep. Ere long the congregation of the dead shall be the congregation of the living.

Xerxes, in beholding his mighty army, wept when he thought that in a hundred years all its members would be dead. Joy, however, animated us as we beheld this infinitely greater assemblage, because our advanced philosophy made us view it as only a company of pilgrims, and this earth as a large inn; and because we knew the heavenly jubilee would soon arrive when this great host of travellers would rest

from their wanderings in the heavenly Jerusalem.

Soon the hundreds of millions had arisen to the music of the largest musical machine man had ever invented, consisting of a perfect forest of pipes, and comprising three hundred bells, to which the bell at Moscow would have been esteemed a tinkling cymbal: its strains, overwhelming in depth and richness, were heard with unclouded distinctness by the whole audience. All was now animation, and the sight, grand before, waxed grander every second. We were lost in the labyrinths of admiring wonder. The scene, pen or pencil or tongue can never describe. The most august historical picture since the crucifixion, it medicated our minds with reverential awe. Soon the millions were breathing out their orisons, and then followed the singing of these sublime words by the united hearts and united voices of all mankind,—"Behold how good a thing it is for brethren to dwell together in unity." As the triumphant music rose like a sweet savour to the heavens, our souls melted with pious emotion.

How heavenly is the power of music! It is

a holy incense, which rises from this vale of tears to better worlds. The heart-language of man, it finds an echo and an audience on high. Before pure music evil is thrown into retreat. Angels lie hidden amid the sound whose breathings enravish our ears. It is heavenly above all things earthly. In the devil's ears alone melody is dissonance, and harmony discord. Thanks to God for the gift of music. Amid the treasures of divine blessings reft from man at the fall, how grateful ought man to be that music was not included, but left as heaven's lenitive to dry his tears and give wings to his delight.

The great family of man were then, with the view of deciding who should be their President, marshalled according to a plan replete with strategic ingenuity. For a few minutes there was the most indescribable bustle man ever caused or witnessed. Formerly ensconced on the earth, the myriads of myriads rose in a great covey to the prescribed musical signal, each flying to his assigned position. Neither nature, nor history, nor fiction, can supply a simile to illustrate the fearful thronging and crowding which ensued. But this seeming con-

fusion merged in a few minutes into the most consummate order. Stillness now reigned in that air which but a moment before was lashed with the flapping of millions of wings. Such was the superlative skill of the manœuvres, that every family fell into its ordained site. When this was effected, all were delighted to find the preparations for comfort so numerous and perfect. All were supplied with optical and acoustical apparatus, which enabled them to view the whole scene and to hear every speech. The spectacle repaid with interest the trouble of the collocation. Eyes filled with tears as they beheld it; hearts swelled with gratitude as they witnessed that peace and goodwill among men for which Christ had lived and died. The senatorial platform formed the nucleus and the Presidential chair the nucleolus of the assembly, while around were concentric circles, containing the whole human population. Around the President upon the central hustings were ranged our leaders and senators, special seats being reserved for the fifty most aged members of mankind, the place of honour being conferred upon Harvey Jenner, the eldest brother of the human family. The venerable man of two

hundred and fifty years sitting, in the midst of forty-nine others, who, though his juniors, had outlived the vicissitudes of two centuries, formed one of the most touching spectacles my eyes ever addressed to my heart. An additional interest was attached to this patriarch. Before him were seated his progeny to the eighth generation, and numbering in all 10,000 souls.

It was difficult to determine whether the sight of the circumambient myriads or the select array in the centre awakened the greater veneration. The first in magnificent magnitude eclipsed all the pictures which history had ever sketched. The other formed a shrine of admiration and a focus of delight to the millions of admiring eyes.

The election now commenced. Stillness and solemnity reigned as our decision emerged from our individual hearts to the sensorium of public opinion. Such was the perfection of the plans, that one hour completed the polling. Amid stillness, broken only by sobs, the aged Aristotle Newton then rose and vacated his chair. Holding in his hand our verdict, he broke the spell of our suspense by announcing that our votes had rendered SHAKSPEARE SOCRATES our President.

