The Symmes theory of concentric spheres, demonstrating that the earth is hollow, habitable within, and widely open about the poles. Compiled by Americus Symmes from the writings of his father, Capt. John Cleves Symmes.

Symmes, John Cleves, 1780-1829.
Louisville, Ky., Printed by Bradley & Gilbert, 1878.

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THE

SYMMES THEORY

OF

Concentric Spheres,

DEMONSTRATING THAT

THE EARTH IS HOLLOW, HABITABLE WITHIN, AND WIDELY OPEN ABOUT THE POLES.

COMPILED BY

AMERICUS SYMMES,

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LOUISVILLE, KY.

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PREFACE.

John Cleves Symmes, the author of the "THEORY OF CONCENTRIC SPHERES," was born in Sussex County, New Jersey, on the 5th of November, 1780. During his boyhood and early life he received a good common English education, which, in after life, he greatly improved through his great fondness for reading and an insatiable desire for knowledge. He cultivated particularly mathematics and the natural sciences, and at an early age studied out the curious theory through which he became so widely known.

At the age of twenty-two years he entered the army of the United States as ensign; his commission bears date April 2, 1802. On May 1, 1804, he was promoted to the rank of second lieutenant; on July 29, 1807, to that of first lieutenant; and on the 20th of January, 1812, he received a commission as captain. He continued to serve in that capacity during the war, and until the disbanding of the army in 1816.

Soon after he entered the army he was ordered to the Southwest, and was stationed successively at Fort Coupee, Louisiana; Fort Adams, fifty miles below Natchez, on the Mississippi, and at New Orleans.

While at Fort Adams he fought a duel with one of his comrade officers, an account of which we may as well record in his own words, as given in a letter to his brother Celadon, dated Fort Adams, June 28, 1807:

"I sit down to emit from the point of my pen such ideas as may chance to rise in my mind while I imagine myself narrating to you the pleasures and pains I have experienced since I last wrote; the proportion of the latter has far exceeded that of the former, although the six months I spent at Fort Coupee glided away like a pleasing dream, where happiness appeared within my reach, and just as I was possessing it, I was aroused and hurried away to Orleans, where a viper-like enemy had been before me and made several others, who were actuated by hope of promotion and love of mischief.

"This subtle, designing enemy was my late surgeon mate, Dr. John Fowles, who insinuated that I had acted dishonorably in giving him a furlough with pros-

pect of pay, and that I had insisted on his giving me his pay while absent, on account of having to take care of the sick for him; on hearing which, I immediately declared his allegation false, and that he should give me a certificate satisfactory or meet me in the field of honor.

"After I had stated the truth that he had built his story out of, declaring I had done nothing but what I was willing the world should know or that I could blame myself for, and pointed out the precedent I was guided by, I obtained, with ease, a furlough to go to Point Coupee to adjust some unsettled business I pretended to have there. I went and humbled his (mean) soul, as much as mine (but too generous then), and dictated a certificate which he copied and signed. I then returned in triumph to Orleans, where those juniors, disappointed in the hope they at first had entertained of obtaining promotion by my resigning in a fright, or getting killed by the doctor, continued their nefarious cabals *under the rose*. But I smelt a rat, felt provoked, and strutted with more confidence than was usual to me at other times. On one of these lowering days I began a letter which I never finished. I here give you a paragraph of it: 'I lately read a French proverb indicating that a man without enemies was no great thing. I then wished for some. I now have my wish, and believe I shall profit thereby. They are a necessary stimulus, calculated to promote energy and perseverance. If I do not take pains to nourish them, I shall not to do them away; unless some one should be so bold as to emerge from under the rose and refuse to apologize and return.'

"A week or two after my return from Point Coupee, I was told by an old acquaintance, under cover of friendship, that my juniors in rank did not admit my character to be fairly cleared up, and had persuaded several to think with them. I made light of it to him, but advised with a field officer, who happened not to be characterized by decision. His response was evasive. I therefore, of my own accord, made an official application to the General for a court of inquiry, to examine whether or not my conduct had been correct.

"The General, being much hurried with business at that time, neglected to order the court for several days, during which time I, in the course of duty, had occasion to see the standing order relative to police, which I had not yet seen. I therefore went, as I ought, to Lieutenant Marshall, who was adjutant, and, in his office, asked him to see the orderly book. He answered that it was more proper that I should examine the books of the company to which I was attached, and that I should not see them there. I then observed that I did not suppose but that he was a man of his word, and reminded him that he had formerly given a like answer and refusal on the same occasion, with a promise that, in case the sergeant had not recorded the orders (as I suggested), I might see them in his office; upon which he blustered toward me, and demanded what I meant, while I returned him that I meant as I said. He then declared that since he had promised them I might see them, and handed me the book, observing at the same time that I was not generally considered as a gentleman. At this time our passions were both raised; I quelled mine and spoke deliberately to this effect, that I should not consult his opinion relative to what other people thought of me, but wished to know if he did not himself say I was not a gentleman; he answered yes, and that he did not consider me one; I continued that I had long observed the ill offices he was inclined to do me, and that he wanted promotion (yes, said he, I do), and would be disappointed in the way he looked for it, but

that I was still willing he should have a chance for it. Let us go out and take a shot (by this time, beside two officers sitting in the room, five or six had collected in front of the door which stood open). He declined, alleging that he did not consider me on a gentlemanly footing with him, alluding to what Dr. Fowles had said of me. I urged that until I was arrested, or officially charged with some misdemeanor, that I stood on the same footing of every other officer, and that I was not subject to be insulted with impunity. About this time he began to come down and endeavor to make out that he had not disputed my gentility; but still refused a second invitation I gave him, alleging the same reason, but said that he would fight me after the court of inquiry (I expected) should acquit me. I consented to the proposition, provided it could not take place sooner, and then proceeded to read the orders I wanted to see, and he sat down to his breakfast. That day I mounted guard, and the next, when relieved, took a sleep after dinner and went early to parade (I then quartered in town) without consulting any person. I had determined what to do, which was to fall in with Mr. Marshall when he had his sword on and wring his nose. I did not get an opportunity until after parade was dismissed, when walking to the barracks I overtook him and requested to speak to him. He turned toward me, I accomplished my intention, and bringing my hand on the hilt of my sword, and taking one step backward, I involuntarily said: 'Draw, and defend yourself!' He did not draw, but stepped toward me (to grapple, as I expected, for he is a large man). I then held my sword horizontally before me, and told him not to advance but draw and defend himself. He then, after an exclamation of surprise, made for his quarters, beckoning and calling me to follow, which I did to the front of his door, where I passed fore and aft, then went to a group of officers near and related what I had done, observing that I expected that he would not hesitate to take the field. Presently he came toward us, calling on me. I advanced to him. He then said that he would meet me, and proposed that our seconds should convene on the gallery as soon as possible. I consented, and glided to my quarters (if possible) like a man intoxicated with pleasurable passion. One of my messmates said I had been drinking wine. Lieutenant Clymer, a messmate, who had at that moment returned, after an absence of two weeks, immediately became my second; met Mr. Marshall, and they agreed that we should meet on the commons at daylight next morning. Mr. Clymer prepared me excellent pistols and a surgeon to attend. We met at the appointed time, and, at the distance of ten paces, standing sideways, fired at the word. The one appointed to give it first asked, *are you ready?* we, at the same instant, answered *yes*. He then said, *fire?* and we raised our arms together deliberately, from a hanging position. My intention was to aim at his hip; his (I learn) at my breast, consequently I got the first fire, which drew his shot somewhat at random, though it must have passed within a line of the lower part of my belly, as it pierced through my pantaloons, shirt tail, and the bone of my careless hanging wrist, close to the joint. He received my ball in his thigh, but where it glanced to the doctors can not find. It is said he is now walking about. I wanted to know if he desired another shot, and being informed in the negative, left my second and surgeon attending to him, and, with my handkerchief wrapped around my wound, went home and ate a hearty breakfast, not expecting to be confined or much afflicted with what appeared to the doctor, as well

as myself, little more than a scratch. But many a long day and night I suffered for the error of not losing blood and dieting as I ought to have done; 'twas near two months before it healed, and two weeks of that time it was dangerously inflamed, and disjointed of itself, which is the cause of its looking or being somewhat awry and not working freely in the joint like the other. The pain produced fever, and that debility, which exposed me to a multitude of infirmities. The most obstinate and afflicting was a dysentery, which began with a dropsy and continued with violence for six or seven weeks. I have now got shut of it, but but my feet and legs continue to bloat to a troublesome degree. The court of inquiry I applied for was ordered agreeable to my request, and as soon as my wound began to mend I wrote an official notice to the recorder that I was ready to come before the court, if they would appoint a place to sit and give me notice; and I repeatedly stated verbally the same to Captain Lockwood who was president thereof, who alleged that he was under marching orders, and it was intimated to me by numbers that the proceedings would be a needless piece of precaution in me, as every one was convinced of my integrity and gentility. I therefore made no further application to be heard, especially as the members of the court were immediately scattered to different posts."

Captain Symmes never fully recovered the use of his wrist—it was always stiff and a little awry. The wound which Lieutenant Marshall received disabled him, so that he carried the effects of it through life. He was afterward befriended by Captain Symmes, who always spoke of this duel with regret.

At the time of the commencement of the war with Great Britain, in 1812, the first regiment of United States Infantry, of which he was senior captain, was stationed at the mouth of the Missouri River, in the Territory of Missouri. Here they remained until 1814, when they were ordered to join the army of General Brown on the Northern frontier. After a long and fatiguing journey by land and water, they reached Canada on the 25th day of July—the very day on which the battle of Bridgewater or Lundy's Lane was fought.

The battle commenced near sunset. The first regiment, which was commanded by Lieutenant Colonel Robert C. Nicholas, had not joined the army at the time of the opening of the battle, but were about two miles in the rear. When the firing commenced, without waiting for or receiving orders from General Brown, the regiment was put in motion by Colonel Nicholas, and marched with all possible expedition to the scene of the conflict. When they arrived at the American camp they found General Ripley, to whom they had been

ordered to report, had advanced with his brigade, and without halting they continued to press forward.

It was twilight when they reached the field; they formed themselves within a short distance of the enemy's batteries, without meeting with any general officer or aid-de-camp to instruct them how they should join in the conflict. Ignorant of the situation of either army, except from the observations made in coming up, and unapprized of the position of General Ripley's brigade, Colonel Nicholas, when he found himself so near a British battery, which had opened fire upon his regiment, ordered the men to retire a short distance. While the attention of the battery was thus directed to the first regiment, Colonel James Miller, leading his battalion, partly under the cover of the fence of a church yard, moved swiftly up the hill and attacked the artillerists almost before they were aware of their presence, and, after a short but desperate hand-to-hand fight, in which he lost a number of his gallant men, he captured the whole park, consisting of seven brass cannon, ammunition wagons, etc.

After the capture of this position, Colonel Nicholas was enabled to report to General Ripley, and was ordered to assume a position on the left of Colonel Miller's regiment. This order was promptly obeyed, and the position held till the close of the action.

General Brown, in his official report, makes honorable mention of the bravery of Captain Symmes in this battle.

On a partial recovery from his wounds, General Brown took command at Fort Erie, which was closely invested by the British, who were actively employed in surrounding it with batteries. On the 17th of September he resolved to make a sortie, which was accomplished with spirit and success; the British were completely surprised, and, after a severe conflict of two hours, the three batteries, the whole line of intrenchments, and their block-houses were in the possession of the Americans. In this action Caytain Symmes and his command captured one of the batteries; he led his men over the intrenchments and spiked the first canon with his own hand.

In 1816 Captain Symmes retired from the army and took up his residence at St. Louis, where he engaged in furnishing supplies for the troops stationed on the upper Mississippi, and in trading with the Fox Indians, for which he had a special license from Governor Clark, of Missouri Territory.

On Christmas day, 1808, Mr. Symmes married Mrs. Mary Anne Lockwood, widow of Captain Benjamin Lockwood,* at Fort Adams. She had at that time a family of five daughters and one son. They were brought up and educated by Captain Symmes as his own family; they were sincerely attached to him, and grew up to maturity with his own children in perfect harmony. They were all married from his house but two, who remained single. Captain Lockwood, at the time of his death, owned a section of land in Brown County, Ohio, on which Captain Symmes regularly paid the taxes even to the neglect of his own; one of his own tracts, four thousand acres, in Licking County, which would have been a fortune to his children, was forfeited by this neglect. When these children arrived at maturity, he turned over this land, free and unincumbered, neither charging them for the money expended on it nor the care he had taken of it.

Captain Symmes' trading experience did not result in a pecuniary benefit to him, so in 1819 he removed from St. Louis and settled at Newport, Kentucky, where he resided till 1824, when he removed to his farm, a section of land presented to him by his uncle and namesake, which had been previously improved, near Hamilton, Ohio.

While at St. Louis Captain Symmes paid more attention to his eccentric *Theory of Concentric Spheres, Polar Voids, and Open Poles;* and, in order to make his discoveries and purposes known, he issued the following circular, which, like a lady's letter, is most important for its postscript:

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* Captain Lockwood, a Virginian by birth, entered the army in 1792 as a lieutenant, and served in Captain Alexander Gibson's company during General Wayne's campaign against the Indians. He was promoted to a captaincy in 1798, and died at Fort Adams early in 1808.

CIRCULAR.

Light gives light to light discover—*ad infinitum.*

ST. LOUIS, MISSOURI TERRITORY, NORTH AMERICA,
April 10, A. D. 1818.

To all the World:

I declare the earth is hollow and habitable within; containing a number of solid concentric spheres, one within the other, and that it is open at the poles twelve or sixteen degrees. I pledge my life in support of this truth, and am ready to explore the hollow, if the world will support and aid me in the undertaking.

JNO. CLEVES SYMMES,
Of Ohio, late Captain of Infantry.

