Across the Zodiac

by Percy Greg

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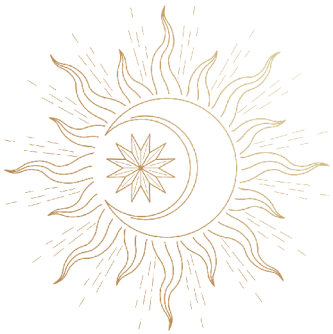

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Shipwreck

Once only, in the occasional travelling of thirty years, did I lose any important article of luggage; and that loss occurred, not under the haphazard, devil-take-the-hindmost confusion of English, or the elaborate misrule of Continental journeys, but through the absolute perfection and democratic despotism of the American system. I had to give up a visit to the scenery of Cooper's best Indian novels—no slight sacrifice—and hasten at once to New York to repair the loss. This incident brought me, on an evening near the middle of September 1874, on board a river steamboat starting from Albany, the capital of the State, for the Empire City. The banks of the lower Hudson are as well worth seeing as those of the Rhine itself, but even America has not yet devised means of lighting them up at night, and consequently I had no amusement but such as I could find in the conversation of my fellow-travellers. With one of these, whose abstinence from personal questions led me to take him for an

Englishman, I spoke of my visit to Niagara—the one wonder of the world that answers its warranty—and to Montreal. As I spoke of the strong and general Canadian feeling of loyalty to the English Crown and connection, a Yankee bystander observed—

"Wal, stranger, I reckon we could take 'em if we wanted tu!"

"Yes," I replied, "if you think them worth the price. But if you do, you rate them even more highly than they rate themselves; and English colonists are not much behind the citizens of the model Republic in honest self-esteem."

"Wal," he said, "how much du yew calc'late we shall hev to pay?"

"Not more, perhaps, than you can afford; only California, and every Atlantic seaport from Portland to Galveston."

"Reckon yew may be about right, stranger," he said, falling back with tolerable good-humour; and, to do them justice, the bystanders seemed to think the retort no worse than the provocation deserved.

"I am sorry," said my friend, "you should have fallen in with so unpleasant a specimen of the character your countrymen ascribe with too much reason to Americans. I have been long in England, and never met with such discourtesy from any one who recognised me as an American."

After this our conversation became less reserved; and I found that I was conversing with one of the most renowned officers of irregular cavalry in the late Confederate service—a service which, in the efficiency, brilliancy, and daring of that especial arm, has never been surpassed since Maharbal's African Light Horse were recognised by friends and foes as the finest corps in the small splendid army of Hannibal.

Colonel A—— (the reader will learn why I give neither his name nor real rank) spoke with some bitterness of the inquisitiveness which rendered it impossible, he said, to trust an American with a secret, and very difficult to keep one without lying. We were presently joined by Major B——, who had been employed during the war in the conduct of many critical communications, and had shown great ingenuity in devising and unravelling ciphers. On this subject a somewhat protracted discussion arose. I inclined to the doctrine of Poe, that no cipher can be devised which cannot be detected by an experienced hand; my friends indicated simple methods of defeating the processes on which decipherers rely.

“Poe’s theory,” said the Major, “depends upon the frequent recurrence of certain letters, syllables, and brief words in any given language; for instance, of *e*’s and *t*’s, *tion* and *ed*, *a*, *and*, and *the* in English. Now it is perfectly easy to introduce abbreviations for each of the common short words and terminations, and equally easy to baffle the decipherer’s reliance thereon by inserting meaningless symbols to separate the words; by employing two signs for a common letter, or so arranging your cipher that no one shall without extreme difficulty know which marks stand for single and which for several combined letters, where one letter ends and another begins.”

After some debate, Colonel A—— wrote down and handed me two lines in a cipher whose character at once struck me as very remarkable.

“I grant,” said I, “that these hieroglyphics might well puzzle a more practised decipherer than myself. Still, I can point out even here a clue which might help detection. There occur, even in these two

lines, three or four symbols which, from their size and complication, are evidently abbreviations. Again, the distinct forms are very few, and have obviously been made to serve for different letters by some slight alterations devised upon a fixed rule. In a word, the cipher has been constructed upon a general principle; and though it may take a long time to find out what that principle is, it affords a clue which, carefully followed out, will probably lead to detection."

"You have perceived," said Colonel A——, "a fact which it took me very long to discover. I have not deciphered all the more difficult passages of the manuscript from which I took this example; but I have ascertained the meaning of all its simple characters, and your inference is certainly correct."

Here he stopped abruptly, as if he thought he had said too much, and the subject dropped.

We reached New York early in the morning and separated, having arranged to visit that afternoon a celebrated "spiritual" medium who was then giving *séances* in the Empire City, and of whom my friend had heard and repeated to me several more or less marvellous stories. Our visit, however, was unsatisfactory; and as we came away Colonel A—— said—

"Well, I suppose this experience confirms you in your disbelief?"

"No," said I. "My first visits have generally been failures, and I have more than once been told that my own temperament is most unfavourable to the success of a seance. Nevertheless, I have in some cases witnessed marvels perfectly inexplicable by known natural laws; and I have heard and read of others attested by evidence I certainly cannot consider inferior to my own."

“Why,” he said, “I thought from your conversation last night you were a complete disbeliever.”

“I believe,” answered I, “in very little of what I have seen. But that little is quite sufficient to dispose of the theory of pure imposture. On the other hand, there is nothing spiritual and nothing very human in the pranks played by or in the presence of the mediums. They remind one more of the feats of traditionary goblins; mischievous, noisy, untrustworthy; insensible to ridicule, apparently delighting to make fools of men, and perfectly indifferent to having the tables turned upon themselves.”

“But do you believe in goblins?”

“No,” I replied; “no more than in table-turning ghosts, and less than in apparitions. I am not bound to find either sceptics or spiritualists in plausible explanations. But when they insist on an alternative to their respective theories, I suggest Puck as at least equally credible with Satan, Shakespeare, or the parrot-cry of imposture. It is the very extravagance of illogical temper to call on me to furnish an explanation *because* I say ‘we know far too little of the thing itself to guess at its causes;’ but of the current guesses, imposture seems inconsistent with the evidence, and ‘spiritual agency’ with the character of the phenomena.”

“That,” replied Colonel A——, “sounds common sense, and sounds even more commonplace. And yet, no one seems really to draw a strong, clear line between non-belief and disbelief. And you are the first and only man I ever met who hesitates to affirm the impossibility of that which seems to him wildly improbable, contrary at once to received opinion and to his own experience, and contrary,

moreover, to all known natural laws, and all inferences hitherto drawn from them. Your men of science dogmatise like divines, not only on things they have not seen, but on things they refuse to see; and your divines are half of them afraid of Satan, and the other half of science."

"The men of science have," I replied, "like every other class, their especial bias, their peculiar professional temptation. The anti-religious bigotry of Positivists is quite as bitter and irrational as the theological bigotry of religious fanatics. At present the two powers countervail and balance each other. But, as three hundred years ago I should certainly have been burnt for a heretic, so fifty or a hundred years hence, could I live so long, I should be in equal apprehension of being burnt by some successor of Mr. Congreve, Mr. Harrison, or Professor Huxley, for presuming to believe in Providential government."

"The intolerance of incredulity," returned Colonel A——, "is a sore subject with me. I once witnessed a phenomenon which was to me quite as extraordinary as any of the 'spiritual' performances. I have at this moment in my possession apparently irresistible evidence of the reality of what then took place; and I am sure that there exists at a point on the earth's surface, which unluckily I cannot define, strong corroborative proof of my story. Nevertheless, the first persons who heard it utterly ridiculed it, and were disposed to treat me either as a madman, or at best as an audacious trespasser on that privilege of lying which belonged to them as mariners. I told it afterwards to three gentlemen of station, character, and intelligence, every one of whom had known me as soldier, and I hope as gentleman, for years; and in

each case the result was a duel, which has silenced those who imputed to me an unworthy and purposeless falsehood, but has left a heavy burden on my conscience, and has prevented me ever since from repeating what I know to be true and believe to be of greater interest, and in some sense of greater importance, than any scientific discovery of the last century. Since the last occasion on which I told it seven years have elapsed, and I never have met any one but yourself to whom I have thought it possible to disclose it."

