

George Fearing Hollis Papers

1852 - 1903

MSS.471

Mexican mining - Handwritten draft of paper discussing geology of Mexico, silver and gold mining, with references to biblical and modern theories regarding geological deposits



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[The geology in Mexican history]

A country, like Mexico, whose chief staple is precious metal, has a history and a character peculiarly its own. It cannot be measured by the standard of others, nor can its commercial prosperity be reckoned by the products alone of its agriculture & manufactures.

The treasure that lies ~~buried~~ beneath its surface is constantly scattering, with a ~~hard~~ capricious hand, fortunes to individuals - fortunes as delusive to the lucky recipients as disastrous in their results to the community. ^{These instances} by ~~the~~ ^{and} a passion for sudden wealth in all clapes of society, ^{and} which effects even the tone and character of the body politic. The geology of such a country is necessarily influences its history; ^{and} its ^{whole} ~~history~~ ^{geology} cannot be well ~~read~~ understood without first briefly considering its geology.

[The gold-diggings of savages & civilized men]

The two precious metals give rise to two clapes of miners - those who delve for silver in the primitive rocks; & those who wash ~~for~~ gold, either from the debris of mountain rivulets, ~~or~~ ^{from} exhausted river-beds, ^{or} grind it ^{from} ~~out~~ of the original quartz matrix, ^{where} ~~it~~ has not yet been disturbed by mountain torrents. The Mexican Indian easily learned the simple process ^{by} which shining bits of gold could be gathered from the "rough-rock", or "hard-pare-clay" bottom of living streams; ~~(but the only)~~ & that these shining pieces ^{could} ~~can~~ be wrought into attractive ornaments for

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his person, his weapons this wigwam - The only
 use to which he ^{could} conceive of applying it. The
 civilized gold-digger ^{brings} employs both art and skill
 to obtain ^{that} a metal ^{which} to him ^{has a value} is a standard
 of values. He quickly learned ^{that} gold ^{was} to be found
 as abundantly where ~~there~~ now no signs of
 water ^{exist} as in the banks & eddies of ^{the} existing streams.
 He ^{and} by the exercise of his intellectual powers ^{arrived}
^{at the} concluded ^{two} that beneath an existing range
 of hills ~~there~~ was once a water-course ^{where} which
 gold had been deposited ^{of old}. Relying ^{upon} ^{his} a
 conclusion ^{this man} he unhesitatingly embarks both labor and
 capital in digging a shaft or in "drifting" through the
 earth & rocks, that ^(the between) impede his access to
 the spot ~~he has~~ fixed upon as the ^{probable} place ^{of} deposit ^{of} an
 auriferous clay. His aim consists the chief differ-
 -ence between the Indian & the civilized gold dig-
 -ger. The one employs skill without calculation in
 the acquisition of a metal, ^{which} ^{has} no other value
 in his estimation, than its use ^{as} an ornament. The
 civilized gold digger ^{employs} ^{other} ^{exerts} his intellectual powers
 as much as his hands in the acquisition of a metal ^{precious} to him ⁱⁿ
 [^{the} civilized gold digger a geologist]
 The civilized gold digger's employment involves
 him in the margins of geological science. He
 searches for gold as readily beneath the everlasting hills
 as beneath ^{the} running waters, ^{even} though there are ^{no} indications
 that ~~no~~ water has run in these exhausted river
 beds since ^{he} ^{seek} ^{for} the time when the oldest of the present
 mountain chains were formed. He ~~has~~ to feel his
 way among the ruins of an ancient world, as he
 follows the course of ^{the} choked up rivers, ~~of~~ exhaus-

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And ^{among} ~~of~~ subverted valleys, & material forms, that ^{passed along apparently} appear to have existed long before the advent of Adam. In his daily employment he has to act upon geological principles, ^{that} ~~which~~ ^{that} the other cluses of society are only subjects of abstract speculation. He ^{acts} ^{upon} ^{the} ^{one} ^{idea} ^{that} ^{the} ^{surface} ^{of} this ^{solid} earth has not always continued ^{as now} ~~in one form~~, since the time of its creation. There are changes that appear to have taken place in countless ages past, & changes that have taken place ^{comparatively} occurred ^{apparently} but yesterday, all of ^{these} ~~which~~ are registered unmistakably upon the mountains & in the valleys. He ^{is} ~~is~~ bewildered ^{amid} ~~in~~ the speculations to which his daily employment leads & ~~he~~ is forced to conclude that, ^{almost} ~~an~~ infinity of years separates him from that distant ~~past~~ ^{the beginning}, ~~when God first created the matter, which now constitutes this earth.~~

