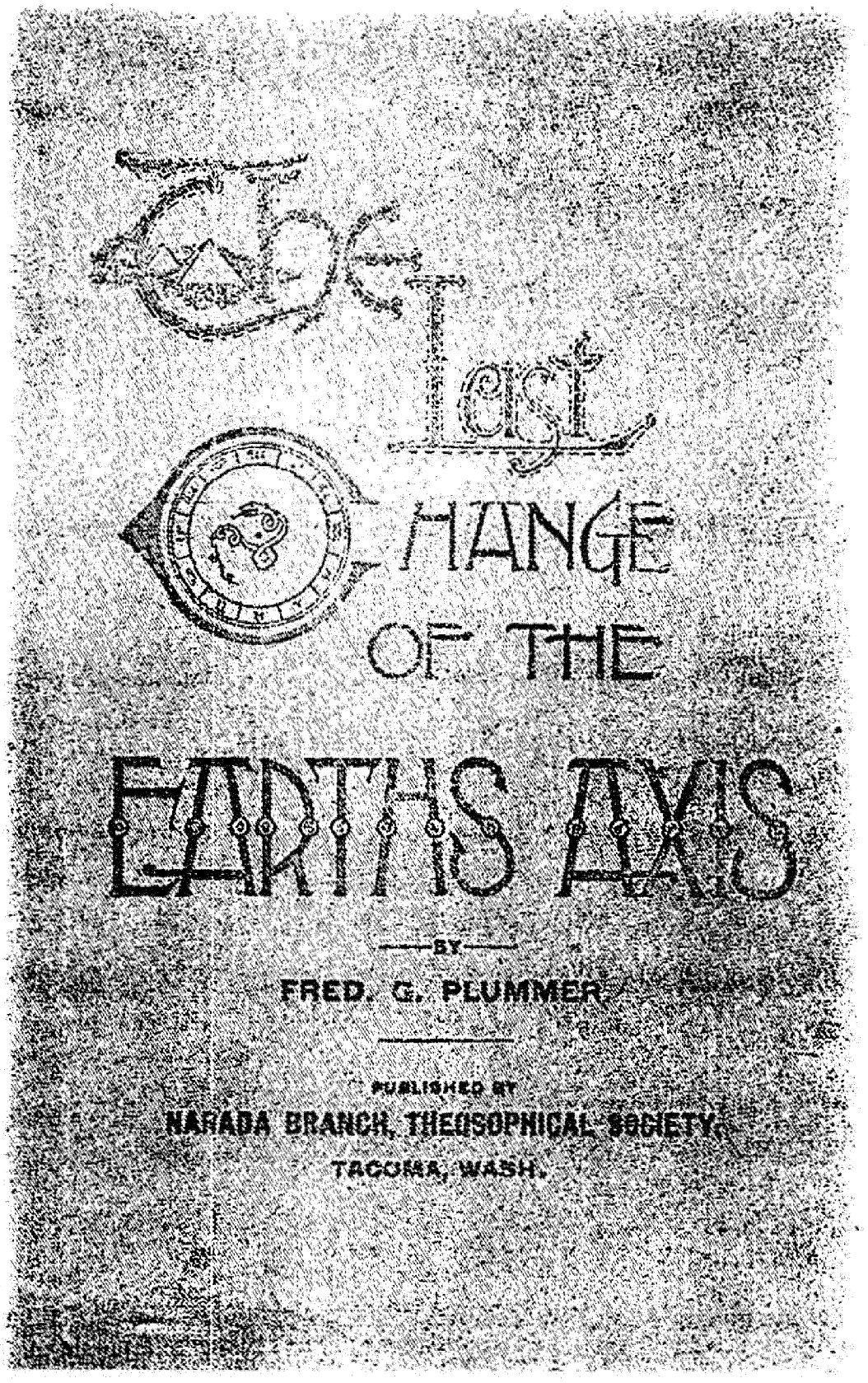

CHANGE OF THE EARTH'S AXIS

BY

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PUBLISHED BY

NARADA BRANCH, THEOSOPHICAL SOCIETY,

TACOMA, WASH.

The Last Change of the Earth's Axis.

By FRED. G. PLUMMER.

CHAPTER I.

THE PROPOSITION.

Upon this planet we are accustomed from childhood to note the regularity with which the heavenly bodies rise and set, the following of night and day, and the recurrence of seasons. These seem to us as fixed as the "everlasting hills," and indeed they are—but no more so.