"I have," I answered, "an intense interest in all occult phenomena; believing in regard to alleged magic, as the scientists say of practical science, that every one branch of such knowledge throws light on others; and if there be nothing in your story which it is personally painful to relate, you need not be silenced by any apprehension of discourteous criticism on my part."

"I assure you," he said, "I have no such wish now to tell the story as I had at first. It is now associated with the most painful incident of my life, and I have lost altogether that natural desire for sympathy and human interest in a matter deeply interesting to myself, which, like every one else, I felt at first, and which is, I suppose, the motive that prompts us all to relate often and early any occurrence that has keenly affected us, in whatever manner. But I think that I have no right to suppress so remarkable a fact, if by telling it I can place it effectually on record for the benefit of men sensible enough to believe that it may have occurred, especially since somewhere in the world there must yet exist proof that it did occur. If you will come to my rooms in —— Street tomorrow, Number 999, I will not promise, but I think that I shall have made up my mind to tell you what I have

to tell, and to place in your hands that portion of the evidence which is still at my command—evidence that has a significance of its own, to which my experience is merely episodical."

I spent that evening with the family of a friend, one of several former officers of the Confederacy, whose friendship is the one permanent and valuable result of my American tour. I mentioned the Colonel's name, and my friend, the head of the family, having served with him through the Virginian campaigns, expressed the highest confidence in his character, the highest opinion of his honour and veracity; but spoke with bitter regret and pain of the duels in which he had been engaged, especially of one which had been fatal; remarking that the motive in each instance remained unknown even to the seconds. "I am sure," he said "that they were not, could not have been, fought for the one cause that would justify them and explain the secrecy of the quarrel—some question involving female honour or reputation. I can hardly conceive that any one of his adversaries could have called in question in any way the personal loyalty of Colonel A——; and, as you remarked of General M——, it is too absurd for a man who had faced over and over again the fire of a whole brigade, who had led charges against fourfold numbers, to prove his personal courage with sword or pistol, or to think that any one would have doubted either his spirit or his nerve had he refused to fight, whatever the provocation. Moreover, in each case he was the challenger."

"Then these duels have injured him in Southern opinion, and have probably tended to isolate him from society?"

“No,” he replied. “Deeply as they were regretted and disapproved, his services during the war were so brilliant, and his personal character stands so high, that nothing could have induced his fellow-soldiers to put any social stigma upon him. To me he must know that he would be most welcome. Yet, though we have lived in the same city for five years, I have only encountered him three or four times in the street, and then he has passed with the fewest possible words, and has neither given me his address nor accepted my urgent invitations to visit us here. I think that there is something in the story of those duels that will never be known, certainly something that has never been guessed yet. And I think that either the circumstances in which they must have had their origin, or the duels themselves, have so weighed upon his spirits, perhaps upon his conscience, that he has chosen to avoid his former friends, most of them also the friends of his antagonists. Though the war ruined him as utterly as any of the thousands of Southern gentlemen whom it has reduced from wealth to absolute poverty, he has refused every employment which would bring him before the public eye.”

“Is there,” I asked, “any point of honour on which you could suppose him to be so exceptionally sensitive that he would think it necessary to take the life of a man who touched him on that point, though afterwards his regret, if not repentance, might be keen enough to crush his spirit or break his heart?”

The General paused for a moment, and his son then interposed—

“I have heard it said that Colonel A—— was in general the least quarrelsome of Confederate officers; but that on more than one occasion, where his statement upon some point of fact had been

challenged by a comrade, who did not intend to question his veracity but simply the accuracy of his observation, their brother officers had much trouble in preventing a serious difficulty."

The next day I called as agreed upon my new-found friend, and with some reluctance he commenced his story.

"During the last campaign, in February 1865, I was sent by General Lee with despatches for Kirby Smith, then commanding beyond the Mississippi. I was unable to return before the surrender, and, for reasons into which I need not enter, I believed myself to be marked out by the Federal Government for vengeance. If I had remained within their reach, I might have shared the fate of Wirz and other victims of calumnies which, once put in circulation during the war, their official authors dared not retract at its close. Now I and others, who, if captured in 1865, might probably have been hanged, are neither molested nor even suspected of any other offence than that of fighting, as our opponents fought, for the State to which our allegiance was due. However, I thought it necessary to escape before the final surrender of our forces beyond the Mississippi. I made my way to Mexico, and, like one or two Southern officers of greater distinction than myself, entered the service of the Emperor Maximilian, not as mere soldiers of fortune, but because, knowing better than any but her Southern neighbours knew it the miserable anarchy of Mexico under the Republic, we regarded conquest as the one chance of regeneration for that country, and the Emperor Maximilian as a hero who had devoted himself to a task heroic at once in its danger and difficulty—the restoration of a people with whom his house had a certain historical connection to a place

among the nations of the civilised world. After his fall, I should certainly have been shot had I been caught by the Juarists in pursuit of me. I gained the Pacific coast, and got on board an English vessel, whose captain—loading for San Francisco—generously weighed anchor and sailed with but half a cargo to give me a chance of safety. He transferred me a few days afterwards to a Dutch vessel bound for Brisbane, for at that time I thought of settling in Queensland. The crew was weak-handed, and consisted chiefly of Lascars, Malays, and two or three European desperadoes of all languages and of no country. Her master was barely competent to the ordinary duties of his command; and it was no surprise to me when the first storm that we encountered drove us completely out of our course, nor was I much astonished that the captain was for some days, partly from fright and partly from drink, incapable of using his sextant to ascertain the position of the ship. One night we were awakened by a tremendous shock; and, to spare you the details of a shipwreck, which have nothing to do with my story, we found ourselves when day broke fast on a coral reef, about a mile from an island of no great size, and out of sight of all other land. The sextant having been broken to pieces, I had no means of ascertaining the position of this island, nor do I now know anything of it except that it lay, in the month of August, within the region of the southeast trade winds. We pulled on shore, but, after exploring the island, it was found to yield nothing attractive to seamen except cocoa-nuts, with which our crew had soon supplied themselves as largely as they wished, and fish, which were abundant and easily caught, and of which they were soon tired. The captain, therefore, when he had

recovered his sobriety and his courage, had no great difficulty in inducing them to return to the ship, and endeavour either to get her off or construct from her timbers a raft which, following the course of the winds, might, it was thought, bring them into the track of vessels. This would take some time, and I meanwhile was allowed to remain (my own wish) on *terra firma*; the noise, dirt, and foul smells of the vessel being, especially in that climate, intolerable.

"About ten o'clock in the morning of the 25th August 1867, I was lying towards the southern end of the island, on a little hillock tolerably clear of trees, and facing a sort of glade or avenue, covered only with brush and young trees, which allowed me to see the sky within perhaps twenty degrees of the horizon. Suddenly, looking up, I saw what appeared at first like a brilliant star considerably higher than the sun. It increased in size with amazing rapidity, till, in a very few seconds after its first appearance, it had a very perceptible disc. For an instant it obscured the sun. In another moment a tremendous shock temporarily deprived me of my senses, and I think that more than an hour had elapsed before I recovered them. Sitting up, somewhat confused, and looking around me, I became aware that some strange accident had occurred. In every direction I saw such traces of havoc as I had witnessed more than once when a Confederate force holding an impenetrable woodland had been shelled at random for some hours with the largest guns that the enemy could bring into the field. Trees were torn and broken, branches scattered in all directions, fragments of stone, earth, and coral rock flung all around. Particularly I remember that a piece of metal of considerable size had cut off the tops of two or three trees,