The sons of men rose to their feet as the successful candidate approached. Newton having embraced him, conducted him to the Presidential chair, and, amid solemnities which told us that heaven as well as earth viewed the great scene, he implored the divine blessing upon his appointment. Heaven having thus been solemnly asked to ratify the installation, the world accorded its congratulations to its new President. These were conducted by a series of great aërial volutions around the centre platform. Formed according to the latitudes of their dwelling-places, the movements of the myriads were conducted with rigid regularity. One million balloons were engaged in the pageants. One hundred millions of mankind, like Ganymedes, rode on eagle-back; five millions, like Junos, were towed by flying peacocks; eighteen millions, Venus-like, were drawn by doves; 18,000,000, like Mercuries, flew with wings; while others were driven in aërial equipages of all species of construction.

But this is a mere dry digest of the data of the day. To attempt description of the devotional solemnities and musical pæans, would be to presume to the folly of a literary Phae-

thon; to applaud their grandeur would be to silverize gold. The whole world saw and formed the splendour of the scene, yet none dared describe the indescribable. The very *Times* of that day was dumb before its transcendent glories. I cannot, however, refrain from referring to what was the culmination of the proceedings, the conclusion of the election ceremonials, when the Hundredth Psalm was sung by all people who on earth do dwell. The cosmopolitans, meeting in unison and brotherly love, to weep over their unbrotherly conduct in the past, to rejoice in the peace now universal, and to pray that brotherly love might continue in the future, was, in itself, the zenith of sublimity.

Next morning was Sabbath, and its solemnities commenced at sunrise. Massillon Chalmers and Baxter Taylor preached in succession from the pedestal used on the previous day for the senators. Such were the arrangements that there was not one of the whole human race whose ears were not the happy recipients of their thought-fraught and heart-thrilling language. Before the sublimity of the services, the grandeur of the scene, the eloquence of the speakers, and, above

all, the fervency of the prayers, whatever was hard in man's heart was melted, and whatever was icy was thawed. A more remembrance-worthy and a more auspiciously holy day is not recorded in the annals of the millennium. Its glories were of that heavenly nature before which earthly language or human tongue is silenced.

The following morning the human family rose refreshed, and with minds sealed with indelible impressions of the divine glories of the great jubilee of the brotherhood of mankind. The only sad part of the programme had now to be faced. The touching dismissal services rendered few eyes to be without a tear, and few bosoms without a sigh. Finished amid a torrent of music, which echoed the tumult of sadness in our hearts, the signal for separation was then sounded. In a few minutes the air was teeming with clouds of balloons, and the earth was swallowing up millions, and hurrying them on by rail, tramway, and tube. Like a sudden stroke of magic, like a mighty dissolving view, was the departure. In a few minutes scarce a vestige was left to tell the story of the greatest bivouac ever beheld on the stage of the world.

CHAPTER XXI.

THE ASTRONOMICAL GUN.

UNDER the stimulus of the conviction which I had ever reverently treasured within my heart of hearts, that man would erewhile soar to the stars, I had all this time been working and keeping others at work in founding the science of inter-planetar navigation. My house had long been a workshop for inventing trans-aërial machines, and an academy for the study of ultra-aërial dynamics. Ere this, indeed, I may be said to have been the captain of a powerful mental organization, the aim of which was to burst the bars of man's cosmical prison. My colleagues and pupils had now swollen to ten thousand brain-workers, whose souls were as powerfully yoked as mine to the great and good cause. Our nearest relation, the world's lunar consort, we had considered as entitled to our

first attention. Having made its acquaintance, we felt we would soon be enabled to visit our stellar brothers and sisters, Saturn, Jupiter, Mars, Venus, and the other members of the solar family. Hitherto our tactics had been futile, and we had long studied how they might be changed to advantage. Though for years we had struggled amid labyrinths of calculations, explored untrodden philosophical paths, loosened ravelled scientific skeins, and performed myriads of original experiments to secure the foundations of the new science, all was yet spring, without even the appearance of a summer. At length I hit upon the happy idea of making a vast cannon, whose projectile would form a vehicle for the propulsion of man to other worlds. After twenty thousand experiments by my pupils and colleagues, and twenty thousand speculations by an interested world, I introduced the matter to the political and scientific congresses. Unlike those times in which years and ages intervened between the sowing and the blossoming of public enterprises, my favourite bill was read, debated, and passed in a single hour. In the next we had embarked upon the greatest scheme of the century—a