N. B.—I have ready for the press a treatise on the principles of matter, wherein I show proofs of the above positions, account for various phenomena, and disclose Dr. Darwin's "*Golden Secret.*"

My terms are the patronage of THIS and the NEW WORLDS.

I dedicate to my wife and her ten children.

I select Dr. S. L. Mitchell, Sir H. Davy, and Baron Alexander Von Humboldt as my protectors.

I ask one hundred brave companions, well equipped, to start from Siberia, in the fall season, with reindeer and sleighs, on the ice of the frozen sea; I engage we find a warm and rich land, stocked with thrifty vegetables and animals, if not men, on reaching one degree northward of latitude 82; we will return in the succeeding spring.

J. C. S.

Captain Symmes addressed a copy of this circular to every learned institution and to every considerable town and village, as well as to numerous distinguished individuals, throughout the United States, and sent copies to several of the learned societies of Europe.

Its reception by the public can easily be imagined; it was overwhelmed with ridicule as the production of a distempered imagination, or the result of partial insanity. It was for many years a fruitful source of jest with the newspapers.

The Academy of Science of Paris, before which the circular was laid by Count Volney, decided that it was not worthy of consideration. The scientific papers of Europe generally treated it as a hoax, rather than believe that any sane man could issue such a circular or uphold such a theory.

Circulars and newspaper articles soon followed this one, and were kept up for years, despite of the ridicule which was poured on the unfortunate author from all sides. In 1820 Captain Symmes commenced lecturing on his theory; first at Cincin-

nati, then at other large towns in the West. The novelty of the subject attracted large audiences, but he failed to make converts who possessed wealth or influence enough to secure the means to test, by exploration, the truth of his theory.

In May, 1824, he explained his theory at Hamilton to a large audience, with such convincing effect that after the lecture they "*Resolved*, That we esteem Symmes' Theory of the Earth deserving of serious examination and worthy of the attention of the American people."

So much did the Theory attract popular attention in the West, that the "Polar Expedition" was thought a fit object for a benefit at the Cincinnati Theater, which was given on March 29, 1824. Mr. Collins then recited an address, written for the occasion by Moses Brooks, in which, after recounting the great discoveries to be made, he wound up with—

> "Has not Columbia *one* aspiring son,
> By whom th' unfading laurel may be won?
> Yes! history's pen may yet inscribe the name
> Of SYMMES to grace her future scroll of fame."

In 1822 he petitioned the Congress of the United States, setting forth his belief of the existence of a habitable and accessible concave to this globe; his desire to embark on a voyage of discovery to one or other of the polar regions; his belief in the great profit and honor his country would derive from such discovery; and praying that Congress would equip and fit out for the expedition two vessels of two hundred and fifty or three hundred tons burden; and grant such other aid as Government might deem necessary to promote the object. This petition was presented in the Senate by Colonel Richard M. Johnson, a member from Kentucky, on the 7th day of March, 1822, when, after a few remarks, it was laid on the table.

In December, 1823, he forwarded a similar petition to both houses of Congress, which met a similar fate.

In January, 1824, he petitioned the General Assembly of the State of Ohio, praying that body to pass a resolution approbatory of his theory; and to recommend him to Congress for an outfit suitable to the enterprise. This memorial was presented by Micajah T. Williams, and, on motion, the further consideration thereof was indefinitely postponed.

In 1825 he applied through the American Minister, at the Court of St. Petersburg, for permission to accompany the Polar Expedition then fitting out by the Russian Government, which was readily granted by the Chancellor, Count Romanzoff, but the want of means to procure a proper outfit hindered him from accepting the offer.

Among his converts was a young lawyer, Mr. J. N. Reynolds, a graduate of Ohio University. With him Captain Symmes entered into an agreement for a lecturing tour through the Eastern States. They set out in September, 1825, accompanied by Anthony W. Lockwood, a step-son of Captain Symmes, and lectured in various towns in Ohio. In about a month Captain Symmes was forced to return home in consequence of ill health. In January, 1826, he rejoined them at Pittsburgh, and they proceeded eastward. Some difficulty soon occurred, however; Reynolds became dissatisfied and left them. Symmes, undaunted by this desertion, or the constant ridicule with which he was met, continued his tour to Philadelphia, New York, Boston, as far as Maine, and even into Canada, lecturing at the various towns through which he passed.

His health was by this time greatly impaired by his constant labors and excitement, and he was reluctantly obliged to give up lecturing. He retired for a time to his native place in New Jersey, where he remained the guest of an old friend of his father until his health was sufficiently restored to enable him to travel homeward. When he reached Cincinnati, in February, 1829, he was so feeble that he had to be conveyed on a bed, placed in a spring wagon, to his home near Hamilton. He continued gradually to sink, until released by death on the 29th of May, 1829.

His remains were committed to the grave the next day, in the old burying ground at Hamilton, with military honors. They are now covered with a monument, erected by his son, Americus Symmes, a solid structure of freestone, surmounted with a hollow globe, open at the poles, bearing the following inscriptions:

On the west side—"Captain John C. Symmes, a native of

New Jersey, died in May, 1829, aged forty-nine years and six months."

On the north side—"Captain John Cleves Symmes was a philosopher and the originator of '*Symmes' Theory of Concentric Spheres and Polar Voids.*' He contended that the earth is hollow and habitable within."

On the south side—"Captain John Cleves Symmes entered the army of the United States as an ensign in the year 1802. He afterwards rose to the rank of captain, and performed daring feats of bravery in the battles of Lundy's Lane and sortie from Fort Erie."

Captain Symmes was a man of great simplicity and earnestness of character, a high-minded, honorable, honest, and exemplary man in every walk of life, and was beloved, trusted, and respected by all who knew him.

So fixed in his mind was the belief of the truth of his theory, that for ten years, although laboring under great pecuniary embarrassments, and buffeted by the ridicule and sarcasm of an opposing world, he persevered in his endeavors to interest others in it, so as to enable him to test its truth by a polar expedition, but without success.

It should now be remembered to his credit, that many of the facts and fancies (as they then appeared) which he brought forward in proof of his theory of *open polar voids* have since been fully corroborated by the observations of Drs. Kane and Hayes and Captain Hall, but applied by them to the more plausible theory of *open polar seas.*

THE

THEORY OF CONCENTRIC SPHERES.

According to this theory the earth is globular, hollow, and open at the poles. The diameter of the northern opening is about two thousand miles, or four thousand miles from outside to outside. The south opening is somewhat larger. The planes of these openings are parallel to each other, but form an angle of 12° with the equator, so that the highest part of the north plane is directly opposite the lowest part of the south plane. The shell of the earth is about one thousand miles thick, and the edges of this shell at the openings are called verges, and measure, from the regular concavity within to the regular convexity without, about fifteen hundred miles. The verges occupy about 25°, and if delineated on a map would show only the outer half of the verge, while all above or farther from the equator, both north and south, would lie on the apex and within the verge. All the polar regions upon the present map would be out of sight. The meridian lines extend at right angles from the equator to the outer edges of the verges, and then wind round along the surface of the verges, terminating at the points directly under the highest parts of the verges both north and south.

The line which marks the location of the apex of the northern verge begins at a point in Lapland about 68° N. and 20° E. from London on a meridian traversing Spitzbergen, whence it passes southwest across the Atlantic Ocean and the southern part of Greenland, through Hudson's Bay and over the continent to the Pacific near Cook's Inlet, thence across the Fox Islands to a point about 56° N. and 160° W., nearly south of Behring's Straits. Then it passes over the Pacific, crossing the south part of Kamtchatka, continuing northwest through Siberia, entering Europe across the Ural Mountains, in latitude about

58° N., and passing near the Arctic coast, over the mouth of the White Sea, to the point of starting.

Captain Symmes collated with great labor many isolated facts from his own researches, and from the accounts of Ross, Howe, Parry, McKenzie, and others who had by sea and land explored the polar regions, while similar proofs have been drawn from later explorations since the promulgation of the theory in 1829.

The explorers who furnish facts for the support of this theory seem, none of them, to have had the remotest conjecture of it. The facts are admitted, and it can not be urged against its author that he has marshaled in its support fictitious premises. His arguments, drawn from the facts, may be erroneous. Yet it is true that many of them which have not as yet been otherwise satisfactorily explained are easily accounted for upon his theory.

There is a remarkable difference of climate under different meridians upon the same parallel of latitude. It is known that the climate of the eastern coast of North America is much colder than that of Western Europe in the same latitude. The notion that this diversity is produced by the proximity of the ocean or of ranges of mountains is unsatisfactory; for countries, similar in these respects, in the same latitude, have a great diversity of climate. A theory which would explain the mild climate of France and England from these causes would not suit the case of New York and New England and the cold regions around the Gulf of St. Lawrence south of 59° north latitude. The topography of these sections of country is similar; and yet England and France have a mild and genial climate, while New England and Newfoundland are cold and bleak in the winter. Labrador, not so far north as Great Britian, is as cold and bleak as countries in Europe 20° farther north.

The heat and cold of the different climates are governed by their distance from the verge of the polar opening, and do not depend on their nearness to or remoteness from the equator. The natural climates are parallel to the planes of the polar openings, and cut the parallels of latitude at an angle of twelve degrees. When the sun is on the tropic of Capricorn, the circle of greatest cold would be about twenty-three and a half

degrees south of the apparent verge, and when the sun is on the tropic of Cancer this circle would probably be just under the umbrage of the real verge; hence it follows, if this doctrine be correct, that the climate of forty degrees north latitude on the plains of Missouri, in the western part of the continent of America, will be as cold in winter as the latitude of fifty or fifty-two degrees in Europe; and observation has fully confirmed such to be the fact.

The Gulf Stream does not satisfactorily account for this diversity of climate between America and Europe. Sweeping along the coast of the United States northeastwardly from the Gulf of Mexico, with its vast volume of water, why should it not moderate the climate of North America as well as that of Eastern Europe? After nearing the banks of Newfoundland, it deflects eastwardly across the Atlantic about two thousand miles, and then sends off one branch northeastwardly along the coast of Norway, and another down the western coast of Europe and Africa, till it is lost in the Southern Atlantic. Why, then, does not this mighty river of the ocean affect the climate of the United States as much or even more than that of France and England? It is claimed that this stream raises the climate of Europe 12° or 15° higher than that of the United States, whereas its effect should be greater upon the United States than upon Europe.

The characteristics of the isothermal belts of both hemispheres throw some light upon this theory. The region of the verges must be the coldest parts of the earth's surface, because, being more convex, they diverge instead of converging the sun's rays. The temperature, therefore, of any given part of the earth's surface depends as well upon its proximity to the verge as to the equator. Europe, under the northern verge in latitude 60° N. would have the same climate with a place 70° west longitude, some six degrees farther south; and at 160° west longitude the climate would be some twelve degrees colder than that of England. This would be true as a general rule, subject, however, to many local exceptions arising from the elevation and direction of mountain ranges, or the proximity of the ocean or large bodies of water, or from other causes. Paris, 49° N., is about

the same distance from the verge as Washington in latitude 30° N., and their climate is nearly alike.

Thus, while this theory does not explain all the phenomena of climatic differences as indicated by the isothermal belts, it affords a general rule for explaining why the climate of Europe is milder than that of North America. The isothermal line of 32° of Fahrenheit, which marks the southern limit of frozen ground, as laid down on climatic charts, corresponds very nearly with the location of the northern verge.

The theory of ocean currents will not explain these climatic differences upon the earth's surface. If, for instance, the Gulf Stream—having traversed the Atlantic, battling with the cold waters of Baffin's Bay and the icebergs which are drifted out of the Arctic Ocean—so modifies the climate of Western Europe, why should not the Brazilian current, flowing southwardly along the east coast of South America, produce the same effect upon Patagonia? The antarctic currents, sweeping past Cape Horn and uniting with this warm Brazilian current, flow eastwardly across the South Atlantic Ocean, round the Cape of Good Hope, into the Indian Ocean. While these antarctic currents might lower the temperature of the west coast of Patagonia, it will not be pretended that they would in like manner affect the east coast of this bleak region, or so counteract the effect of the warm Brazilian current flowing down along the eastern coast of South America as to produce the cold climate of Eastern Patagonia.

It is now generally conceded that a vast open ocean exists in the polar regions, and Professor Maury holds that this open sea results from the flow of warm submarine currents from the equatorial regions of the earth, north and south, causing the counterflow, upon the surface, of mighty currents from the arctic regions. Further discoveries may throw more light upon this mysterious subject, and explain these ocean currents in connection with the interior currents of the earth, across the verges in both directions, and thus demonstrate the truth of Captain Symmes' theory.

The highest altitude of the sun is not at noon in high latitude, but at some time after, as Captain Parry informs us. The mer-

idian lines on which the sun is at noon come up from the equator at right angles until they reach the outer edge of the verge, where they deflect to the right over and along the surface of the verge to a point underneath the highest part of the same. This deflection, as well as the angularity of the plane of the verge with the equator, would cause the sun, in latitude on and over the verge, to have the highest altitude after midday. Beyond longitude 160° west from London, this deflection of the meridian lines is to the left.

In the Pacific Ocean, in longitude and latitude answering to the lowest part of the verge, or that part of it nearest the equator, navigators have observed opposite the sun a luminous belt or ring, of a crescent form, elevated some 15° above the horizon, which is caused by the reflection of the sun's rays from the opposite highest part of the verge. The refracted rays, coming from the opposite side of the earth through the dense atmosphere of the verge, would so strike the eye of the observer as to cause this apparent elevation.

But navigators in longitude answering to the highest part of the verge, instead of the bright appearance just noted, observe opposite the sun a dark, opaque space low in the horizon, as though there were no objects to reflect back the rays of the sun. This singular appearance is produced by the fact that the incident rays of light, as they are reflected from the lowest part of the verge, are so refracted that they fall below the eye of the observer, and thus cause this dark appearance, or blank space, in the horizon.