and fixed itself at last on what was now the summit of one about a third of whose length had been broken off and lay on the ground. I soon perceived that this miraculous bombardment had proceeded from a point to the north-eastward, the direction in which at that season and hour the sun was visible. Proceeding thitherward, the evidences of destruction became every minute more marked, I might say more universal. Trees had been thrown down, torn up by the roots, hurled against one another; rocks broken and flung to great distances, some even thrown up in the air, and so reversed in falling that, while again half buried in the soil, they exposed what had been their undermost surface. In a word, before I had gone two miles I saw that the island had sustained a shock which might have been that of an earthquake, which certainly equalled that of the most violent Central American earthquakes in severity, but which had none of the special peculiarities of that kind of natural convulsion. Presently I came upon fragments of a shining pale yellow metal, generally small, but in one or two cases of remarkable size and shape, apparently torn from some sheet of great thickness. In one case I found embedded between two such jagged fragments a piece of remarkably hard impenetrable cement. At last I came to a point from which through the destruction of the trees the sea was visible in the direction in which the ship had lain; but the ship, as in a few moments I satisfied myself, had utterly disappeared. Reaching the beach, I found that the shock had driven the sea far up upon the land; fishes lying fifty yards inland, and everything drenched in salt water. At last, guided by the signs of ever-increasing devastation, I reached the point whence the mischief had proceeded. I can give no

idea in words of what I there found. The earth had been torn open, rooted up as if by a gigantic explosion. In some places sharp-pointed fragments of the coral rock, which at a depth of several feet formed the bed of the island, were discernible far below the actual surface. At others, the surface itself was raised several feet by *dèbris* of every kind. What I may call the crater—though it was no actual hole, but rather a cavity torn and then filled up by falling fragments—was two or three hundred feet in circumference; and in this space I found considerable masses of the same metallic substance, attached generally to pieces of the cement. After examining and puzzling myself over this strange scene for some time, my next care was to seek traces of the ship and of her crew; and before long I saw just outside the coral reef what had been her bowsprit, and presently, floating on the sea, one of her masts, with the sail attached. There could be little doubt that the shock had extended to her, had driven her off the reef where she had been fixed into the deep water outside, where she must have sunk immediately, and had broken her spars. No traces of her crew were to be seen. They had probably been stunned at the same time that they were thrown into deep water; and before I came in sight of the point where she had perished, whatever animal bodies were to be found must have been devoured by the sharks, which abounded in that neighbourhood. Dismay, perplexity, and horror prevented my doing anything to solve my doubts or relieve my astonishment before the sun went down; and during the night my sleep was broken by snatches of horrible dreams and intervals of waking, during which I marvelled over what I had seen, scarcely crediting my memory or my senses. In the

morning, I went back to the crater, and with some tools that had been left on shore contrived to dig somewhat deeply among the *debris* with which it was filled. I found very little that could enlighten me except pieces of glass, of various metals, of wood, some of which seemed apparently to have been portions of furniture; and one damaged but still entire relic, which I preserved and brought away with me."

Here the Colonel removed a newspaper which had covered a portion of his table, and showed me a metallic case beaten out of all shape, but apparently of what had been a silvery colour, very little rusted, though much soiled. This he opened, and I saw at once that it was of enormous thickness and solidity, to which and to favouring circumstances it owed its preservation in the general ruin he described. That it had undergone some severe and violent shock there could be no question. Beside the box lay a less damaged though still seriously injured object, in which I recognised the resemblance of a book of considerable thickness, and bound in metal like that of the case. This I afterwards ascertained beyond doubt to be a metalloid alloy whereof the principal ingredient was aluminium, or some substance so closely resembling it as not to be distinguishable from it by simple chemical tests. A friend to whom I submitted a small portion broken off from the rest expressed no doubt that it was a kind of aluminium bronze, but inclined to believe that it contained no inconsiderable proportion of a metal with which chemists are as yet imperfectly acquainted; perhaps, he said, silicon; certainly something which had given to the alloy a hardness and tenacity unknown to any familiar metallurgical compound.

“This,” said my friend, opening the volume, “is a manuscript which was contained in this case when I took it from among the debris of the crater. I should have told you that I found there what I believed to be fragments of human flesh and bone, but so crushed and mangled that I could form no positive conclusion. My next care was to escape from the island, which I felt sure lay far from the ordinary course of merchant vessels. A boat which had brought me ashore—the smaller of the two belonging to the ship—had fortunately been left on the end of the island furthest from that on which the vessel had been driven, and had, owing to its remoteness, though damaged, not been fatally injured by the shock. I repaired this, made and fixed a mast, and with no little difficulty contrived to manufacture a sort of sail from strips of bark woven together. Knowing that, even if I could sustain life on the island, life under such circumstances would not be worth having, I was perfectly willing to embark upon a voyage in which I was well aware the chances of death were at least as five to one. I caught and contrived to smoke a quantity of fish sufficient to last me for a fortnight, and filled a small cask with brackish but still drinkable water. In this vessel, thus stored, I embarked about a fortnight after the day of the mysterious shock. On the second evening of my voyage I was caught by a gale which compelled me to lower the sail, and before which I was driven for three days and nights, in what direction I can hardly guess. On the fourth morning the wind had fallen, and by noon it was a perfect calm. I need not describe what has been described by so many shipwrecked sailors,—the sufferings of a solitary voyager in an open boat under a tropical sun. The storm had supplied me with water more than enough; so that I was spared

that arch-torture of thirst which seems, in the memory of such sufferers, to absorb all others. Towards evening a slight breeze sprang up, and by morning I came in sight of a vessel, which I contrived to board. Her crew, however, and even her captain, utterly discredited such part of my strange story as I told them. On that point, however, I will say no more than this: I will place this manuscript in your hands. I will give you the key to such of its ciphers as I have been able to make out. The language, I believe, for I am no scholar, is Latin of a mediæval type; but there are words which, if I rightly decipher them, are not Latin, and hardly seem to belong to any known language; most of them, I fancy, quasi-scientific terms, invented to describe various technical devices unknown to the world when the manuscript was written. I only make it a condition that you shall not publish the story during my life; that if you show the manuscript or mention the tale in confidence to any one, you will strictly keep my secret; and that if after my death, of which you shall be advised, you do publish it, you will afford no clue by which the donor could be confidently identified."

"I promise," said I. "But I should like to ask you one question. What do you conceive to have been the cause of the extraordinary shock you felt and of the havoc you witnessed? What, in short, the nature of the occurrence and the origin of the manuscript you entrust to my care?"

"Why need you ask me?" he returned. "You are as capable as myself of drawing a deduction from what I have told you, and I have told you everything, I believe, that could assist you. The manuscript will tell the rest."

“But,” said I, “an actual eye-witness often receives from a number of little facts which he cannot remember, which are perhaps too minute to have been actually and individually noted by him, an impression which is more likely to be correct than any that could be formed by a stranger on the fullest cross-questioning, on the closest examination of what remains in the witness’s memory. I should like to hear, before opening the manuscript, what you believe to have been its origin.

“I can only say,” he answered, “that what must be inferred from the manuscript is what I had inferred before I opened it. That same explanation was the only one that ever occurred to me, even in the first night. It then seemed to me utterly incredible, but it is still the only conceivable explanation that my mind can suggest.”

“Did you,” asked I, “connect the shock and the relics, which I presume you know were not on the island before the shock, with the meteor and the strange obscuration of the sun?”

“I certainly did,” he said. “Having done so, there could be but one conclusion as to the quarter from which the shock was received.”

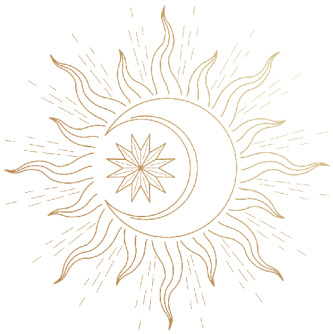
The examination and transcription of the manuscript, with all the help afforded me by my friend’s previous efforts, was the work of several years. There is, as the reader will see, more than one _hiatus valde deflendus_, as the scholiasts have it, and there are passages in which, whether from the illegibility of the manuscript or the employment of technical terms unknown to me, I cannot be certain of the correctness of my translation. Such, however, as it is, I give it to the world, having fulfilled, I believe, every one of the conditions imposed upon me by my late and deeply regretted friend.