scheme which was to add new worlds to the conquests of man. I was appointed generalissimo of the measure, and was decreed unlimited powers to mobilise millionaire armies and amass arsenals of machinery. My triumph was more valuable to me than Arbela to Alexander, Austerlitz to Napoleon, or Waterloo to Wellington. It was worth more to the world than a century's labours in the Dark Ages. Darius and Xerxes gloried in their ability to raise mighty armies, but for me I had the power of mustering more men in ten hours than they could in ten years. In the course of the evening I had embodied an organization of workers and thinkers which was truly worthy of the great mission. No sooner was this done than there flowed in upon us a tide of plans and inventions in furtherance of our task. At our first council we resolved in the interests of speed to make a mountain our gun, the apex whereof would suit for the muzzle and the base for the breech; all that was required by this method being but to make a five-mile vertical tunnel and the necessary ram-rod apparatus. After due deliberation we found Mount Everest best suited our purpose, inasmuch as it possessed an extinct volcano, the funnel of

which was so formed as to necessitate little mining, and inasmuch as by firing from this lofty height the atmospheric resistance to the projectiles would be so trifling.

Simultaneously, we mustered 50,000 pioneers to prepare the way for the work by forming railways, tramways, tubeways, and roadways, together with workshops and store-houses around, on, and in the mountain. Several mines were eviscerated to provide the necessary metals, several forests felled to furnish us with wood, and several engineering depots emptied to supply us with the requisite working plant.

The vast organization included legions of chemists, under Priestley Faraday and Hales Cavendish, whose laboratories comprised lakes of liquid and hills of solid reagents. Electricians to the number of ten myriads manned batteries which could fuse tons of iron in a few seconds. Machinists under Caxton Arkwright, armed with engines of Herculean power, performed exploits that shamed those of the fabled Vulcan.

The mountain was a shrine of zeal and activity. Aërial machines, and cadets on eagle-back and condor-back, darkened the sky, and the

hordes of science, like vultures on a carcase, blackened its sides. Every beat of the clock saw stores of crude metal converted into part of the huge gun. Once fighting among a jungle of theorems, theories, and calculations, my pupils were now battling triumphantly with the real and gaining victories in handicraft and braincraft, mighty in themselves but mightier in their prognostics.

The invincible allies, time and perseverance, soon transformed the crater of the volcano into the bore of the gun. The casting, which in those times presumptuously called enlightened would have occupied all the furnaces of Britain a whole month, was effected by our tiny electrical machines in ten hours. The cooling, which once would have extended over years, was consummated by caloric subtractors in a few hours; and the heat, which would have been lost, was economically returned to man's force-magazines. The founding of the intra-montane tunnel gun, with its interior surface of four square kilomètres, was no greater task to our engineers than in war ages it would have been for Birmingham to make a blunderbuss.

The loading apparatus was now forged, and

an electro-factory established to make projectiles for the celestial ordnance. This new phase of our labours entailed mighty reinforcements, so that when the full complement had been concentrated, Mount Everest was invested by a larger army than Xerxes led across the Hellespont. Yet how different the enterprises. They went to slaughter and be slaughtered, we to solve one of the paragon problems of science. Infatuation dragged them to death, Wisdom led us to glory's goal. They went to throttle a nation, we to conquer new worlds.

The closing scenes of the mighty enterprise are impressed on so many paintings, and so vividly described in history's pages, as to render any description from my pen a stale superfluity. Not a day having passed but saw upwards of forty millions studded on Mount Everest, together with the mightiest array of machinery, chemical, electrical, caloric, and mechanical, ever accumulated at one spot, could the scene be aught but one familiar and dear to the memory of every soul?

Meanwhile the preparations and precautions in prospect of the conclusion of the work were being elaborated. Meteorologists had devised

means to prevent any storm or hurricane from the violence of the firing of the gun. Legions of architects, under Angelo Wren, had planned earth-works and arsenals for the astronomical artillerists, while myrmidons of workers were following their instructions. Naturalists, no less energetic in the good cause, had forwarded armies of chamois, eagles, and allied genera to expedite the colossal undertaking. Chemists were endeavouring to find an explosive which would produce the maximum of force with the minimum of noise. Astronomers were framing calculations to ascertain the exact amount of pulsion force necessary to bear a projectile to moon-land, and the exact limits of time within which should take place the firing. All these points had been considered by me and my pupils previously; but to ensure the truest results, we were subjecting them to still more rigorous and vigorous investigations.