Captain Ross states that in high latitudes there are remarkable changes in the apparent extent of the sensible horizon. From north to south the horizon is so limited that objects can be seen only at very short distances, while in a direction east or west the horizon is greatly extended, and objects can be seen at an immense distance, as if upon a horizontal plane. The direction north and south is directly over the convex surface of the verge, where the horizon is extremely limited; while along the surface of the verge east and west the view is along upon the plane of the verge, and the horizon is greatly extended. This is precisely what would result from the existence of such

a verge. The slight depression of the surface of the earth around the poles is wholly insufficient to produce this effect, which accords so well with this theory.

Another beautiful phenomena, observed by Captain Parry, is the elongated appearance of the sun and moon in high latitude, with the prismatic colors observed on these occasions. According to a simple law of optics, this is due to the dense atmosphere of the verge acting like a prism, and causing this elongated appearance; and the prismatic hues are due to the different refrangibility of the sun's rays. These beautiful hues may be heightened by particles of frost floating in the atmosphere.

Captain Parry and others speak of the brilliant twilight of the North as being sufficient to enable them to read ordinary printed matter distinctly. This curious fact is wholly inexplicable upon the Newtonian theory, but is easy of explanation upon this. This twilight, coming from the north, may be caused by the sun's rays thrown into the interior through the southern opening, which, by two refractions, one at each opening, and two or three reflections from the inner concave surface, would pass out at the north over the verge, and produce there this strong twilight.

Captain Parry states that, when sailing northward in high latitude, the North Star rises over the bow of the ship to the zenith and then declines toward the stern. On the Newtonian theory the ship must have sailed directly under the star, and over and down upon the opposite side of the earth. But this can not be true, for no navigator has sailed so far north.

From the regular convexity to the interior concavity of the earth across the verge is fifteen hundred miles—a distance so great that a vessel, in sailing over the verge, would not perceive one change in her direction, except from the apparent change of the heavenly bodies, or from observations of the difference in the expanse of the visible horizon. The ship going north along the deflected meridians upon and over the verge causes these apparent changes in the North Star.

Further confirmation of the Symmes theory is drawn from the variations and dip of the magnetic needle. "The line of no

variation" is a line coming up through the South Atlantic Ocean over the eastern part of South America, and passing on northwest over the equator to a point a little west of Cape Hatteras, North Carolina, then through Virginia to Lake Erie, east of Cleveland, and on through Lake Huron, terminating at a point in longitude about 90° west from London and in north latitude about 70°.

How do these facts accord with this theory? It will be remembered that the planes of the verges form an angle each with the equator, but are parallel to each other. Now, midway between the verges lies the magnetic equator, cutting the equator of the earth at an angle of twelve degrees, and "the line of no variation" crosses this magnetic equator at nearly right angles. The terminus of "the line of no variation" is about midway between the highest and lowest parts of the northern verge. This line, continued to the southern verge, would also terminate about midway between the highest and lowest parts of the southern verge. These are curious facts and are entitled to consideration. If they do not fully explain the variation of the magnetic needle, they present some views which may help to clear up these mysteries of nature.

The dip of the needle is another phenomenon not fully understood. This dip is nearly uniform upon the same latitude, but increases as the needle is carried north, and, in high latitude answering to the location of the verge, the dip is greatly increased and becomes nearly perpendicular.

The true magnetic poles are not at the points where the "line of no variation" terminates—at the north and south—but are equidistant from this line and immediately under the highest points of the verges north and south, and "the line of no variation" lies midway between these magnetic poles. The needle, while it does not vary, along the line, to the right or left, yet, as it goes northward or southward from the magnetic equator, it is attracted towards the true magnetic poles lying under the highest part of the verges; and so the dip is increased till it reaches the apex of the verge, where it is the greatest.

Thus these general facts in regard to the movement of the magnetic needle correspond with the Symmes theory of the

earth. The barometer also illustrates the theory; for it is well established that, along the region of the verge, the mercury rises the highest, for here the atmosphere is most dense. It would be difficult to show, upon any other hypothesis, why the barometer should rise higher along the locality of the verge than upon the upper side of it to north or south.

The aurora borealis affords a most interesting illustration. If, as Franklin supposed, this is an electrical phenomenon, the question arises, Why is it always exhibited in high latitude? The electric fluid pervades all nature, and is excited by heat, by cold, and by friction.

The sun, in his daily course, rarefies the air of the equatorial regions. It therefore rises and falls down towards the poles, causing currents from the equator towards the north and the south, where it is condensed. This process of rarefaction and condensation produces the aurora along the verges, where the greatest condensation takes place. In proof of this view, Captain Parry and other explorers and navigators state that, when in high latitudes upon and beyond the verge, the aurora is almost always seen in a southerly or southwesterly direction.

Navigators in the South Atlantic, while sailing down the coast of South America, observe, low in the horizon, to the east and southeast, several bright, luminous bodies, like clouds in the sky, which become more and more elevated as the vessel goes south, until, in the vicinity of the Straits of Magellan, these clouds appear nearly in the zenith.

The cause of this beautiful appearance is as yet unknown, or is only the subject of vague conjecture. Captain Symmes holds that these bright clouds are produced by the light of the sun reflected from New Zealand and Van Diemen's Land, and perhaps the south part of New Holland, which lie upon the opposite side of the earth, and which, in the vicinity of Cape Horn, are nearly in the zenith. They are upon the southern verge, between the highest and lowest parts of it, and an observer near Cape Horn is within the southern verge, or upon it, and his zenith is not a radial line drawn from the center of the earth, but is at right angles to a line equidistant from the outer and inner surfaces of the earth, and nearly at right angles to the

plane of the verge, so that the opposite side of the earth would be nearly in the zenith to him, and the light thrown from these islands would present them as bright, luminous bodies, always seen in the same direction, like moons, reflecting the light of the sun. They do not rise and set, as do the sun and moon; and this fact gives plausibility to the explanation.

Facts, attested by good authority, prove the existence of a warmer climate beyond the verge. The Indians of the interior of North America, in latitude about 60°, migrate west or northwest on the approach of winter, to seek a milder climate, and find no sea. Hearn establishes this fact. Though these Indians thus migrate far to the northwest, they have, as Hearn informs us, no knowledge of the Pacific Ocean.

From the interior of North America, west of Hudson's Bay, such emigration would have to be to a great distance to reach the Arctic Ocean in the vicinity of Behring's Straits. This course would take them through Alaska, and lead over the verge, where they would come to a milder climate.

In 1789 Hearn traveled over this part of the continent. Great changes have since taken place, and much information has been obtained, yet it is interesting to know what were his views at that time. He says, that for a long time he traveled over a bleak, inhospitable country, and found it difficult to sustain existence. At length the character of the country changed, and he found a milder climate, sustaining vegetation, with forests of timber of various kinds. He found also a variety of animals, and inhabitants whom he calls "strangers," different from any he had before seen.

From these people he learned there was a vast continent stretching far to the northwest. They had also a tradition of a large river, greater than McKenzie's River, far to the west and northwest of them. This river was probably the great river Yukon, in Alaska, which rises southeast of Mount Elias and flows west and northwest, some twelve hundred miles, into the Pacific Ocean or into Behring's Straits. Its whole course is along upon the verge, and at its mouth it should be warmer than up the stream six hundred miles—a fact that could be easily ascertained. The statements of Hearn, so far as relates

to climate, are corroborated by other travelers. They concur in stating that, in high latitude, the inhabitants speak of the south as colder than the north in the winter, and that they migrate north in the winter season to a milder climate.

One navigator, Captain Ross, when in high latitude beyond the verge, speaks of the Arctic Sea as being calm and clear of ice, while south of him was a wide belt of ice. He describes the currents of air coming from the north as being so warm as to dissolve the snow and ice around him and far to the south. Captain Parry makes frequent mention of these warm currents of air coming from the north and northeast—that is, from the interior of the earth.

Now, all these facts are utterly inconsistent with the commonly received opinion of the arctic regions, that the farther we go to the north the colder it becomes. If any reliance can be placed upon the representations of these explorers, it is fully proved that, above and beyond 68° and 70° north latitude, in the interior of North America, there is a milder climate than at a lower degree of latitude. According to the common opinion, such a climate could not encircle the poles, for every argument which shows the climate colder at 45° than at 20° north, proves it colder at the poles than at 70° north. Large herds of deer, white bears, foxes, and other animals migrate northward on the approach of winter. They can not exist upon the cold, icy belt of the earth along the verge, and they instinctively migrate where they can procure subsistence. From the regions around the northern part of the verge they migrate to the north, and from the southern border of the same they migrate south in winter. From Canada and the countries along the same latitude, immense flocks of migrating birds go south on the approach of winter and return in the spring. The reindeer in March or April come down from the north in droves of thousands and return north again in October, in the interior of North America. (See Rees's Cyclopædia, "Hudson Bay.") The same is true of the north of Asia. In these high latitudes the musk-oxen and white bears thus migrate. The cattle are seen retiring north on the ice in autumn, and returning in the spring in great numbers, bringing their young with them. (See

Hearn's Journal, pp. 357, 358.) These are curious facts, and well deserve a candid consideration.

Immense shoals of herrings, in good condition, according to Buffon, come down from the polar seas, and are never known to return. This renders the solution of the migration of fishes from the north more difficult. If they return in the spring, why are they never observed as well as when they go south? Admit the Symmes theory, and the conjecture would not be unreasonable, that they make the annual circuit of the earth, over the exterior and interior surfaces and through both openings at the poles. If, on the present hypothesis of the earth, we allow land enough for the sustenance of the numerous herds of animals which annually migrate to the polar regions, there would hardly remain water sufficient for the immense shoals of fishes which abound there.

The true causes which produced this change of climate in the arctic regions—heretofore supposed to be one vast solitude of eternal ice—may not be fully known. The progress of science and the discoveries of explorers will soon shed more light on this interesting subject.

Spitzbergen, on the south side of the verge, is a bleak, barren country, while to the northward plants, flowers, and trees are found. This island is upon or partly within the verge, and the north part would lie within and be warmer than the southern portion of the island.

Driftwood is found in great quantities upon the northern coasts of Iceland, Norway, Spitzbergen, and the arctic borders of Siberia, having every appearance of a tropical production. Trees of large dimensions and of different kinds are found, some in a good state of preservation. Vegetables of singular character, and flowers of peculiar fragrance and color, unknown to botanists, are sometimes found in this drift. These could not be the production of the cold arctic regions, nor is it probable they were drifted thither by the Gulf Stream or by submarine currents, for their specific gravity would make this impossible. Besides, why are they not found along the southern coasts of these localities, if borne north by the Gulf Stream, and why is not this drift seen as it passes along through the Atlantic.

It is interesting, in this connection, to notice that one of the results of late German exploration in the arctic regions is the discovery of beds of mineral coal; also mountains higher than Mont Blanc; and botanical specimens which indicate that Greenland must have have been once covered with a rich vegetation; or, as Captain Symmes might have urged, these deposits were drifted from the interior of the earth.

The winters of Spitzbergen and England alternate in severity; when it is cold in England, it is comparitively mild in Spitzbergen, and the reverse is true. The explanation is this: the warm winds from the south moderate the winters of England, but, continuing through the ice-bound regions of the verge, fall down on Spitzbergen as cold, bleak winds, and lower the temperature of that island. So, winds out of the interior, which moderate the winter of this island, as they pass over the verge fall down upon England as cold north winds.

McKenzie, who discovered the great river of the North bearing his name, informs us that he found the river near its source clear of ice, but along the location of the verge it was ice-bound, and again open at its mouth. This is what would be expected if this theory be true, but is difficult of explanation upon any other hypothesis.

PROOFS OF THE THEORY.

That a disposition to hollow cylinders does exist in nature, we think must be admitted; and that a similar principle exists in the planetary system, at least in some degree, appears to me as certain. Every person has seen or heard of Saturn and his rings. At certain periods of time the appearance of this planet, viewed through a good telescope, represents him to be surrounded with two luminous rings or bodies of matter, concentric with each other, and with the body of the planet. These rings no where adhere to the body of the planet, but are distinct and separate, some considerable distance from him, and from each other, leaving a portion of vacant space between the planet and the rings, through which we see the fixed stars beyond.* It is a fact, we believe, admitted by all, and of which

* Physical World, p. 42—Adam's Philosophy, vol. 4, p. 206; Philadelphia, 1807.

we have positive occular demonstration, that these rings are constituted of some kind of matter, if not solid, at least to all appearance as much so as the body of the planet. Their thickness must be very inconsiderable, for when the edge is turned to the eye it is no longer visible, except to the powerful reflecting telescope of Dr. Herschel.

Thus the rings undergo phases according to the position of the planet in his orbit, which prove them to be opaque, like other bodies in the planetary system, and like them shining by reflection. We are not informed what is the precise velocity of the rotary motion of the rings; probably their varying aspect, or some other cause, has prevented a correct observation from being made. However, the planet itself revolves on its axis with an astonishing velocity; and no doubt the rings also, though perhaps with different degrees of velocity.

The appearance of Saturn, we conceive, establishes the fact, that the principle of concentric spheres, or hollow planets, does exist, at least in one instance, in the solar system. And if the fact be established that it exists in one case, is it not fair, nay, is it not almost a certain and necessary consequence, that the same laws of matter which formed one planet into concentric spheres, must form all the others on a plan more or less the same? If we draw any conclusion, or form any opinion at all, respecting the formation of the planets, whose inner parts we can not see; or if we form any opinion in relation to our own planet in particular, whose poles have never been explored, would not reasoning from analogy bring us to the conclusion, that all bodies of matter are formed similar to that of Saturn, unless we have positive proof to the contrary? But it is not in Saturn alone that we find proof of the principles contended for by Captain Symmes. Most, if not all of the other planets, belonging to our system, whose relative situation afford us an opportunity of observation, appear to exhibit strong proofs that the same principles prevail throughout.