The character of the manuscript is very curious, and its translation was exceedingly difficult. The material on which it is written resembles nothing used for such purposes on Earth. It is more like a very fine linen or silken web, but it is far closer in texture, and has never been woven in any kind of loom at all like those employed in any manufacture known to history or archaeology. The letters, or more properly symbols, are minute, but executed with extraordinary clearness. I should fancy that something more like a pencil than a pen, but with a finer point than that of the finest pencil, was employed in the writing. Contractions and combinations are not merely frequent, but almost universal. There is scarcely an instance in which five consecutive letters are separately written, and there is no single line in which half a dozen contractions, often including from four to ten letters, do not occur. The pages are of the size of an ordinary duodecimo, but contain some fifty lines per page, and perhaps one hundred and fifty letters in each line. What were probably the first half dozen pages have been utterly destroyed, and the next half dozen are so mashed, tattered, and defaced, that only a few sentences here and there are legible. I have contrived, however, to combine these into what I believe to be a substantially correct representation of the author's meaning. The Latin is of a monastic—sometimes almost canine—quality, with many words which are not Latin at all. For the rest, though here and there pages are illegible, and though some symbols, especially those representing numbers or chemical compounds, are absolutely undecipherable, it has been possible to effect what I hope will be found a clear and coherent translation. I have condensed the narrative but have not altered or

suppressed a line for fear of offending those who must be unreasonable, indeed, if they lay the offence to my charge.

One word more. It is possible, if not likely, that some of those friends of the narrator, for whom the account was evidently written, may still be living, and that these pages may meet their eyes. If so, they may be able to solve the few problems that have entirely baffled me, and to explain, if they so choose, the secrets to which, intentionally or through the destruction of its introductory portion, the manuscript affords no clue.

I must add that these volumes contain only the first section of the MS. record. The rest, relating the incidents of a second voyage and describing another world, remains in my hands; and, should this part of the work excite general attention, the conclusion will, by myself or by my executors, be given to the public. Otherwise, on my death, it will be placed in the library of some national or scientific institution.



2

Outward Bound

For obvious reasons, those who possessed the secret of the Apergy had never dreamed of applying it in the manner I proposed. It had seemed to them little more than a curious secret of nature, perhaps hardly so much, since the existence of a repulsive force in the atomic sphere had been long suspected and of late certainly ascertained, and its preponderance is held to be the characteristic of the gaseous as distinguished from the liquid or solid state of matter. Till lately, no means of generating or collecting this force in large quantity had been found. The progress of electrical science had solved this difficulty; and when the secret was communicated to me, it possessed a value which had never before belonged to it.

Ever since, in childhood, I learnt that the planets were worlds, a visit to one or more of the nearest of them had been my favourite day-dream. Treasuring every hint afforded by science or fancy that

bore upon the subject, I felt confident that such a voyage would be one day achieved. Helped by one or two really ingenious romances on this theme, I had dreamed out my dream, realised every difficulty, ascertained every factor in the problem. I had satisfied myself that only one thing needful was as yet wholly beyond the reach and even the proximate hopes of science. Human invention could furnish as yet no motive power that could fulfil the main requirement of the problem—uniform or constantly increasing motion *in vacuo*—motion through a region affording no resisting medium. This must be a *repulsive* energy capable of acting through an utter void. Man, animals, birds, fishes move by repulsion applied at every moment. In air or water, paddles, oars, sails, fins, wings act by repulsion exerted on the fluid element in which they work. But in space there is no such resisting element on which repulsion can operate. I needed a repulsion which would act like gravitation through an indefinite distance and in a void—act upon a remote fulcrum, such as might be the Earth in a voyage to the Moon, or the Sun in a more distant journey. As soon, then, as the character of the apergic force was made known to me, its application to this purpose seized on my mind. Experiment had proved it possible, by the method described at the commencement of this record, to generate and collect it in amounts practically unlimited. The other hindrances to a voyage through space were trivial in comparison with that thus overcome; there were difficulties to be surmounted, not absent or deficient powers in nature to be discovered. The chief of these, of course, concerned the conveyance of air sufficient for the needs of the traveller during the period of his journey. The construction of an air-

tight vessel was easy enough; but however large the body of air conveyed, even though its oxygen should not be exhausted, the carbonic acid given out by breathing would very soon so contaminate the whole that life would be impossible. To eliminate this element it would only be necessary to carry a certain quantity of lime-water, easily calculated, and by means of a fan or similar instrument to drive the whole of the air periodically through the vessel containing it. The lime in solution combining with the noxious gas would show by the turbid whiteness of the water the absorption of the carbonic acid and formation of carbonate of lime. But if the carbonic acid gas were merely to be removed, it is obvious that the oxygen of the air, which forms a part of that gas, would be constantly diminished and ultimately exhausted; and the effect of highly oxygenated air upon the circulation is notoriously too great to allow of any considerable increase at the outset in the proportion of this element. I might carry a fresh supply of oxygen, available at need, in some solid combination like chlorate of potash; but the electricity employed for the generation of the apergy might be also applied to the decomposition of carbonic acid and the restoration of its oxygen to the atmosphere.

But the vessel had to be steered as well as propelled; and in order to accomplish this it would be necessary to command the direction of the apergy at pleasure. My means of doing this depended on two of the best-established peculiarities of this strange force: its rectilinear direction and its conductibility. We found that it acts through air or in a vacuum in a single straight line, without deflection, and seemingly without diminution. Most solids, and especially metals, according to

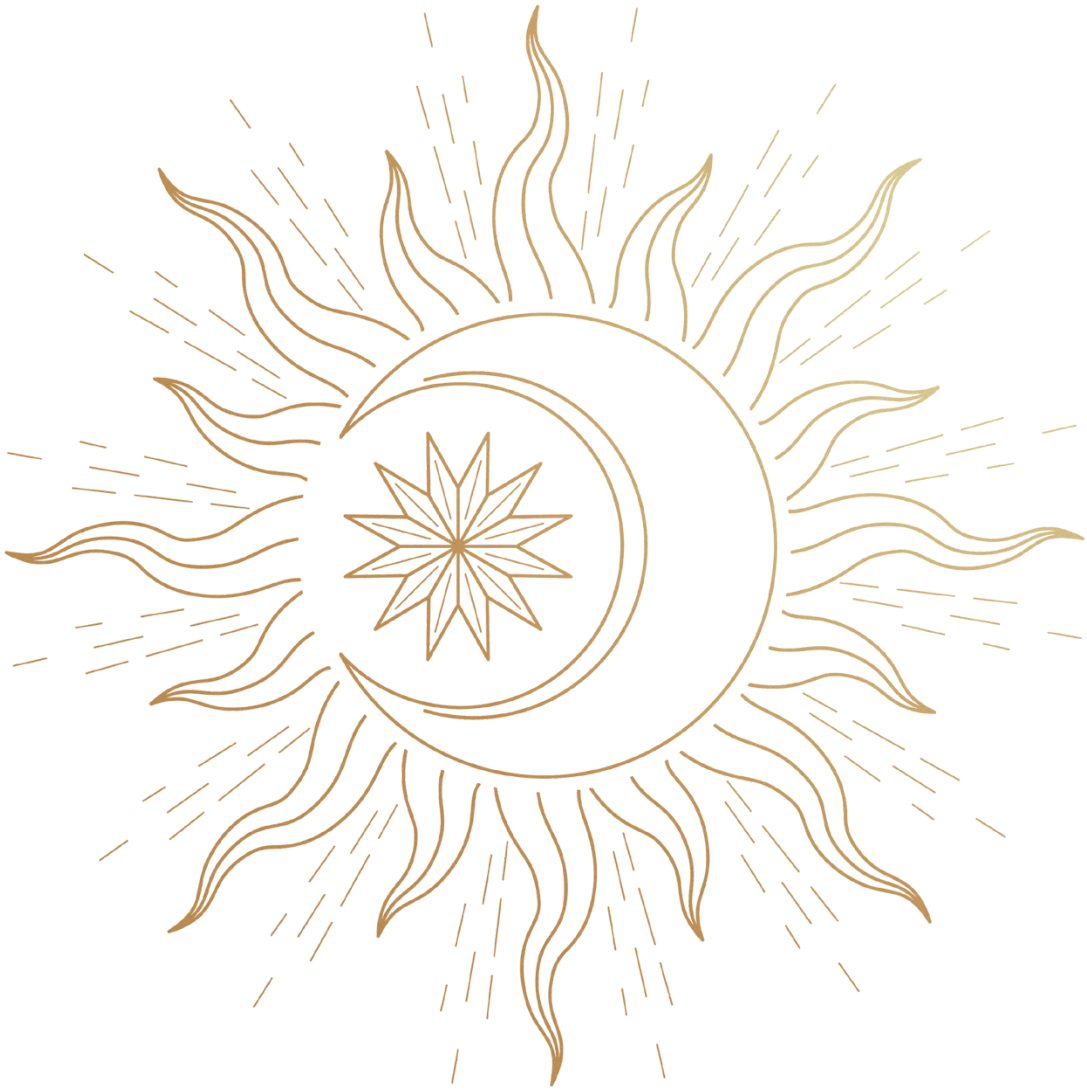
their electric condition, are more or less impervious to it—antapergic. Its power of penetration diminishes under a very obscure law, but so rapidly that no conceivable strength of current would affect an object protected by an intervening sheet half an inch in thickness. On the other hand, it prefers to all other lines the axis of a conductive bar, such as may be formed of [undecipherable] in an antapergic sheath. However such bar may be curved, bent, or divided, the current will fill and follow it, and pursue indefinitely, without divergence, diffusion, or loss, the direction in which it emerges. Therefore, by collecting the current from the generator in a vessel cased with antapergic material, and leaving no other aperture, its entire volume might be sent into a conductor. By cutting across this conductor, and causing the further part to rotate upon the nearer, I could divert the current through any required angle. Thus I could turn the repulsion upon the resistant body (sun or planet), and so propel the vessel in any direction I pleased.