Father Time had just fingered the date, August 22, 2836, when the gun was finished. Noble consummation! A few months had seen the construction of a work which had focussed within it sufficient labour to have formed one

hundred Egyptian Pyramids. The projectiles ere this had been factured and were ready for use. Fabricated on the principle of a bomb-shell, their interiors were rendered chambers fitted up with all the essentials for the voyage. Chief among these was an air-ship ready for inflation, which comprised the apparatus and provisions necessary for life in non-aërial regions; the mode of operation being that the occupant, when nearing the moon, would, by pulling a trigger, burst the shell and disenthral himself and his balloon. Thus released, he would be enabled to descend at will whithersoever he desired. This magical metamorphosis entailed complex machinery, but I resolved to stake my life upon its accuracy. Millions were prepared to volunteer their lives in a trial trip; but it was agreed that, after my labours in the seed-time of the movement, I was entitled to be the pioneer of its harvest.

Many preliminary experiments were made with the gun before a conclave of the world's *virtuosi*. For the convenience of the multitudes, extempore leviathan telescopic batteries, five hundred in number, had been planted in

the vicinity, in addition to the permanent watch-towers, previously constructed, so that altogether accommodation was made for ten million pairs of eyes.

We handselled the ordnance with blank cartridge, and subjected it to crucial tests to prove its soundness. With the moon as a target, and the vertical pit as a gun, the great mundo-lunar artillery blank-ball practice commenced. The loading was managed with ease in two minutes. In five seconds more the first astronomical projectile was fired to the moon by the hand of Shakspeare Socrates. The outburst of noise which was excited might have shamed thunder,—the vibration was mightier than a mighty earthquake. The smoke overhead immersed us in darkness deep as night. The aërial disturbance kindled the peaceful breezes into a fury hurricane. Re-assured that all was right, our eyes, as soon as the smoke dissipated, were directed toward the mammoth missile as it made its transcendent ascension. Our delight was unbounded as we beheld the thunder-bolt striking its mark. A cheer from millions of throats thereafter heralded the entrance into the moon of this the first message

from its mother world. Meanwhile other shots were fired every few seconds, until the revolution of the earth carried the gun away from the direction of our astronomical butt. By this time eight missiles were in mid-air. Every succeeding ball was further from the mark, but the gravitation attraction of Diana caught them all, and bore them to her bosom, showing satisfactorily how the gun could pay tribute to the Night Queen even when she was far distant from her zenith throne.

Thus, mused I, the great emprise to which I have devoted a lifetime of brain toil, inspired by the stimulus of a soul saturated with enthusiasm, seems on the eve of consummation. These famous missiles are the harbingers of man's dominion over the world's satellite, and the inanimate pioneers of a human invasion. In my irrepressible joy, I summoned my great college of colleagues and pupils, and in their company spent the evening. Our deliberations, erst amid wintry difficulties, were now amid the summer scenes of jubilant hope. Our labours so long with the ploughshare of inquiry in the regions of ice-bound calculation and conjecture, were

now so advanced that we were on the eve of using the sickle. Our minds having been so long engaged in bitter strife in the fields of uncertainty, were now justly proud to emerge into the enjoyment of such brilliant realities.

It was a great disadvantage that the gun, being immovable, was only of use when Cynthia was nearly athwart its muzzle. Yet the comparative ease and speed with which it was built rendered it proper to adopt the present plan at the outset, reserving to the future the task of making ordnance which might be revolved and suit for firing at any declination or inclination. By dint of a series of statistics, framed by my own pupils, based on the results of the previous firing, it was resolved that the projectile in which I should be pitched to the moon should have such an ascensional force as only to send it to the frontiers between the gravitation forces of our globe and its satellite, leaving me to burst the shell when there, and pilot my way to the virgin world. For my return due provision was made. My balloon was framed of sufficient calibre to enable it to perform a journey from

the moon to the earth. This, indeed, was a simple task, as the mighty gravitation of our planet rendered it not so much a voyage as a descent. Foresight, I think, scarcely overlooked a single detail.

CHAPTER XXII.

INTRA-BOMB VOYAGES.—I AM BURIED ALIVE.