The planet Mars exhibits concentric circles round one or the other of his poles, according as either is more or less in opposition to us. These circles appear alternately light and dark, exactly as they should, supposing the planet to be constituted

of concentric spheres (such as Symmes believes of the earth), the light being reflected from their verges on which it falls; and in which case the vacant space between the spheres would necessarily appear dark.

Sometimes he appears to us with a single ring at each pole. At such times his axis is at right angles, or nearly so, with a line drawn from the earth to his center. This, we conceive, can be accounted for by the great refraction occasioned by the increased density of his atmosphere around the poles, which appears to throw out the further sides of the verges so as to make them appear like rings, in the form they present themselves to our view. That such is the natural appearance may be evidenced by taking a small wooden sphere with open poles, and immerse it in a circular glass vessel filled with water; when viewed horizontally through the side of the glass, with the plane of the openings at a right angle with the visual ray, the refraction occasioned by the water, answering to the dense atmosphere of Mars, will apparently throw out the polar openings, and present you with a view, similar to the appearance of Mars, when his axis is at right angles to us.

Our next neighbor, Venus, between us and the sun (though her being between us and the sun prevents us from having so favorable an opportunity of examining her poles as those of Mars, who is our next neighbor on the side opposite the sun), presents appearances at certain times which seem to lead to the conclusion, that she also is constituted of concentric spheres. At times, when this planet is nearly a crescent, we are able to discover a deficient space near the tip of one of her horns. Admitting Venus to be constituted of concentric spheres with open poles; and supposing one of the vacant spaces, between two of her spheres about the polar openings, to traverse her horn or cusp, at the place where the dark space occurs, it would present to us exactly such an appearance as does actually occur.

At other times, one of the horns or cusps of Venus is seen to wind inward as it were into the body of the planets, extending about fifteen degrees further than the other horn This is an appearance which would also be presented, if Venus is formed

according to Symmes' theory. And again, supposing one of her horns to terminate around the verge of a polar opening, in such way as to follow the curve of the verge for some distance (which is of course more curved than the periphery of the planet), and the same appearances, we think, would occur. The axis of the planet not being at right angles with the polar openings, in its revolutions one side of the verge would be thrown much nearer to us than the other; and the different spheres revolving on their axis with different velocities would at different times exhibit to our view the verge of a different sphere.*

The axis of the planet Jupiter is always at right angles with a line drawn to the earth, consequently his poles are never presented to us; but his belts, which we can and do see, seem to speak loudly in favor of a plurality of spheres. The most common appearance of Jupiter is that he is surrounded by four belts, two bright and two dark, alternate to each other. But they are variable, presenting different appearances; at sometimes seven or eight belts are discoverable, at other times they appear interrupted in their length, and to increase and diminish alternately, running into each other, and again to separate into a number of belts of a smaller size. If Jupiter be a solid globe, how is it possible to account for those various changes in his belts, or even for their existence at all? Astronomers, we understand, have heretofore considered the phenomena of Jupiter's belts as altogether unaccountable. If he be a simple plain globe, those belts could not exist; or, if they did, they must forever remain uniform, and not change their size and shape or relative positions in respect to each other; neither could the spots on one belt rotate faster than those on another. But if we adopt the doctrine of concentric spheres, and that this planet is composed of a number of them, we can account at once for

* "Dr. Herschel has observed a faint illumination in the unlighted part of the planet Venus, which he ascribes to some phosphoric quality of its atmosphere." Editor's note to Adams' Philosophy, vol. 4, p. 204, Philadelphia, 1807.

Query—Might not such an appearance be accounted for as rationally, by supposing the rays of the sun to shine or be reflected through one of her polar openings, and to fall on the verge of the sphere at the opposite polar opening?

all the various appearances in a rational manner. The belts would be produced by the shadow cast on the space between the polar opening of one sphere and the adjoining one; that is, a portion of the sunshine would be reflected from the verges of the spheres on which it fell; and another portion would appear to be swallowed by the intervening space. And if refraction bends the rays of vision between and under his spheres, as it bends a portion of the rays of the sun, so as to produce the apparent belts of comparative shade, then a very complete solution of those appearances, heretofore considered wonderful, would be afforded. The variation which has been observed in their number, shape, and dimensions can in no way be better accounted for, than by concluding the planet to be constituted of a number of concentric spheres, of different breadths, revolving on different axis, and with different velocities, so as sometimes to present to our view the verge of one sphere, and sometimes that of another; and the rays of the sun falling on the parts of the verges presented to us would occasion the diversified appearances which we discover. If some sections of both crusts of the spheres be formed of water alone, and become occasionally transparent, it will afford an additional reason for the varying phenomena attendant on these appearances, which may also be increased by alternate regions of water, ice, dry land, and snow.

Modern astronomers have long noticed the spots frequently visible on the sun. They are described as having the appearance of vast holes, or fractures, in his outer surface or crust, through which an inner appears to be seen. This, also, seems to favor the doctrine of different spheres. Notwithstanding the sun revolves very slowly on his axis, it is probable that his poles are open to a greater or less extent; but we can never see into them, owing perhaps to the earth never being very far from the plane of the sun's equator, his being such a vast deal larger than the earth, and the atmosphere surrounding him so extremely luminous.

Very little doubt exists in our mind that the poles of the sun and of Jupiter would appear somewhat like those of Mars, or the rings of Saturn, were it not that the two former never

present their axis, in any perceptible degree, towards us; neither does our satellite, the moon, ever present either of her poles to us: hence, though this may be in some degree open, (notwithstanding her slow rotation) owing to her axis always being nearly at right angles with a line drawn to the earth, we are not able to see whether they are open or not—more especially as her atmosphere is so light and rare as not to produce much refraction. The vast round deep caverns observable on the surface of the moon appear as if they might once have been polar openings; if so, she must frequently have changed her axis.

The spots of light which have at different periods been discovered by astronomers on the surface of the moon, near her poles, when she was on the face of the sun, in an eclipse of that luminary, are perhaps best accounted for by supposing the sun to shine in, either at one of her polar openings or through a cavity on her further side, and appearing to us through one of her annular cavities, on this side, and near her poles. Or the sun being much larger than the moon, and the axis of the moon a little varied from right angles with the earth (or perhaps the low side of the sphere being next to the earth), the sun would shine through an annular cavity or open pole, so as to appear to us as a spot of light on the moon's disk.

The foregoing enumerated astronomical phenomena are some of the facts tending to confirm and elucidate Symmes' theory. They all have been long known to exist; yet we have never heard them accounted for to the satisfaction of our mind. Indeed, we believe some of them never was attempted to be accounted for in any manner whatever. We would, therefore, request the reader, who may deign to give the subject a serious thought, to reflect, that if all the celestial orbs are entire round globes, as the old theory considers them to be, on what principles, or in what manner, could they present the various appearances which we have enumerated? Why should the horns of Venus assume different shapes? What would make the appearance of belts on Jupiter? Or rings and concentric circles at the poles of Mars? And, finally, in what position could a round solid globe be placed to exhibit the rings of Saturn,

revolving with different velocities, as respects each other, and spaces appearing between them and the body of the planet, through which stars, millions of miles beyond, can be distinctly seen? These are phenomena we should like to hear explained. On the principle of concentric spheres they can all be accounted for in a most satisfactory manner. They appear perfectly plain and intelligible. What was thought to be involved in inexplicable mystery and midnight darkness now perfectly accords with the established laws of nature, and can be understood by the most ordinary capacity.

We would now advert to a few of the known terrestrial facts which have a tendency to support the theory advanced by Captain Symmes, such as the migration of animals, including beasts, birds, and fishes, in the arctic regions; and from refraction, and the variation of the compass observed in high northern latitudes.

It is a fact well attested by whalers and fishers in the northern seas, and one that almost every author who adverts to the northern fisheries confirms, that innumerable and almost incredible numbers of whales, mackerel, herring, and other migratory fish, annually come down in the spring season of the year from the arctic seas towards the equator. Some authors describe the shoals of herring alone to be equal in surface to the island of Great Britain. Besides these, innumerable shoals of other fish also come down. These fish, when they first come from the north in the spring, are in their best plight and fattest condition; but as the season advances, and they move on to the southward, they become poor; so much so, that by the time they get on the coast of France or Spain, as fishermen say, they are scarce worth catching.

The history of the migratory fish affords strong grounds to conclude, that the shoals which come from the north are like swarms of bees from the mother hive, never to return; particularly the herring and other small fish. They are not known to return in shoals; and it is doubted by some writers on the subject whether any of them ever return north again, or whether they are not entirely consumed by men and by other fish.

Whalers and other fishermen who go to the north generally prosecute their business in the seas between latitudes sixty and

seventy degrees, where whales are most abundant. Pinkerton, in his voyages, states that the Dutch, who at different periods got detained in the ice and were compelled to winter in high northern latitudes, could find but few fish to subsist on during the winter, which proves that the migrating fish do not winter amongst or on this side of the ice.

All these facts relative to fish appear to be well authenticated. Now, were the earth a compact and solid spheroid, according to the old theory, and were the seas frozen nearly to the bottom at the poles, as we would be led to conclude, where could all those fish, that come down to us every spring, breed? or, if they even all returned in the autumn, and all the north were a sea that did not freeze even to the poles, it would require a great stretch of credulity to imagine where they could obtain food for the winter; or even if their source of food were inexhaustible, could the region of the pole afford space sufficient for their health, so as to migrate south in the spring? If the earth be not hollow (or at least greatly concave about the poles), where could all those fish find room in winter? But on Symmes' plan, admitting the globe to be a hollow sphere, and the inner, or concave part, as habitable as without (at least as habitable for fish), the whole matter is at once explained.

Whales, and various fish, delight in cold regions. According to Symmes' theory, a zone at a short distance beyond the real verge of the sphere (which constitutes the coldest part, or as he has thought proper to term it, "the icy circle,"), commencing at the highest point, in about latitude sixty-eight degrees, in the northern sea, near Norway, thence gradually declining to about latitude fifty degrees in the Pacific Ocean, which is the lowest point, and thence regularly round again to the highest point. A certain distance beyond this, and short of the apparent verge, this zone or icy circle exists, which is believed to be the coldest region of the earth. After passing this, we would advance into the interior of the globe and into a milder clime. In the interior region, it is contended, those immense shoals of fish are propagated and grow which annually come out and afford us such an abundant supply; nor does it appear that the interior parts of the sphere are altogether forsaken by the fish

in summer; for shoals of fat mackerel and herring come down from the north in autumn as well as in the spring.

The seal, another animal found in cold regions, is also said to migrate north twice each year; going once beyond the icy circle to produce their young, and again to complete their growth, always returning remarkably fat—an evidence that they find something more than snow and ice to feed on in the country to which they migrate.

Numerous other facts of importance, relative to the migration of quadrupeds, are well authenticated by travelers and others, particularly that of the reindeer. In Rees's Cyclopedia, under the head "Hudson's Bay," it is stated that the reindeer are seen in the spring season of the year, about the month of March or April, coming down from the north in droves of eight or ten thousand, and that they are known to return northward in the month of October, when the snow becomes deep. Hudson's Bay is situated between sixty and sixty-five degrees north latitude. We are informed by Professor Adams, of St. Petersburg, that on the northern coast of Asia, every autumn the reindeer start northeastwardly from the river Lena, and return again in the spring, in good condition: the mouth of the river Lena is in about latitude seventy degrees north. This appears to us rather a mystery according to the old theory of the earth, for why should those deer, when the cold commences, seek a colder climate and a more sterile country? The inhospitable coast of Siberia and Hudson's Bay, in the gloom of a dark winter, we should suppose would be cold enough, without their seeking to spend the winter among nothing but eternal mountains of ice at the pole, where nature must be robed in snows and crowned with storms.

Hearne, who traveled very high north and northwest on the continent of America, details various facts in his journal which strongly corroborate Symmes' position. Some of the facts he attempts to explain agreeably to his own ideas, and others he considers inexplicable. Among a great collection of facts, he states that large droves of *musk-oxen* abound within the arctic circle, few of which ever come so far south as the Hudson's Bay factories. He mentions seeing, in the course of one day,

several herds of those animals, of seventy or eighty in a herd, in about latitude sixty-eight degrees. He states that the polar white bears are very rarely found by any of the Indians in winter; and that their winter retreats appear to be unknown;* that they are sometimes seen retiring towards the sea on the ice in autumn, and appear again in great numbers in the latter end of March, bringing their young with them.

Hearne also states that the white or arctic foxes are, some years, remarkably plentiful, and always come from the north; that their numbers almost exceed credibility; that it is well known none of them ever migrate again to the northward; and that naturalists are at a loss to know where they originate.† He also mentions that all kinds of game, as well as fish, in those high latitudes, are at some seasons excessively plentiful, and at others extremely scarce.

These facts strongly corroborate the doctrine of a hollow sphere; otherwise, why should the reindeer and other animals migrate north instead of south, as our buffalo on the plains of Missouri do when pressed with snow and cold weather? Instinct generally leads animals to fruitful and productive, rather than unproductive regions; why then proceed north on the approach of winter, unless in expectation of finding a warmer climate, or at least a more mild and plentiful country beyond the icy circle? Independent of the immense droves of reindeer, great numbers of musk-oxen, white bears, and white foxes spend their winters towards the north, which tends to establish the fact that a considerable extent of land must exist in that quarter of the earth. This, however, would infringe on the space necessary to accommodate the vast quantities of fish which appear to be propagated in that region if the old system were true.

If we were to judge of the internal surface of the sphere by its animal production—admitting that those animals heretofore enumerated are propagated there—we should conclude that the internal region of the earth is as much more favorable to the

* Hearne's Journal, pp. 357, 368.