I had determined that my first attempt should be a visit to Mars. The Moon is a far less interesting body, since, on the hemisphere turned towards the Earth, the absence of an atmosphere and of water ensures the absence of any such life as is known to us—probably of any life that could be discerned by our senses—and would prevent landing; while nearly all the soundest astronomers agree in believing, on apparently sufficient grounds, that even the opposite hemisphere [of which small portions are from time to time rendered visible by the libration, though greatly foreshortened and consequently somewhat imperfectly seen] is equally devoid of the two primary necessaries of animal and vegetable life. That Mars has

seas, clouds, and an atmosphere was generally admitted, and I held it to be beyond question. Of Venus, owing to her extraordinary brilliancy, to the fact that when nearest to the Earth a very small portion of her lighted surface is visible to us, and above all to her dense cloud-envelope, very little was known; and though I cherished the intention to visit her even more earnestly than my resolve to reach the probably less attractive planet Mars, I determined to begin with that voyage of which the conditions and the probable result were most obvious and certain. I preferred, moreover, in the first instance, to employ the apergy as a propelling rather than as a resisting force. Now, after passing beyond the immediate sphere of the Earth's attraction, it is plain that in going towards Mars I should be departing from the Sun, relying upon the apergy to overcome his attraction; whereas in seeking to attain Venus I should be approaching the Sun, relying for my main motive power upon that tremendous attraction, and employing the apergy only to moderate the rate of movement and control its direction. The latter appeared to me the more delicate, difficult, and perhaps dangerous task of the two; and I resolved to defer it until after I had acquired some practical experience and dexterity in the control of my machinery.

It was expedient, of course, to make my vessel as light as possible, and, at the same time, as large as considerations of weight would admit. But it was of paramount importance to have walls of great thickness, in order to prevent the penetration of the outer cold of space, or rather the outward passage into that intense cold of the heat generated within the vessel itself, as well as to resist the tremendous outward pressure of the air inside. Partly for these

reasons, and partly because its electric character makes it especially capable of being rendered at will pervious or impervious to the apergic current, I resolved to make the outer and inner walls of an alloy of …, while the space between should be filled up with a mass of concrete or cement, in its nature less penetrable to heat than any other substance which Nature has furnished or the wit of man constructed from her materials. The materials of this cement and their proportions were as follows.



Briefly, having determined to take advantage of the approaching opposition of Mars in MDCCCXX … I had my vessel constructed with walls three feet thick, of which the outer six and the inner three inches were formed of the metalloid. In shape my Astronaut somewhat resembled the form of an antique Dutch East-Indiaman, being widest and longest in a plane equidistant from floor and

ceiling, the sides and ends sloping outwards from the floor and again inwards towards the roof. The deck and keel, however, were absolutely flat, and each one hundred feet in length and fifty in breadth, the height of the vessel being about twenty feet. In the centre of the floor and in that of the roof respectively I placed a large lens of crystal, intended to act as a window in the first instance, the lower to admit the rays of the Sun, while through the upper I should discern the star towards which I was steering. The floor, being much heavier than the rest of the vessel, would naturally be turned downwards; that is, during the greater part of the voyage towards the Sun. I placed a similar lens in the centre of each of the four sides, with two plane windows of the same material, one in the upper, the other in the lower half of the wall, to enable me to discern any object in whatever direction. The crystal in question consisted of …, which, as those who manufactured it for me are aware, admits of being cast with a perfection and equality of structure throughout unattainable with ordinary glass, and wrought to a certainty and accuracy of curvature which the most patient and laborious polishing can hardly give to the lenses even of moderate-sized telescopes, whether made of glass or metal, and is singularly impervious to heat. I had so calculated the curvature that several eye-pieces of different magnifying powers which I carried with me might be adapted equally to any of the window lenses, and throw a perfect image, magnified by 100, 1000, or 5000, upon mirrors properly placed.

I carpeted the floor with several alternate layers of cork and cloth. At one end I placed my couch, table, bookshelves, and other necessary furniture, with all the stores needed for my voyage, and

with a further weight sufficient to preserve equilibrium. At the other I made a garden with soil three feet deep and five feet in width, divided into two parts so as to permit access to the windows. I filled each garden closely with shrubs and flowering plants of the greatest possible variety, partly to absorb animal waste, partly in the hope of naturalising them elsewhere. Covering both with wire netting extending from the roof to the floor, I filled the cages thus formed with a variety of birds. In the centre of the vessel was the machinery, occupying altogether a space of about thirty feet by twenty. The larger portion of this area was, of course, taken up by the generator, above which was the receptacle of the apergy. From this descended right through the floor a conducting bar in an antapergic sheath, so divided that without separating it from the upper portion the lower might revolve in any direction through an angle of twenty minutes (20’). This, of course, was intended to direct the stream of the repulsive force against the Sun. The angle might have been extended to thirty minutes, but that I deemed it inexpedient to rely upon a force, directed against the outer portions of the Sun’s disc, believing that these are occupied by matter of density so small that it might afford no sufficient base, so to speak, for the repulsive action. It was obviously necessary also to repel or counteract the attraction of any body which might come near me during the voyage. Again, in getting free from the Earth’s influence, I must be able to steer in any direction and at any angle to the surface. For this purpose I placed five smaller bars, passing through the roof and four sides, connected, like the main conductor, with the receptacle or apergion, but so that they could revolve through a much larger angle, and

could at any moment be detached and insulated. My steering apparatus consisted of a table in which were three large circles. The midmost and left hand of these were occupied by accurately polished plane mirrors. The central circle, or metacompass, was divided by three hundred and sixty fine lines, radiating from the centre to the circumference, marking as many different directions, each deviating by one degree of arc from the next. This mirror was to receive through the lens in the roof the image of the star towards which I was steering. While this remained stationary in the centre all was well. When it moved along any one of the lines, the vessel was obviously deviating from her course in the opposite direction; and, to recover the right course, the repellent force must be caused to drive her in the direction in which the image had moved. To accomplish this, a helm was attached to the lower division of the main conductor, by which the latter could be made to move at will in any direction within the limit of its rotation. Controlling this helm was, in the open or steering circle on the right hand, a small knob to be moved exactly parallel to the deviation of the star in the mirror of the metacompass. The left-hand circle, or discometer, was divided by nineteen hundred and twenty concentric circles, equidistant from each other. The outermost, about twice as far from the centre as from the external edge of the mirror, was exactly equal to the Sun’s circumference when presenting the largest disc he ever shows to an observer on Earth. Each inner circle corresponded to a diameter reduced by one second. By means of a vernier or eye-piece, the diameter of the Sun could be read off the discometer, and from his diameter my distance could be accurately calculated. On the further side of the machinery

was a chamber for the decomposition of the carbonic acid, through which the air was driven by a fan. This fan itself was worked by a horizontal wheel with two projecting squares of antapergic metal, against each of which, as it reached a certain point, a very small stream of repulsive force was directed from the apergion, keeping the wheel in constant and rapid motion. I had, of course, supplied myself with an ample store of compressed vegetables, preserved meats, milk, tea, coffee, &c., and a supply of water sufficient to last for double the period which the voyage was expected to occupy; also a well-furnished tool-chest (with wires, tubes, &c.). One of the lower windows was made just large enough to admit my person, and after entering I had to close it and fix it in its place firmly with cement, which, when I wished to quit the vessel, would have again to be removed.