It may seem scientific heresy for one at this late day to attempt to prove, by the records of the past, that our own mother earth has been subject to influences which have altered her days and seasons. And it may be regarded as a very bold undertaking to show that such a great change took place recently, in fact long after man came upon earth.

In this age of reason abundant proofs are demanded before the acceptance of any new hypothesis, especially if it conflicts or appears to conflict with any generally followed theories. This paper is a collection of such proof, but does not pretend to be complete, nor in fact convincing to all readers, for it is assumed that the student, before believing, will apply tests from his own knowledge and future research.

The question will be asked, however, why it is, if a startling event, such as the changing of the earth's axis, did really happen, perhaps only 12,000 years ago, how is it that we are just learning the fact, when the records have always been open to us? To this it may be answered that this is an age of discoveries in which great truths are constantly being rediscoved, and it is to be expected that such a truth as this might now be established. The author believes that astronomy and geology offer proofs of this great catastrophe, and that traditions and history tell of it, and that to him belongs the credit, no more or less, of collecting and arranging the argument for the benefit of those who want to learn this truth. To this end authorities may be quoted which to some minds may not carry much weight, but which will appeal strongly to others.

If it is a great truth that the earth's axis changed, we want to know it. If in proving it to be a truth we run counter to any theory, we are very sorry, but cannot help it. If it will explain the flood, the sinking of Atlantis, the presence of the drift deposits, the birth of Niagara, the position of the magnetic pole, the frozen mammoth in Alaska, the reindeer in Europe and many of the myths and traditions of all ancient nations, it will go far toward establishing it as a fact.

If the testimony does not agree we must be more than careful how we interpret it. If there apparently rise up in our minds other facts which contradict us in this belief, we must stop to inquire, with reason unbiased by predjudice, if they are facts or simply theories advanced by some scientist for the purpose of bolstering up some former theory or faith; and that theory in turn to help demonstrate some earlier theory, and so on till we find that its origin was in a scientific guess. Doubtless this original guess was made in good faith, but was accepted and taught because of the high standing and good behavior of the scientist—perhaps it was his first offense.

The student may agree with the writer that the truth that the earth has changed its axis is not a guess, but an observable astronomical fact, but we cannot be too cautious, and will do well to subject it mentally to the most severe tests of our higher senses.

CHAPTER II.

ITS ASTRONOMICAL PROBABILITY.

To begin, let us take a broad view of our solar system. We are upon one of many worlds revolving around the common center of gravity of all. Our world is neither the largest nor the smallest, nor is it the nearest to, or the farthest from the sun. It might be called a fair average member of our system.

We have powerful telescopes and skilled observers at them constantly, who have given us a vast amount of valuable data regarding these neighbors of ours. They all revolve about the sun in nearly the same plane, and the lengths of their days and years are generally well known. That which is of particular interest to us at this time is the axial position of these worlds. They do not revolve in what might be called an "upright" position as a top might, but in every case the axis, or line connecting the poles, is more or less inclined to the plane of revolution around the sun. It is the position, or inclination of this axis which controls the climates on the planet, in the extreme case giving a season of light or darkness at the poles, and producing winter and summer in lower latitudes.

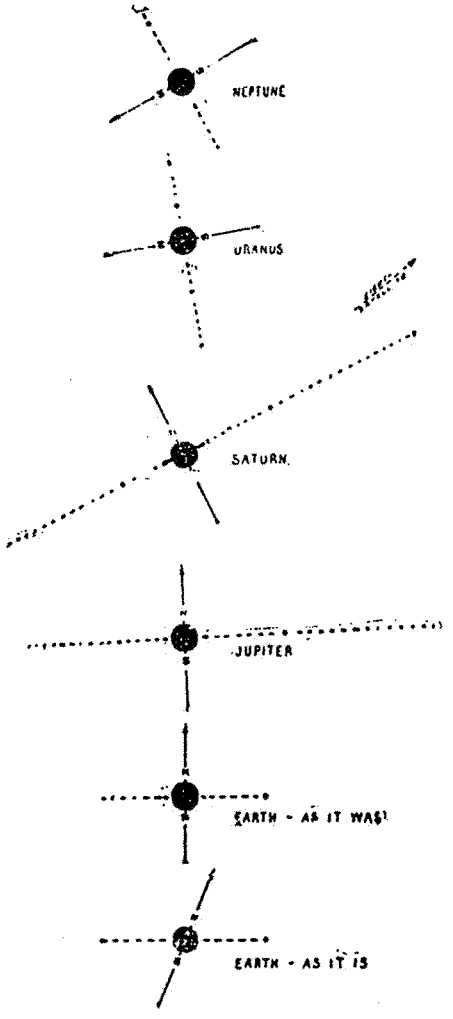
The giant planet Jupiter turns on an axis which is almost perpendicular to the plane of its orbit, the inclination observed being a little over 3 degrees from the perpendicular. Its appearance through the telescope is of a great globe with belts or bands running around it on lines of latitude. The planet Saturn shows similar features and in addition is graced by a flat ring which revolves independently from and without touching the planet, but on its equatorial plane. Very faint belts are also observed on Uranus, whose distance of seventeen hundred million miles prevents a very detailed study of its features. The axis of Saturn is inclined about 27 degrees, while Uranus' axis is nearly on the same plane as its orbit.