PREVIOUS to my first attempt to crack the aërial shell in which the earth-nut is enclosed, and thereby escape to the moon, I took the precaution of making a few trial trips. In the maiden experimental voyage my soul was a waif in a storm of intense suscitations. With conflicting hopes and doubts, I allow myself to be cribbed into my aërial carriage if all go well, or my coffin if not. I then feel the missile in which I am imprisoned being pressed home five kilomètres deep into the breech of the cannon. A mighty pressure of emotion swells my heart in this crisis. Under me lies a hell imprisoned in dust, ready to be liberated with the key of an electric spark. In the next beat of my palpitating heart, a mighty sound and a mightier vibration tell me I am no longer in the world, but far, far into the regions of vacuity. I had

dreaded that the dreadful shock might have robbed me of my sensibility; but happily the scientific appliances and adjustments prevent even a temporary overthrow of my presence of mind. Scarcely is the explosion over, when I arise, examine my instruments, test them, study my bearings, and note the direction in which I am proceeding, my speed and my distance from the earth. Having finished this scrutiny, I feel how admirably the whole range of inventions involved in this system work. Not a single arrangement has miscarried,—not even the light which illuminates my cell has been quenched by an explosion so virulent.

It had been settled that I should be tossed 20,000 kilomètres beyond the earth; and so accurately had the pulsion force been applied, that I was sent to within a few kilomètres of the specified distance. I must have left my soul behind me had my thoughts during this time not been cast in the mould of devotion. My reflections crowded the chambers of my brain, and flitted before me with equal rapidity and vividity. The ideas of a week seemed to be condensed into the compass of a few minutes. They sped before me with a speed

commensurate with the celerity of my voyage. Before their fluent current, fear and dismay were swept from my feelings. I was panoplied with courageous joy. I felt triumphant in the achievement of ploughing into the realms of space in a few minutes to a distance which it would have taken the finest clippers in monarchic times years to accomplish. When I arrived at the terminus of my pitch, I bravely faced the critical juncture in which to liberate the balloon coiled up in its bomb-shell prison. Just as the indicator reached the specified spot, I donned my ultra-aërial breathing equipments, tied myself to the car, and applied the trigger. A fierce yet silent concussion ensued. What on earth would have caused an explosion mightier than thunder did not here cause so much sound as a whisper. For the first time I witnessed a dumb detonation and the wreck of matter without the accompaniment of clamour and clangour. Meantime the unearthly darkness, superadded to the unearthly silence, oppressed me with dreadful uncertainty. For a few seconds I was spun about like a top, the bewildering whirl of the machine overwhelming me with sensations of indescribable horror.

Had I not been tied to my car I should inevitably have fallen overboard. What a horrible possibility! Could the pains of an Ixion or a Prometheus have been more dreadful? My Montgolfier gained an equipoise before my mind. The sun, moon, stars, and the world for a while seemed to reel around me like huge wheels. My muscles quivered, as if each was convulsed, and my heart bombarded my ribs with an intensity which sounded in my maddened imagination like the beating of a drum. In this exigency I unloosed my hands, threw myself on the floor of the car, and, shutting my eyes, implored deliverance. Nothing but a kind Providence rallied me from my emotions, for strength of my own was drowned in fright.

Feeling better, I arose and looked around. I found my balloon inflated, and its machinery unimpaired. Beholding the broken fragments of the bomb around me in all directions, I was amused to notice how accurately they retained their relative positions, owing to each and all being taxed equally by the impartial tariff of gravitation. Having, however, applied my engines, I sailed below the ruins of the wrecked bomb-shell, and saw its pieces grow smaller and smaller.

Oh, momentous moments, mused I, your triumphs fire my joy! My safety is ensured. My present adventure is a pledge that I may be enabled to reach the moon. My heart-hatched anticipations of this rocket system are realized. The world is about to enter on a new era, the curtain that screens which I have been chosen to raise.

My descent is victorious. At a terrific speed I fall into the lap of mother earth. Leaving her at Mount Everest, I now alight upon her at the shores of New England. Here I am welcomed by my fellow-citizens, and laid under the exaction of supplying them with an account of my ascension and descension. Thereafter I am blown by special tube to Constantinople. Here await me the great colleges of science and art, and here I have to re-relate my adventures.

I was glutted with applause. The *Times* thundered out my performances; the moon became the topic of the hour. But for myself I found my chief delight in the prospect of being so soon enabled to plant my feet upon its untrodden soil.