~~The intelligent gold miner & the monkish theologian~~

To ~~such~~ ^{a man thus situated} ~~such~~ ^a ~~narrow~~ ^{narrow} nature presents an aspect different from that ~~which~~ ^{to it} the monkish theologian assigns. He may be ~~religious~~ ^{religious}, & if so ~~he~~ ^{finds} ~~no~~ ^{no} cause in his daily speculations upon creative power to lessen his reverence for the Almighty - ~~his reflections~~ ^{increasing} ~~on~~ ^{his} ~~the~~ ^{devotion} ~~vastness~~ ^{for} ~~of~~ ^{its} ~~the~~ ^{great} ~~Author~~ ^{Author} ~~of~~ ^{of} ~~all~~ ^{all} ~~things~~. But the monk, who ~~will~~ ^{admits} ~~no~~ ^{no} modifications of the traditional interpretation of the scriptures, on any amount of testimony, ~~is~~ ^{is} ~~ready~~ ^{ready} ~~to~~ ^{to} ~~denounce~~ ^{denounce} ~~as~~ ^{as} ~~a~~ ^a ~~lapsed~~ ^{lapsed} ~~heretic~~ ^{heretic} ~~any~~ ^{any} ~~one~~ ^{one} ~~who~~ ^{who} ~~turns~~ ^{turns} ~~to~~ ^{to} ~~the~~ ^{the} ~~right~~ ^{right} ~~hand~~ ^{hand} ~~or~~ ^{or} ~~the~~ ^{the} ~~left~~ ^{left}, ~~the~~ ^{the} ~~scripture~~ ^{scripture} ~~of~~ ^{of} ~~a~~ ^a ~~hair's~~ ^{hair's} ~~breadth~~ ^{breadth} ~~from~~ ^{from} ~~the~~ ^{the} ~~beaten~~ ^{beaten} ~~track~~ ^{track} ~~of~~ ^{of} ~~the~~ ^{the} ~~scriptures~~ ^{scriptures} ~~in~~ ⁱⁿ ~~the~~ ^{the} ~~tradition~~ ^{tradition}. ^{The} ~~interpretation~~ ^{interpretation} ~~of~~ ^{of} ~~scripture~~ ^{scripture} ~~in~~ ⁱⁿ ~~the~~ ^{the} ~~can~~ ^{can} ~~not~~ ^{not} ~~conform~~ ^{conform} ~~with~~ ^{with} ~~natural~~ ^{natural} ~~laws,~~ ^{laws,} ~~which~~ ^{which} ~~does~~ ^{does} ~~not~~ ^{not} ~~militate~~ ^{militate} ~~against~~ ^{against} ~~a~~ ^a ~~sound~~ ^{sound} ~~exegesis~~ ^{exegesis} ~~of~~ ^{of} ~~the~~ ^{the} ~~scripture~~ ^{scripture} ~~text~~.

Handwritten draft regarding Mexican geology of Silver and

though it may be against monkish theology. The
 book & scripture, for obviously wise reasons, takes cog-
 nizance only of the apparent in nature - of the sun
 rising & setting instead of the daily revolutions of the earth -
 a black-letter interpretation having been made at a
 time when natural laws were imperfectly under-
 stood every new discovery of a natural law involves
 theological contest - a contest with an interpretation of
 scripture which has become hereditary. The Monk
 who personifies these old ideas will hardly admit
 that the earth is round! Science, art, intellectual de-
 velopement all must be sacrificed to one unbriding
 zeal, that reduces civilized man to the intellectual con-
 dition of the savage. With the educated miner no
 such principle can obtain. Science is the foundation
 of his success - geology in the discovery of gold deposits;
 chemistry in the reduction of silver ores; & both often
 unite in the separation of gold from clay. His very
 employment makes him the antipode of the Monk
 of the religious notions received traditionally from the
 lap of interpreters. And he interprets scripture in con-
 formity with reason, & not as though it was a combination of
 old wives fables

[The gold-diggers geology & his theology]

The miners daily avocation restricts his philosophy to the
 practical. He has no occasion to meddle with the wild spec-
 ulations of popular geological lecturers. The general
 outlines of leading geologists are sufficient for his use. In de-
 tail there may be different theories to which he does not object.
 One may hold, that all the water of the Ocean to be the product
 of combustion deposited drop by drop until the seas were filled;
 that the mountains and the broken surface of the
 land has been caused by a bubbling & breaking of it

The author never knew but only noticed that publicly combatted the } rotundity of the earth & that was Father O'callaghan, the author of a book against new & divers other works

At the present moment the popular geological work is a small volume of printed lectures by Mr Hugh Miller of Edinburgh. One cause of the notoriety of this volume is the extraordinary circumstances attending the death of the author. This event the publisher has skilfully improved by filling the customary place of a preface, with obituary notices of the author.