In the case of these planets we observe that these belts are on the lines of zones, and that their axial inclinations are not alike. Turning to our earth, or our neighbor, Mars, we find no such markings upon them. Of course it is not to be presumed that the earth is in exactly the same condition as the planets Jupiter, Saturn or Uranus are at this time, but it once was in that condition, and where are the markings upon our planet? We may fairly assume that these belts, lying in zones, are the result of the axial rotation and as the planet cools off (according to some theories) or hardens, why do not traces of these belts remain? On a newly-made planet we would expect to find its greatest volcanic region on or near the equator where the speed of rotation is greatest and where centrifugal force was most exerted. It would be along the equatorial belt that great lava flows would issue from any cracks or fissures that might occur. We do not find any such indications upon the present equator of the earth. Perhaps we shall see that such lines or markings do exist, and that they were upon the equators when made.

Again, let us observe the motions of the satellites of these three planets, Jupiter, Saturn and Uranus. Jupiter is so near that with an opera glass we may see its four tiny moons moving, apparently back and forth, because they revolve around the planet on the equatorial plane. To an observer on the equator of Jupiter these moons would rise in the east and passing directly overhead, would set in the west. They would not, like our complacent satellite, "run high" and "run low" as the seasons changed. Of Saturn's eight moons and ring the same may be said, for some of them revolve on the plane of the planet's equator, the eighth being inclined 12 degrees. As this moon is the outermost and probably the oldest of Saturn's moons, we may be sure that the planet's axial inclination changed after its orbit was established, and that it has not changed since the remainder of its system was called into being. We note also that the four moons of the Uranian system revolve on the equatorial plane of their primary and their motion is therefore unique, in that they appear to move up and down in space.

Comparing this phenomena with the motion of our own moon we find the rule does not hold good. Our moon does not revolve in the plane of the equator, but on the contrary its orbit is closer to the plane

of the ecliptic, or the plane of the earth's orbit around the sun. Why is this? Was the earth's axis formerly like Jupiter's, nearly perpendicular to the plane of its orbit? Did the moon formerly revolve about the equator? Were the signs of the zodiac formerly on the polar horizon? Was it once perpetual spring at what was then the north pole? We shall see.



[Diagrams showing the planets with their axial inclinations, and the planes of their satellites orbits.]

The nebular hypothesis of Laplace and Kant which is today a generally taught and accepted theory, must be in error unless we can assume that a planet's axis may change, both its inclination as referred to its orbit, and its direction through the mass of the planet itself—that is to say, the locations of the polar regions may be changed upon the globe. Recent observations of the moons of Jupiter show that they are not spherical in shape, or even flattened into oblate spheroids, but on the contrary are of an ellipsoidal form, more like an egg. This is particularly true of the first or inner satellite which, in rotating upon its axis, appears to turn end over end. In a paper on the origin of worlds (New York Sun, April 8, 1894) Professor Garrett P. Serviss, formerly secretary of the American Astronomical society, calls particular attention to these peculiar facts, and concludes that the poles of the earth must have changed.

No student of astronomy will doubt that during the life of a planet there is ample opportunity for great changes to take place. It is not remarkable that a catastrophe should occur—it would be more wonderful if it did not happen.

It is plain to us, through the most convincing of our senses, sight, that the planets in space are inclined at different angles although moving in nearly the same plane about the sun. How can it be possible that they were thrown off from the sun, or, as many prefer to believe, could they have had a common origin, unless their axes have changed or been changed since their birth? Doubtless such changes are generally slow, and it may be that the satellites partake of the change, but how does it happen that our earth is one of the exceptions to the observed rule and has a sattelite which, like Saturn's eighth, does not revolve in the plane of its equator? The cuts show this very plainly, and the facts being presented we are pressed to a conclusion. We cannot, assuming that the nebular hypothesis is correct, say that when the sun cast off Neptune its axis was different, and has gradually changed, as Uranus, Saturn, Jupiter and the earth were made, for then their orbits should lie in widely different planes as those of comets do. Nor should we too hastily believe that there is a progressive change in the chain of planets, for Mars is an exception, although a slight one.