Other ten trial shots such as this were fired,

in each of which I was thrown several thousand kilomètres further. In each successive trip I became more adroit in conducting the bursting of the shell and the emergence of the balloon in its interior, so that what at first caused me terror as bitter as the threatening frown of death, ultimately cost me not so much as a single false beat in my heart's harmonics. Fortified in my expectations, I mustered around me my faithful colleagues, and by their aid made a supreme effort to cross the earth's Rubicon and invade the moon. I was provided with an infinity of comforts. My balloon was stocked with stores alike for mind and body. In addition to a six months' supply of food and condensed air, I had a library of microscopic books, an arsenal of ultra-aërial instruments and apparatus specially adapted for lunar research, all of which were remarkable for portability and their union of strength and levity. Nothing was awanting that ingenuity could suggest.

I would have been accompanied in my great tour, but, considering its danger, I thought it inadvisable to stake more than my own life before the altar of such hazards. Hence I left

this world a solitary pioneer to attempt the great feat of opening the moon's door.

July 20, 2837, was appointed the day in which I should be shot to the moon. In taking farewell of my friends, I felt how painful it was to be snatched from the world in the summer of life, to be pitched probably into the moon, but possibly into eternity. The weak embankments of my philosophy offered but a feeble resistance to the overflowing current of my human frailties. Not till I was surrounded by my beloved pupils and colleagues could I throw off the coils of my weakness and face my heart-wrenching task.

Eleven o'clock in the evening is the hour appointed for the commencement of the services. The comptroller of the weather having cleared the sky, the full charms of heavenly beauty emblazon the spectacle. The great starry population seem to look down with glistening eyes upon the performance of this great drama in history. The moon itself appears endued with adventitious splendour, as if aware she was the cynosure of all eyes. As night had enveloped Everest in its sable mantle, there appeared little promise that it would form the

scene of one of the greatest plays ever acted in this small stellar theatre; but as the clocks of the world struck ten it suddenly became the rendezvous of nearly one-fifth of the human race. By the magical conjurations of art, the mighty mountain was illuminated with electric and magnesium lights, while thousands of railway and pneumatic trains, and millions of balloons, disgorged their thousands of millions of passengers at its base. The political senate, which but an hour ago was in deep conclave in the Lyceum, the scientific congress, which two hours previously had been making sundry investigations in the Andes, world's clergymen from all points of the globe, and the governors of the various provinces of the earth, are each and all now focussed within the area of a few square miles. Every country, every profession, every family, has sent on deputies and representatives. The earth in miniature now reposes on the bosom of Mount Everest.

The myriads marshalled, the imposing services commenced. Prayers, urged by the momentum of millions of glowing hearts, are wafted to heaven. Orations sealed with the most fervent eloquence electrify the audience,

and bid it feel the significance of the event of which history is about to be delivered. But my soul is a chaos of emotions, and upon me the ceremonies are lost. I feel the strength of my weakness, and the weakness of my strength. Long ere the solemnities come to a close, the citadel of my moral courage has surrendered to cowardice. Even when I look up and behold the moon in all its majesty serenading the world, I shudder to think that to it I must now depart. When the auspicious moment does arrive in which I am to step out of the world into the shell which is to bear me beyond its pale, the feelings which hold possession of my breast are such as smother my manliness. I stagger towards the bomb as if it were my coffin. I look wildly around as if I would never see the world in the flesh.

But when my eyes fall upon the millions stationed along the gigantic galleries of nature around, I strive to take courage, and to think my mission worthy of a martyrdom. My memory will ever picture with the richest colours of vividness the immeasurable tribes of my fellow-men with hands uplifted to their God, praying for my safety in my great

embassy. Still, it is with a heart tossing with unutterable throes on breakers of emotion that I enter that missile which is destined either to seal my fame or my fate. While the prayers of my fellow-men ascend to the Most High, my prison is pressed into the breech of the cannon. I fall upon my knees at this awful moment, and resign myself into the hands of Heaven. As if God had entered the bomb with me to be my preserver and protector, I soon feel prepared for whatever He has prepared. In the midst of my reflections the bomb is driven from the depths of the gun, a percussion of terrific intensity ensues, a whiz follows indicative of my progress through the atmosphere, and then I am immersed in the stillness of the grave. I feel no motion and hear no sound. Unparalleled sensations—sensations to a tune never before played upon the chords of a human heart, in a single beat of my hurried pulse I am hurled thousands of kilomètres into the regions of space. A moment before I was in the realms of night, now I am under the eye of the orb of day. My speed, though almost electrical, gives no hint to my senses even of the slightest