The remarkable feature of this volume is the promulgation of the doctrine, that all races of animals now on the earth, which originated before the Adamic animals were made, which had no representatives in the ark.

Granting this doubtful position a second necessarily follows, that the animal races were vastly more widely dispersed over the earth than the human family - The flood therefore which would destroy the whole human family need only be local, In such a flood would be embraced all the Adamic animals, while

anti-Adamic races that still survived could not be contained represented in an ark of such dimensions - All this theory rests on secondary fossil evidence! A second assumption of this popular lecturer has certainly the credit of novelty - that at the time of the flood the whole human race was congregated in the valley of the Caspian, & of the Jordan, & that the letting in of the Black sea, & of the Persian Gulf would produce a flood that would be local, but which would apparently be universal! To such petty results affairs do we reduce the great miracles

of the Almighty, when we undertake to ^{qualify} plain declarations of Scripture with doubtful speculations "All flesh died that moved upon the earth" saith the sacred volume, & as the weight of evidence ~~is~~ ^{is} present is in favor of a literal reading we shall abide in this belief for the present.

Handwritten marginal notes on the right edge of the page, including "Handwritten draft..." and "471".

[The gold miner avoids the primitive] 8
 Gold & silver countries districts appear to have
 been alike subjected to the action of earthquakes and
 volcanos. But the period of ~~this~~ action in the gold
 districts ~~and has~~ preceded similar disturben-
 ces in the silver region by an almost infinity of
 years. ^{vical} ^{is reported} ~~Electrical action~~ ^{operated} ~~to~~ ~~seem~~ to have operated
~~been active~~ in decomposing the quartz matrix of the
 gold. The ~~series~~ of floods that have swept the districts
 most abundant in gold, ~~have~~ spread it broad cast over
 the foot-hills ^{*} at the mountains base - ~~(except)~~ ^{and} the winter
 torrents have torn ~~the~~ ^{it} ~~severed~~ particles of gold into the
 valleys ~~that~~ ^{existing} ~~there~~ ~~exists~~ - but which may have since
 disappeared. ~~And~~ The gold-giggers operations are
^{therefore} all in secondary formations & in beds of silt. He
 avoids the mountains & primitive rocks, unless
 perchance one of these may have ^{been} thrust up into
 some valley, which has made tunnelling necessary ^{at the river beyond} to get

[The silver miner in primitive rocks]

It is not so with the ~~miner~~ ^{miner} for silver. His labors
 are exclusively confined to the mountains ^{of} ~~prim-~~
~~ative rocks~~, ⁱⁿ ~~excepting~~ certain silver districts of
 of Sonora ⁺ where the matrix even of ^{the roads} ~~silver~~ ~~arrang~~
 seems to have decayed; the ore appearing often times
 to be in the silver, rather than the silver in the ore.
 As the geologist ^{might} ~~would~~ probably say - It is only a mill of the
 =ion of years, or so, since these silver ores first ~~of~~ ~~them~~
 =peared on the surface - thrust up through the ~~sw~~
~~cracks~~ of those rocks that had ~~evolved~~ under ^{by}
 a heavy pressure - ~~the~~ ~~primitive~~. Thus the
 silver miner lives among the primitive
 mountains & ^{obtaining} ~~gets~~ his metals among rocks into
 the interior chambers of which he has penetrated.