Is there any good reason why we should not conclude, from the astronomical evi-

dence before us, that the axis of the earth has changed or been changed since the orbit of the moon was established?

CHAPTER III.

SOME GEOLOGICAL FACTS.

Professor J. J. H. Teall, M. A., F. R. S., president of the geological section of the British association, inquires (Nature, September 21, 1893) "if geological facts point to a shifting of the position of the axis, is there any dynamical reason why they should not receive due consideration? Geologists want as much freedom as possible."

Many careful scientists have gone further than that. The facts that the flora and fauna of the earth are found in zones, and that the fossils, or former evidences of life, are not found in zones coincident with our present lines of latitude, are enough to force the conclusion upon any thinker that the past has seen vast changes of climate upon the earth. How, indeed, may changes of climate occur so that points of equal latitude will be affected unequally, excepting by a change of the earth's axis? As long as the earth revolves its climates will be in zones, and no theory can explain how ice-sheets existed in Ohio, when Siberia was not glaciated, or why the reindeer made his home in Europe while the mammoth fed on the tropical vegetation of Alaska, excepting on the theory that the zones, and consequently the axis, were formerly different.

That we may understand that these changes of climate have been very great, we will consult some of our scientific friends who have given the subject special attention:

"We must imagine that the hills and valleys about the present site of New York were covered with noble trees and a dense undergrowth of species for the most part different from those now living there, and that these were the homes and feeding grounds of many kinds of quadrupeds and birds, which have long since become extinct. The broad plain which sloped gently seaward from the highlands must have been covered with a sub tropical forest of giant trees and tangled vines teeming with animal live. This state of things doubtless continued through many thousands of years, but ultimately a change came over the fair face of nature more complete and terrible than we have language to describe."—Pop. Sci. Mon., Oct., 1878, p. 648.

We see that the theory of a catastrophe accompanying or causing this change of climate is advocated. This delightful climate was not continued to the present temperate or tropical regions. It extended to the very shores of the Arctic sea. In north Greenland, at Atane-Kerdluk, in latitude 79 north, at an elevation of more than 1,000 feet above the sea, were found the remains of beeches, oaks, pines, poplars, maples, walnuts, magnolias, limes and vines. The remains of similar plants were found in Spitzbergen, in latitude 78 degrees 56 minutes.—Am. Antiquarian, July, 1881, pp. 290.

Obviously there was in the northern hemisphere a vast surface of land under a mild and equable climate, and clothed with a rich and varied vegetation. (Earth and Man, pp. 261). Sir Edward Belcher brought away from the dreary shores of Wellington canal (latitude 75 degrees 32 minutes north) portions of a tree which there can be no doubt whatever had actually grown where he found it. The roots were in place in a frozen mass of earth, the stump standing upright where it was probably overtaken by the great winter.—Ragnarok, pp. 45.

This flora did not grow in these latitudes. The theory that the polar inclination was greater will not explain the presence of their remains, because a long and warm summer would surely mean an equally long and cold winter. Nor will the supplementary theory of greater orbital eccentricity help the matter any, for this flora did not thrive without the direct sunlight for half the year. It is not to be presumed that the flora was carried into the polar regions. It must have been overwhelmed by the "great winter." What caused the great winter? If astronomy is to be believed the sun has not cooled materially since oaks, pines and poplars came to grace the earth. The fact that the remains of the mammoth, a tropical animal, are found so perfectly preserved has forced upon the scientific world the belief that a

catastrophe occurred at the time of their death. "It is remarkable that nowhere in the great plains of Siberia do any traces of glacial action appear to have been observed. Consequently we find the great river deposits with their mammalian remains, which tell of a milder climate than now obtains in those high latitudes, still lying undisturbed at the surface."—The Great Ice Age, pp. 480.

"These animals were slaughtered outright, and so suddenly that few escaped. Admiral Wrangle tells us that the remains of elephants, rhinoceroses, etc., are heaped up in such quantities in certain parts of Siberia that he and his men climbed over ridges and mounds composed entirely of their bones.—Ragnarok, pp. 40.

"Dr. Bunge, who undertook to excavate a mammoth at the spot, found the material a frozen mass of snow 'as hard as sugar.' Still another mammoth was discovered in 1578 on the Moloda river. We shall have to inquire, hereafter, what was the nature of the catastrophe which buried these huge quadrupeds in their common tomb of ice. The same mammoth dwelt in Alaska."—Winchell's "Walks and Talks."