Of course some months were occupied in the manufacture of the different portions of the vessel and her machinery, and sometime more in their combination; so that when, at the end of July, I was ready to start, the opposition was rapidly approaching. In the course of some fifty days the Earth, moving in her orbit at a rate of about eleven hundred miles per minute, would overtake Mars; that is to say, would pass between him and the Sun. In starting from the Earth I should share this motion; I too should go eleven hundred miles a minute in the same direction; but as I should travel along an orbit constantly widening, the Earth would leave me behind. The apergy had to make up for this, as well as to carry me some forty millions of miles in a direction at right angles to the former—right outward towards the orbit of Mars. Again, I should share the motion of that

particular spot of the Earth's surface from which I rose around her axis, a motion varying with the latitude, greatest at the equator, nothing at the pole. This would whirl me round and round the Earth at the rate of a thousand miles an hour; of this I must, of course, get rid as soon as possible. And when I should be rid of it, I meant to start at first right upward; that is, straight away from the Sun and in the plane of the ecliptic, which is not very different from that in which Mars also moves. Therefore I should begin my effective ascent from a point of the Earth as far as possible from the Sun; that is, on the midnight meridian.

For the same reason which led me to start so long before the date of the opposition, I resolved, having regard to the action of the Earth's rotation on her axis, to start some hours before midnight. Taking leave, then, of the two friends who had thus far assisted me, I entered the Astronaut on the 1st August, about 4.30 P.M. After sealing up the entrance-window, and ascertaining carefully that everything was in order—a task which occupied me about an hour—I set the generator to work; and when I had ascertained that the apergion was full, and that the force was supplied at the required rate, I directed the whole at first into the main conductor. After doing this I turned towards the lower window on the west—or, as it was then, the right-hand side—and was in time to catch sight of the trees on the hills, some half mile off and about two hundred feet above the level of my starting-point. I should have said that I had considerably compressed my atmosphere and increased the proportion of oxygen by about ten per cent., and also carried with me the means of reproducing the whole amount of the latter in case of need. Among

my instruments was a pressure-gauge, so minutely divided that, with a movable vernier of the same power as the fixed ones employed to read the glass circles, I could discover the slightest escape of air in a very few seconds. The pressure-gauge, however, remained immovable. Going close to the window and looking out, I saw the Earth falling from me so fast that, within five minutes after my departure, objects like trees and even houses had become almost indistinguishable to the naked eye. I had half expected to hear the whistling of the air as the vessel rushed upward, but nothing of the kind was perceptible through her dense walls. It was strange to observe the rapid rise of the sun from the westward. Still more remarkable, on turning to the upper window, was the rapidly blackening aspect of the sky. Suddenly everything disappeared except a brilliant rainbow at some little distance—or perhaps I should rather have said a halo of more than ordinary rainbow brilliancy, since it occupied, not like the rainbows seen from below, something less than half, but nearly two-thirds of a circle. I was, of course, aware that I was passing through a cloud, and one of very unusual thickness. In a few seconds, however, I was looking down upon its upper surface, reflecting from a thousand broken masses of vapour at different levels, from cavities and hillocks of mist, the light of the sun; white beams mixed with innumerable rays of all colours in a confusion, of indescribable brilliancy. I presume that the total obscuration of everything outside the cloud during my passage through it was due to its extent and not to its density, since at that height it could not have been otherwise than exceedingly light and diffuse. Looking upward through the eastern window, I could now

discern a number of brighter stars, and at nearly every moment fresh ones came into view on a constantly darkening background. Looking downward to the west, where alone the entire landscape lay in daylight, I presently discerned the outline of shore and sea extending over a semicircle whose radius much exceeded five hundred miles, implying that I was about thirty-five miles from the sea-level. Even at this height the extent of my survey was so great in comparison to my elevation, that a line drawn from the vessel to the horizon was, though very roughly, almost parallel to the surface; and the horizon therefore seemed to be not very far from my own level, while the point below me, of course, appeared at a vast distance. The appearance of the surface, therefore, was as if the horizon had been, say, some thirty miles higher than the centre of the semicircle bounding my view, and the area included in my prospect had the form of a saucer or shallow bowl. But since the diameter of the visible surface increases only as the square root of the height, this appearance became less and less perceptible as I rose higher. It had taken me twenty minutes to attain the elevation of thirty-five miles; but my speed was, of course, constantly increasing, very much as the speed of an object falling to the Earth from a great height increases; and before ten more minutes had elapsed, I found myself surrounded by a blackness nearly absolute, except in the direction of the Sun,—which was still well above the sea—and immediately round the terrestrial horizon, on which rested a ring of sunlit azure sky, broken here and there by clouds. In every other direction I seemed to be looking not merely upon a black or almost black sky, but into close surrounding darkness. Amid this darkness, however,

were visible innumerable points of light, more or less brilliant—the stars—which no longer seemed to be spangled over the surface of a distant vault, but rather scattered immediately about me, nearer or farther to the instinctive apprehension of the eye as they were brighter or fainter. Scintillation there was none, except in the immediate vicinity of the eastern horizon, where I still saw them through a dense atmosphere. In short, before thirty minutes had elapsed since the start, I was satisfied that I had passed entirely out of the atmosphere, and had entered into the vacancy of space—if such a thing as vacant space there be.

At this point I had to cut off the greater part of the apergy and check my speed, for reasons that will be presently apparent. I had started in daylight in order that during the first hundred miles of my ascent I might have a clear view of the Earth's surface. Not only did I wish to enjoy the spectacle, but as I had to direct my course by terrestrial landmarks, it was necessary that I should be able to see these so as to determine the rate and direction of the Astronaut's motion, and discern the first symptoms of any possible danger. But obviously, since my course lay generally in the plane of the ecliptic, and for the present at least nearly in the line joining the centres of the Earth and Sun, it was desirable that my real journey into space should commence in the plane of the midnight meridian; that is, from above the part of the Earth's surface immediately opposite the Sun. I had to reach this line, and having reached it, to remain for some time above it. To do both, I must attain it, if possible, at the same moment at which I secured a westward impulse just sufficient to counterbalance the eastward impulse derived from the rotation of the

Earth;—that is, in the latitude from which I started, a thousand miles an hour. I had calculated that while directing through the main bar a current of apergy sufficient to keep the Astronaut at a fixed elevation, I could easily spare for the eastward conductor sufficient force to create in the space of one hour the impulse required, but that in the course of that hour the gradually increasing apergic force would drive me 500 miles westward. Now in six hours the Earth's rotation would carry an object close to its surface through an angle of 90°; that is, from the sunset to the midnight meridian. But the greater the elevation of the object the wider its orbit round the Earth's centre, and the longer each degree; so that moving eastward only a thousand miles an hour, I should constantly lag behind a point on the Earth's surface, and should not reach the midnight meridian till somewhat later. I had, moreover, to lose 500 miles of the eastward drift during the last hour in which I should be subject to it, through the action of the apergic force above-mentioned. Now, an elevation of 330 miles would give the Astronaut an orbit on which 90° would represent 6500 miles. In seven hours I should be carried along that orbit 7000 miles eastward by the impulse my Astronaut had received from the Earth, and driven back 500 miles by the apergy; so that at 1 A.M. by my chronometer I should be exactly in the plane of the midnight meridian, or 6500 miles east of my starting-point in space, provided that I put the eastward apergic current in action exactly at 12 P.M. by the chronometer. At 1 A.M. also I should have generated a westward impulse of 1000 miles an hour. This, once created, would continue to exist though the force that created it were cut off, and would exactly counterbalance the opposite rotation impulse

derived from the Earth; so that thenceforward I should be entirely free from the influence of the latter, though still sharing that motion of the Earth through space at the rate of nearly nineteen miles per second, which would carry me towards the line joining at the moment of opposition her centre with that of Mars.