and 18

the aid of gun-powder, & cast steel; without these
 silver has yet been procured in the country of the Aztecs
~~The geological was terminating the fourth day~~
 have now done with the geology & the chemistry necessary
 in understanding of the business of gathering the pre-
 cious metals - sufficient ^{has been said} to show why gold-finders
 the hands of Anglo-Saxons yield a return so in-
 censeably greater, than in the hands of the intellectually
~~wretched~~ debased Spanish-Americans. And that the
 production of silver requires a combination of science
 while the possession of gold was not inconsistent with their barbarian
 mechanical powers, unknown to the Aztecs. We may
 complete the chapter by a hasty notice of those
 events which must be referred to in the progress of this
 work.
 Beginning then our scientific notices with the ad-
 vent of Adam - the most important of all scientific
^{topographical} ~~as - we~~ ~~repeat~~ ~~the~~ ~~conclusion~~ ^{the theory} hypothesis - The
 monsters, that previously inhabited the earth had all
 perished, as such creation of living things before them
 had disappeared, & there was no living ^{thing} upon the face of
 the earth when God undertook the work of fitting the
 world for a human habitation. The vapors that ~~had~~
 before shrouded the earth in darkness ^{were} ~~had been~~
 lifted up & light for the first time penetrated its
 sky. This was the first geological-day's work of the
 Almighty. His second ^{the vegetation} ~~days~~ ^{of} work was an atmosphere
 firmament. Then, the waters floating upon the sur-
 face of the earth were gathered into seas, & the dry
 land began to bring forth grass, herbs & fruit. On the
 fourth day, the light of Sun & of the moon, & of the
 stars penetrated the stars atmosphere & shone in
 the first time upon a re-modeled world,
 furnishing a standard by which time could be

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measure for the future, ^{of that} by the most important era in the world's history. On the fifth day the newly made atmosphere the newly formed sea were filled with inhabitants. On the sixth the work was perfected with the present race of animals & the important addition of man. After which He rested & was refreshed* "The strength of all figurative language - attributing fatigue to Almighty power! Implying rather that the work ^{was of his will} of long continuance, ^{rather} than ^{miraculous power} the instantaneous use."

Epodus XXX-17

The geological notices necessary & the whole period divided into the elucidation of early American history must necessarily be brief, as to preclude a lengthy recitation of theories differing in detail from some of the latest authorities. For the same reason hypotheses are in some instances stated as though they were settled doctrines. This has been avoided as much as possible. ^{Example} You wonder in relation to this, now scarcely fifty years old, is not that there should still be debatable ground, but that there should be so much that is settled. The doctrine of Chalmers - that an incalculable number of years intervened between the beginning mentioned in the first verse of Genesis, & the six day labor of the creator; ^{that the six days} and these mentioned were natural days - has

been discarded by late geologists & the whole period divided into six geological eras. With due deference to authorities we have ventured to adopt a part of both theories & to allow that the days were geological eras until there could really be an apparent day by which time could be measured, & an evening & a morning made to appear - the fourth day. Such a suggestion would dispose of the objection to Chalmers theory.

The absurd notion that the Ark rested three months upon Ararat - above the line of perpetual snow is one of the stupid errors that men who have never climbed a mountain are apt to fall into. It would have required a nightly miracle to preserve the freezing the contents of the Ark

Notes to page 10 Chap III

* "After a wearisome & indeed dangerous ride we found ourselves on a snowy platform, variegated with Alpine plants. The tiny streams which trickled through the ice were edged with forget-me-nots of the truest blue, & with many well remembered European flowers. I climbed up a solitary rock to take bearings of the principle peaks around

As a guide knew no more of this stately mountain, to hire a kind of Mesopotamian for beyond the reach of human travel, than that it was within the territories of the Moscovite Bashut-tumakunda. From this point alone was it visible & we saw it no more during the

MOUNT ARARAT.—An interesting account is given in the London Times, of an ascent of Mount Ararat by five Englishmen. The natives believed the feat to be impossible, and that the summit was guarded by Divine prohibition. It is 17,323 feet above the sea level, and terminates in a precipitous snow-capped cone, which has hitherto foiled all the attempts of explorers. Major Robert Stewart, who was one of the party, and who writes the account of it from Erzerum, says that on reaching the top they stuck to the hill in the snow a short double-edged sword. They also drank the health of the Queen. On this he observes, "Her Majesty's name is probably the first that has been pronounced on that solemn height, since it was quitted by the great patriarch of the human race, as no record or tradition exists of the ascent having ever been made before."

as magnificent & awaited me. High above certain ranges, like a troubled sea my feet rose one of unspotted

journey. The bearing I obtained of Mount Ararat (N. 15° 30") corresponds correctly with its position on the best Maps. Our distance was about 145 miles."

Layards Kingdom of Babylon page 362 + Genesis 8-4

not be mistaken; it was Mount Ararat. My notes =

Genesis XI.2

Notes to page 10 Chap III

* "After a wearisome & indeed dangerous ride we found ourselves on a snowy platform, variegated with Alpine plants. The tiny streams which trickled through the ice were edged with forget-me-nots of the Tundra's blue, & with many well remembered European flowers. I climbed up a solitary rock to take bearings of the principle peaks around us. A sight as magnificent as unexpected awaited me. Far to the north, & high above the dark mountain ranges, which spread like a troubled sea beneath my feet rose one solitary cone of unshattered white sparkling in the rays of the sun. Its form could not be mistaken; it was Mount Ararat. My Ararat

= Fian guide knew no more of this stately mountain, to him a kind of mythical land far beyond the reach of human travel, than that it was within the territories of the Moscovite Bashut-tamahunda. From this point alone was it visible & we saw it no more during the journey. The bearing I obtained of Mount Ararat (N. 15° 30") corresponds exactly with its position on the best maps. Our distance was about 145 miles."