"Organic life is incompatable with such (low) temperature, and to this cause must we attribute the disappearance of certain species of animals and plants—in particular the rhinoceros and the elephant—which before this sudden and extraordinary cooling of the globe, appeared to have limited themselves, in immense herds, to northern Europe, and chiefly to Siberia, where their remains have been found in such prodigious quantities."—The World Before the Deluge. pp. 462.

"We cannot doubt, after such testimony, of the existence, in the frozen north, of the almost entire remains of the mammoth. The animals seem to have perished suddenly; enveloped in ice at the moment of their death, their bodies have been preserved from decomposition by the continued action of the cold"—The World Before the Deluge. pp. 396.

"If they had not been frozen as soon as killed, putrefaction would have decomposed them; and, on the other hand, this eternal frost could not have previously prevailed in the place where they died, for they could not have lived in such a temperature. It was, therefore, at the same instant when these animals perished that the country they inhabited was rendered glacial. These events must have been sudden, instantaneous, and without any gradation."—Cuvier.

"We have as yet no clues to the source of this great and sudden change of climate."—Agassiz' Geological Sketches. pp. 210.

"The most violent convulsions of the solid and liquid elements appear to have been themselves only the effects due to a cause much more powerful than the mere expansion of the pyrosphere; and it is necessary to recur in order to explain them, to some new and bolder hypothesis than has yet been hazarded. Some philosophers have belief in an astronomical revolution which may have overtaken our globe in the first stage of its formation, and have modified its position in relation to the sun. They admit that the poles have not always been as they are now, and that some terrible shock displaced them, changing at the same time the axis of the rotation of the earth."—The World Before the Deluge. pp. 463.

It appears from the above authorities, who have no axial change theory to maintain, that it was a catastrophe which caused the sudden change of climate, and possibly it was a change of the axis of rotation. At least it was a cataclysm quite as awful and far-reaching.

"It was a remarkable and stupendous period—a period so startling that it might justly be accepted with hesitation, were not the conception unavoidable before a series of facts as extraordinary as itself."—Ice Age.

"It is plain that it was the result of violent action of some kind, and this action must have taken place upon an unparalleled and continental scale."—Donnely's Ragnarok. pp. 7.

"The whole scope of animated nature, the evolution of animals, was suddenly arrested in that part of our hemisphere over which these gigantic convulsions spread, followed by the brief but sudden immersion of entire continents."—The World Before the Deluge. pp. 435.

"Somewhere and somehow in the far north a series of gigantic waves was mys-

teriously propagated. These waves were supposed to have precipitated themselves upon the land, and then swept madly over mountain and valley alike, carrying along with them a mighty burden of rocks and stone and rubbish."—The Great Ice Age. pp. 26.

This is precisely what we would expect if the axis of the earth were to suddenly change. The oceans would overflow the lands in certain directions and at certain places, depending upon their relative positions. It may be thought by some that a great geological change could not have occured so recently upon the earth, but such an opinion is clearly erroneous. "At the close of the cretaceous period occurred one of the most complete exterminations of species of which there is any record." (Dana. pp. 487). The cretaceous was in the geological yesterday. But still later, at the time of the great flood, when the drift was deposited, there was also a remarkable extinction of animals. "Among these we may mention two species of the cat family as large as lions; four species of the dog family, some of them larger than wolves; two species of bears; a walrus, found in Virginia; three species of dolphins, found in the eastern states; two species of the sea cow, found in Florida and South Carolina; six species of the horse; the existing South American tapir; a species of South American llama; a camel; two species of bison; three species of sheep; two species of elephants and two of mastodons; a species of megatherium, three of megalonyx, and one of mylodon—huge terrestrial sloths as large as elephants, which ranged over the southern states to Pennsylvania, and the mylodon as far as the great lakes and Oregon."—The Ice Age in North America. p. 386.

Flammarion thinks the deluge of the north pole was only 4,200 years ago. The present north polar region was dry land during the Eocene Tertiary age. Cuvier said he was "not inclined to conclude that man had no existence at all before the epoch of the great revolutions upon the earth. He might have inhabited certain districts of no great extent, whence, after these terrible events, he re-peopled the world."

Todd says "the last great cataclysm is geologically speaking, not very ancient. Accumulating evidence compels us to believe that one of these destructive events has occurred since the human race was created."

We would not be justified in saying, that because the clock has not struck for fifty-nine minutes, that it will never strike a[illegible]

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