† Hearne's Journal, pp. 364, 365.

support of animal life, as the reindeer is larger than our deer, and the white bear larger than our bear, and, consequently, we must conclude that there are more salubrious climates and better countries within than any we have yet discovered without.

Hearne also informs us that swans, geese, brants, ducks, and other wild water-fowl are so numerous about Hudson's Bay in the spring and summer that the company every season salt up vast quantities of them, sometimes sixty or seventy hogsheads.* He enumerates ten different species of geese, several of which (particularly the snow geese, the blue geese, brent geese, and horned wavey), lay their eggs and raise their young in some country unknown even to the Indians,† as their eggs and young are never seen by them, neither have the most accurate observers been able to discover where they make their winter residence; as it is well known that they do not migrate to the southward, but few of them ever pass to the south, and some of the species are said never to have been seen south of latitude fifty-nine degrees.‡ Most of those fowls molt or shed their feathers in a peculiar manner in summer and become nearly naked. Hence it would seem that they must breed in winter while absent, for it is impossible that they could lay and sit whilst molting, whereas the migratory geese and ducks of this country are not known to shed their feathers in any great degree, and are well known to raise their young in the summer whilst in the north. It may, therefore, be inferred that many of those water-fowls which Hearne describes raise their young beyond the icy circle and within the sphere. As many of the ten species of geese he saw there are unknown further south, it establishes the fact that they do not come to the south to winter.

In the papers of the Honorable D. Barrington and Colonel Beaufoy, on the possibility of approaching the north pole, read before the Royal Society of London, there is an extensive collection of instances cited where navigators have reached high

* Hearne's Journal, p. 442.

† Hearne's Journal, pp. 442, 443, 444, 445, 446.

‡ Ibid, p. 445.

northern latitudes, from which it appears to be well authenticated that navigators have, in numerous instances, reached the latitude of eighty-two, eighty-three, and eighty-four degrees,* and some are said to have sailed as far north as eighty-eight and eighty-nine degrees.† It is almost uniformly stated that in those high latitudes the sea is clear of ice, or nearly so, and the weather moderate.‡ To cite the various instances in which navigators have sailed far north would be too tedious,§ the whole book principally consists of a series of facts which have a strong bearing on the subject, and to which I would refer the reader who feels disposed to investigate. The whole appears to strengthen the opinion that there is a barrier or circle of ice about where the whalers go to fish, but when that is passed we come to an open sea and a more temperate region.

The sea is stated to be open and always clear of ice, even in the middle of winter, on the northern part of Spitzbergen, which is situated in latitude eighty degrees north, and the

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* Barrington and Beaufoy, pp. 21, 51.

† Ibid, pp. 25, 61.

‡ Ibid, pp. 25, 32, 37, 61.

[*From the National Intelligencer of Sept.* 30, 1824.]

§ "POLAR SEAS.—The fact that there are open seas round both the earth's poles has received strong corroboration within the last few months. We have now a letter on our table from a naval officer at Drontheim, who notices the fact that Captain Sabine had good weather and reached eighty degrees and thirty-one minutes north latitude without obstruction from the ice, so that the expedition might easily have proceeded farther had its object so required. We have also had the pleasure to meet recently with a British officer, who, with two vessels under his command, last season penetrated to seventy-four degrees twenty-five minutes south latitude in the antarctic circle, which is about three degrees beyond Cook's utmost limit. There he found the sea perfectly clear of ice, and might have prosecuted his voyage towards the pole if other considerations had permitted. There was no field of ice in sight towards the south, and the water was inhabited by many finned and hump-backed whales—the longitude was between the south Shetland Islands, lately discovered, and Sandwich land—this proves the former to be an Archipelago (as was supposed) and not a continent. The voyage is remarkable as being the utmost south upon record, and we hope to be favored with other particulars of it. At present we have only to add that the variation of the needle was extraordinary, and the more important as they could not readily be explained by the philosophical principles at present maintained on the subject."

Literary Gazette.

further north the more clear it is of ice.* But at the same season on the southern parts of Spitzbergen the sea is bound up with solid and compact ice.

If the doctrine be true that the earth is a solid spheroid, the cold must increase regularly as we approach the pole, and, consequently, vegetation invariably diminish; this, however, is ascertained not to be the fact. Nova-Zembla, which is situated in north latitude seventy-six degrees, produces no timber nor even a blade of grass,† consequently all the quadrupeds which frequent it are foxes and bears, both carniverous animals. On the coast of Greenland, about latitude sixty-five and seventy degrees, neither timber nor grass grows,‡ while on the northern parts of Spitzbergen they have reindeer, which are often exceedingly fat; and Mr. Grey mentions three or four species of plants which grow and flower there during the summer.§

On any meridian passing through England it is ascertained to be more temperate at the latitude of eighty degrees north than at seventy-three degrees,|| and both Pinkerton and Barrington inform us that beyond the latitude of seventy-five degrees the north winds are frequently warm in winter;** that in the middle of winter for several weeks there falls almost continued rain, and that vegetables and animals are more abundant at the latitude of eighty degrees than at seventy-six degrees.

It has long been observed that the climates vary very considerably on the same parallels of latitude. New York, which is situated in latitude forty degrees, is known to be considerably colder in the winter than London, which is situated in latitude fifty-one degrees, and the parallel of latitude forty degrees on the plains of Missouri is much colder than the city of New York. The climate at St. Peters, on the Mississippi, which is in latitude

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* Barrington and Beaufoy, p. 74.

† Purchas, vol. 1, p. 479.

‡ Hearne's Journal, p. 7.

§ Barrington and Beaufoy, p. 36—Dr. Birch's history of the Royal Society, vol. et seq.

|| Bar, p. 101.

** Barrington and Beaufoy, pp. 25, 124.

forty-six degrees, is said to be considerably colder than Quebec.* This difference of climate has, by some, been attempted to be accounted for on the principle that land is colder than water, and that the cold is occasioned by the large portion of land in the continent of America; however, we submit to the consideration of the reader whether so great a difference could arise from a cause of this nature.

In the northern sea, between Spitzbergen and the continent of America, there is a strong current which always comes from the north and sets southwardly.† It has been stated by some that in the spring season of the year the water of this current is warmer and fresher than the surrounding water of the sea. Various other currents have at different times been observed, in different parts of the sea, setting from the north. Floating southwardly on these currents have been seen large masses of ice, from fresh water rivers, with wolves and bears occasionally on them. New fallen trees have also been seen floating from the north, and various kinds of timber, some of which the species have hitherto been unknown, are frequently found lodged on the northern part of the coast of Norway, having drifted from some region still farther north. Trees have also been found floating in the ocean at latitude eighty degrees, when no timber is known to grow north of latitude seventy degrees. Also seeds, unknown to our botanists, and those of tropical plants have been found drifted on the coast of Norway and parts adjacent, many of which were in so fresh a state as to vegetate and grow,‡ when it is well known that no plant of their species comes to perfection in any known climate far without the tropics. And, what makes the matter particularly extraordinary, is that these things appear to be drifted by currents coming from the north, when, according to the old theory, we must believe the sea to be always frozen at the poles, which would render it difficult, if not impossible, to account for the existence of the currents at all.

* At the mouth of St. Peter's River in winter it is as much colder than at Sackel's Harbor as Sackel's Harbor is colder than Mobile, although St. Peter's is west and Mobile south of Sackel's Harbor, at nearly equal distances.

† Barrington and Beaufoy, p. 74—Ross's Voyage, vol. 1, p. 52, London, 1819.

‡ Darwin's Botanic Garden.

In the United States of America and in Europe the Aurora Borealis is always seen to the north. But many of those travelers and navigators who penetrated to high northern latitudes observed the Aurora Borealis in the south, and never in the north. The region in which it is believed to exist is supposed to be about the place where the verge commences, and about fifty or sixty miles above the plane of the earth's surface, and that the travelers who discovered these appearances south of them were at that time beyond the verge.

The Indians discovered by Captain Ross on the coast of Baffin's Bay, in the summer of 1818, in latitude seventy-five degrees fifty-five minutes north, when interrogated from whence they came pointed to the north, where, according to their account, there were "plenty of people;"* that it was a warmer country, and that there was much water there. And when Captain Ross informed them that he came from the contrary direction, pointing to the south, they replied "that could not be, because there was nothing but ice in that direction."† Consequently these people must live in a country not composed of ice, for it appears they deem such an one uninhabitable. Hence we must infer, if the relation given by Captain Ross be correct, that north of where they then were the climate becomes more mild and is habitable, a change, the cause of which is not easily accounted for on the old philosophic principles.

In high northern latitudes, owing to refraction or some other peculiar circumstance which hitherto has not, to our knowledge, been attempted to be accounted for, the extent of vision appears to be greatly increased, so that objects much farther than the ordinary distance are distinctly seen, frequently appearing elevated above the sea or their real situation, and their image sometimes pictured in the sky. The real objects themselves are sometimes seen with the naked eye one hundred and forty or one hundred and fifty miles,‡ and sometimes at the astonishing distance of two hundred miles. These facts are well attested

* Ross's Voyage, vol. 1, p. 175.

† Ross's Voyage, vol. 1, p. 110.

‡ Ross's Voyage, pp. 71, 135, 199, 206.

by Captain Ross and other navigators. How this can be accounted for on the information maintained by the old theory we can not conjecture. We believe it is admitted that the deck of a vessel at sea, anywhere between the equator and latitude fifty or sixty degrees, can not be discovered even by the best telescope at a greater distance than twelve or fifteen miles.* Nay, were there no end to vision and could the eye penetrate two hundred miles through our atmosphere with sufficient clearness, it would require an observer to be elevated about five miles before he could discover an object on the surface of the earth two hundred miles distant. But on the edge of the verge of the polar opening, if the atmosphere were clear and the power of vision strong enough, an observer might discover objects situated on the verge at any point all around the sphere, as they would be on an exact plane with the observer. And, on the contrary, traveling across the verge from the convexity to the concavity of the sphere a very few miles makes objects disappear.

All northern navigators and travelers agree that high north the sun becomes less bright and the sky darker than in more southern latitudes. Is not this owing to the rays of the sun being refracted round the verge of the polar opening? Another circumstance observed by navigators who have visited high latitudes is that the latitude and longitude, as found by celestial observations, frequently differ very materially, sometimes as much as one-half from that given by the log-line.† It has also been observed that the mercury in the barometer is less fluctuating in northern regions than it is further south.

Those appearances observed in the southern hemisphere, which are termed Magellanic clouds by navigators, have not, so far as we know, been accounted for. They are three in number, of an irregular shape, and observed by night in the South Atlantic and the southeast parts of the Pacific oceans (reversed from New Holland and New Zealand), but never visible in the eastern parts of the Indian Ocean; their color is like that of

* Mackenzie states "that sometimes the land *looms* so that there may be a great deception in the distances."—Mackenzie's Voyage, p. 11, New York, 1802.

† Ross's Voyage, vol. 2, p. 4, London, 1819.

far distant mountains on which the sun is shining. In the one sea they appear due south, and in the other to the left. They are stationary, appearing perpetually fixed at a certain height and in a particular situation as viewed from any given place. The stars and the heavens, in their diurnal revolutions, sweep by them and they remain the same. To the navigator who proceeds to the east or west they appear to be more or less to the right or left of the meridian, in proportion as he changes his longitude, and as he sails south they increase in height until they reach the zenith, and finally become north when seen by an observer south of the straits of Magellan, which is in latitude fifty-two degrees south. Captain Symmes accounts for the appearance of these clouds by the great refractive power of the amosphere about the polar openings, causing the opposite side of the verge to be pictured in the sky, as navigators informs us objects do sometimes appear in the arctic regions; and in the manner Scoresby's ship appeared in the sky, with every particular about her so accurately represented as to be at once identified by the observers, though the vessel at that time was at such a distance as to render it rather incredible how she could be seen at all. As proof of this position, Captain Symmes alleges that the relative position, shape, and proportions of these clouds agree in their general outlines with the southern part of New Zealand, the southeast part of New Holland, and the whole of Van Dieman's Land, which are situated on and near to the verge of the sphere, opposite to where the clouds are visible. These clouds are only seen in the night when the atmosphere is clear, at which time the sun is shining on the islands in question. Hence it is alleged that from these facts their relative appearance is deducible. As we are never sensible that the rays of light are refracted by the medium through which they pass before they reach our visual organs, we frequently imagine objects to be situated where they really are not, and such is believed to be the case as respects Van Dieman's and the circumjacent land as before described.

Franklin, in his journey far north on the continent of America, discovered a cloud which appeared to remain always in the same position, and which the Indians informed him was

permanent. Not having the book at hand, we can not now advert particularly to what he says on the subject, but, from memory only, recollect that he states something to that effect. If such an appearance exist there, may it not be accounted for in the same manner as the Magellanic clouds?

Navigators who have sailed far north admit the variation of the needle to be excessive. Captain Ross found it in Baffin's Bay to be as much as one hundred and ten degrees; and Parry, during his voyage in 1822, found it so changed that the needle pointed within about fourteen degrees of south. All, we believe, concur that this is a phenomenon which universally occurs in high northern latitudes, but it has hitherto remained unexplained. We believe, according to the old theory, the needle is imagined to be attracted by something at or near the pole; were this supposition correct, the needle would uniformly maintain its polarity on proceeding north on any given meridian until you arrived at the very pole itself. The possibility of a moving magnetic cause is difficult, if not impossible, to be reconciled with a solid globe; yet that the magnetic needle does vary on the same meridian, and to a most extraordinary degree in high northern latitudes, is confirmed beyond all doubt. Why not then urge the variableness of the magnetic cause against the possibility of a solid globe?