movement. I am so soon the master of myself, that my fortitude, erewhile perfidious, is again loyal. Thereupon I become so reconciled to my unworldly flight, that I sit down composedly, work at my instruments, and study my bearings. At length I arrive within 80,000 kilomètres of my destination. I look out upon it from the port-hole in the prow of my iron vessel, and am struck by its mighty appearance. I clap my hands in my joy—joy, alas! premature. I thought verily I was on the eve of achieving that success for which I had so long longed, when I was actually on the brink of one of the wildest misfortunes that man was ever dispensed. This beat of my pulse thrills delight through every artery and capillary, but the next freezes my whole frame with consternation. I find, at this instant, that the concussion of the firing of the cannon has broken the instrument which can alone liberate me from my iron fetters. Where are the words that can paint the anguish which boils within my soul at this juncture? Desperation itself in its attempts to mend the damaged instrument only succeeds in being mocked by fate. Such is the intense friction of the thoughts and fears

which my mind rolls out, that my soul is at once fired into a frenzy of horror. While my agonizing excitement is at its height, the shell reaches its full limits, topples over, and begins to descend.

As it capsized I was knocked down and nearly stunned. Such were the gripes of my despair otherwise, that I lay thinking death would be a luxury, and further life a penance. But a sense of my duty to Heaven aroused me, and I arose upbraiding myself for want of Christian courage—nay, remembrance told me that God, ere He allowed His chosen people to enter the promised land, wearied them out with marches and countermarches in a barren wilderness. How then, thought I, should I complain even if, like a Moses, I should only see from the Pisgah of this great elevation the promised land of the moon. I bowed in submission to Providence, and greedily occupied the time in preventing my fall upon the earth harming me or my instruments. At length, on looking out, I perceive that the quiver of misfortune is still filled with arrows with which to pierce my already bleeding soul. Horror of horrors! madness-inspiring spectacle! I am falling

where there is none to see or save me—into the Pacific Ocean. Braving the billows of my sorrows, I spend the few spare minutes in rendering my prison waterproof. Just as I finished this work, my iron cage was concussed against the atmosphere with such terrific violence, that my soul was lost in the mazes of insensibility. How long I was oblivious I know not. It may have been minutes, hours, or days. All the while delirium and fancy maintained possession of the fortresses of my mind. Cruelly they asserted their sway, torturing me with the darts of inexpressible ravings. My hallucinations were as frightful as if my soul had been the head-quarters of a pandemonium. But that the phantasies of braindom are unworthy of print, I could, through the rehearsal of various of the scenes of my temporary frenzy, fill a volume with a catalogue of horrors.

When consciousness regained its sceptre, I was so weak that I was astonished my soul had not relinquished its shattered tabernacle. Surely, mused I, I have been chastened by a Phaeton's fall, for some good purpose known only in heaven. Opening my eyes and viewing

only darkness, I crawled around my narrow domains, and satisfied myself that my vessel was not a wreck. Having then procured a light, I irradiated my small territories with an artificial sun in the shape of my electric lamp, and rescued my sense of sight from the horrors of an ocular famine. I then refreshed my body with some stimulants and my soul by reading the Bible. Examining thereafter my instruments, a new flagration of grief was kindled when I discovered they were hopelessly destroyed. I laboured in vain to repair my chronometer, and at length was forced to allow time to run its course without being marked by its trusty automatic sentinels and patrols. My consolation was wherefore should I trouble myself regarding the measurement of minutes and seconds, when to me there was neither morning, noon, nor evening, but continual night, — neither sun, moon, nor stars, but a gloomy chaos,—neither seasons nor the pleasant vicissitudes of sunshine and darkness, but the monotony of an unearthly silence, and the sameness and tameness of a prison prospect? What use had I for instruments of horology? What use were there for calendars in a chaos, sun-dials in an Erebus,

quadrants, sextants, or theodolites in a dungeon? I accordingly left time to run its race unwatched, and concentrated my energies upon the husbanding of my fuel and food, and in the improvement of the physiological apparatus to economize both. Meantime, I realized the maddening truth of my insulation from all earthly ties. In my vexation I vowed I could as soon breathe without air as live without the atmosphere of human sympathy. Alas! to what a life I had to submit—a life in a grave, a life in which life was wretchedness, and death a pleasing prospect.

END OF VOL. I.

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