All went as I had calculated. I contrived to arrest the Astronaut's motion at the required elevation just about the moment of sunset on the region of the Earth immediately underneath. At 12 P.M., or 24h by the chronometer, I directed a current of the requisite strength into the eastward conductor, which I had previously pointed to the Earth's surface, but a little short of the extreme terrestrial horizon, as I calculated it. At 1 A.M. I found myself, judging by the stars, exactly where I wished to be, and nearly stationary as regarded the Earth. I instantly arrested the eastward current, detaching that conductor from the apergion; and, directing the whole force of the current into the downward conductor, I had the pleasure of seeing that, after a very little adjustment of the helm, the stars remained stationary in the mirror of the metacompass, showing that I had escaped from the influence of the Earth's rotation. It was of course impossible to measure the distance traversed during the invisibility of the Earth, but I reckoned that I had made above 500 miles between 1h. and 2h. A.M., and that at 4h. I was not less than 4800 miles from the surface. With this inference the indication of my barycrite substantially agreed. The latter instrument consisted of a spring whose deflection by a given weight upon the equator had been very carefully tested. Gravity diminishing as the square of the distance from the centre, it was obvious that at about 8000 miles—or 4000 above the Earth's

surface—this spring would be deflected only one quarter as much by a given weight as on Earth: at 16,000 miles from the surface, or 20,000 from the centre, one-twenty-fifth as much, and so on. I had graduated the scale accordingly, and it indicated at present a distance somewhat less than 9000 miles from the centre. Having adjusted the helm and set the alarum to wake me in six hours, I lay down upon my bed.

The anxiety and peril of my position had disturbed me very little whilst I was actively engaged either in steering and manipulating my machinery, or in looking upon the marvellous and novel spectacles presented to my eyes; but it now oppressed me in my sleep, and caused me frequently to wake from dreams of a hideous character. Two or three times, on such awaking, I went to examine the metacompass, and on one occasion found it necessary slightly to readjust the helm; the stars by which I steered having moved some second or two to the right of their proper position.

On rising, I completed the circuit which filled my vessel with brilliant light emitted from an electric lamp at the upper part of the stern, and reflected by the polished metallic walls. I then proceeded to get my breakfast, for which, as I had tasted nothing since some hours before the start, I had a hearty appetite. I had anticipated some trouble from the diminished action of gravity, doubting whether the boiling-point at this immense height above the Earth might not be affected; but I found that this depends upon the pressure of the atmosphere alone, and that this pressure was in nowise affected by the absence of gravity. My atmosphere being somewhat denser than that of the Earth, the boiling-point was not 100°, but 101° Cent. The

temperature of the interior of the vessel, taken at a point equidistant from the stove and from the walls, was about 5° C.; unpleasantly cool, but still, with the help of a greatcoat, not inconveniently so. I found it absolutely impossible to measure by means of the thermometers I had placed outside the windows the cold of space; but that it falls far short of the extreme supposed by some writers, I confidently believe. It is, however, cold enough to freeze mercury, and to reduce every other substance employed as a test of atmospheric or laboratory temperatures to a solidity which admits of no further contraction. I had filled one outside thermometer with spirit, but this was broken before I looked at it; and in another, whose bulb unfortunately was blackened, and which was filled with carbonic acid gas, an apparent vacuum had been created. Was it that the gas had been frozen, and had sunk into the lower part of the bulb, where it would, of course, be invisible? When I had completed my meal and smoked the very small cigar which alone a prudent consideration for the state of the atmosphere would allow me, the chronometer showed 10 A.M. It was not surprising that by this time weight had become almost non-existent. My twelve stone had dwindled to the weight of a small fowl, and hooking my little finger into the loop of a string hung from a peg fixed near the top of the stern wall, I found myself able thus to support my weight without any sense of fatigue for a quarter of an hour or more; in fact, I felt during that time absolutely no sense of muscular weariness. This state of things entailed only one inconvenience. Nothing had any stability; so that the slightest push or jerk would upset everything that was not fixed. However, I had so far anticipated this that nothing of any material

consequence was unfixed, and except that a touch with my spoon upset the egg-cup and egg on which I was about to breakfast, and that this, falling against a breakfast cup full of coffee, overturned that, I was not incommoded. I managed to save the greater part of the beverage, since, the atmospheric pressure being the same though the weight was so changed, lead, and still more china or liquid, fell in the Astronaut as slowly as feathers in the immediate vicinity of the Earth. Still it was a novel experience to find myself able to lean in any direction, and rest in almost any posture, with but the slightest support for the body's centre of gravity; and further to find on experiment that it was possible to remain for a couple of hours with my heels above my head, in the favourite position of a Yankee's lower limbs, without any perceptible congestion of blood or confusion of brain.

I was occupied all day with abstract calculations; and knowing that for some time I could see nothing of the Earth—her dark side being opposite me and wholly obscuring the Sun, while I was as yet far from having entered within the sphere where any novel celestial phenomena might be expected—I only gave an occasional glance at the discometer and metacompass, suppressing of course the electric glare within my vessel, till I awoke from a short siesta about 19h. (7 P.M.) The Earth at this time occupied on the sphere of view a space —defined at first only by the absence of stars—about thirty times greater than the disc of the Moon as seen through a tube; but, being dark, scarcely seemed larger to the eye than the full Moon when on the horizon. But a new method of defining its disc was presently afforded me. I was, in fact, when looking through the lower window,

in the same position as regards the Earth as would be an inhabitant of the lunar hemisphere turned towards her, having no external atmosphere interposed between us, but being at about two-thirds of the lunar distance. And as, during an eclipse, the Lunarian would see round the Earth a halo created by the refraction of the Sun's rays in the terrestrial atmosphere—a halo bright enough on most occasions so to illuminate the Moon as to render her visible to us—so to my eyes the Earth was surrounded by a halo somewhat resembling the solar corona as seen in eclipses, if not nearly so brilliant, but, unlike the solar corona, coloured, with a preponderance of red so decided as fully to account for the peculiar hue of the eclipsed Moon. To paint this, unless means of painting light—the one great deficiency which is still the opprobrium of human art—were discovered, would task to the uttermost the powers of the ablest artist, and at best he could give but a very imperfect notion of it. To describe it so that its beauty, brilliancy, and wondrous nature shall be in the slightest degree appreciated by my readers would require a command of words such as no poet since Homer—nay, not Homer himself—possessed. What was strange, and can perhaps be rendered intelligible, was the variation, or, to use a phrase more suggestive and more natural, if not more accurate, the extreme mobility of the hues of this earthly corona. There were none of the efflorescences, if one may so term them, which are so generally visible at four cardinal points of its solar prototype. The outer portion of the band faded very rapidly into the darkness of space; but the edge, though absolutely undefined, was perfectly even. But on the generally rainbow-tinted ground suffused with red—which perhaps

might best be described by calling it a rainbow seen on a background of brilliant crimson—there were here and there blotches of black or of lighter or darker grey, caused apparently by vast expanses of cloud, more or less dense. Round the edges of each of these were little irregular rainbow-coloured halos of their own interrupting and variegating the continuous bands of the corona; while throughout all was discernible a perpetual variability, like the flashing or shooting of colour in the opal, the mother-of-pearl, or similarly tinted translucent substances when exposed to the irregular play of bright light—only that in this case the tints were incomparably more brilliant, the change more striking, if not more rapid. I could not say that at any particular moment any point or part of the surface presented this or that definite hue; and yet the general character of the rainbow, suffused with or backed by crimson, was constant and unmistakable. The light sent through the window was too dim and too imperfectly diffused within my vessel to be serviceable, but for some time I put out the electric lamp in order that its diffused light should not impair my view of this exquisite spectacle. As thrown, after several reflections, upon the mirror destined afterwards to measure the image of the solar disc, the apparition of the halo was of course much less bright, and its outer boundary ill defined for accurate measurement. The inner edge, where the light was bounded by the black disc of the Earth, shaded off much more quickly from dark reddish purple into absolute blackness.