According to the doctrine of hollow spheres this whole mystery of the variation of the compass can be satisfactorily explained. The magnetic needle, it is believed, regards the center of the polar opening, and not the pole or axis of the earth. It will be recollected that the axis of the earth being at an angle of twelve or fifteen degrees from the plane of the polar openings causes one part of the verge to extend farther north than the other, the highest part of which is nearly on a meridian running through Spitzbergen, in about latitude sixty-eight degrees, and the lowermost side in about the fiftieth degree. Now, in proceeding north on the first meridian running near Spitzbergen, there ought to be no variation of the needle until you arrive at the apparent verge, when the needle would cease to traverse, and by proceeding onward would turn and point south. Should you proceed north on a meridian

west of this, when you approached the apparent verge the needle would seem to turn west, but, in reality, it would be the meridian turning to the right along the verge to its highest or most northerly point, the needle keeping at a right angle with the verge. And, in like manner, pursuing a course north on a meridian east of Spitzbergen, on your approach to the apparent verge the needle would still direct its course at a right angle into the polar opening (governed most probably by some principle of electricity or other property contained in matter and kept in one position, subject to the shape of the earth, which may not even yet be exactly known), the meridian would here wind to the left and conduct you to the highest point of the apparent verge north of Spitzbergen. Hence the variation of the needle would be east in Asia and west in America, which we are told is the fact. From an examination of the variation of the compass, as ascertained in different degrees of latitude and longitude, it increases as you proceed north and west, which would be exactly the case in accordance with the theory of concentric spheres.*

Admitting the earth to be a solid globe, and the cause of magnetism to be some attractive power at the pole, how could the needle vary differently on the same meridian in different latitudes at the same period of time, or vary at the same place at different periods of time? But, admit the doctrine contended for by the advocates of concentric spheres, and it can be satisfactorily explained. The observations of modern astronomers have ascertained that the poles or axis of the earth are not always directed to the same fixed star, and, of consequence, that the axis does not always remain parallel to itself. This variation is discovered to be about fifty-one minutes annually, which would make a degree in about seventy-one years; hence the needle always pointing to the polar opening would vary in about that proportion at the same place in the same period of time.†

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* Ross's Voyage, vol. 2, p. 119.

† Physical World, p. 72.

According to the Symmes theory, each sphere has an intermediate cavity or *mid-plane-space* of considerable extent situated between the convex and concave surfaces of the sphere, filled with a very light and elastic fluid, rarified in proportion to the gravity or condensing power of the exposed surfaces of the respective spheres; and also various other less cavities or spaces between the larger or principle one, and the outer and inner surfaces of the spheres, each filled with a similar fluid or gas, most probably partaking much of the nature of hydrogen. This fluid is lighter than that in which the sphere floats, and has a tendency to poise it in universal space. The spheres, in many parts of the unfathomable ocean, are believed to be water quite through from the concave or convex surfaces to the great mid-plane space, and probably the earthy or solid matter of the sphere may in many places extend quite through from one surface to the other, tending like ribs or braces to support the sphere in its proper form. Such a formation of spheres appears to be supported by various facts and phenomena, amongst the most prominent of which are volcanoes and earthquakes. Many volcanic mountains burst out and burn for ages, discharging from the bowels of the earth immense quantities of lava, pumice, and vitrious substances of various kinds. Some of these mountains have been burning for thousands of years, at least as far back as the records of history have been made known to us.

Had the earth at its formation been a solid globe four times as hard as hammered iron at the center, and gradually lessening in density towards the surface, we must admit that it would still be solid matter. Governing ourselves by these principles, how can we imagine that such immense caverns, filled with combustible matter as would be necessary to supply those volcanoes from time immemorial, could have existed? However, that they do exist is certain, which we think is in no way more easily accounted for than on the plan of a *mid-plane-space*, or of spaces filled with a certain hydrogenous gas, which being much lighter than atmospheric air, if there should be any small aperture or crevice extending from the surface to the space beneath, the gravity of the outer part of the sphere pressing on it would

occasion a portion of this gas to escape through the aperture, and as it comes in contact with the oxygen of the atmosphere would take fire and occasion those tremendous explosions which we know do sometimes take place and cause those mountains to burn for years, until the cavity which supplied the volcanic matter becomes exhausted, or until some shock or convulsion consequent on the burning may have loosened rocks or earth of the denser part of the sphere, which, falling into the aperture, choke it up. Hence, the gas ceasing to escape, the volcano would cease to burn until some shock or accident should again open the aperture.

The elastic fluid with which the *mid-plane* cavities are filled being forced out into the common atmosphere, the greater degree of gravity would condense and set free its latent heat or caloric and be resolved into its original base, somewhat as coal gas out of the tube of a gas-light apparatus yields up its latent heat by condensation. Hence steam burns when mixed with coal-gas.

If the earth be a solid globe, we are at a loss to account for the cause of earthquakes. Long before the promulgation of Symmes' theory, or perhaps before it had an existence in the mind of man, when reading accounts of earthquakes it appeared to us altogether unaccountable that such violent concussions could take place in one part of the world and not be felt throughout the globe. It appears altogether inconsistent that one part of a solid piece of matter would be shaken so violently without affecting the whole mass. We are informed by authentic history that whole islands and vast sections of country have been sunk by earthquakes and never more heard of. On the other hand, islands which are now inhabited and productive have been raised apparently from the bottom of the unfathomable ocean. How such things occur we are unable to divine. If the globe be solid, on what principle could a large portion of its surface, which is said to be lighter than the parts beneath, sink into a dense medium? How could a heavy mass, lying a thousand fathoms deep at the bottom of the ocean, rise and be suddenly elevated above the surface of the water, when all below is so compact and governed by an opposite and immutable tendency? It appears to be a solecism in nature.

We have had detailed to us the effects of earthquakes from the lips of an eye witness. He was in the neighborhood of New Madrid, on the Mississippi River, in the year 1812, at the time when that country was so violently convulsed with an earthquake. He saw and heard innumerable explosions, as though a large quantity of air had been confined in the bowels of the earth, and, seeking vent, rushed out with a tremendous sound, forcing up considerable quantities of sand through the apertures, in many instances mixed with black muddy water and a substance resembling stone coal or carbonated wood, which emitted a strong bituminous odor when exposed to fire.

At one place the river was stopped in its course a short time, the water rose to a considerable height above its common level, and on the west side of the channel of the river there was a counter-current for a few minutes of an astonishing velocity. So great was its force that for some distance the cotton wood and willows on the margin of the river were either prostrated or bent up the stream, and their branches looked as if they had been dragged a long way on the ground. The waters of the river soon subsided and flowed in their natural direction.

So tremendous were those explosions that when happening under large trees the tenacity of their texture yielded at once to their force, and the largest in the forest were split and fractured from root to top. During these convulsions the ground on which the town of New Madrid is situated, together with the country for several miles round, sunk about five feet below its former elevation, in which situation it has remained. Eight years afterwards the narrator was again on the same spot. The desolate aspect which the country presented at the time he witnessed those scenes was measurably obliterated, but the banks of the river were still in their sunken situation.

How could all those violent convulsions take place at this point and not be felt at New Orleans, along the sea coast of the United States, and other places? Whence came this water and air which issued from those apertures in the earth? And why did the river for a few minutes flow in a contrary direction and then resume its natural course? If the earth be a compact and solid globe we can account for none of these things; but, ad-

mitting the formation of the sphere to be such as we contend for, they are all resolved into the most simple principles, and what would otherwise be impenetrable mystery is made as plain as noon-day. If the sphere be formed as we allege, those concussions were doubtless occasioned by the gas or fluid in the *mid-plane* or some intermediate space near the surface, which, by being suddenly rarified, would make it expand and cause the upper part of the sphere to be suddenly elevated in the neighborhood of the Little Prairie, and hence the waters of the river, pursuing the laws of gravity, would flow in a contrary direction. This sudden expansion and elevation of the surface would cause apertures through which the rare gas would escape, and the surface would then settle down again, not only to its former level, but, as a considerable portion of this gas had escaped, the remaining part would occupy less space; hence the surface of the country around New Madrid would be below its former situation.*

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* EARTHQUAKES.—M. Biot, after detailing the phenomena of the earthquake on the 22d of February, 1822, concludes an interesting paper with these observations:

"In the infancy of chemistry and natural philosophy it was imagined that earthquakes might be easily explained; in proportion as these sciences have become more correct and more profound this confidence has decreased. But, by a propensity for which the character of the human mind sufficiently accounts, all the new physical agents which have been successively discovered, such as electricity, magnetism, the inflammation of gases, the decomposition and recomposition of water, have been maintained in theories as the causes of the great phenomena of nature. Now, all these conjectures seem to be insufficient to explain convulsions so extensively produced at the same time over such large portions of the earth as those which take place during earthquakes. The most probable opinion, the only one which seems to us to reconcile, in a certain degree, the energy, the extent of these phenomena, and often their frightful correspondence in the most distant countries of the globe, would be to suppose, conformably to many other physical indications, that the solid surface on which we live is but of inconsiderable thickness in comparison with the semi-diameter of the terrestrial globe, is in some measure only a recent shell covering a liquid nucleus, perhaps still in a state of ignition, in which great chemical or physical phenomena operating at intervals cause those agitations which are transmitted to us. The countries where the superficial crust is less thick or less strong, more recently or more imperfectly consolidated, would, agreeably to this hypothesis, be those the most liable to be convulsed and broken by the violence of these internal explosions. Now, if we compare together the experiments on the length of the pendulum, which have been made for some years past with great accuracy, from the north of Scotland to the

The fluid or gas which fills the mid-plane and intermediate cavities is most probably the same, or partaking of the same nature (though perhaps in a purer state), with that which oozes out of fissures in the earth at the bottom of deep mines, called by chemists *hydro-carbonate*, which, being highly inflammable, takes fire from the lamps used by workmen and explodes with such violence as to destroy both men and horses employed in the mine. This is a frequent occurrence in the deep coal mines of England, and great numbers annually have lost their lives in this way before the introduction of Sir Humphrey Davy's lamp. We are also informed, from good authority, that the miners in some of the deep coal mines in England once felt or heard an earthquake which happened in Italy whilst those on the surface of the ground had no knowledge of it. This would be the case if the intermediate cavities which causes the earthquake extended in that direction and near the bottom of the mine, as it is presumed the rare gas with which those spaces are filled is better adapted to the conveyance of sound or vibratory motion than the more solid parts of the sphere, or even the atmosphere around us.

On the supposition that the globe is solid, and the matter composing it at rest, as repects itself, on what principle can boiling and hot springs be accounted for? some of which issue out several thousands of miles distant from where any volcano or subterranean fire is known to exist, particularly as to those on the waters of Red River, in the State of Louisiana, which are sufficiently hot to cook meat in a few minutes.

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south of Spain, we readily perceive that the intensity of gravitation decreases on this space as we go from the pole towards the equator more rapidly than it ought to do upon an ellipsoid, the concentric and similar strata of which should have equal densities at equal depths, and the deviation is especially sensible about the middle of France, where, too, there has been observed a striking irregularity in the length of the degrees of the earth. This local decrease of gravity in these countries should seem to indicate, with some probability, that the strata near the surface must be less dense there than elsewhere, and perhaps have in their interior immense cavities. This would account for the existence of the numerous volcanos of which these strata show the traces, and explain why they are even now at intervals the focus of subterraneous convulsions.

Phenomena which occur in various lakes in Europe may be adverted to in support of this theory. The waters of Lake Zirchnitzer, in the Dutchy of Carniola, in Germany, flow off and leave the basin empty, and again fill it in an extraordinary and impetuous manner, bringing up with its waters fish and even sometimes wild water fowls.* In the same country there is a subterranean lake in the Grotto Podspetschio of considerable extent. The whole of this vast body of water at certain times will disappear in a few minutes and leave the basin dry, and after a few weeks it again suddenly returns with a frightful noise. The Lake Geneva, and some others in Switzerland, at certain times rise and fall several feet without any cause which has as yet been satisfactorily explained, and some writers inform us that those lakes, particularly Geneva, send forth at times a grumbling noise. In the Saian mountains, near the source of the Yenisei, is a lake called Boulamy-Koul, which at the approach of winter emits strange sounds, somewhat similar to those which precede the eruption of a volcano, and which are compared by the neighboring inhabitants to howling. The inhabitants on the borders of Baikal also state that they have often heard dreadful and terrific howlings proceed from that lake.† The Lake Agnano, in Italy, sometimes, especially when the waters are high, appears to boil at its borders. This ebullition is supposed to be occasioned by some gaseous fluids discharged into the bottom which traverse the waters of the lake.† These various phenomena, which can not be easily accounted for, might be best explained, perhaps, on the principles of *mid-plane-spaces*. In various parts of the north thick strata of ice are found under a thick soil, and on icebergs floating in the ocean have been discovered masses of earth, granite, and other rocks.‡

On the shores of Greenland the ebb tide flows towards the coast, apparently as though it passes under the land, and the flood tide recedes from the shore, and in those regions the sea

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*Cook's Geography, vol. 2, p. 250—Also Rees's Cyclopedia, article Lake.

†Rees's Cyclopedia, article Lake Geneva.

‡Ross's Voyage, vol. 1, p. 225.

is almost universally found deeper as you approach the shore.* When the whales become scarce experience has taught the whalers to seek for them near the shore, as if at certain seasons they retired to it and then disappeared. Captain Symmes imagines that the sea extends quite through the spheres about Greenland, and that the whales suddenly migrate either to the *mid-plane-space* or to the seas at the opposite side, which he alleges to be the case with several other species of fish as well as seals, all of which he supposes breed in the *mid-plane-space*. The reasons that induce him to adopt this conclusion are various, such as, that fish have been thrown up by the eruption of a volcano in South America†—herring appearing in such immense numbers at certain seasons of the year—the whales seeming to pass under Greenland—two seals having been once caught in Lake Ontario, which is said to be unfathomable, although this lake is many degrees south of where the seals have ever before been known to come—and the various species of fish in our northern lakes which appear and disappear at certain periods. That the exterior seas in some places communicate with the interior seas is rendered probable by various other circumstances, such as currents running continually into the Mediterranean and no visible outlet to the water thus continually flowing in. It is scarcely probable that evaporation could carry off all the water supplied by the straits of Gibraltar—the white sea being more salt at the head than at the foot—the tides being higher in the Baltic than the Mediterranean—white foxes having been forced up by the waters of the sea (as Symmes undertakes to prove) in the northern regions—the peculiarities of the tremendous whirlpool on the coast of Norway called the Maalstroom, which sucks in and discharges the waters of the sea with great violence—and those observable in the Bay of Biscay, which are said to be unfathomable.