Layards Nineveh & Babylon page 362 + Genesis 8-4
 Genesis XI.2

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sea became dry-land & the dwelling place of the family that of Noah & the world of the anti-deluvians had passed away, for ever then we can explain diverse geological phenomena without a conflict with anything more serious than the foolish traditions of monkish interpreters of sacred writ.

The landing place of Noah

Another common tradition ~~we seem to have derived from the same doubtful authority~~ is - that Noah & his family & all creatures however delicate, inclosed with him in the ark - after remaining ~~at an~~ elevation three months at an altitude where every living thing would have died landed upon the perpetual snow covered mountain peaks of Ararat*. The Bible says the ark rested over or upon (33)[†] Ararat. An expression evidently intended to indicate the height of the water above the plains, & not that the contents of the ark were detained there three months & then emptied upon a precipitous mountain covered with perpetual snow & ice[‡]. Upon the strength of this single interpretation expression of doubtful interpretation the whole of the popular theory of the landing place of Noah rests. The first recorded movement of the human family, or, more probably, a part of it, after the flood, implies that they journeyed from the east to the land of Shinar[‡]; seeming to indicate that after the ark had been becalmed or touched bottom in the seventh month it has again floated over the table land of Central Asia; then & there emptied out the precious cargo - the live from which the dominant races of men have ever migrated.

This idea of the landing place of the ark is not original with the author. See Wm Jones

vol 3 page 191. supposes the landing place of the ark to be in Iran - ancient Persia

its crust by liquid fires beneath & he may even admit that
 even distinct floods occurred before the creation of
 Adam. Another that before the sun & moon actually ~~seen~~
 shown upon our globe the days mentioned in ^{the} sacred
 record were geological eons, but after that event
 we measured of single rotations of the earth upon its
 axis. These are subordinate questions to him. But
 when an attempt is made to overturn the plain
 reading of scripture by human speculation - when any
 attempt is made to show the whole human family
 was confined to the valley of the Caspian & the Jordan
 at the time of the Deluge & that the flood was re-
 ally nothing more than a breaking into these valleys
 of the waters of that sea of the Persian Gulf he halts
 & may be told that there are now on the earth races of
 animals that had no representatives in the ark. But such
 scientific ravings he looks upon as absurd as the monks' ^{the} ~~con-~~
 ceptions ^{* = separatism}

[His idea of floods & the flood]

a man daily engaged amid the disturbed strata of the earth
 in search of gold the theory of floods is popular & he readily
 unites the disappearance of race after race of animals
 creations as the result of ordinary cataclysms before the
 accession of the perfect animal creation that attended the
 advent of man, notwithstanding the many objections
 that may be assigned to it by the overlapping of fossils.
 He so constantly finds what he believes to be sea marks
 above the beds of exhausted rivers that he not only adopts
 the theory of frequent floods in the chaotic eons
 prior to Adam, but he looks even upon that of Noah
 as the result of natural causes - the dry land
 and the sea changing places. And the miracle to
 him consists in the preservation of Noah & those

[Small type] ^{with gullies}
The monk is the personification of blind faith. With him
the earth, the sky, & the air are in subordination to
an ever active miraculous power. Not only the Al-
mighty, but the Virgin & the Saints are busily engaged
in working miracle. The immutable laws of
nature are as unknown to him as the immutable
laws of morality. In nature & in Providence he
sees only the caprice of miracle workers. Though
he is the antipode of those foolish philosophers,
who worship the laws of nature, he practically
reaches the same result, as he renders divine how-
-ers to a Being, or beings different from that One
who governs the Universe according to a fixed
system of his own reacting. The theology of the
monk has ^{up to} ~~so~~ circumscribed the sphere of his
intellectual research, that he has become the
personification of conservatism in its worse
sense, a species of intellectual automaton - the
reproducer of antique absurdities, & is as much
(the enemy of) opposed to the investigation of
moral & physical laws, as he commonly is to
scrap & rout

* Quoting the popular catechism ^{Q. 2.} Is theft a grave offence?
from recollection - It is as follows A. To steal the amount