And now a surprise, the first I had encountered, awaited me. I registered the gravity as shown by the barycrite; and, extinguishing the electric lamp, measured repeatedly the semi-diameter of the

Earth and of the halo around her upon the discometer, the inner edge of the latter affording the measurement of the black disc, which of itself, of course, cast no reflection. I saw at once that there was a signal difference in the two indications, and proceeded carefully to revise the earth-measurements. On the average of thirteen measures the halo was about 87”, or nearly 1-1/2’ in breadth, the disc, allowing for the twilight round its edge or limb, about 2° 50’. If the refracting atmosphere were some 65 miles in depth, these proportions were correct. Relighting the lamp, I worked out severally on paper the results indicated by the two instruments. The discometer gave a distance, roughly speaking, of 40 terrestrial radii, or 160,000 miles. The barycrite should have shown a gravity, due to the Earth’s attraction, not 40 but 1600 times less than that prevailing on the Earth’s surface; or, to put it in a less accurate form, a weight of 100 lbs. should have weighed an ounce. It did weigh two ounces, the gravity being not one 1600th but one 800th of terrestrial gravity, or just double what, I expected. I puzzled myself over this matter longer, probably, than the intelligent reader will do: the explanation being obvious, like that of many puzzles that bewilder our minds intensely, only to humiliate us proportionately when the solution is found—a solution as simple as that of Columbus’s egg-riddle. At length, finding that the lunar angle—the apparent position of the Moon—confirmed the reading of the discometer, giving the same apogaic distance or elevation, I supposed that the barycrite must be out of order or subject to some unsuspected law of which future observations might afford evidence and explanation, and turned to other subjects of interest.

Looking through the upper window on the left, I was struck by the rapid enlargement of a star which, when I first noticed it, might be of the third magnitude, but which in less than a minute attained the first, and in a minute more was as large as the planet Jupiter when seen with a magnifying power of one hundred diameters.

Its disc, however, had no continuous outline; and as it approached I perceived that it was an irregular mass of whose size I could form not even a conjectural estimate, since its distance must be absolutely uncertain. Its brilliancy grew fainter in proportion to the enlargement as it approached, proving that its light was reflected; and as it passed me, apparently in the direction of the earth, I had a sufficiently distinct view of it to know that it was a mainly metallic mass, certainly of some size, perhaps four, perhaps twenty feet in diameter, and apparently composed chiefly of iron; showing a more or less blistered surface, but with angles sharper and faces more regularly defined than most of those which have been found upon the earth's surface—as if the shape of the latter might be due in part to the conflagration they undergo in passing at such tremendous speed through the atmosphere, or, in an opposite sense, to the fractures caused by the shock of their falling. Though I made no attempt to count the innumerable stars in the midst of which I appeared to float, I was convinced that their number was infinitely greater than that visible to the naked eye on the brightest night. I remembered how greatly the inexperienced eye exaggerates the number of stars visible from the Earth, since poets, and even olden observers, liken their number to that of the sands on the seashore; whereas the patient work of map and catalogue makers has shown

that there are but a few thousands visible in the whole heavens to the keenest unaided sight. I suppose that I saw a hundred times that number. In one word, the sphere of darkness in which I floated seemed to be filled with points of light, while the absolute blackness that surrounded them, the absence of the slightest radiation, or illumination of space at large, was strange beyond expression to an eye accustomed to that diffusion of light which is produced by the atmosphere. I may mention here that the recognition of the constellations was at first exceedingly difficult. On Earth we see so few stars in any given portion of the heavens, that one recognises without an effort the figure marked out by a small number of the brightest amongst them; while in my position the multitude was so great that only patient and repeated effort enabled me to separate from the rest those peculiarly brilliant luminaries by which we are accustomed to define such constellations as Orion or the Bear, to say nothing of those minor or more arbitrarily drawn figures which contain few stars of the second magnitude. The eye had no instinctive sense of distance; any star might have been within a stone's throw. I need hardly observe that, while on one hand the motion of the vessel was absolutely imperceptible, there was, on the other, no change of position among the stars which could enable me to verify the fact that I was moving, much less suggest it to the senses. The direction of every recognisable star was the same as on Earth, as it appears the same from the two extremities of the Earth's orbit, 19 millions of miles apart. Looking from any one window, I could see no greater space of the heavens than in looking through a similar aperture on Earth. What was novel and interesting in my

stellar prospect was, not merely that I could see those stars north and south which are never visible from the same point on Earth, except in the immediate neighbourhood of the Equator; but that, save on the small space concealed by the Earth's disc, I could, by moving from window to window, survey the entire heavens, looking at one minute upon the stars surrounding the vernal, and at another, by changing my position, upon those in the neighbourhood of the autumnal equinox. By little more than a turn of my head I could see in one direction Polaris (*alpha* Ursæ Minoris) with the Great Bear, and in another the Southern Cross, the Ship, and the Centaur.

About 23h. 30m., near the close of the first day, I again inspected the barycrite. It showed 1/1100 of terrestrial gravity, an incredibly small change from the 1/800 recorded at 19h., since it implied a progress proportionate only to the square root of the difference. The observation indicated, if the instrument could be trusted, an advance of only 18,000 miles. It was impossible that the Astronaut had not by this time attained a very much greater speed than 4000 miles an hour, and a greater distance from the Earth than 33 terrestrial radii, or 132,000 miles. Moreover, the barycrite itself had given at 19h. a distance of 28-1/2 radii, and a speed far greater than that which upon its showing had since been maintained. Extinguishing the lamp, I found that the Earth's diameter on the discometer measured 2° 3' 52" (?). This represented a gain of some 90,000 miles; much more approximate to that which, judging by calculation, I ought to have accomplished during the last four hours and a half, if my speed approached to that I had estimated. I inspected the cratometer, which indicated a force as great as that with which I had started,—a

force which should by this time have given me a speed of at least 22,000 miles an hour. At last the solution of the problem flashed upon me, suggested by the very extravagance of the contradictions. Not only did the barycrite contradict the discometer and the reckoning but it contradicted itself; since it was impossible that under one continuous impulsation I should have traversed 28-1/2 radii of the Earth in the first eighteen hours and no more than 4-1/2 in the next four and a half hours. In truth, the barycrite was effected by two separate attractions,—that of the Earth and that of the Sun, as yet operating almost exactly in the same direction. At first the attraction of the former was so great that that of the Sun was no more perceived than upon the Earth's surface. But as I rose, and the Earth's attraction diminished in proportion to the square of the distance from her centre—which was doubled at 8000 miles, quadrupled at 16,000, and so on—the Sun's attraction, which was not perceptibly affected by differences so small in proportion to his vast distance of 95,000,000 miles, became a more and more important element in the total gravity. If, as I calculated, I had by 19h. attained a distance from the earth of 160,000 miles, the attractions of Earth and Sun were by that time pretty nearly equal; and hence the phenomenon which had so puzzled me, that the gravitation, as indicated by the barycrite, was exactly double that which, bearing in mind the Earth's attraction alone, I had calculated. From this point forward the Sun's attraction was the factor which mainly caused such weight as still existed; a change of position which, doubling my distance from the Earth, reduced her influence to one-fourth, not perceptibly affecting that of a body four hundred times more remote.

A short calculation showed that, this fact borne in mind, the indication of the barycrite substantially agreed with that of the discometer, and that I was in fact very nearly where I supposed, that is, a little farther than the Moon’s farthest distance from the Earth. It did not follow that I had crossed the orbit of the Moon; and if I had, she was at that time too far off to exercise a serious influence on my course. I adjusted the helm and betook myself to rest, the second day of my journey having already commenced.