Further proof and confirmation of the Symmes theory is to be found in the report of Dr. Kane's expedition during the years 1853, 1854, and 1855, which, besides confirming the

* Ibid, vol. 1, p. 144.

† Humboldt.

truth of former expeditions as to milder climate beyond the arctic circle, and the presence of animals and fowls in those high northern latitudes, makes known the discovery of an *open polar sea* as a fact beyond question. The warmth of the climate, the temperature of the water, and the presence of rain clouds, to say nothing of the presence of plants, fowls, and animals, are such strong arguments of the truth of the Symmes hypothesis that we give the report of the discovery of the open polar sea in the words of Mr. Morton himself:

"June 4.—I left the vessel at 4 P. M. in company with the party of Messrs. McGary and Bonsall, and arrived at Cache Island on the 14th. The details of this journey are fully given in Mr. Bonsall's report.

"I remained at this place with Messrs. McGary and Bonsall's party, waiting for Hans, who arrived with the dog-sledge two days later.

"June 18.—Allowing twenty-four hours' rest for Hans and the dogs, we set out at 0:30 A. M. in company with the other party, with whom we were forced to travel a mile on their way to the west, in order to avoid some cracks and openings in the ice near the glacier.

"After leaving them we pursued a northerly course nearly parallel with the glacier, and from five to seven miles distant from it, according to the condition of the ice.

"The snow was deep and free from hummocks; but, as the traveling was very heavy, we averaged only about three and a half miles per hours, which, in a continued journey of seven and a half hours, made our total distance but little more than twenty-six miles.

"The appearance of the glacier is accurately described in Mr. Bonsall's report.

"When about twelve miles out I took a back-bearing to Cache Island, and found it N. 284° E. magn. (N. 176° E. true.) We encamped at 8 A. M., our course having been N. 103° E. magn. (N. 5° W. true.) A back-bearing from the camp to Cache Island gave N. 285° E. magn. (N. 177° E. true.)

"We started again at 9:30 P. M., and halted at midnight in order to take observations.

"June 19.—We resumed our journey at 1 A. M. During three successive hours the traveling was very heavy; the sledge would sometimes be buried in the snow, notwithstanding all our exertions to prevent it. Afterwards the traveling became better, and we moved off at the rate of four miles per hour until 4:20 A. M., when we were suddenly checked by meeting the barrier of icebergs mentioned by Mr. Bonsall in his journey in September, 1853. The icebergs and hummocks were so close together that we could not see one hundred yards in any direction. We pursued a westerly course about five miles along the edge of the hummocks and icebergs, when we discovered an opening between them, which we entered, and after a short circuitous route struck again on the right course. We halted at 5:45 A. M., and after supper climbed a high iceberg to select our course for the next day. From this point I discovered some rocks projecting from the face of the glacier, and also some hills on its surface. The sun was so much obscured that I could not obtain a solar bearing.

"At 10:30 P. M. we resumed our journey, our course being N. 76° E. magn. (N. 32° W. true), but at the end of three miles our progress was arrested by icebergs, hummocks, and cracks. We therefore were forced to retrace our steps, and at midnight arrived again at our last encampment. We then followed a westerly course, and four miles brought us to a group of icebergs, between which we found great difficulty in making our way, having to ferry ourselves occasionally over the numerous lanes of water, or to make bridges over them from the floe-pieces which were piled up in hummocks on the edges of the cracks.

"June 20.—We succeeded in getting through the bergs by 2:30 A. M. Hans shot a dovekie in one of the cracks. At the same time we first sighted the west land with three prominent capes. We soon got on better ice than we had yet passed over, and made good headway to the N. and E. to within twelve miles of the glacier and about forty miles of the west shore.

"The level surface of the glacier was interrupted by rocks and landhills, excepting which, the back ground was nothing but snow or glacier. The land becomes continuous to the N.,

and has an appearance similar to the hills west of our winter quarters, only the debris is comparatively not so high.

"No seals were seen during the two preceding days, but to-day we saw several, and three dovekies. We encamped at 7:20 A. M., and at 11:20 P. M. started again and stood for a point of land which I supposed to be a cape, as there was a vacancy between it and the west land. The ice was good and free from bergs, only two or three in sight.

"The weather became very thick and misty. We suffered from cold, a strong N.E. wind blowing off the glacier at the time. Temp. +20°. The west land which I saw faintly yesterday was soon obscured, and the cape for which I stood vanished from our view, only a small portion of the east shore remaining faintly visible. I steered my course entirely by bearings of the cape which I took yesterday.

"June 21.—At 7 A. M. we reached the mouth of a channel having to the northward and westward a fine headland. Here stretching ahead we found open water, and before I was aware of it we had gone some distance on rotten ice, which was so weak that we could not get within a mile and a half of the open water. My first intention was to go up the channel on the ice, but the water prevented it. We retraced our steps carefully, calling the dogs after us, as they were very much frightened. Birds, apparently ducks, were seen in great numbers flying over the open water.

"On reaching the safe ice we traveled in an easterly direction, standing for the cape on the east side of the channel, and halted a mile from it at 7:40 A. M.

"After supper, or more properly breakfast, I went to the cape, and around it at the distance of four miles from our camp. The temperature of the water was +40°. I found it would be difficult to pass the cape with a sledge, as the ice-foot was scarcely broad enough; but beyond the cape the ice-foot became better, and would apparently afford good traveling. We returned, fed the dogs, and turned in, after taking a meridian-altitude of the sun.

"We started at 11:30 P. M. One of us climbed up the ice-

belt, while the other handed up the dogs and provisions, making a ladder of the sledge. While here we saw a large flock of geese.

"We then prepared for a journey up the channel, by making a cache of half our provisions, which would be enough to take us to the vessel on our return. It was very difficult to get around the cape, as the ice-foot was nearly all worn away, and the cliffs were very steep. This caused me to reflect what could be done in case the narrow ice-foot should be washed away before my return. I observed a ledge on the face of the cliffs about seventy feet above the ice-belt, over which I could escape myself, and leave the dogs and sledge behind.

"We put the sledge on one runner, and thus passed around the most narrow part of the ice-foot. The water under us was very deep and transparent. Its temperature was 36° close alongside of the ice-foot, but in a rapid tideway. We here lost our thermometer.

"June 22.—At 0:30 A. M. we got around the cape and found good traveling; we went freely at the rate of six miles per hour. After passing three or four bluffs with small inlets, we got beyond the cliffs, where a low country opened on us. Here we saw nine seals in a small bay.

"The land-ice across this shallow bay or inlet extended in some places two miles from the water's edge, where piles of gravel were formed, so that the sledge was drawn between hummocks of gravel. On account of this broad land-ice we were enabled, in some places, to make a short cut, instead of following all the indentations of the coast. About two miles in-shore were cliffs which appeared perpendicular, and not unlike the broken walls of houses. About midnight I observed pieces of ice moving up the channel, toward the north, at the rate of four knots per hour; and now when we are encamping they are moving down the channel at the same rate.

"The ice here is entirely broken up, and the channel is navigable for vessels of any size. Eider-ducks are so numerous that Hans killed two at one shot. Large flocks of geese are flying in-shore and up the channel, and the rocks are covered with tern, who are now breeding. Dovekies are very num-

erous, and ivory-gulls and burgomasters have made their appearance.

"We have traveled fifty miles to-day, and must be forty-five miles up the channel. It has been very cold, and so cloudy that I have not been able to see the sun since I entered the channel, which runs north (true) and seems to be about thirty-five miles wide. The opposite (western) shore runs apparently in a straight line, and is very high; the mountains, having a form resembling a sugar-loaf, extend far back in the interior. This coast-line is interrupted by only two bays.

"June 23.—In consequence of a gale, we did not start until 0:30 A. M. After traveling about six miles we were arrested by floe ice in an inlet, which was pressed over the land-ice against the mountains to the height of one hundred feet. Beyond this there was no ice-belt. We secured the dogs and left the sledge, as it would be impossible to transport them over these hummocks, which we succeeded in ourselves crossing with great difficulty. Our object was to ascertain the state of the traveling on the other side. We found it worse, with few landing-places, the cliffs overhanging the water and broken masses of ice. On these we ferried ourselves over to such pieces of ice as were attached to the coast. In this manner we traveled about four miles and returned, after sighting a high cape on the north side of a bay before us, opposite to which lay an island. On reaching the sledge we made ourselves as comfortable as possible, and resolved to go on to-morrow without it. Here the ducks were less numerous, but gulls were seen in numbers.

"June 24.—We started on foot at 3 A. M., taking with us a small stock of provisions. We found great difficulty in crossing some places, where, in the absence of land-ice, we were forced to crawl over the rocks, or get on loose floating pieces of ice and jump from one to another, or else ferry ourselves until we could again reach the land.

"When about nine miles on our way to-day, we saw a bear with a young one at a short distance from us. Five of our dogs had followed us, and, seing the bear, gave chase to it. The bear ran a considerable distance in-shore. The young one,

which could not move fast enough, was pushed ahead by the old one, which sometimes turned round and faced the dogs in order to enable the little one to gain ground. Finally she stopped, and, taking the cub between her fore-legs, guarded it, and at the same time kept the dogs at a distance. She would sometimes make a jump at them, but always kept her eye on the little one, and never left it unprotected. She was thus fighting them off when we came up, and Hans shot her dead and then killed the cub. We skinned both of them, and gave the old one to the dogs, but cached the young one, to be eaten on our return. The skins we wished to take with us to the ship. We found at this place the runner of an esquimaux sledge. Many small pieces of willow, about an inch and a half in diameter, had drifted up the eastern slope of this bay. Much grass was seen, as well as many plants, all of which I have reported to Dr. Kane. We had wood enough, including the sledge-runner, to cook a large part of the bear.

"After this delay we started in the hope of being able to reach the cape to the north of us. At the very lower end of the bay there was still a little old fast ice, over which we went without following the curve of the bay up the fiord, which shortened our distance considerably. Hans became tired, and I sent him more inland, where the traveling was less laborious. As I proceeded toward the cape ahead of me the water came again close in-shore. I endeavored to reach it, but found this extremely difficult, as there were piles of broken rocks rising on the cliffs, in many places to the height of one hundred feet. The cliffs above these were perpendicular, and nearly two thousand feet high. I climbed over the rubbish; but beyond it the sea was washing the foot of the cliffs, and, as there were no ledges, it was impossible for me to advance another foot. I was much disappointed, because one hour's travel would have brought me round the cape. The knob to which I climbed was over five hundred feet in height, and from it there was not a speck of ice to be seen. As far as I could discern, the sea was open, a swell coming in from the northward and running cross-wise, as if with a small eastern set. The wind was due N.—enough of it to make white caps—and the surf broke in on the

rocks below in regular breakers. The sky to the N.W. was of dark rain-cloud, the first that I had seen since the brig was frozen up. Ivory-gulls were nesting in the rocks above me, and out to sea were molle-moke and silver-backed gulls. The ducks had not been seen N. of the first island of the channel, but petrel and gulls hung about the waves near the coast.

"June 25.—As it was impossible to get around the cape, I retraced my steps and soon came up to Hans, who had remained a short distance behind.

"When we returned to the spot where the bears were killed the dogs had another feed; they had not followed us any farther, but remained near the carcass of the bear. Three of them lying down, having eaten so much they were unable to run.

"After a difficult passage around the southern cape of the bay we arrived at our camp, where we had left the sledge at 5 P. M., having been absent thirty-six hours, during which time we had traveled twenty miles due north of it.

"June 26.—Before starting I took a meridian-altitude of the sun (this being the highest northern point I obtained it except one, as, during the last two days, the weather had been cloudy, with a gale blowing from the north), and then set off at 4 P. M. on our return down the channel to the south.

"I can not imagine what becomes of the ice. A strong current sets it almost constantly to the south; but, from altitudes of more than five hundred feet, I saw only narrow strips of ice with great spaces of open water, from ten to fifteen miles in breadth, between them. It must therefore either go to an open space in the north or dissolve. The tides in-shore seemed to make both north and south, but the tide from northward ran seven hours, and there was no slack-water. The wind blew heavily down the channel from the open water, and had been freshening since yesterday nearly to a gale, but it brought no ice with it.

"To-day we again reached the entering cape of the channel, and camped at the place where we deposited half of our provisions on our journey to the north. I here found the thermometer which I had lost on the 21st. The water, five feet

deep, taken from a rock, gave +40°, the tide setting from northward. The air in the shade was +34°.

"June 27.—We started at 2 P. M. and traveled four hours, but the snow was so soft, in consequence of the warm sun, that we made slow progress. We camped at 6 P. M., intending to commence our night-traveling again.

"June 28.—We started at 2 A. M., and traveled along the land in order to discover more accurately where the glacier joins it. About thirty miles from the entrance of the channel it overlaps the land, which here becomes gradually lower. This land is of low round knobs, about eight hundred feet high.

"Two large cracks running east and west caused us some delay. We had to go a great distance to the west near one of them, until we found a loose piece in it large enough to ferry ourselves and the sledge over. A great number of seals were around the cracks. We halted at 9:45 A. M. opposite the place where the land and glacier unite.

"June 29.—We started at 0:40 A. M., and went to the south between the icebergs. We were detained by two cracks which we met with to-day. We saw the west shore to the south-of-west from us, which, as far as the eye could reach, did not appear to alter its trend

"June 30.—We started at 1:40 A. M., and soon got clear of the icebergs. We found better traveling-ice; but the snow was soft, and melting very fast. In a few days more it will be impossible to travel here.

"This morning we sighted Cache Island, and shaped our course for Sunny Gorge. I saw the western shore to-day and think it was about sixty miles distant.

"July 1.—We started at 2:30 A. M. The traveling to-day was very heavy, the snow being so soft that we sometimes sank to our knees in water, yet we got along safely. A great number of seals were on the ice, and the west shore in sight.

"July 2.—We started at 0:30 A. M., and traveled fast toward Sunny Gorge. The places between the old hummocks were filled with water. The dogs were sometimes actually swimming and the sledge floating. At 8 A. M. we halted, being very much exhausted; we gave the dogs half feed. After a short rest we

started again at 1 P. M., and reached the belt at 2:30 P. M. This belt-ice was firm and solid, twenty paces wide and eighteen feet thick. We reached Sunny Gorge at 3:40 P. M., where we encamped.

"July 3.—We started at 4:40 A. M., and traveled along the land-ice, which, in some places, is completely overflowed by water falling in cascades and torrents from the tops of the cliffs. It has already made trenches for itself in some places by cutting the land-ice completely through down to the gravel.

"When we passed Cape George Russell I saw the alcohol-keg sticking out of the land-ice, and tried to get it, but this was impossible. I then made a hole in it and tasted the contents, but found the alcohol much diluted by snow-water. The dogs' feet were considerably cut by the honey-combed ice. We camped near Chimney Rock at 11 A. M.

"We started again at 7 P. M. and crossed Marshall Bay, which was covered with water. Minturn River had made for itself a channel more than one hundred yards wide, over which we ferried ourselves, sledge, and dogs on a large loose piece of ice. To the west of Marshall Bay a torrent of water came down every ravine, which obliged us to go off the ice-foot and on the floe around it.

"July 4.—At 7 A. M. we arrived at the brig, after an absence of thirty days."

AURORA BOREALIS.

There is another subject that goes far to prove the existence of a beautiful world in the interior of the spherical shell which we inhabit, and that is the Aurora Borealis.

The brilliant displays of auroral lights that are frequently beheld emanating from the arctic circle have thus far baffled all attempts of scientific minds to unfold their mysteries, and these phenomena remain to-day, as they ever have, entirely inexplicable.

Although they sometimes light up a great portion of the northern hemisphere with unequaled beauty and grandeur by their softened, mellow scintillations, yet all the causes that

produce their glories are shrouded and concealed from the minds of men in the darkness of Egyptian night.

Very many observations have been made by men of learning in order to penetrate this mystery, but as yet they have resulted in very little that would explain the philosophy of the Aurora Borealis.

The old time theory is that it is caused by electricity. But Doctor Bissels, one of Captain Hall's scientific corps, beheld it in all its glory, and could detect but a particle of electricity in the atmosphere by the aid of instruments.

It will be remembered that its appearance is almost universally at night, and very seldom when the sun is shining, as the sun's influence seems to be more powerful upon our earth than the elements that produce the Aurora.

The auroral element, when in activity, displays a softened and mellow light, but always in the extreme north—even upon the exterior surface of the globe—one that at times is entirely sufficient for practical purposes; and it is our honest conviction that an exploration of the grand interior, where this kind of light universally prevails, would give us a lucid explanation of the whole subject of auroral phenomena.

If the auroral light has no connection with the *interior world*, how strange that it should occur at the *poles*, the natural center of extreme cold, where the least possible amount of solar influence can be exerted, and the only portion of our globe where possibly can be found accessible apertures that would connect the two surfaces; and how singular that such lights should exhibit themselves in their greatest glory in the absence of the sun and always under an arch. We venture the opinion, based upon analogical reasoning, that the *interior* surface of our globe is already unfolded to a condition quite as high as the exterior of the outer independent planets—that beautiful auroral and magnetic lights and genial warmth are all produced by the more advanced inherent powers existing within this shell, and that the auroral *polar lights* are, to a great extent, generated by powers and elements that *exist in* and emanate from the *interior world.*

If there was no such beautifully unfolded *inner world* connected with the *polar regions*, upon which the sun's rays enter from the *south polar opening*, and reflect and refract, then there would be no such grand illuminations thrown out in the north to awaken the sublimest emotions in the mind of every beholder.

Reason, common sense, and all the analogies in the natural universe, conspire to support and establish the theory, and an examination will prove that it is the most natural and harmonious view of this subject that has ever been presented for the consideration of the human mind.

CAPTAIN HALL'S EXPEDITION.

The first exploring expedition ever fitted out by our Government was in 1871, and under the command of Captain Hall, who was formerly a business man on Fourth Street, in the city of Cincinnati, Ohio.

He was furnished a steam vessel, which he named the Polaris, and steamed out of New York Harbor June 29, 1871. After staying nearly a week at one place in Greenland to obtain the skins of wild animals to make the necessary clothing for his men, and at another place four or five days to purchase the Esquimaux dogs for his sled rides and to hire drivers for them, and several days for the steamer Congress to bring up extra supplies from New York, he was fully prepared, as he thought, for his trip to the *North Pole*. He accordingly left Greenland and pushed his way through the ice up to eighty-two degrees and sixteen minutes, when he got into *open water* and into a much warmer climate than he expected. This so alarmed his sailing-master, Captain Buddington, that he stopped the further progress of the vessel, and told Captain Hall that they must go no further in that direction, but must go into winter quarters. Now this took place on the 29th day of August following, showing that it took only *two months* to run from New York through the icy regions and out into open water, after stopping some fifteen or eighteen days on the way.

It was Captain Hall's privilege to say go in this direction or in that, but if Captain Buddington thought there was danger in

going where Captain Hall directed, it was his privilege to prevent it, as he occupied the position of sailing-master.

The reason he stopped the vessel at 82° 16′ was that he did not understand the "Symmes Theory," which differs so much from that of Sir Isaac Newton. After the eightieth degree of north latitude is passed, as Newton says, it is one vast solitude of eternal ice up to the nintieth degree, while Symmes says after the eightieth degree is passed the climate begins to moderate and you get into a country of *open water*, where will be found more *water fowls* and wild animals than can be found anywhere else in creation, and that the *open polar sea* will be found at about the eighty-third degree.

When Buddington stopped the vessel Captain Hall begged to go just one degree further north, saying "it would be a big thing for him, as other vessels had got up as high as he then was, but none up to the eighty-third degree."

It was in the evening when the vessel was stopped, and Buddington finally agreed with Captain Hall to hold a consultation among the crew, and if a majority agreed to go on then he would do so, and if not they must go into winter quarters. In the morning a Mr. Hobby, who was thought to have better vision than the others, was the first sent up to the "look-out," and he said he could see forty or fifty miles northward, and, as there was no ice in the way, but all *open water*, he was for going on. Then a Mr. Chester, who was mate of the vessel, went up and said, "I can see thirty or forty miles northward and there is no ice in the way, and I also see a cloud up there that denotes open water." When he came down he was for going on, when some one asked him what he meant by that *cloud* he spoke of, and he said, "I mean a *water cloud*, that denotes that there is no ice or snow under it, and if you don't believe it let one of the scientific men go up and take a look at it."

A Mr. Meier, of that department, went up and said, "I can see forty or fifty miles northward, and I see the cloud spoken of by Mr. Chester, and I will guarantee that if you will run up to it you will find open water plenty," meaning that if there is an open polar sea it can be found *there*, and they all with one

accord said "Let's go on," when Buddington exclaimed, "I'll be dammed if the vessel shall go any further."

"Hold on, then," said Mr. Meier, "before we turn back I want to measure the distance up to that cloud," and he got out his instruments and first took the position of the vessel, which then had floated back to 82° and 9′, as the current runs from north to south at the rate of eight miles in twenty-four hours. He said it was just sixty-four miles up to the cloud. Now put the nine minutes to the sixty-four miles, and you are up to 83° and 3′, which proves the Symmes theory *true*, as far as the open polar sea is concerned, by actual measurement, as sixty-nine miles make one degree.

The vessel dropped back to 81° 38′, where an iceberg was found fast on the bottom near the shore, and she was placed between it and the land so she could be protected on two sides from storms.

After some days Captain Hall and Mr. Chester started on a sled ride northward, to be gone two weeks, but did not go further than fifty miles when they came to an *open sea*, the waters of which were filled with shrimps, with numerous seals bobbing up their heads. Two of the latter were shot.

Captain Hall remained there two days, looking northward, and said he could see land and open water for seventy miles, or up to 83° 5′, and he saw a *dark*, nimbus *cloud* in that direction that certainly indicated that beneath it was the *open polar sea*.

While there he wrote his last dispatch to the Secretary of the Navy, in which he says, "I find this a much warmer country than I expected, and it abounds with life, and seals, game, geese, ducks, musk-cattle, deer, foxes, wolves, rabbits, partridges, lemmings, etc., with snipe, plover, and all kinds of wading birds."

Does not all this go far to prove the correctness of the Symmes theory, for it is in exact accordance with what is laid down in it?

He further says: "I have made a copy of this dispatch and placed it in a copper cylinder and buried it beneath a pile of stone. It is written with ink. I must now start on my return, as I was only to be absent two weeks." He got back on time,

and when his men saw him coming they all went out to meet him. They shook hands with him, and asked how was his health. He told them it was good, and that he had had a nice trip. He then turned to Captain Buddington and told him he was going again, but would state no time for his return, as he intended to go on until he found people, and if he found any he imagined they would be giants, as this was such a life-giving atmosphere to breathe. "You must stay here until I come back." He then turned to Captain Tyson and said: "I want you to go with me." Then turning to his carpenter he said, "I want you to make me four wheels and an axle-tree, so that when I reach the warm country I can use the wagon instead of the sleds." All this conversation took place before he went to his room on board the ship, where Captain Buddington and Dr Bissels followed him. While in his room he asked for a cup of coffee, which was given him, and in less than one hour he was taken sick. Every symptom indicated that poison had been put in the coffee. After a few days of suffering he expired, and he was the only person of the whole ship's crew that was sick a day.

After he died Buddington went among the crew and said, "I have a big stone taken off my heart." When asked what he meant, he replied, "Captain Hall is dead, and now we will all go home." And every one of them did get home safe.

This Buddington was a drunken old sea captain, that had been breaking all the fastenings that Captain Hall could put on the doors where the liquor was kept, and was often drunk. It was proven in Washington, after their return, that Buddington's heart was not in the expedition, and he wanted to return home, while Captain Hall was determined to go further north, so, to get him out of the way, poison was doubtless administered him. as any physician will say when he reads the character of the symptoms as shown by Hall immediately after the drinking of the coffee.

He told Mr. Chester and Mr. Morton, both of whom nursed him in his sickness, that he was poisoned.

After Captain Hall's death nothing was done until the return of spring, when they all started home, and brought to

Washington many kinds of grass, flowers, fresh water algæ, and garnets of a large size. They also brought many kinds of birds, butterflies, catterpillars, bugs, beetles, spiders, etc., with many smaller insects, all of which they gathered in the extreme north.

Does *that* look like the Newtonian theory was the true one? Could such animal life exist amongst cold and ice, and in a country containing an area of 1,131,000 square miles, where Jack Frost is said to hold high carnival throughout the whole year? All the explorations in the north by Parry, Ross, Kane, and Hall certainly go further to prove the Symmes theory true than it does the Newtonian.

The most common objection to this theory is, that, if it were true, the sun could not possibly light and warm the interior of the world. This is easily answered. The rays of light come parallel from the sun to the earth, and, if he were no larger than the earth, they would fall at least twelve degrees upon the concave interior surface, as they passed over the lower part of the verge both north and south. But the earth in her annual revolution, owing to the inclination of the poles to the plane of her orbit, alternately permits the incident rays to fall much more than twelve degrees upon the interior surface. This inclination is 23° 30′, which, added to 12°, the angularity of the verges, gives 35° 30′ of the concave surface upon which the direct incident rays of the sun fall. But these rays, passing over the dense, cold air of the verges, are refracted many degrees, probably at least ten or fifteen degrees, so that by one refraction and one or two reflections the rays of light would be thrown out over the verge opposite to that through which they entered; and because those rays would converge upon the concave surface instead of diverging, they would produce abundant light and heat throughout the whole interior. As compared with moonlight, the sun's rays, reflected from one interior surface to the other, would be as much more intense as the square of the diameter of the inner world is less than the square of the distance of the moon from the earth. According to this law, assuming the diameter of the interior to average 4,000 miles, and the moon's distance 240,000 miles, the light of the interior would be equal to 3,600 moons as large as our sun, and this too without considering the greater intensity of the interior light upon a concave surface over that of the moonlight reflected from and falling upon convex surfaces. These views, which are in accordance with the known laws of light, show that this popular objection has not the slightest force.

Since this theory was promulgated by its author, enough has come to light to prove that he was correct in his views of the existence of a warmer climate at the north, and of an open polar sea. And it is believed that, if his theory had been fully made public long ago, much hardship, suffering, and expense would or might have been avoided in the futile attempts to find a passage through the bleak and desolate regions around Baffin's Bay. That Behring's Straits offer the best route into the arctic regions admits of little or no doubt, and an expedition for this purpose from the Pacific coast is well worth the consideration of the government.

Time, the great revealer of secrets, will soon determine whether this startling theory is true, in whole or in part, and whether its author was a visionary enthusiast, or a profound philosopher whose name will be honored among men, like that of Franklin or Newton, as a benefactor of his race, and an honor to the country which gave him birth.